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ACKNOWLEDGEMENT

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

2020 - JCR Evaluation Form

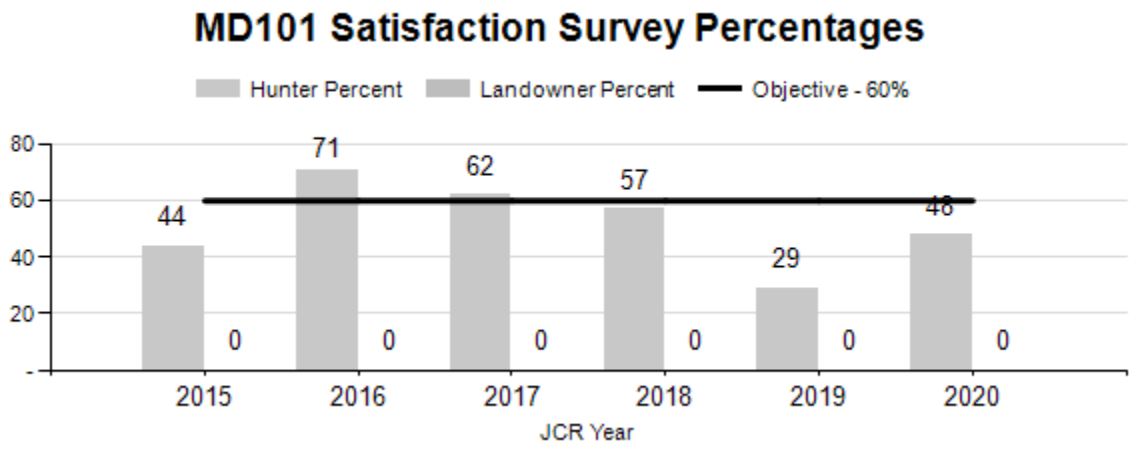
SPECIES: Mule Deer
PERIOD: 6/1/2020 - 5/31/2021

HERD: MD101 - TARGHEE

HUNT AREAS: 149
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Hunter Satisfaction Percent	55%	48%	60%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	22	13	25
Hunters:	83	84	85
Hunter Success:	27%	15%	29 %
Active Licenses:	83	84	85
Active License Success:	27%	15%	29 %
Recreation Days:	428	415	400
Days Per Animal:	19.5	31.9	16
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:	3



2021 HUNTING SEASONS
TARGHEE MULE DEER HERD (MD101)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
149	Gen	Sep. 1	Sep. 14	Sep. 15	Oct. 6		Antlered mule deer or any white-tailed deer
148, 149, 150, 151, 152, 155, 156	3	Sep. 1	Sep. 14	Sep. 15	Nov. 30	50	Any white-tailed deer
148, 149, 150, 151, 152, 155, 156	8	Sep. 1	Sep. 14	Sep. 15	Nov. 30	75	Doe or fawn white-tailed deer

2021 Regional H Non-Resident Quota: 600 licenses

2020 Hunter Satisfaction: 48% Satisfied, 40% Neutral, 12% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation: Hunting opportunity in this herd unit is limited due to limited access points to public lands, steep terrain, and fall migration of mule deer to Idaho. Eighty-four hunters harvested 13 mule deer in the herd unit in 2020. Eleven white-tailed deer were harvested (9 using a general license and 2 using a Type 3 license). Hunter satisfaction was low in 2020 and did not meet the herd unit objective of 60%. The general license season and non-resident quota were unchanged in 2021, however managers made some change to the Type 3 and Type 8 license types by incorporating additional deer hunt areas in the Jackson Region where the tags are valid. License quotas were increased to reflect these expanded areas. These changes will provide hunters more flexibility with where they can use these licenses and address areas where white-tailed deer numbers have been increasing.

2.) Management Objective Review: The next objective review is scheduled for 2024.

3.) Chronic Wasting Disease Management: This is a Tier 3 surveillance herd that is not a priority for CWD sampling at this time due to its very low deer harvest. Collecting an adequate sample size in this herd is not feasible at this time. Only one CWD sample was collected from 2018-2020 in this herd. CWD management in this herd focuses on opportunistic hunter-harvest, roadkill sampling, and sampling any animals that are displaying signs of sickness.

2020 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2020 - 5/31/2021

HERD: MD131 - WYOMING RANGE

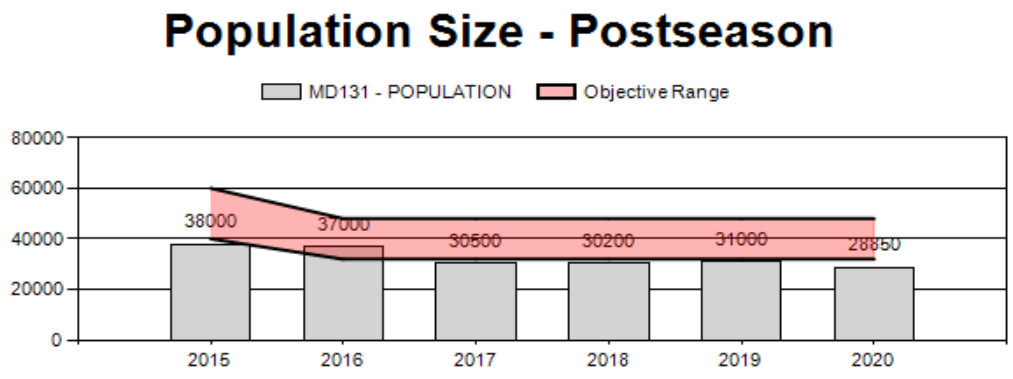
HUNT AREAS: 134-135, 143-145
PREPARED BY: GARY FRALICK

	2015 - 2019 Average	2020	2021 Proposed
Population:	33,340	28,850	27,500
Harvest:	2,258	1,574	1,937
Hunters:	5,583	5,331	5,400
Hunter Success:	40%	30%	36 %
Active Licenses:	5,583	5,331	5,400
Active License Success:	40%	30%	36 %
Recreation Days:	30,774	30,240	31,000
Days Per Animal:	13.6	19.2	16.0
Males per 100 Females	34	26	
Juveniles per 100 Females	58	66	

Population Objective (± 20%) :	40000 (32000 - 48000)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-27.9%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/22/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	6%	5%
Males ≥ 1 year old:	26%	31%
Total:	5%	7%
Proposed change in post-season population:	-4%	-5%



2021 HUNTING SEASONS
WYOMING RANGE MULE DEER HERD (MD131)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
134	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 11		Antlered mule deer four (4) or more points on either antler or any white-tailed deer
135	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 11		Antlered mule deer three (3) points or more on either antler or any white-tailed deer
143	Gen	Sep. 1	Sep. 14	Sep. 15	Oct. 6		Antlered mule deer or any white-tailed deer
144	Gen	Sep. 1	Sep. 14	Sep. 15	Oct. 6		Antlered mule deer or any white-tailed deer
145	Gen	Sep. 1	Sep. 14	Sep. 15	Oct. 6		Antlered mule or any white-tailed deer
145	3	Sep. 1	Sep. 14	Sep. 15	Nov. 15	50	Any white-tailed deer
145	3	Sep. 1	Sep. 14	Nov. 16	Jan. 31		Antlerless white-tailed deer

2021 Region G nonresident quota: 400 licenses

2020 Hunter Satisfaction: 44% Satisfied, 23% Neutral, 34% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation:

<u>Hunt Areas 143-145 Justification (Jackson/Pinedale Regions)</u>

Deer seasons in the northern areas remain unchanged from 2020, and are proposed to open September 15 and close October 6 in Hunt Areas 143, 144, and 145. These hunting seasons continue to promote population growth and buck retention into the postseason population by focusing on antlered only hunting and closing deer seasons prior to the onset of the fall migration.

Antlered only hunting and the insignificant antlerless harvest, typically < 100 does which are taken primarily by youth hunters, should allow the population to increase toward the objective this year since high overwinter survival is anticipated on all major winter ranges. High winter

mortality was observed during the 2017, 2019, and 2020 winter, primarily on the southern winter ranges, and was responsible for the slight downturn in the population estimate observed the last three years (2017-2020) after 5 years of sustained population growth during the period from 2012-2016. During this 5-year period the population approached the objective of 40,000.

Hunt Areas 134 and 135 Justification (Green River Region)

In hunt areas 134 and 135 the combined buck:doe ratio is very low at 21:100. It is the lowest it has been in 20+ years and well below objective. This is a result of very poor fawn survival in 3 out of 4 winters from 2016 to 2020 in the southern part of the herd unit. This is represented in very poor yearling buck:doe ratios in those years following the bad winters. The current low buck:doe ratio has not been the result of hunting management. It is due to the lack of recruitment caused by bad weather.

We propose to get more conservative with buck harvest to boost buck numbers and quickly get back within the objective range. The reinstatement of a 3-point restriction in hunt area 135 will protect most yearling bucks and facilitate their recruitment into the adult buck population. The current fawn crop will likely have a high survival rate due to very mild winter conditions (as of late February 2021). This means we should have good postseason 2021 yearling buck numbers. Once we get the buck:doe ratio within objective we need to remove the point restriction to avoid any negative genetic influences and to provide more hunter harvest opportunity. Barring a negative weather event, we should be back to objective within a year or two and can remove the restriction at that time.

The use of a 4-point restriction in Hunt Area 134 is recommended to match up with the proposed season in the rest of Nonresident Region K. The point restriction is being proposed in that area for the same reasons described above. However, in this area a more restrictive 4-point season is proposed due to the winters from 2018 to 2020 having been much more severe in the adjacent Uinta Herd Unit.

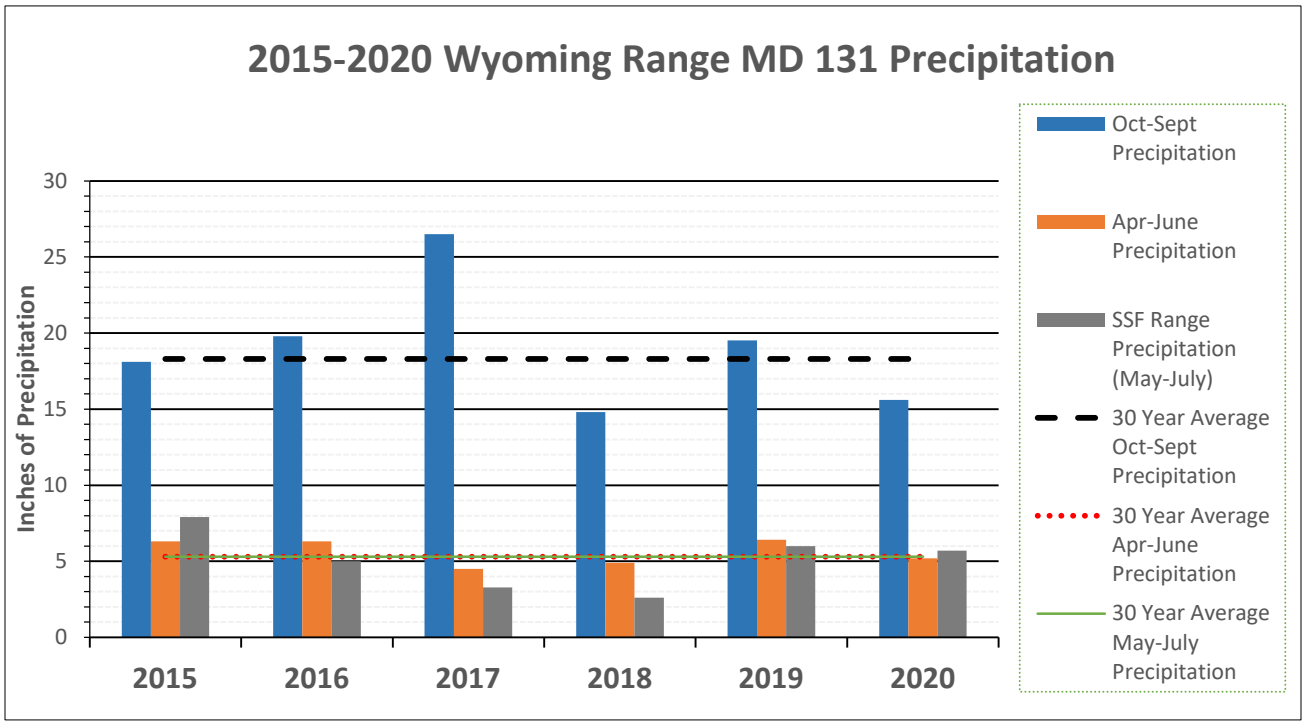
2.) **Management Objective Review:** The Wyoming Range mule deer population objective was reviewed by the public and federal agency personnel in 2016. The population was reduced from 50,000 to 40,000 (± 20%) deer based on public review, and approval by the Commissions. An internal review conducted in 2021 resulted in the decision to continue with the current objective. Reasons include declining fawn:doe ratios and body condition of adult female deer as the population approaches 40,000 which may indicate the nutritional carrying capacity of the herd is in the neighborhood of the current objective (Appendix A). Completion of current research into these matters will better inform this assessment.

3.) **Herd Unit Evaluation**: Management strategies since 1993 emphasized hunting antlered deer in an effort to promote population growth. Antlered deer hunts occur in mid-September and early October throughout the herd unit. Hunt seasons close in the northern hunt areas prior to the onset of the annual fall migration in order to minimize vulnerability of bucks that migrate from subalpine summer ranges to sagebrush winter ranges in the Upper Green River Basin. Sustained population growth has been largely tempered because of the frequency of high to extreme

overwinter mortality approximately every 3 years over the last 29 years on crucial winter ranges. Most recently extreme winter mortality occurred in 2017, and 2019 and 2020 exclusively on the southern winter ranges.

Wyoming Range Mule Deer Herd JCR – 2020 Habitat Report

Weather



Precipitation

The Parameter-Elevation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating a climate-elevation regressions for each Digital Elevation Model grid cell (4km resolution) for the Wyoming Range Mule Deer Herd Unit during the period from October 2019 through September 2020 (water year). Annual precipitation was below the 30 year (Sept-Oct) average. Precipitation during the growing season (April-June) and during the spring-summer use period (May-July) were near the 30 year average. Generally, 2019-2020 winter precipitation was average to below average with near normal spring and early summer precipitation, and dry conditions persisted from mid-summer into early fall.

Winter Severity

Most low elevation winter ranges experienced below average monthly snow accumulation between November 2020 and February 2021, with the exception of the Afton area having normal to above normal monthly snow accumulation. SNOWTEL sites at higher elevations showed the snow water equivalent ranging from 89-120% of the median as of February 24, 2021, suggesting desirable soil moisture for early growing season conditions. Average monthly temperatures recorded from locations

near winter ranges were above normal compared to 30 year monthly averages at most locations except for Afton, where the November-January monthly averages were colder than the 30 year average.

Habitat

Significant Events

Several habitat improvement efforts occurred within the herd unit during 2020. Approximately 4,023 acres of sagebrush mowing, 50 acres of prescribed burn treatment to enhance aspen habitat, 7, 285 acres of sagebrush--grassland habitat were treated with herbicide to control cheatgrass, and 7 miles of fence were converted to wildlife friendly specifications in the Pinedale Region. An additional 19,300 acres of sagebrush-grassland were chemically treated to control cheatgrass in the Green River Region. More details about these projects can be found in the Pinedale and Green River Region's section of the 2020 Statewide Habitat Plan (SHP) report.

Habitat Monitoring

Winter range shrub transects were monitored at five locations on the Big Piney Front during 2020 to evaluate trends in annual leader growth of True Mountain Mahogany. The average annual mahogany leader growth in 2020 was 2.3 inches, which was less than the 24 year average of 2.71 inches. Department personnel also conducted monitoring associated with past and future treatments throughout the herd unit, which is discussed in more detail in the 2020 SHP Report.

Rapid Habitat Assessments

Rapid Habitat Assessments (RHA) were first implemented by the Department in 2015 to generally characterize conditions of important habitat types on the landscape within Mule Deer Initiative Herd Units. Summarized RHA data are used as a habitat component during herd population objective reviews to evaluate whether or not deer numbers are in balance with sustaining habitat at an acceptable level or higher quality condition.

Department personnel completed 159 acres of rangeland RHAs, 704 acres of aspen RHAs, 5 acres of riparian RHAs, and 4 acres of special feature RHAs. Emphasis was placed on aspen RHAs on summer range during 2020. Warm dry mid-summer conditions caused earlier curing of herbaceous vegetation, and difficulty with identifying plant species in rangelands sites, especially on lower elevation winter ranges. Aspen understory vegetation at higher elevations was easily identified through the entire growing season and was the focus of filling in transitional and summer range data gaps in 2020.

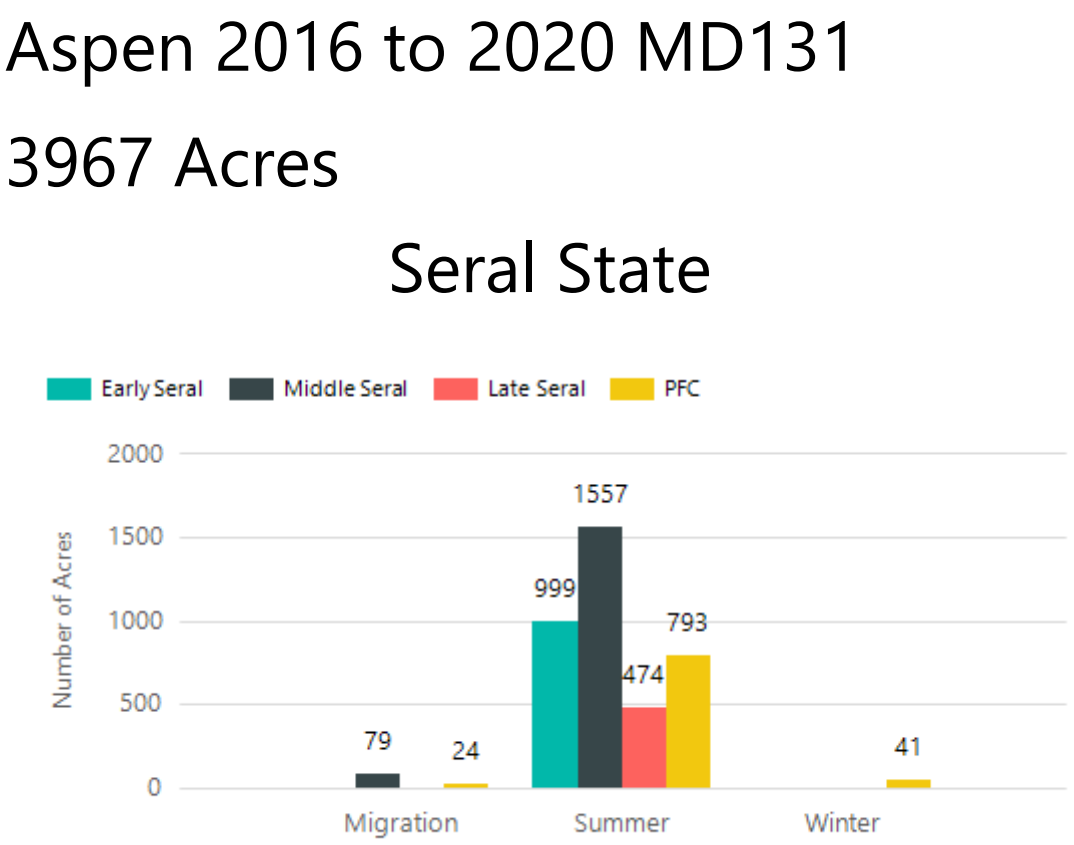
Wyoming Range Mule Deer Herd Objective Review Habitat Report

Overall Recommendation

RHA data collected between 2016 and 2020 suggests habitat conditions are adequate for maintaining the current population objective for this deer herd.

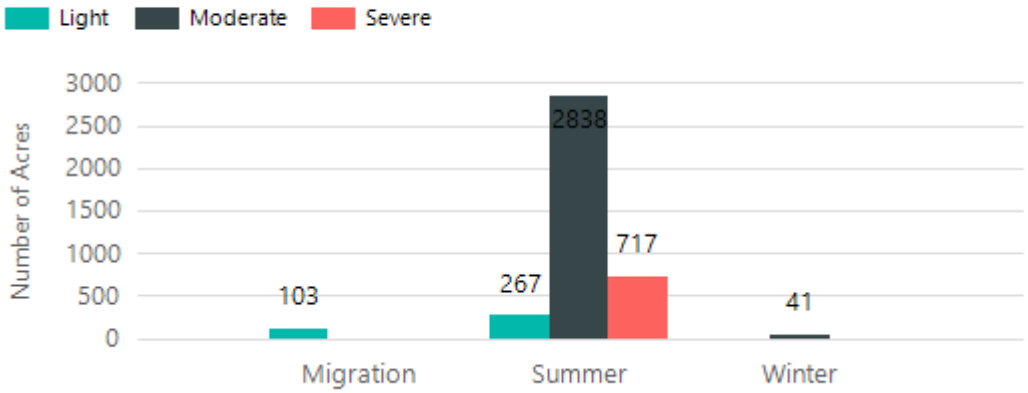
Rapid Habitat Assessments

The 2016-2020 RHA data was summarized for consideration during the Wyoming Range Mule Deer Herd Objective Review. Results of surveys found 98% of rangeland sites did not meet or partial met management objectives, which is attributed to lack of class diversity in key shrub species and mid to late seral stage shrub stands. Winter and summer seasonal range shrub stands exhibited mostly moderate to severe hedging, and light hedging occurred on transitional ranges. Winter and summer rangeland sites maintained moderate to high plant species diversity. Nearly half of the aspen acres surveyed achieved management objectives. The majority of summer range aspen stands displayed moderate to high understory species diversity, with 39% of stands in mid seral successional stage. Severe browsing was observed in only 19% of summer range aspen stands.

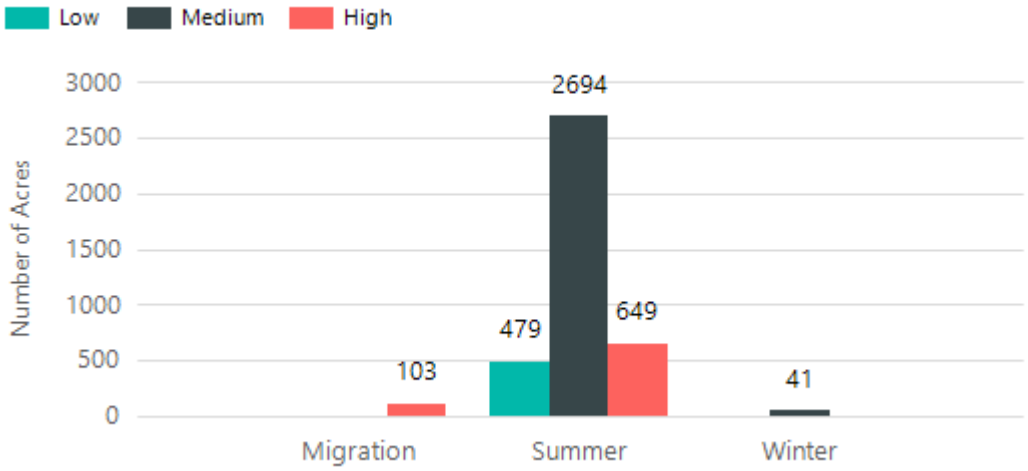


Herbivory

2016 to 2020 MD131 3967 Acres

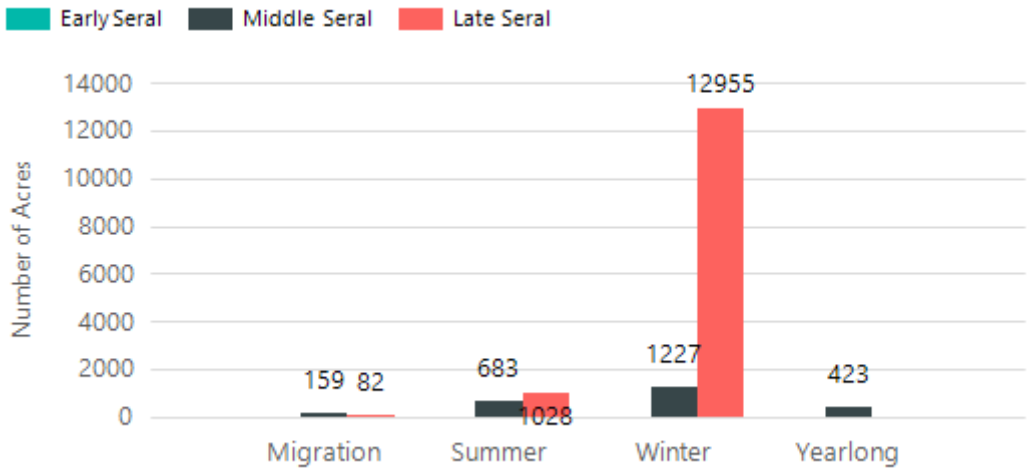


Species Diversity



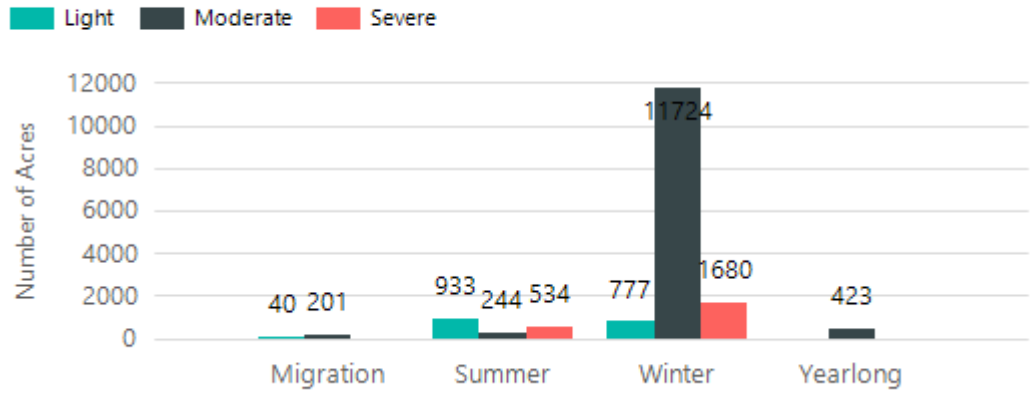
Rangeland 2016 to 2020 MD131 16557 Acres

Seral State

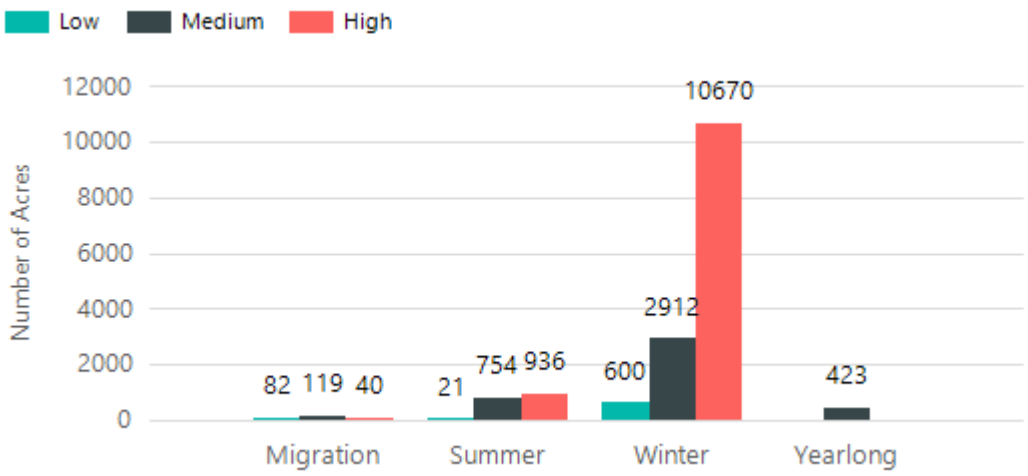


Herbivory

2016 to 2020 MD131 16557 Acres

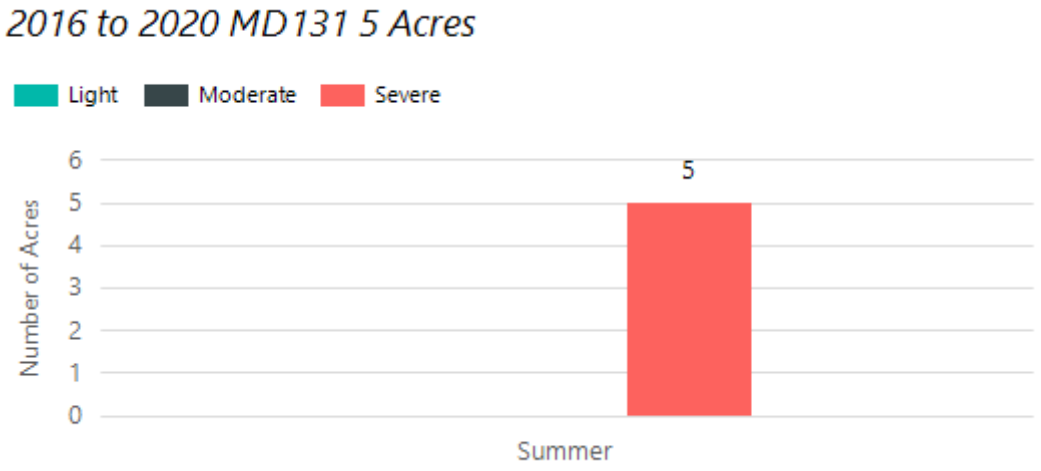


Species Diversity

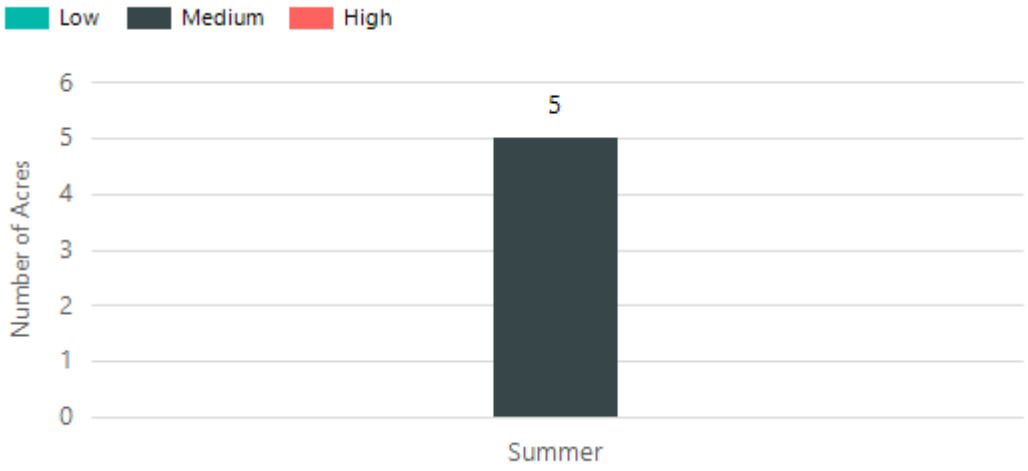


Riparian 2016 to 2020 MD131 5 Acres

Herbivory

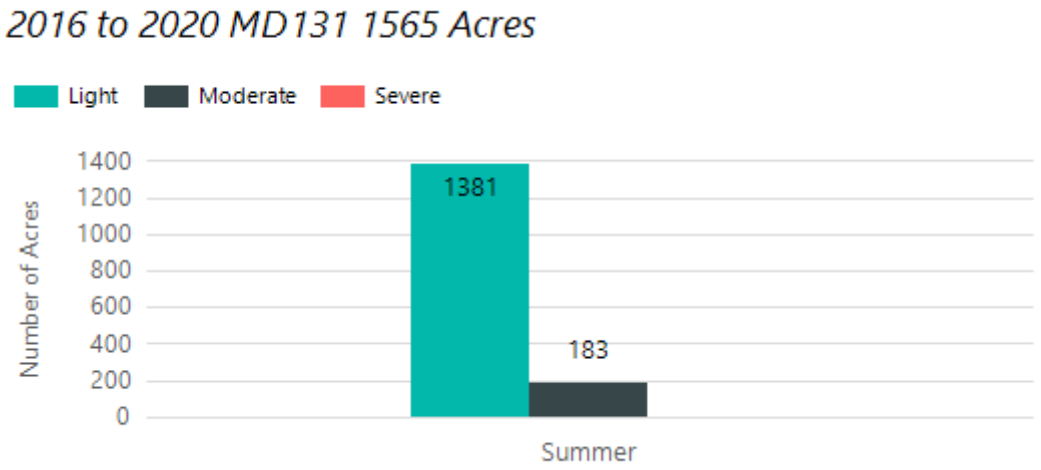


Species Diversity

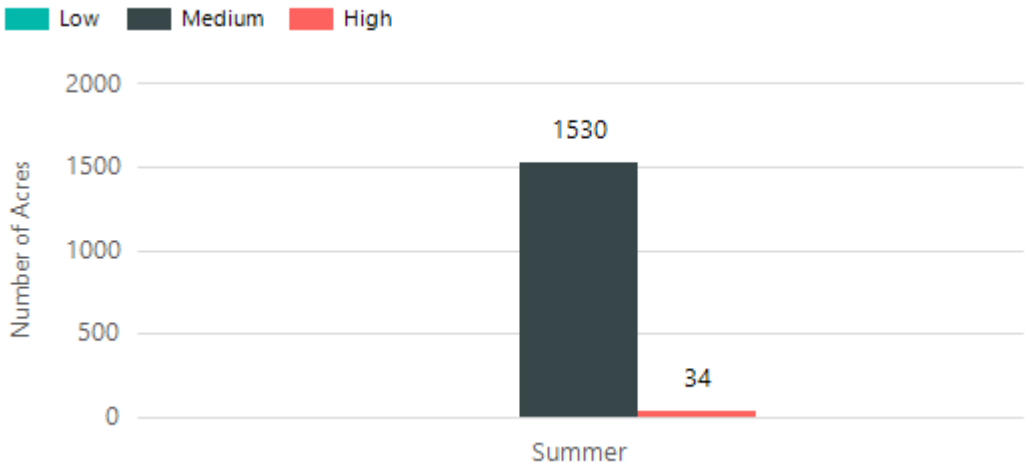


Special 2016 to 2020 MD131 1565 Acres

Herbivory



Species Diversity



4) Chronic Wasting Disease Management: The Wyoming Range mule deer herd is a Tier 1 surveillance herd that prioritized in 2020, and specific efforts were directed at gathering CWD samples. The sample goal of 200 adult males was not obtained in 2020, but 164 samples were gathered from 2018-2020 (Table 1). It is felt that with similar attention given to sampling as in 2020, a sample of 200 adult males should be achievable in a two-year period. Samples in 2020 were collected without the assistance of CWD technicians, so it is felt a similar level of effort and corresponding CWD samples should be expected into the foreseeable future. This level of effort is felt to be appropriate with the high profile and importance of this deer herd.

Table 1. CWD prevalence for hunter-harvested mule deer in the Wyoming Range Herd, 2020.

Year	Percent CWD-Positive and sample size (n) *Hunter Harvest Only*
	All Adult Male Deer (CI = 95%)
2018-2020	0.0% (0.0% - 2.2%, n=164)

Appendix A. Wyoming Range Mule Deer Herd, posthunt herd composition data, 2013-2020.

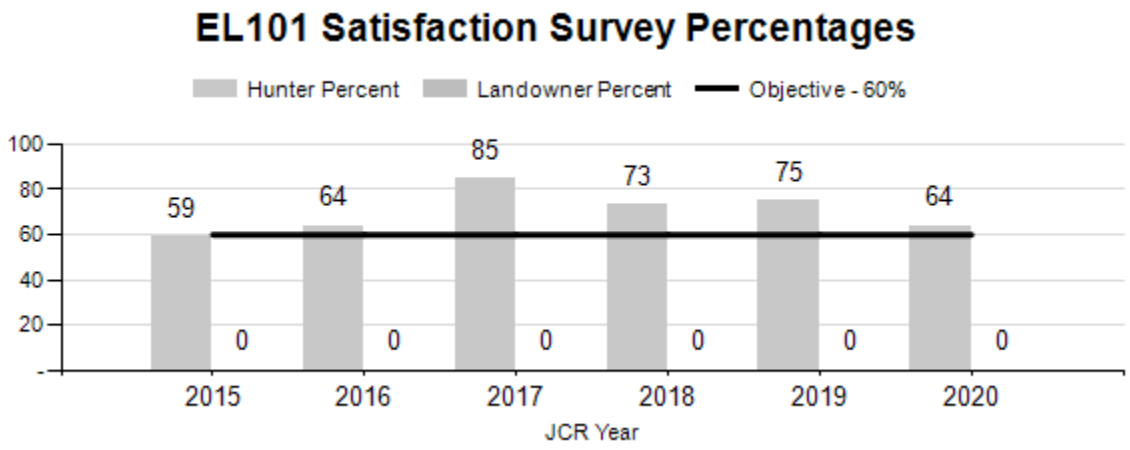
							Ratio:100 Females			
2013	Yrlng Males	Adult Males	Total Males	Does	Fawns	Total	Yrlng Males	Adult Males	Total Males	Fawns
HA134	99	175	274	660	496	1430	15	26	41	75
HA135	145	203	348	913	672	1933	16	22	38	74
HA143	300	326	626	1373	897	2896	22	24	46	65
144/145	Survey conducted in March 2014					805				
TOTAL	544	704	1248	2946	2065	7064	18	24	42	70
2014										
HA134	100	138	238	565	466	1269	18	24	42	82
HA135	191	322	513	1386	1128	3027	14	23	37	81
HA143	291	271	562	1288	884	2734	22	21	43	68
144/145	Survey conducted in February 2015					1005				
TOTAL	582	731	1313	3239	2478	8035	18	22	40	76
2015										
HA134	81	173	254	737	406	1397	11	23	34	55
HA135	176	302	478	1188	828	2494	15	25	40	70
HA143	415	399	814	2005	1147	3966	21	20	41	57
144/145	Survey conducted in February 2016					440				
TOTAL	672	874	1546	3930	2381	8297	17	22	39	60
2016										
HA134	95	190	285	774	489	1549	12	24	36	63
HA135	182	380	562	1605	1008	3175	11	24	35	63
HA143	256	260	516	1430	723	2669	18	18	36	50
144/145	Survey conducted in February 2017					517				
TOTAL	533	830	1363	3809	2220	7910	14	22	36	58
2017	Herd Unit Wide Antlered Deer, 3 points APR Hunt Season									
HA134	14	153	167	672	389	1228	2	23	25	58
HA135	47	282	329	1105	701	2135	4	25	30	63
HA143	111	348	459	1547	701	2707	7	22	30	45
144/145	Sightability Survey Conducted in February 2018					1405				
TOTAL	172	783	955	3324	1791	7475	5	23	29	54
2018*	Herd Unit Wide Antlered Deer, 3 points APR Hunt Season									
HA134	134	135	269	1223	721	2213	11	11	22	59
HA135	197	375	572	1752	1070	3394	11	21	33	61
HA143	178	239	417	1277	742	2436	14	19	33	58
144/145	Survey conducted in February 2019					823				
TOTAL	509	749	1258	4252	2533	8,866	12	18	29	59
2019*	Herd Unit Wide Antlered Deer, 3 points APR Hunt Season									
HA134	14	86	100	520	287	907	3	16	19	55
HA135	111	318	429	1346	730	2505	8	24	32	54
HA143	338	365	703	1706	1088	3497	20	21	41	64
144/145	Survey to be conducted in February 2020									
TOTAL	463	769	1232	3572	2105	6909	13	21	34	59
2020										
HA134	14	82	96	635	395	1126	2	13	15	62
HA135	50	260	310	1302	835	2447	4	20	24	64
HA143	120	225	345	937	672	1954	13	24	37	72
144/145	Survey conducted in February 2021					632				
TOTAL	184	577	751	2874	1902	6159	6	20	26	66

2020 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2020 - 5/31/2021
HERD: EL101 - TARGHEE
HUNT AREAS: 73
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Hunter Satisfaction Percent	72%	64%	60%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	39	57	50
Hunters:	104	119	100
Hunter Success:	38%	48%	50 %
Active Licenses:	108	136	100
Active License Success:	36%	42%	50 %
Recreation Days:	716	927	700
Days Per Animal:	18.4	16.3	14
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:	5



2021 HUNTING SEASONS
TARGHEE ELK HERD (EL101)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
73	Gen	Sep. 1	Sep. 19	Sep. 20	Oct. 25		Antlered elk, spikes excluded
73	6	Sep. 1	Sep. 19	Aug. 15	Jan. 31	35	Cow or calf valid on private land

2020 Hunter Satisfaction: 64.1% Satisfied, 23.1% Neutral, 12.9% Dissatisfied

2021 Management Summary

1.) Hunting Season Explanation: There were no changes to the 2021 seasons compared to 2020. Hunting opportunity in this herd unit is limited due to limited access points to public lands, steep terrain, and fall migration of elk to Idaho. Despite relatively low overall harvest numbers (57 elk were harvested in 2020), hunter satisfaction in this herd unit is relatively high and the herd is meeting its hunter satisfaction objective.

2.) Management Objective Review: The next objective review is scheduled for 2024.

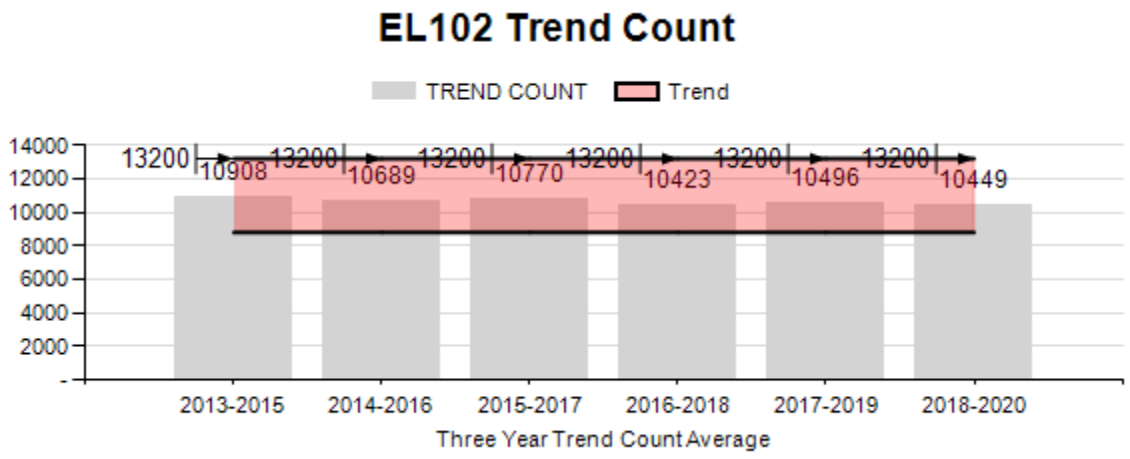
3.) Chronic Wasting Disease Management: This is a Tier 3 surveillance herd that is not a priority for CWD sampling at this time due to its low elk harvest. Collecting an adequate sample size in this herd is very difficult due to low hunter harvest and primarily backcountry harvest. Only two CWD samples were collected from 2018-2020 in this herd. CWD management in this herd focuses on opportunistic hunter-harvest and roadkill sampling and sampling any animals that are displaying signs of sickness.

2020 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2020 - 5/31/2021
HERD: EL102 - JACKSON
HUNT AREAS: 70-72, 75, 77-83
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	10,585	10,734	11,000
Harvest:	1,213	1,304	1,200
Hunters:	2,934	2,917	3,000
Hunter Success:	41%	45%	40 %
Active Licenses:	3,069	3,045	3,000
Active License Success	40%	43%	40 %
Recreation Days:	19,406	18,461	19,400
Days Per Animal:	16.0	14.2	16.2
Males per 100 Females:	33	N/A	
Juveniles per 100 Females	20	N/A	

Trend Based Objective (± 20%)	11,000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	-2.4%
Number of years population has been + or - objective in recent trend:	7



2021 HUNTING SEASONS
JACKSON ELK HERD (EL102)

Area	Type	Archery Dates		General Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
70	Gen	Sep. 1	Sep. 19				Any elk
70	Gen			Sep. 20	Oct. 31		Antlered elk, spikes excluded
71	Gen	Sep. 1	Sep. 19				Any elk
71	Gen			Sep. 20	Oct. 31		Antlered elk, spikes excluded
72							Closed
75	4			Nov. 6	Nov. 21	50	Antlerless elk; the Snake River Bottom portion 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			Nov. 22	Dec. 12		Antlerless elk; the Snake River Bottom and Antelope Flats portions shall be closed
75	6			Nov. 6	Nov. 21	350	Cow or calf; the Snake River Bottom portion shall be closed
75	6			Nov. 22	Dec. 12		Cow or calf; the Snake River Bottom and Antelope Flats portions shall be closed
77	Gen			Oct. 12	Oct. 25		General license and unused limited quota licenses, excluding limited quota cow or calf licenses, valid for any elk
77				Oct. 26	Nov. 24		General license and unused limited quota licenses; antlerless elk
77	Youth Only			Nov. 25	Nov. 27		National Elk Refuge permits shall be issued only for those in possession of a full price youth elk license, any elk; youth only

77				Nov. 28	Dec. 12		General license and unused limited quota licenses, antlerless elk
78	Gen	Sep. 1	Sep. 25				Any elk valid in the entire area
78	Gen			Aug. 15	Oct. 31		Antlerless elk valid on private land
78	1			Aug. 15	Sep. 25	50	Any elk valid off national forest
78	1			Sep. 26	Jan. 31		Any elk valid in the entire area
78	2			Aug. 15	Oct. 31	50	Any elk valid on private land
78	6			Aug. 15	Sep. 25	175	Cow or calf valid off national forest
78	6			Sep. 26	Jan. 31		Cow or calf valid in the entire area
79							Closed
80	Gen	Sep. 1	Sep. 25	Sep. 26	Oct. 31		Any elk
80	6	Sep. 1	Sep. 25	Oct. 15	Nov. 14	300	Cow or calf
80	6			Nov. 15	Nov. 30		Cow or calf valid south of the Curtis Canyon and Sheep Creek Roads (U.S.F.S. Road 30440 and 30445)
81	Gen	Sep. 1	Sep. 25				Any elk
81	Gen			Sep. 26	Oct. 25		Antlered elk, spikes excluded
82	Gen	Sep. 1	Sep. 25				Any elk
82	Gen			Sep. 26	Oct. 25		Antlered elk, spikes excluded
82	4	Sep. 1	Sep. 9	Sep. 10	Nov. 15	35	Antlerless elk
82	4			Nov. 16	Jan. 31		Antlerless elk valid on private land, also valid on private land in Area 81
83	Gen	Sep. 1	Sep. 30				Any elk
83	Gen			Oct. 1	Oct. 25		Antlered elk, spikes excluded

2020 Hunter Satisfaction: 70.5% Satisfied, 17.9% Neutral, 11.7% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 season structure was maintained similar to recent years and continues to focus antlerless harvest on short-distance migratory herd segments and more conservative, antlered-only harvest on long-distance migratory and Gros Ventre herd segments. The current hunting season structure has succeeded in stabilizing the herd to within a very small margin of the 11,000 mid-winter trend count objective. The 2020 mid-winter trend count was 10,734 elk. The main changes to the 2021 seasons included decreasing the quota in Hunt Area 75 by 150 licenses due to a lower mid-winter trend count in 2020 compared to 2019, standardizing the Hunt Area 80 Type 6 license opening date to October 15, and extending the Hunt Area 82 Type 4 season from November 15 to January 31 on private lands only to address damage issues. This license is also valid on private lands in Hunt Area 81 from November 15 – January 31 to address damage. The quota was increased slightly from 25 to 35 licenses to reflect its validity in a larger area.

2.) Management Objective Review: The Jackson Elk Herd objective review was scheduled for 2021. Herd unit managers decided to postpone the objective review until the current Elk Feedgrounds Public Collaborative Process is completed. The results of this process may have direct implications to the evaluation of the herd unit objective.

3.) Chronic Wasting Disease Management: This is a Tier 1 surveillance herd. The first CWD-positive elk in this herd unit was detected in 2020 in Hunt Area 75. Prevalence estimates and sample sizes are presented below (Table 1). Sample quantity is excellent in this herd due to mandatory sampling in Hunt Areas 75 (Grand Teton National Park) and 77 (National Elk Refuge) and efforts by Department personnel in the Jackson Region to collect samples from meat processors, head barrels, and from hunter contacts in the field. However, sample distribution is skewed to the southern hunt areas that are primarily antlerless harvest where access is easier. Samples are limited from backcountry hunt areas, however Department personnel are working to improve this by training hunters and outfitters to collect their own samples in the backcountry. The Department initiated the Elk Feedgrounds Public Collaborative Process in 2020, with the goal of developing a long-term management plan for feedgrounds. Currently, CWD management activities are focused on proper carcass disposal and surveillance through hunter-harvested elk, road-kills, and any elk that is exhibiting signs of sickness. In addition, the Department is employing general disease management principles on feedgrounds such as low-density feeding and reducing the length of the feeding season when feasible to reduce animal-to-animal contact and density.

Table 1. Chronic wasting disease prevalence for hunter-harvested elk in the Jackson Elk Herd.

Year	Percent CWD-Positive and sample size (n) *Hunter Harvest Only*
	All Adult Elk (CI = 95%)
2020	0.2% (n=466)
2018 - 2020	0.1% (CI 0.0% - 0.5%, n=1035)

4.) Mid-Winter Trend Count: The 2020 mid-winter trend count for the Jackson Elk Herd was 10,734 elk. Age/sex classifications were not done on the National Elk Refuge this year due to the large number of personnel needed and COVID-19 precautions; instead, the total number of elk was recorded (8,384 elk on supplemental feed). The calf:cow ratios on the National Elk Refuge have remained relatively stable in recent years at 19, 19, 18, and 18 calves per 100 cows for the 2016-2019 mid-winter trend counts. There were an additional 186 elk counted on the National Elk Refuge that were on native winter range. There were a total of 1,486 elk counted in the Gros Ventre drainage during the trend count, including 1,087 elk on the Patrol Cabin Feedground and 399 on native winter range. Elk attended the Fish Creek Feedground earlier in the winter but were not there during the trend count. Feeding did not occur at Alkali Feedground this year. The calf:cow ratio was 25 calves per 100 cows. The adult bull ratio was 16 and the yearling bull ratio was 9. There were 678 elk on other native winter ranges, primarily in areas east of the National Elk Refuge near Flat Creek and Curtis Canyon, Spread Creek, Elk Ranch, and Buffalo Valley.

5.) Other Management: In 2020, the U.S. Fish and Wildlife Service began its implementation of the Bison and Elk Management Step-Down Plan: a Structured Framework for Reducing Reliance on Supplemental Winter Feeding (2019) on the NER. During winter 2020/2021, feeding initiation criteria (based on measurements of forage availability and snow conditions) remained the same as in previous years and the NER began feeding on February 3, 2021. Based on the Step-Down Plan direction, the NER ceased feeding approximately 2 weeks earlier in the spring than traditionally done during past years with similar snow conditions. That resulted in cessation of feeding on March 29, 2021. Per the Step-Down Plan direction, there were no other changes to feeding operations in 2021 except for the earlier end-date.

2020 - JCR Evaluation Form

SPECIES: Elk
HERD: EL103 - FALL CREEK
HUNT AREAS: 84-85

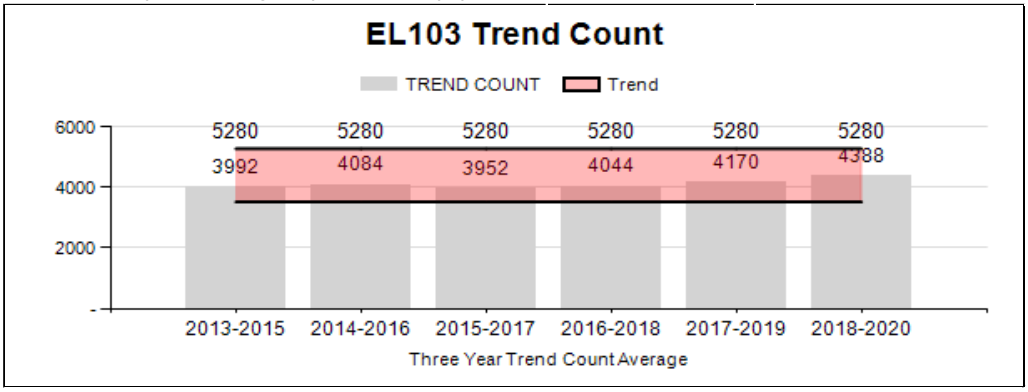
PERIOD: 6/1/2020 - 5/31/2021
PREPARED BY: GARY FRALICK

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	4,122	4,408	4,350
Harvest:	467	703	685
Hunters:	1,527	1,713	1,700
Hunter Success:	31%	41%	40 %
Active Licenses:	1,577	1,803	1,700
Active License Success	30%	39%	40 %
Recreation Days:	9,655	10,931	10,050
Days Per Animal:	20.7	15.5	14.7
Males per 100 Females:	20	16	
Juveniles per 100 Females	29	23	

Trend Based Objective (± 20%)	4,400 (3520 - 5280)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	2

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

	JCR Year	Proposed
Females ≥ 1 year old:	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%



2021 HUNTING SEASONS
FALL CREEK ELK HERD (EL103)

Hunt		Archery Dates		Season Dates			
Area	Type	Opens	Closes	Opens	Closes	Quota	Limitations
84	Gen	Sep. 1	Sep. 25				Any elk
84	Gen			Sep. 26	Oct. 31		Any elk, spikes excluded
84	1			Nov. 1	Jan. 31	20	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	Sep. 1	Sep. 25	Sep. 26	Nov.10	50	Cow or calf; that portion of Area 84 east and south of Granite Creek to the Hoback River shall be closed after October 31
84,85	7			Aug. 15	Jan. 31	225	Cow or calf valid on private land in Area 84; also valid in that portion of Area 85 on or within 200 yards of irrigated land north of Fall Creek
85	Gen	Sep. 1	Sep. 25				Any elk
85	Gen			Sep. 26	Oct. 31		Any elk, spikes excluded
85	6	Sep. 1	Set. 25	Sep. 26	Oct. 31	50	Cow or calf

2020 Hunter Satisfaction: 74% Satisfied, 16% Neutral, 9% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation: The hunting season structure will promote any elk hunting, spikes excluded opportunity from September 26 - October 31 because of a sustained number of elk counted in the postseason trend count that is within the population trend objective range. Public sentiment, primarily from resident hunters, supports more opportunity to harvest antlerless elk in this herd. Any elk hunting opportunities, in which hunters may select antlerless elk, can mitigate, or decease hunting pressure on the antlered segment of the population and thereby potentially increase the number of antlered elk observed in the postseason population.

To provide opportunity limited quota cow or calf only licenses and November hunting will continue in 2021. The number of Type 6 licenses valid for cow or calf only in Area 84 and Area 85 slightly decrease from 75 licenses to 50 in each area in 2021. The Type 6, closing date which has closed on November 20 the last several years, will close on November 10 in 2021. The shorter season and earlier closing date in November for Type 6 license holders offers up to 71 days of recreation. The management strategy associated with the issuance of Type 7 licenses

has proven to be popular with the hunting public and as a result, these limited quota licenses are proposed to increase from 200 to 225 licenses in 2021. These late season hunts provide an opportunity for hunters to harvest elk in areas where elk are depredating privately stored crops or co-mingling with livestock.

Hunters on Area 84 Type 1 licenses experienced a 93.8% success rate in 2020. This is a late season, private land hunt intended to address damage and comingling with livestock. Area 84, 85 Type 7 licenses are the primary means of dealing with this issue, but a small number of any elk licenses are needed to address problems when bulls are involved in the damage/comingling.

2.) **Management Objective Review**: The Fall Creek elk herd postseasons trend objective is 4400 elk. The postseason trend count objective of 4400 elk was last reviewed by the public in 2017. The Wyoming Game and Fish Commission approved the objective in 2017. The next objective review is scheduled for 2022.

3.) **Herd Unit Evaluation**: The number of elk counted during postseason surveys slightly decreased from 4660 elk in 2019 to 4400 in 2021 (Appendix A). The slight decrease in the annual trend count still continues to warrant hunting seasons that provide opportunity to hunt any elk, spikes excluded, the entire length of the hunting general hunting season, September 26 – October 31.

Efforts to discontinue the spikes excluded hunt have proven unsuccessful because of public sentiment that supports this restriction. Since 2013 spikes excluded hunting have precluded yearling bulls from the harvest, and placed the hunting pressure of antlered elk on 2+year old, or branched-antlered bulls. The spikes excluded restriction will likely persist into the future as high popularity with segments of the hunting public will successfully petition the Department to continue with this management program.

4.) **Chronic Wasting Disease Management**: This is a Tier 2 surveillance herd. No CWD positive elk have been documented in this herd unit (Table 1). Sample quantity is quite good in this herd due to efforts by Department personnel in the Jackson Region to collect samples from meat processors, head barrels, and from hunter contacts in the field. Currently, CWD management activities are focused on proper carcass disposal and surveillance through hunter-harvested elk, road-kills, and any elk that is exhibiting signs of sickness. In addition, the Department is employing general disease management principles on feedgrounds such as low-density feeding and reducing the length of the feeding season when feasible to reduce animal-to-animal contact and density.

Table 1. Chronic wasting disease prevalence of hunter-harvested elk in the Fall Creek Herd Unit.

Year	Percent CWD-Positive and sample size (n) *Hunter Harvest Only*
	All Adult Elk (CI = 95%)
2018-2020	0.0% (0.0% - 2.0%, n=182)

Appendix A. Fall Creek Elk Herd, posthunt herd composition data, 2015-2020.										
							Ratio:100 Females			
2015	Adult Males	Yrlng Males	Total Males	Cows	Calves	Total	Adult Males	Yrlng Males	Total Males	Calves
84 HCFG	101	18	119	384	74	577				
84 CCGF	51	21	72	847	242	1161				
84 SPFG	120	46	166	603	214	983				
84 NR	6	5	11	7	19(68)	105				
85 DCFG	76	35	111	569	212	892				
85 NR	6	6	12	36	7(41)	96				
TOTAL	360	130	490	2446	768(109)	3813	15	5	20	31
2016										
84 HCFG	116	76	192	833	281	1306				
84 CCGF	37	46	83	485	118	686				
84 SPFG	117	90	207	647	250	1104				
84 NR	25	3	28	19	9(92)	148				
85 DCFG	72	57	129	627	240	996				
85 NR	9	1	10	1	0(35)	46				
TOTAL	376	273	649	2612	898(127)	4286	14	10	24	34
2017										
84 HCFG	115	52	167	787	148	1102				
84 CCGF	5	12	17	446	47	510				
84 SPFG	73	42	115	609	218	942				
84 NR	24	7	31	64	25(59)	179				
85 DCFG	23	30	53	551	85	689				
85 NR	11	15	26	44	24(240)	334				
TOTAL	251	158	409	2501	547(299)	3756	10	6	16	22
2018										
84 HCFG	78	50	128	927	203	1258				
84 CCGF	11	28	39	512	157	708				
84 SPFG	74	42	116	513	167(50)	846				
84 NR	22	9	31	61	36(110)	238				
85 DCFG	48	29	77	595	201	873				
85 NR	8	8	16	111	25(15)	167				
TOTAL	241	166	407	2719	789(175)	4090	9	6	15	29
2019										
84 HCFG	181	89	270	1194	314	1778				
84 CCGF	10	27	37	563	201	801				
84 SPFG	88	45	133	553	185	871				
84 NR	18	13	31	46	29(56)	162				
85 DCFG	54	39	93	705	177	975				
85 NR	2	5	7	12	14(45)	78				
TOTAL	353	218	571	3073	920(101)	4665	11	7	18	30
2020										
84 HCFG	124	43	167	671	205	1043				
84 CCGF	19	39	58	990	201	1249				
84 SPFG	63	48	111	541	134	786				
84 NR	44	11	55	139	26(175)	395				
85 DCFG	28	14	42	398	78	518				
85 NR	15	2	17	30	1(369)	417				
TOTAL	293	157	450	2769	645(544)	4408	10	6	16	23

2020 - JCR Evaluation Form

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

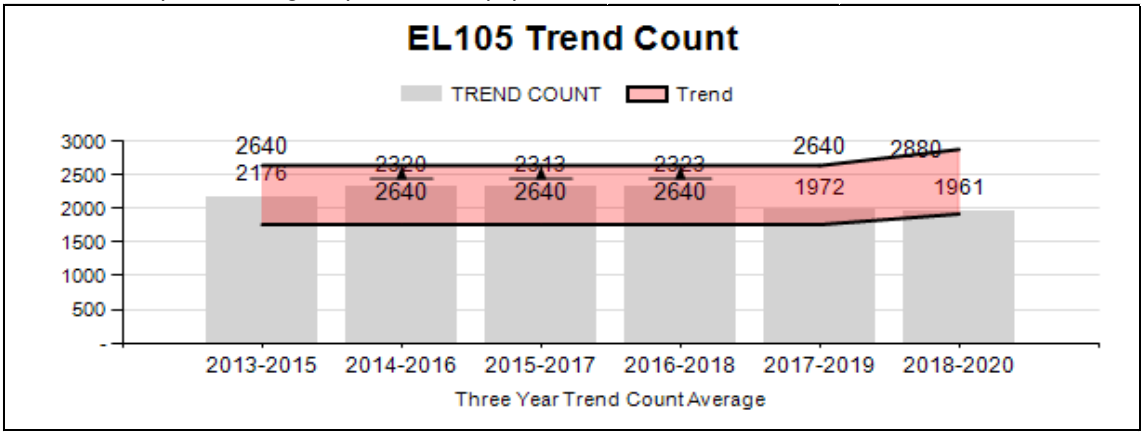
PERIOD: 6/1/2020 - 5/31/2021
PREPARED BY: GARY FRALICK

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	2,089	2,379	2,100
Harvest:	872	851	800
Hunters:	2,607	2,501	2,490
Hunter Success:	33%	34%	32 %
Active Licenses:	2,705	2,623	2,490
Active License Success	32%	32%	32 %
Recreation Days:	16,792	15,591	16,235
Days Per Animal:	19.3	18.3	20.3
Males per 100 Females:	19	23	
Juveniles per 100 Females	35	29	

Trend Based Objective (± 20%)	2,400 (1920 - 2880)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	-0.9%
Number of years population has been + or - objective in recent trend:	1

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

	JCR Year	Proposed
Females ≥ 1 year old:	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%



2021 HUNTING SEASONS
AFTON ELK HERD (EL105)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
88	1	Sept.1	Sept. 30	Oct. 1	Oct. 31	40	Any elk
	1			Nov. 1	Jan. 31		Antlerless elk valid south of Peterson Lane and south and west of the Greys River Wildlife Habitat Management Area Elk Fence
89	Gen	Sept. 1	Sept. 30	Oct.15	Oct.19		Any elk
89	Gen			Oct. 20	Oct. 25		Antlered elk
90	Gen	Sept. 1	Sept.30	Oct. 15	Oct. 19		Any elk
	Gen			Oct. 20	Oct. 25		Antlered elk
90	6	Sept. 1	Sept.30	Oct. 15	Oct. 25	50	Cow or calf
91	Gen	Sept. 1	Sept. 30	Oct.15	Oct. 31		Any elk
91	1	Sept. 1	Sept.30	Oct. 1	Oct. 31	100	Any elk
91	1			Nov. 1	Dec. 31		Antlerless elk
91	1			Jan. 1	Jan. 31		Antlerless elk valid in the entire hunt area. Archery, muzzleloading firearm or shotgun 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
91	6	Sept. 1	Sept. 30	Oct. 1	Dec. 31	200	Cow or calf

91	6			Jan. 1	Jan. 31		Cow or calf valid in the entire area. Archery, muzzle loading firearm or shotgun 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
91	7	Sept.1	Sept. 30	Nov.1	Jan. 31	200	Cow or calf valid west of U.S. Highway 89 and south of Wyoming Highway 239

2020 Hunter Satisfaction: 69% Satisfied, 17% Neutral, 14% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 hunting season is designed to promote population growth in the Greys River segment of the population - Hunt Areas 89 and 90. In Area 91 an additional limited quota license will provide more opportunity to harvest antlerless elk along the Wyoming-Idaho Stateline through January.

No changes are proposed in Area 88 in 2021.

In Area 89, a shortened season is proposed to address lower bull numbers and ratios observed on native winter ranges and the Greys River feedground. A week shorter season should increase bull numbers in the lower Greys River.

In the upper Greys River, Hunt Area 90, the number of elk observed on the Forest Park feedground have been declining over the last four years. The number of elk counted (N-399) during the current year is one of the lowest numbers of elk documented on this feedground since its inception in 1979. The hunting public have expressed concerns about the general absence of elk in this area over the last three hunting seasons. Concurrent with the lower, overall elk numbers is the reduced number of antlered elk observed during the current count. A reduction in the hunting season by one week should promote overall growth and corresponding increase in bull elk in both segments of the population. The November antlerless portion of the season is proposed to be discontinued, fewer Type 6 licenses are proposed, and for the first time in over 20 years the general, any elk season will be shortened to five (5) days, October 15-October 19 in order to promote an increase in elk and bull elk numbers in the upper Greys River where this population has been in decline.

In Area 91, the current proposal describes a significant departure in historical elk management along the Idaho-Wyoming Stateline. In an attempt to address long-term, chronic damage issues

and potential elk-livestock co-mingling concerns, the Region is proposing to increase limited quota license antlerless elk hunting opportunity from November through January. Limited quota Type 7 license holders will have the opportunity to pursue antlerless elk west of U.S. Highway 89 and south of Wyoming Highway 239. Managers believe this is an initial response to address increasing elk numbers, largely from elk moving into Wyoming from Idaho, with a management program that offers the limited quota license hunter an opportunity to harvest antlerless elk in an area where elk management has been presented management challenges for over 30 years.

2.) **Management Objective Review**: The Afton elk herd postseasons trend objective is 2200 elk. The postseason trend count objective of 2200 elk was last reviewed by the public in 2017. The Wyoming Game and Fish Commission approved the objective in 2017. The next objective review is scheduled for 2022.

3.) **Herd unit Evaluation**: Management strategies have focused on maintaining elk numbers and more recently attempting to promote population growth and increase the number of bulls in the Greys River – Hunt Areas 89 and 90. The 2021 season proposal for these two areas is a more aggressive approach to increase bull numbers and total elk numbers by shortening the general license hunting seasons, and closing the general any elk season on the same day in both areas (Appendix A.

4). **Chronic Wasting Disease Management**: This is a Tier 2 surveillance herd. No CWD positive elk have been documented in this herd unit (Table 1). Sample quantity is quite good in this herd due to efforts by Department personnel in the Jackson Region to collect samples from meat processors, head barrels, and from hunter contacts in the field. The Department initiated the Elk Feedground Public Collaborative Process in 2020, with the goal of developing a long-term management plan for feedgrounds. Currently, CWD management activities are focused on proper carcass disposal and surveillance through hunter-harvested elk, road kills, and any elk that is exhibiting signs of sickness. In addition, the Department is employing general disease management principles on feedgrounds such as low density feeding and reducing the length of the feeding season when feasible to reduce animal-to-animal contact and density.

Table 1. Chronic wasting disease prevalence for hunter harvested elk in the Afton Elk Herd Unit.

Year	Percent CWD-Positive and sample size (n) *Hunter Harvest Only*
	All Adult Elk (CI = 95%)
2018-2020	0.0% (0.0% - 2.8%, n=128)

Appendix A. Afton Elk Herd, posthunt herd composition data, 2016-2020.										
							Ratio:100 Females			
Year	Adult Males	Yrlng Males	Total Males	Cows	Calves	Total	Adult Males	Yrlng Males	Total Males	Calves
2016										
88 GRFG	43	13	56	532	144	732				
88 NR	0	1	1	3	1(5)	10				
89 NR	4	3	7	88	44(52)	191				
90 FPFG	61	48	109	507	198	814				
90 NR	0	2	2	2	2(1)	7				
91 NR	41	33	74	148	122((592)	936				
TOTAL	149	100	249	1280	511(650)	2690	11	8	19	40
2017										
88 GRFG	29	7	36	358	82	476				
88 NR	0	0	0	0	0	0				
89 NR	7	4	11	37	15(562)	625				
90 FPFG	66	25	91	409	79	579				
90 NR	0	1	1	0	0(8)	9				
91 NR	57	1	58	8	0(658)	724				
TOTAL	159	38	197	812	176(1228)	2413	19	5	24	22
2018										
88 GRFG	18	13	31	378	110	519				
88 NR	0	0	0	0	0	NS				
89 NR	1	12	13	111	85(108)	317				
90 FPFG	36	11	47	326	94	467				
90 NR	0	0	0	0	0	NS				
91 NR	49	21	70	227	90(177)	564				
TOTAL	104	57	161	1042	379(285)	1867	10	5	15	36
2019										
88 GRFG	22	13	35	343	110	488				
88 NR	0	1	1	3	1	5				
89 NR	15	10	25	187	82 (63)	357				
90 FPFG	36	25	61	318	108 (2)	489				
90 NR	3	0	3	6	4	13				
91 NR	20	7	27	18	9 (230)	284				
TOTAL	96	56	152	875	314(295)	1636	11	6	17	36
2020										
88 GRFG	33	16	49	400	95	544				
88 NR	0	0	0	2	3	5				
89 NR	19	7	26	59	21(156)	262				
90 FPFG	31	6	37	312	50	399				
90 NR	0	0	0	7	5	12				
91 NR	70	34	104	175	102(776)	1157				
TOTAL	153	63	216	955	276(932)	2379	16	7	23	29

2020 - JCR Evaluation Form

SPECIES: Moose

PERIOD: 6/1/2020 - 5/31/2021

HERD: MO101 - TARGHEE

HUNT AREAS: 16, 37

PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Population:		N/A	N/A
Harvest:	4	3	5
Hunters:	5	5	5
Hunter Success:	80%	60%	100 %
Active Licenses:	5	5	5
Active License Success:	80%	60%	100 %
Recreation Days:	41	63	40
Days Per Animal:	10.2	21	8

Limited Opportunity Objective:

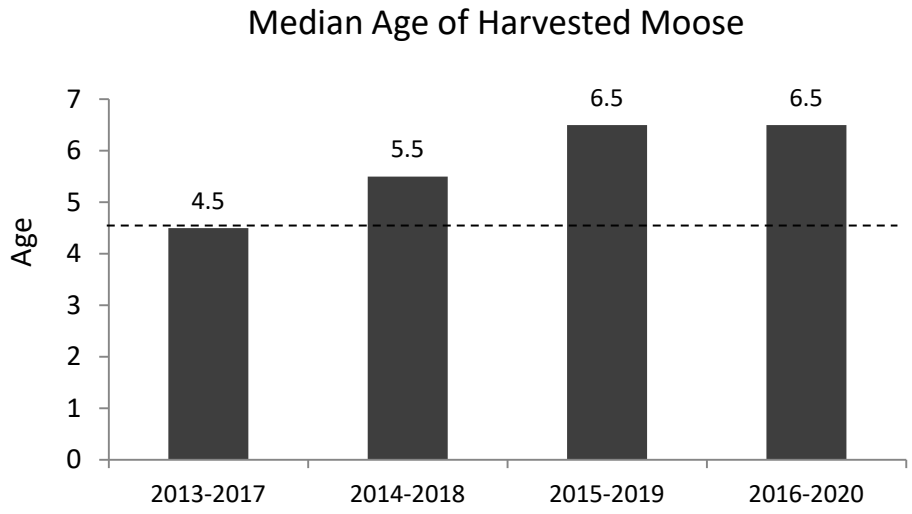
5-year median age of > 4.5 years for harvested moose

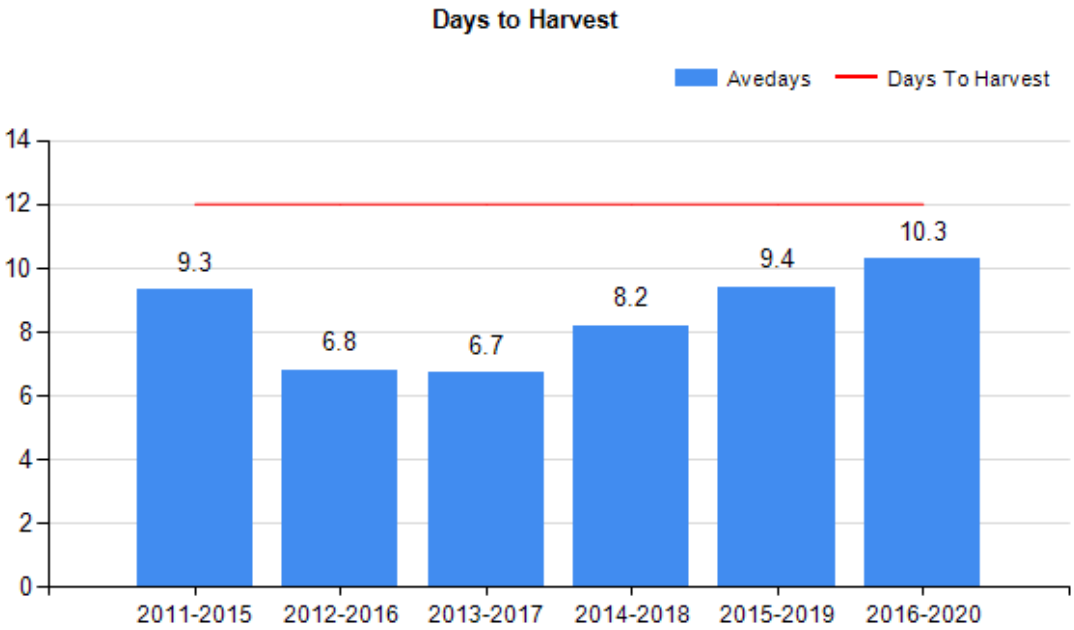
5-year average of <= 12 days/animal to harvest

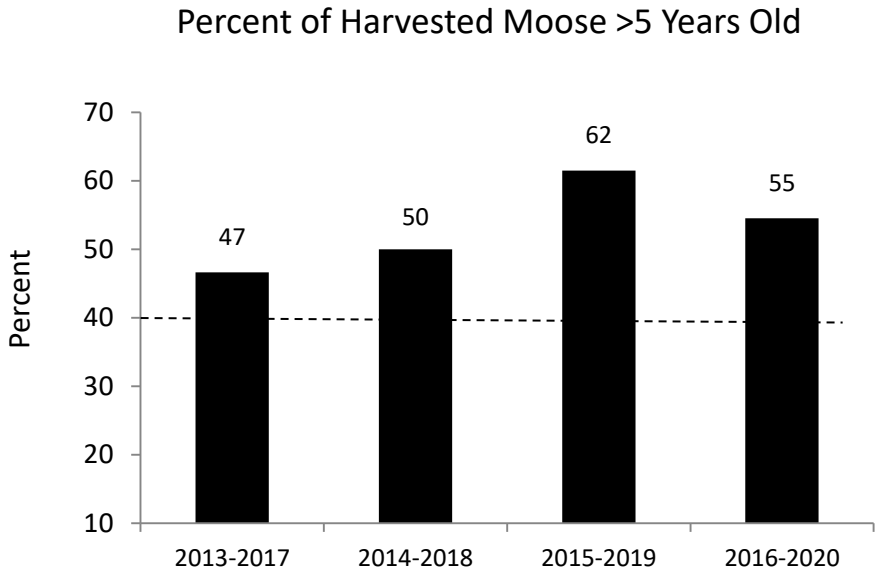
Secondary Objective:

5-year average of 40% of harvested moose are > 5 years of age

Management Strategy: Special




Days to Harvest
Avedays
Days To Harvest
14
12
10
8
6
4
2
0
9.3
6.8
6.7
8.2
9.4
10.3
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019
2016-2020


Percent of Harvested Moose >5 Years Old
Percent
70
60
50
40
30
20
10
47
50
62
55
2013-2017
2014-2018
2015-2019
2016-2020

2021 HUNTING SEASONS
TARGHEE MOOSE HERD (MO101)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
16, 37	1	Sep. 1	Sep. 14	Sep. 15	Nov. 15	5	Antlered moose

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 seasons remained unchanged from 2020. In 2020, two hunters submitted teeth for aging (2 and 4 years old). In 2020, harvest success dropped slightly for this herd unit (to 60%) and days to harvest increased (to 21 days). Managers believe this could be due to the relatively dry and hot conditions during the 2020 season. Currently, the herd is meeting its three limited opportunity objectives. This herd is not surveyed from the air due to its interstate nature (many moose migrate to Idaho for the winter) and winter ranges in Wyoming have poor aerial moose sightability due to tree cover.

2.) Management Objective Review: The next scheduled herd unit review is in 2024.

2020 - JCR Evaluation Form

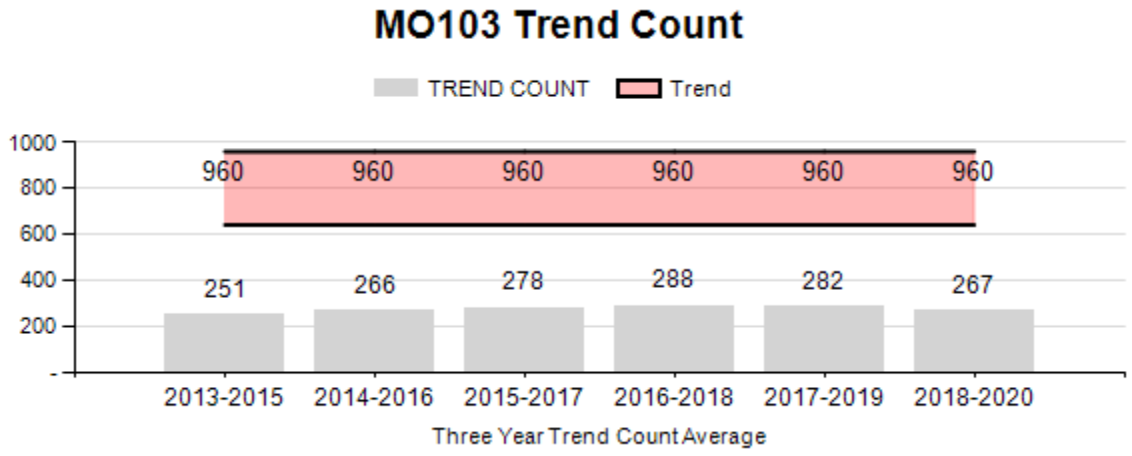
SPECIES: Moose
PERIOD: 6/1/2020 - 5/31/2021

HERD: MO103 - JACKSON

HUNT AREAS: 7, 14-15, 17-19, 28, 32
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	281	240	350
Harvest:	9	9	10
Hunters:	10	10	10
Hunter Success:	90%	90%	100 %
Active Licenses:	10	10	10
Active License Success	90%	90%	100 %
Recreation Days:	82	87	80
Days Per Animal:	9.1	9.7	8
Males per 100 Females:	79	82	
Juveniles per 100 Females	46	55	

Trend Based Objective (± 20%)	800 (640 - 960)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-71.4%
Number of years population has been + or - objective in recent trend:	20



2021 HUNTING SEASONS
JACKSON MOOSE HERD (MO103)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
7, 14, 15, 19, 32							CLOSED
17, 28	1	Sep. 1	Sep. 14	Sep. 15	Oct. 31	5	Antlered moose
18	1	Sep. 1	Sep. 30	Oct. 1	Oct. 31	5	Antlered moose

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 seasons remained the same as 2020. Even though the herd continued to be below objective, managers feel that limited antlered moose hunting in some areas is still sustainable. Harvest success was 90% in 2020 with average days to harvest at 9.7. Bull ratios were relatively high again during the 2020 post-season classification at 82 bulls per 100 cows. Even though overall numbers remain low, calf:cow ratios have been higher in recent years. In 2009, the calf:cow ratio was 15 calves per 100 cows. Since then, it has been increasing and the 2020 calf ratio was 55 per 100 cows, which is the highest since 1994. Managers anticipate that this calf ratio will lead to a growing population in the future. Hunt areas 7, 14, 15, 19, and 32 remained closed in 2021. We have received clear feedback from our constituents that they do not support opening these areas at this time.

2.) Management Objective Review: We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2026; however, if the situation arises that a change is needed, we will review and submit a proposal as needed. The next scheduled objective review is in 2025.

3.) Research: Managers initiated a moose GPS-collaring project in collaboration with Wyoming Department of Transportation (WYDOT) in the southern end of the herd unit and northern end of the Sublette Moose Herd Unit in winter 2019 to evaluate moose movements around roadways in relation to moose-vehicle collisions. The areas surrounding the Snake River Bridge on Highway 22 have the highest rate of moose-vehicle collisions in Teton County. For that reason, wildlife underpasses have been incorporated into the planning design for a bridge replacement project planned for 2023. Over the past 3 years, a total of 23 moose have been GPS-collared in the area to provide movement data for the wildlife crossings project. Funding support has been provided by WYDOT, Teton Conservation District, Greater Yellowstone Coalition, U.S. Geological Survey at Montana State University, Veterinary Initiative for Endangered Wildlife, and Teton County Commission. Results from this project will be available beginning next year.

The WGFD has also partnered with a PhD student at Montana State University and a local veterinarian from Veterinary Initiative for Endangered Wildlife to study moose health. See the Disease Monitoring section for a current summary of this work.

2020 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2020 - 5/31/2021

HERD: BS106 - TARGHEE

HUNT AREAS: 6

PREPARED BY: ALYSON COURTEMANCH

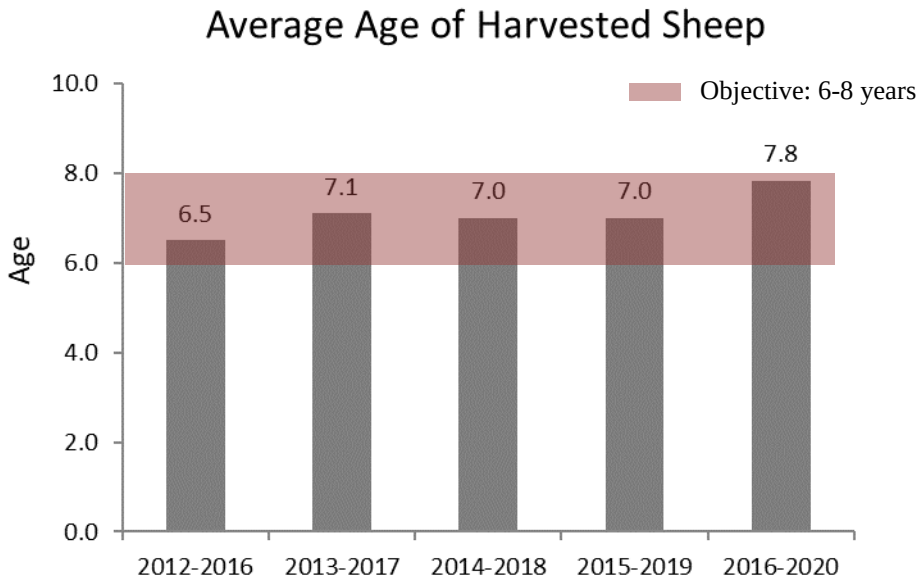
	2015 - 2019 Average	2020	2021 Proposed
Population:		N/A	N/A
Harvest:	1	0	1
Hunters:	1	1	1
Hunter Success:	100%	0%	100 %
Active Licenses:	1	1	1
Active License Success:	100%	0%	100 %
Recreation Days:	31	8	10
Days Per Animal:	31	0	10

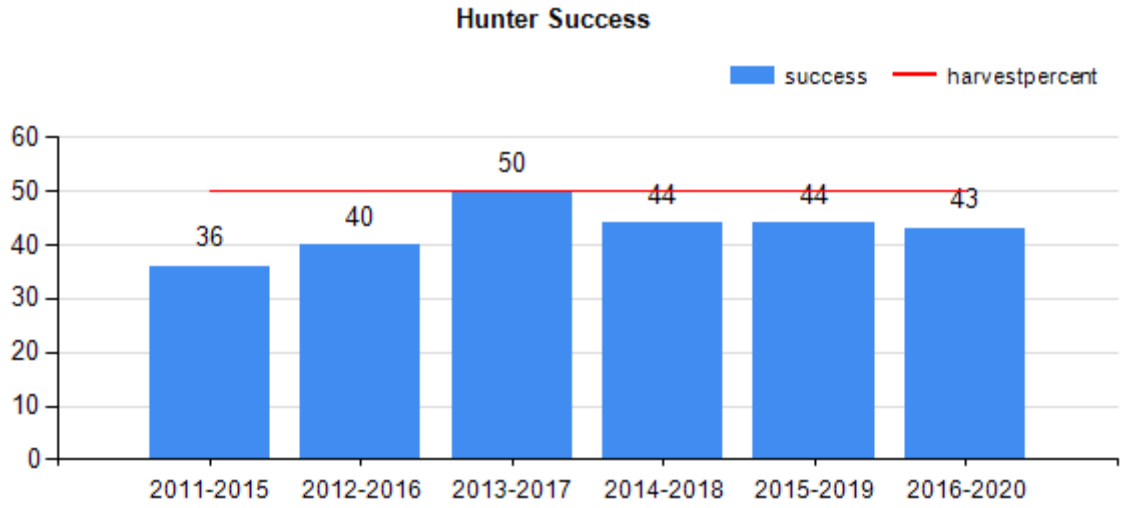
Limited Opportunity Objective:

5-year average harvest age of 6-8 years

5-year average hunter success of >= 50%

Management Strategy: Special





2021 HUNTING SEASONS
TARGHEE SHEEP HERD (BS106)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
6	1	Aug. 1	Aug. 14	Aug 15.	Oct. 31	1	Any ram (1 resident)

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 hunting season remained the same as 2020. The one hunter in 2020 was not successful, however, the hunter reported seeing mature rams and had opportunity. This is a limited opportunity management herd with two objectives: 1) 5-year average harvest age of 6-8 years, and 2) 5-year average hunter success of at least 50%. In 2020, the herd met the first objective but not the second.

Managers reduced the license quota from 2 to 1 beginning in 2018 because mature ram numbers were low, particularly in the southern herd segment where all harvest has occurred in the past 20 years. This is likely due to relatively easier access in the southern portion of the hunt area. During the 2020 mid-winter trend count, a total of 90 sheep were classified (53 sheep in the north herd segment and 37 sheep in the south). The lamb ratio was 32 per 100 ewes. Only four rams of three-quarter curl or better were observed in the southern herd segment. Managers will continue to monitor population trends in the herd and evaluate the feasibility of increasing licenses again in the future.

2.) Management Objective Review: The next scheduled objective review is 2024.

3.) Teton Range Bighorn Sheep Working Group: Teton Range Bighorn Sheep Working Group was very active during the past year. The working group includes representatives from

WGFD, Grand Teton National Park, Bridger-Teton National Forest, Caribou-Targhee National Forest, Wyoming Wild Sheep Foundation, and Northern Rockies Conservation Collaborative (retired biologist who studied the herd in the 1970s). The working group initiated the Teton Sheep and Recreation Community Collaborative Process in winter 2019/2020 to address the impacts of backcountry skiing on this herd. The working group hired Dr. Jessica Western from the University of Wyoming's Ruckelshaus Institute to facilitate a series of three collaborative learning workshops with the public and two virtual workshops with a focus group. The purpose of these workshops was, 1) build community awareness about the Targhee Herd and impacts from winter recreation, and 2) identify community-supported solutions that would balance bighorn sheep habitat needs with recreation access. A total of 158 people attended at least one of the workshops, and many people attended multiple. Attendees were from the backcountry skiing community, commercial guiding companies, ski resorts staff, conservation non-profit organizations, recreation advocacy non-profit organizations, hunting outfitters, Teton County commissioners, and general members of the public. Final results of this collaborative process were delayed due to COVID-19, but plan to be finalized in summer 2021. Funding was provided by Community Foundation of Jackson Hole, Wyoming Wild Sheep Foundation, U.S. Forest Service, Grand Teton Park Association, and Winter Wildlands Alliance.

4.) Mountain Goats: The WGFD implemented a new mountain goat hunt area (Hunt Area 4) that overlaps with Bighorn Sheep Hunt Area 6 in fall 2019. The hunt was continued in fall 2020. The purpose of this hunt is to reduce the mountain goat population in this area to alleviate potential impacts to the Targhee Herd (transmission of respiratory disease pathogens and competition for limited winter habitat). A total of 48 Type A licenses were issued for this hunt area in both 2019 and 2020. Twenty-three goats were harvested in 2019 and 11 in 2020. Hunters enjoyed this new hunt area and the opportunity to harvest a goat, even though goat densities were low. Details about this hunt area for 2021 can be found in the Palisades Mountain Goat Herd Job Completion Report.

Grand Teton National Park also implemented a qualified volunteer program in fall 2020 to reduce mountain goat densities. A total of 43 mountain goats were removed by qualified volunteers as part of this effort in the park.

Through these efforts, mountain goat numbers have been reduced in the Teton Range over the last two years. Mountain goat numbers reached a high of 88 goats observed during the February 2019 aerial survey and dropped to 29 in the February 2021 survey.

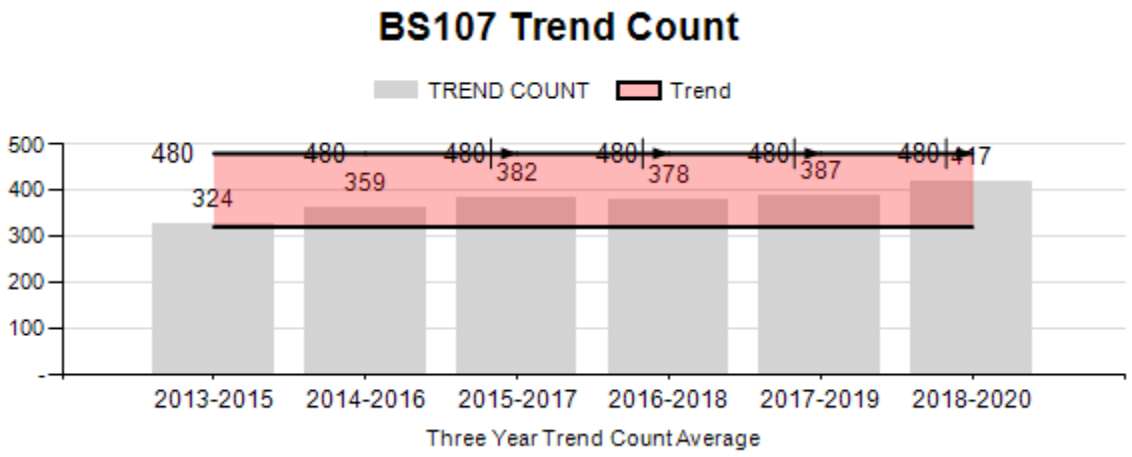
2020 - JCR Evaluation Form

SPECIES: Bighorn Sheep
HERD: BS107 - JACKSON
HUNT AREAS: 7

PERIOD: 6/1/2020 - 5/31/2021
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	381	491	475
Harvest:	9	5	12
Hunters:	11	11	12
Hunter Success:	82%	45%	100 %
Active Licenses:	11	11	12
Active License Success	82%	45%	100 %
Recreation Days:	128	125	125
Days Per Animal:	14.2	25	10.4
Males per 100 Females:	38	39	
Juveniles per 100 Females	37	43	

Trend Based Objective (± 20%)	400 (320 - 480)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	23%
Number of years population has been + or - objective in recent trend:	1



2021 HUNTING SEASONS
JACKSON SHEEP HERD (BS107)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
7	1	Aug. 15	Aug. 31	Sep. 1	Oct. 31	12	Any bighorn sheep

2021 Management Summary

1.) Hunting Season Evaluation: There were no changes for the 2021 hunting season. The Jackson Bighorn Sheep Herd has been at objective for the past 5 years and surpassed the objective in 2020. A total of 491 sheep were counted during the 2020 mid-winter trend count, which is the highest number of sheep counted since 2000. The lamb:ewe ratio was 43:100 and the ram:ewe ratio was 39:100. Even though overall population numbers increased in 2020, the number of mature rams greater than ¾ curl did not increase in the survey. Also, hunter success was relatively low during the 2020 season with only 45% successful harvest. For these reasons, managers opted to keep the hunting season the same for 2021 and will reevaluate the possibility of adding additional licenses in 2022.

2.) Management Objective Review: We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2025; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

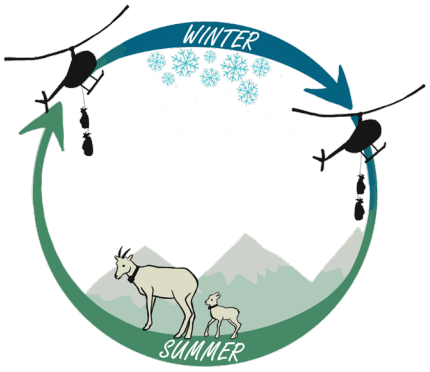
3.) Additional Information: Looking ahead, managers are beginning discussions and evaluation of potentially offering a ewe license type in 2022. The 2020 mid-winter trend count surpassed the population objective for the herd (400 sheep +/- 20% (320-480 sheep)) and the lamb ratio indicates this herd is on track to continue to grow. In the past, pneumonia die-off events have occurred when this herd has reached approximately 500 sheep. Therefore, managers are exploring the possibility of reducing density through ewe harvest to prevent another pneumonia die-off. This license type would be considered for 2022.

4.) Research: For the past 6 years, WGFD has collaborated with the University of Wyoming on the Wyoming Bighorn Sheep Nutrition-Disease Project investigating bighorn sheep nutrition, disease, reproduction, and causes of lamb mortality in the Jackson, Whiskey, and Absaroka Herds (Appendix A). Results from this research will provide additional insight into the nutritional carrying capacity of the herds within the context of respiratory disease. These results will help inform the next population objective review in 2025.

Wyoming Bighorn Sheep Nutrition-Disease Project

The persistence of pneumonia poses a risk to bighorn sheep herds throughout their range, as it is often the culprit for massive population crashes. Following a crash, pneumonia can remain in the herd long after its initial introduction. Infected herds can experience very different population trends - some continue to decline, some undergo crash-recovery cycles, and some are able to tolerate it without significant mortality. It remains puzzling why some herds can recover from the disease while others cannot, but this suggests ecological or environmental factors may be at play to influence population trends in the context of disease.

Wyoming's bighorn sheep herds have experienced pneumonia die-offs throughout the state, to which there has been variability in recovery. Once the largest Rocky Mountain bighorn sheep herd, the Whiskey Mountain herd experienced a pneumonia die-off in the early 1990's and has continued to decline with abysmal lamb survival ever since. Still, there are other herds nearby that have experienced similar die-offs but have not faced the long-lasting population decline affecting the Whiskey herd. The differences in trends across populations with the same pneumonia-related pathogens motivates our investigation into the factors that influence population dynamics in the presence of disease.



We capture bighorn sheep twice a year to track how individuals, and ultimately populations, fare in the face of pneumonia and environmental stressors.

Our Approach

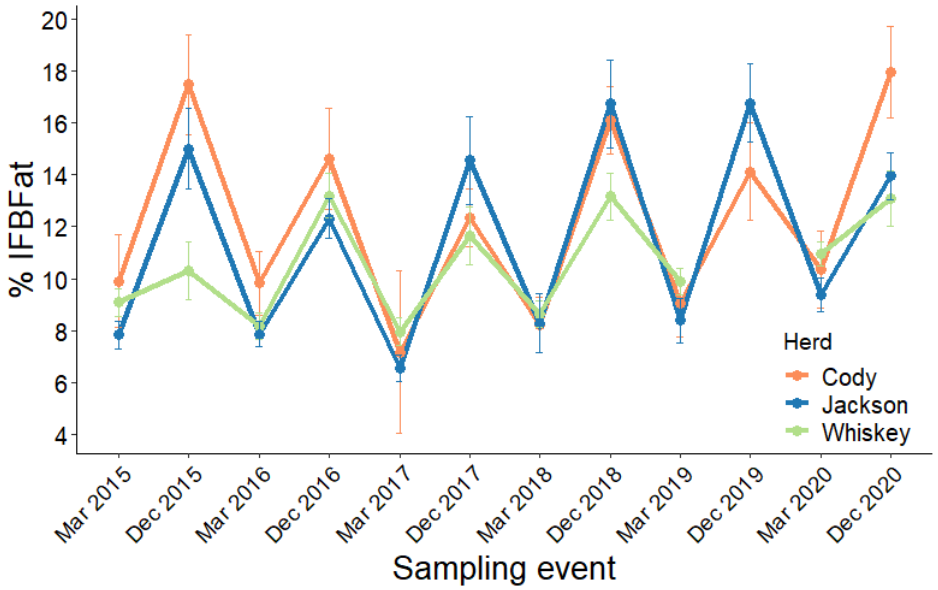
We seek to identify how nutrition and disease interact to influence population dynamics. Our work focuses on the Whiskey Mountain, Jackson, and Cody bighorn sheep herds, which all hold the same bacterial pathogens associated with pneumonia but have much different population trends. We aim to look beyond the disease itself and identify factors that influence the ability of sheep to tolerate or succumb to pneumonia.

By monitoring the same animals through time, we are tracking pathogen presence, nutritional condition, reproduction, adult and lamb survival, mortality causes, and forage conditions of individuals over time. We aim to disentangle the relative roles of each of those components in crashes and recoveries of bighorn sheep populations. Identifying how disease and nutrition interact to influence population dynamics is critical to improving our understanding of pneumonia, developing management options for bighorn sheep, and ultimately, mountain sheep conservation.

Although disease dynamics of bighorn sheep have been studied extensively, the underlying principles of population dynamics have often been discounted. For example, even in the presence of disease, populations are still subject to limitations of forage as populations grow or habitats change. Further, interactions may exist among growing populations, nutrition, predation, and disease. Indeed, immune function and nutrition may well be tightly linked and thereby, may lend some ecological and environmental context to when pneumonia dieoffs may occur in chronically infected herds. Understanding how nutrition, disease, predation, and recruitment in female bighorn sheep interact to influence population dynamics is critical in developing management plans to maintain healthy populations of one of our most cherished ungulate species.

How do bighorn sheep finance survival, reproduction, and immune function?

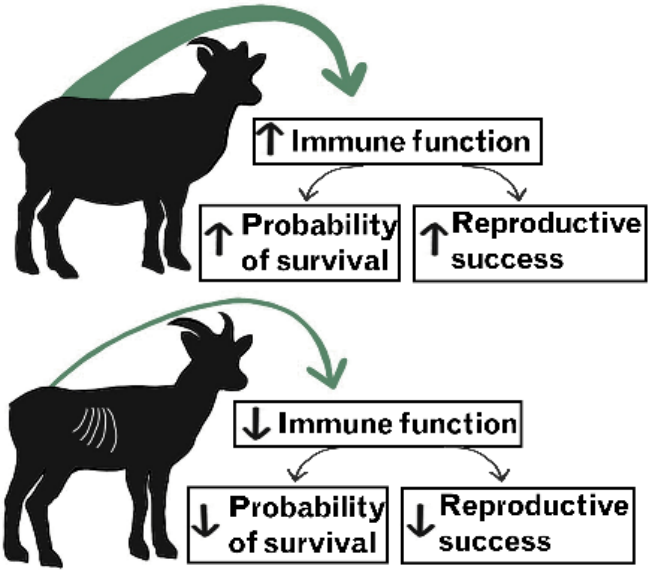
Bighorn sheep live in extreme environments where they experience seasonal fluctuations in resource availability. They accumulate fat reserves over summer, when forage is lush and abundant, for later use to meet energetic demands over winter. Burning through these fat reserves is the main way sheep finance their own maintenance, raise a lamb, and mount an immune response. An overarching goal of the project is to understand environmental factors that affect an individual's ability to gain fat as well as understand how they balance investing their fat reserves between these three needs. We measure percent ingesta-free body fat (IFBFat) each March and December using ultrasonography.



Average percent of body fat of adult, female bighorn sheep from March 2015 through December 2020. Long term study of three herds has allowed us to identify consistently poorer nutritional condition in the Whiskey herd when compared with the other herds in December, but similar nutritional condition in March.

How does mom's nutritional condition interact with immune function, her ability to tolerate pneumonia, and successfully raise a lamb?

Because lamb survival is often the limiting factor to bighorn sheep population growth, we want to understand what allows a mother to successfully raise a lamb. Mothers give their lambs energy to grow, passive immunity to help defend against disease, and potentially the pathogens that she carries. We want to understand how maternal factors such as age, nutritional condition, disease status, and immune function work together to influence her ability to successfully raise a lamb, particularly in the face of pneumonia. Understanding in what ways mothers contribute to lamb survival will help us to better understand where potential vulnerabilities lie, and which individuals will be most successful in raising lambs.



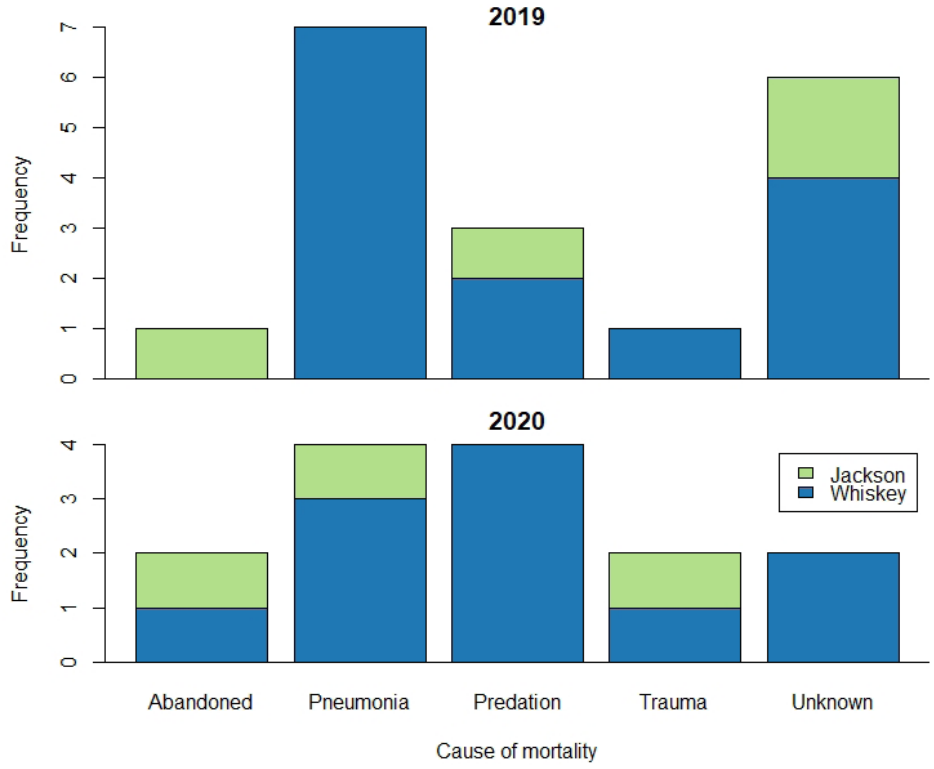
Potential relationship between nutritional condition, immune function, survival, and reproductive success.

How does habitat quality influence the ability of sheep to tolerate pneumonia?

A bighorn sheep's nutritional condition (how much fat it has) is likely indicative of the quality of its habitat. There are apparent differences in nutritional condition in the three herds, particularly noticeable in the fall, after they have migrated off summer range. Individuals in the Whiskey Mountain herd consistently come off summer range in poorer condition than those in the Jackson and Cody herds. We are studying the summer ranges of the Whiskey Mountain and Jackson herds from the ground up to identify why the Whiskey Mountain herd seems to have poorer summer nutrition than the Jackson herd. To do so, we are piecing together the diet composition and quality of each sheep by analyzing fecal samples to identify the plants in their diet and quantifying the digestibility and quality of the species.

Vegetation data collection on summer range of the Gros Ventre herd.

What is the leading cause of lamb mortality?

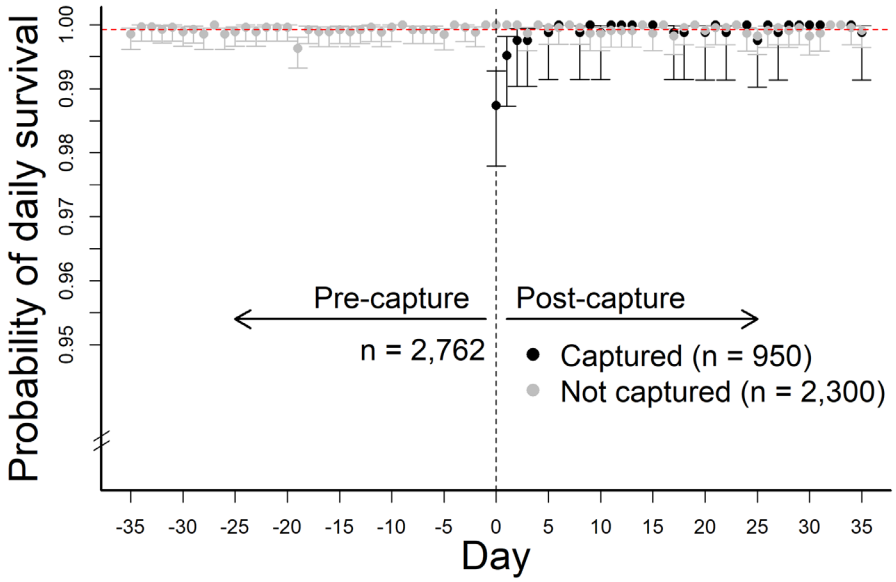


Cause of mortality for the lambs captured in the summer of 2019 and 2020.

We captured 20 lambs (11 in Whiskey and 9 in Jackson) during the 2020 summer. Consistent with our findings last year, causes of mortality such as predation, abandonment, and accidents occurred within the first two weeks of life. We observed more predations this year than last year. In some of these predation cases, however, the lambs were likely more vulnerable because of underlying pneumonia. Later in the summer, pneumonia has been the primary cause of mortality. Almost all the pneumonia deaths were in the Whiskey herd, with one exception that occurred in the Jackson herd in early October.

How does helicopter net-gunning affect survival of bighorn sheep?

Wildlife capture, and the data collection associated with it, has led to major advancements in ecology that are integral to decision making pertaining to wildlife management. Capturing wildlife, however, can incur lethal and non-lethal risk to animals. To better understand the risk associated with wildlife capture, we are utilizing nearly 20 years of capture data to identify how long and to what extent helicopter net-gunning affects survival of bighorn sheep. Additionally, we will evaluate what biological and handling techniques affect probability of capture mortality, such as nutritional condition, age, season of capture, and recaptures. Overall, mortality effects of capture are very low, and short-lived, reinforcing the usefulness of this tool in wildlife research. This project is in collaboration with the Sierra Nevada Bighorn Sheep Recovery Project.



Survival of bighorn sheep capture declines subtly on the day of capture (day 0) and returns to pre-capture levels within 3-days.

Processing a sheep, weighing about 130 pounds, after snowmobiling 20 miles into the staging area. These were the first captures to investigate the high-elevation residents. Photo by M. Gocke.

Next steps

We will continue intensive summer habitat work and monitoring lamb survival in the Whiskey Mountain and Gros Ventre herds through 2021. This March we hope to catch ewes in an additional segment of the Whiskey herd that are high-elevation residents in our study. This segment of the Whiskey herd stays at high elevations year-round, instead of migrating to a lower elevation in the winter like the rest of the herd. Based on herd composition surveys done by Wyoming Game and Fish, the high elevation residents have much higher rates of lamb survival than the elevational migrants. Consequently, the story of the sheep that remain at high elevations may hold powerful insight into understanding how disease, nutrition, or predation dynamics affect this segment of the herd. Such understanding could shed light into potential solutions for the Whiskey Mountain herd. Indeed, to fully comprehend population dynamics and the interaction among density, nutrition, disease and migration in the Whiskey Mountain herd, there is insightful power in including animals from the segments of the population that seem to have better performance.

Our Team

This project is led by master's student Brittany Wagler and PhD student Rachel Smiley. Rachel recently switched from a master's student to a PhD student. Congratulations, Rachel!

Brittany

Rachel

Partners & Collaborators

The Northwest Wyoming Bighorn Sheep Project benefits from being highly collaborative in development, operations, and funding. We fortunate to partner with the Wyoming Game and Fish Department and the Wyoming State Veterinary Laboratory, a collaboration through which we can pull expertise from managers, disease specialists, and ecologists. Funds have been provided by the Wyoming Game and Fish Department, Wyoming Game and Fish Commission, Wyoming Wildlife and Natural Resource Trust, National Wild Sheep Foundation, Wyoming Wild Sheep Foundation, Wyoming Governor's Big Game License Coalition, Bureau of Land Management, Wyoming Animal Damage Management Board, Wyoming Wildlife Livestock Disease Research Partnership, Teton Conservation District, and Bowhunters of Wyoming Inc. Special thanks to the Wyoming Game and Fish Department, United States Forest Service, Wyoming State Veterinary Lab, and the Pinto Ranch for assistance with logistics, lab analyses, field housing, and fieldwork.

2020 - JCR Evaluation Form

SPECIES: Mountain Goat
HERD: MG101 - PALISADES
HUNT AREAS: 2, 4

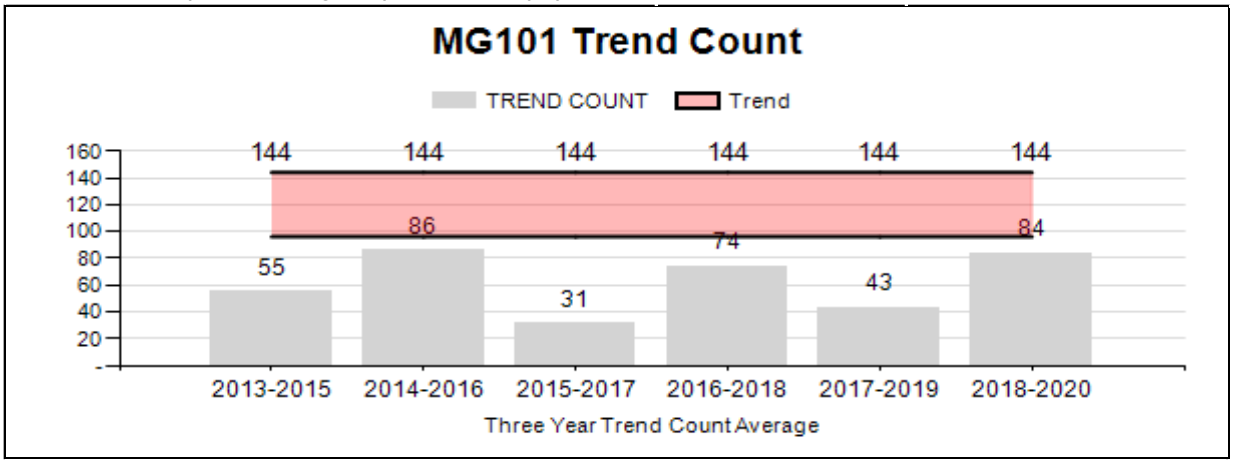
PERIOD: 6/1/2020 - 5/31/2021
PREPARED BY: GARY FRALICK

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	111	122	0
Harvest:	14	18	18
Hunters:	18	48	48
Hunter Success:	78%	38%	38 %
Active Licenses:	18	48	48
Active License Success	78%	38%	38 %
Recreation Days:	94	364	375
Days Per Animal:	6.7	20.2	20.8
Males per 100 Females:	0	0	
Juveniles per 100 Females	33	34	

Trend Based Objective (± 20%)	120 (96 - 144)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	2%
Number of years population has been + or - objective in recent trend:	3

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

	JCR Year	Proposed
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%



2021 HUNTING SEASONS
PALISADES MOUNTAIN GOAT HERD (MG101)

Hunt Area	Type	Archery Dates Opens	Archery Dates Closes	Season Dates Opens	Season Dates Closes	Quota	Limitations
2	1	Aug. 15	Aug. 31	Sep. 1	Oct.31	8	Any mountain goat
4	A	Aug. 1	Aug. 14	Aug. 15	Nov.15	48	Any mountain goat

2020 Hunter Satisfaction: NA

2021 Management Summary

1.) Hunting Season Evaluation: In Area 2 a total of eight (8) licenses, valid for any goat, are proposed to be issued in 2021. The season will run September 1 – October 31. The number of licenses issued will be similar to levels issued since 2017 and reflects a population dynamic that remains within the management trend count threshold of 120 (+/- 20%) mountain goats. Management emphasis in Hunt Area 4 will remain the elimination of mountain goats from the Teton Mountain Range. Licenses issuance will remain similar to 2019 (n=48 licenses). A total of 49 licenses were issued in 2020 that included one medical deferment from 2019.

2.) **Management Objective Review:** The Palisades mountain goat mid-summer trend count objective is 120 goats, and was established by the Wyoming Game and Fish Commission in 2015. The population objective was reviewed in 2020 and felt to be achievable and appropriate. It is important to note that mountain goats are not desired in Hunt Area 4, and therefore any goats found there are not counted toward the objective of 120.

3.) **Herd Unit Evaluation**: A midsummer trend count was conducted in August 2020. This survey was conducted from a helicopter and is a collaborative and concurrent effort with Idaho Department of Fish and Game to survey the Snake River Range mountain goat population. The Palisades herd offers hunters the opportunity to harvest trophy class billies that typically are at least 5 years old. Management goals of the Wyoming subpopulation have focused on maintaining a flexible management approach through the annual issuance of 4 – 12 licenses valid for any goat since 1999. This approach has resulted in a high degree of hunter satisfaction, exceptionally high hunter success, low days/animal harvest, and trophy class males being taken in most years since the hunt was initiated in 1999.

The 2020 hunting season was the 22nd year that goats were hunted in Area 2. A total of eight (8) licenses were issued, and seven goats were harvested. A total of five billies and two nannies were harvested. Since 1999, a total of 150 mountain goats (126 billies, 24 nannies) have been harvested in Hunt Area 2, and 84% and 16% of the total harvest during that period has been comprised of billies and nannies, respectively. In Area 4, a total of 49 hunters harvested 11 mountain goats. Hunter success in Area 4 was reported at 27%.

2020 - JCR Evaluation Form

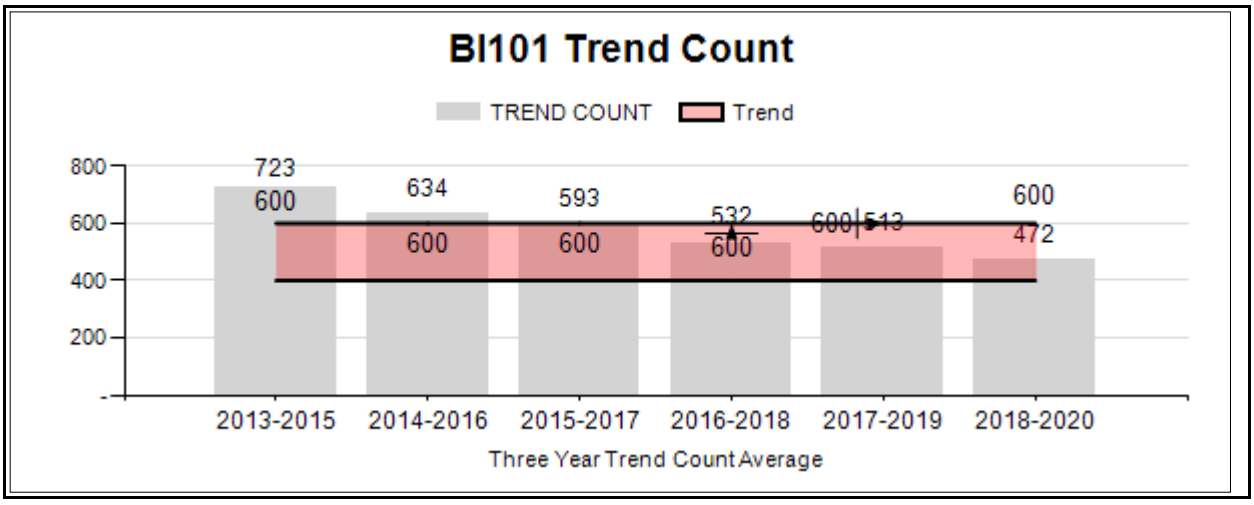
SPECIES: Bison
PERIOD: 6/1/2020 - 5/31/2021

HERD: BI101 - JACKSON

HUNT AREAS: 2
PREPARED BY: ALYSON COURTEMANCH

	2015 - 2019 Average	2020	2021 Proposed
Trend Count:	550	443	500
Harvest:	147	109	100
Hunters:	202	161	150
Hunter Success:	73%	68%	67%
Active Licenses:	202	161	150
Active License Success	73%	68%	67%
Recreation Days:	1,487	1,461	1,000
Days Per Animal:	10.1	13.4	10
Males per 100 Females:	113	79	
Juveniles per 100 Females	49	49	

Trend Based Objective (± 20%)	500 (400 - 600)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	-11.4%
Number of years population has been + or - objective in recent trend:	2



2021 HUNTING SEASONS
JACKSON BISON HERD (BI101)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
2	1			Aug. 15	Jan. 1	125	Any wild bison; also valid in Area 1 within the Clark's Fork River and Soda Butte Creek drainages. Valid in other portions of Area 1 upon notification and authorization by the Department
2	1			Jan. 2	Jan. 31		Any wild bison. Limited alternate permits for the National Elk Refuge may be available through the Department's Jackson Regional Office on a first-come first-served basis until the season closes or forage/weather conditions dictate that supplemental feeding is necessary
2	4			Aug. 15	Jan. 1	25	Any female or calf wild bison; also valid in Area 1 within the Clark's Fork River and Soda Butte Creek drainages. Valid in other portions of Area 1 upon notification and authorization by the Department
2	4			Jan. 2	Jan. 31		Any female or calf wild bison. Limited alternate permits for the National Elk Refuge may be available through the Department's Jackson Regional Office on a first-come first-served basis until the season closes or forage/weather conditions dictate that supplemental feeding is necessary

2021 Management Summary

1.) Hunting Season Evaluation: The 2021 hunting season remained similar to 2020. Type 4 licenses were reduced by 25 due to a declining population trend below 500 bison in the last few years. Four hundred and forty-three (443) bison were classified during the 2020 mid-winter trend count. A large proportion of the herd was found on native winter ranges in Grand Teton National Park (GTNP) and about a third of the herd was on supplemental feed on the National Elk Refuge. This is the third winter that the majority of the herd has stayed on native winter range, which may be leading to an increase in over-winter mortality. Ninety-five calves were classified during the mid-winter trend count, meaning that an annual harvest of about 100 bison will hold this population stable or slightly decrease. Annual harvest over the past 3 years has been 109 bison (2020), 92 (2019), and 91 (2018). Average age of harvested bison in 2020 was 6.5 years for males (max = 17.5) and 7.5 years for females (max = 13.5).

In the past when the Jackson Bison Herd was above objective, hunter success was commonly 80-98% success. During the past three years when the herd has been close to the 500 objective, hunter success has been lower (50-63% success). This is because the majority of bison harvest (and nearly all of the cow/calf harvest) occurs when bison migrate to the National Elk Refuge. For the past four years, this migration has happened very late in January. This uncertainty of the timing of the migration has been frustrating for hunters. Managers are limited in their options to increase hunter opportunity because the majority of the herd resides within GTNP during the hunting season. Managers opted to offer mostly Type 1 licenses in 2021 to allow hunters to have opportunity for any bison that may cross the GTNP boundary onto National Forest in the open hunt area. The Department worked with GTNP in 2020 to allow additional bison retrieval routes from the open hunt area on Bridger-Teton National Forest to parking areas in GTNP.

2.) Management Objective Review: The next objective review is scheduled for 2024.

2020 - Jackson Region Disease Monitoring/Management

PREPARED BY: BEN WISE PERIOD: 6/1/2020-5/31/2021

Wildlife disease management and mitigation is an integral part of supplemental elk and bison feedground management in the Jackson Region of the Wyoming Game and Fish Department (WGFD). Numerous disease issues are exacerbated by supplemental feeding of wildlife and wildlife managers in western Wyoming attempt to make all efforts to limit disease transmission, morbidity and mortality.

Brucellosis Mitigation and Management

Brucella abortus, a gram negative bacterial infection is the causative agent for the disease Brucellosis. Brucellosis is a mammalian bacterial disease that has been endemic in the Greater Yellowstone Ecosystem (GYE) since the early 1900's. The main route of transmission of this disease is via physical contact with infected reproductive materials (aborted fetuses, placenta, amniotic fluids, live born fetuses, etc.) during the transmission period (February 15-June 1). Both the primary transmission route and transmission period were determined and validated through work that was partially undertaken by the WGFD's Brucellosis-Feedground-Habitat (BFH) section from the mid 1980's through 2018. Along with the information that was collected on what transmission in the environment looks like, several Best Management Practices (BMP) were developed in an effort to slow the rate of transmission of brucellosis in feedground settings. Due to the increased risk of disease proliferation in the feedground systems of western Wyoming, several of these practices have been adopted (referred to as the "Target Feedground Plan") at various levels of success in an effort to reduce and control communicable diseases both within wildlife and among livestock populations in the region. For the 2020-2021 feeding season, the following brucellosis (and overall wildlife disease) management efforts were implemented.

Brucellosis Surveillance

During the winter of 2020-2021, the Jackson Regional Disease Biologist captured elk using both chemical immobilization and corral traps at feedgrounds to deploy GPS collars on elk for brucellosis investigations and to continue long term brucellosis seroprevalence trend data. Conditions this winter began mild but the Jackson Region experienced near record snowfall amounts in February, resulting in a later than average overall feedground start date and reduced feedground participation by elk in the Fall Creek and Afton elk herd. As part of a regional surveillance plan, the Afton Elk Herd was the priority surveillance herd for 2021. This effort included trapping elk at Greys River feedground (last statistically significant sample effort in 2019) and Forest Park feedground (last statistically significant sampling effort in 2013). Two trapping efforts were also undertaken in the Jackson elk herd in order to deploy collars and collect baseline monitoring as the National Elk Refuge (NER) begins implementation of the

Bison and Elk Management Step-Down Plan, as well as monitoring movements of Gros Ventre wintering elk. About 370 total elk were handled this winter at seven locations, including trapping about 350 animals on Fish Creek, NER, Greys River and Forest Park feedgrounds and darting 15 elk on feed lines. A total of 54 collars and were deployed on elk in the Jackson Region in 2021. In total, 186 yearling and adult cows were bled, feedground serology data available below (Figure 1).

Feedground	Capture Method	GPS collars deployed	# Captured	# Tested	% Prevalence	Long Term Sero % (total tested)
National Elk Refuge	Trap	21	66	47*	27.66%	34% (2071)
Greys River	Trap	4	109	44*	20.45%	33% (1430)
Forest Park	Trap	15	71	36*	27.78%	25% (363)
Fish Creek	Trap	0	108	44*	27.27%	30% (241)
South Park	Dart	3	3	3	33.33%	30% (270)
Dog Creek	Dart	4	5	5	80.00%	56% (68)
Camp Creek	Dart	3	3	3	66.67%	44% (88)
Buffalo Valley	Dart	3	3	3	66.67%	50% (6)
Horse Creek	Dart	1	1	1	0.00%	44% (132)
Totals =		54	369	186	28.49%	

Figure 1. Elk capture and testing information, 2020-2021 winter. *statistically significant *n* for estimated prevalence to be within +/- 15% of true prevalence

Target Feedground Plan

- Low Density Feeding: Low Density (LD) Feeding is a technique that was developed and validated by the BFH crew in the late 2000's in an effort to reduce contact (and subsequent transmission risk) between elk on supplemental feed. LD feeding has been shown to reduce contacts with aborted fetuses by 66-75% and is a cost effective method to directly reduce brucellosis prevalence among elk attending feedgrounds, and indirectly reduce risk of brucellosis spillover into livestock. The basic idea behind this technique is to distribute the hay in a uniform pattern across the feeding area, which reduces the linear travel of elk on feedlines. When done correctly the feedground looks similar to a checkerboard, allowing an individual animal up to eight potential paths of travel to move between hay piles as opposed to a linear feeding (traditional) system where there are only two directions of travel on the feed lines. Where applicable, the Jackson Region has implemented LD feeding to varying degrees throughout the region and where this techniques is utilized effectively, brucellosis seroprevelance appears to be decreasing. In an effort to better implement LD feeding on feedground utilizing mechanized feeding, two (2) Square Spinner square bale feeders were used at South Park and Horse Creek Feedgrounds in 2020-2021. This new feeding equipment allows for LD feeding and a better overall ability to spread elk out and utilize more feeding area compared to other equipment used in the past.

- Early End Dates: In conjunction with LD feeding, early supplemental feeding end dates has been shown to also reduce brucellosis transmission on feedgrounds (and subsequently reduce brucellosis infection rates among attending elk). Research by the WGFD has found that the rate of elk abortion due to brucellosis on feedgrounds peaks in March, April and May, so the earlier in spring that managers can encourage elk to free range, the less the chance for elk to become exposed to the disease on a crowded feedground. However, to end feeding as early as possible there must be sufficient native forage available for the elk so they remain in good health, and the risk of elk causing damage to stored crops or co-mingling with cattle must be very low. Based on more than 35 years of WGFD feedground data, over 50% of the variation in brucellosis seroprevalence among elk attending feedgrounds can be explained by the end date of the feeding season (the later into spring a feedground operates, the higher brucellosis prevalence is), and truncating feeding seasons, where possible and if successful, should lead to long term decreases in brucellosis prevalence over time.

The 2020-2021 winter in the Jackson region could be classified as mild with below average snowfall and an earlier that average melt out and green up. Conditions prior to the initiation of feeding in the Jackson Region were colder than average with little to no snow fall/snow pack through the month of January. Near record snowfall occurred during the month of February, increasing overall mountain and valley snowpack. Below average snowfall for the month of March coupled with a warming trend toward the end of the month allowed for the early termination of supplemental feeding at throughout the region. Due in part to the truncated feeding season and reduced attendance of elk to supplemental feeding (Figures 2-4), overall winter mortality documented within the feedground system was below average and no large scale mortality events on feedgrounds were observed during the 2020-2021 feeding season.

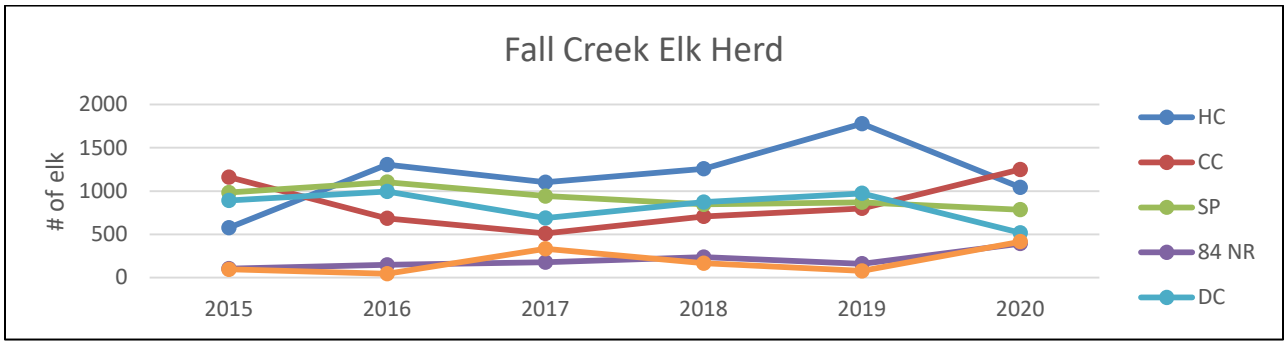


Figure 2. Total number of elk classified by location and year for the Fall Creek Elk Herd from 2016-2020. HC=Horse Creek Feedground, CC=Camp Creek Feedground, SP=South Park Feedground, DC=Dog Creek Feedground, 84 NR=Native winter range in Area 84.

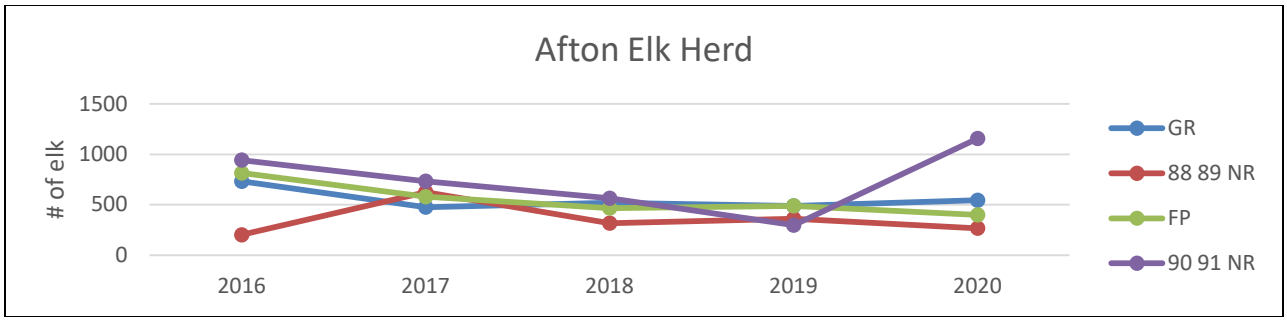


Figure 3. Total number of elk classified by location and year for the Afton Elk Herd from 2016-2020. GR=Greys River Feedground, FP=Forest Park Feedground, 88 89 NR=Native winter range in Area 88-89, 90 91 NR= Native winter range in Areas 90-91.

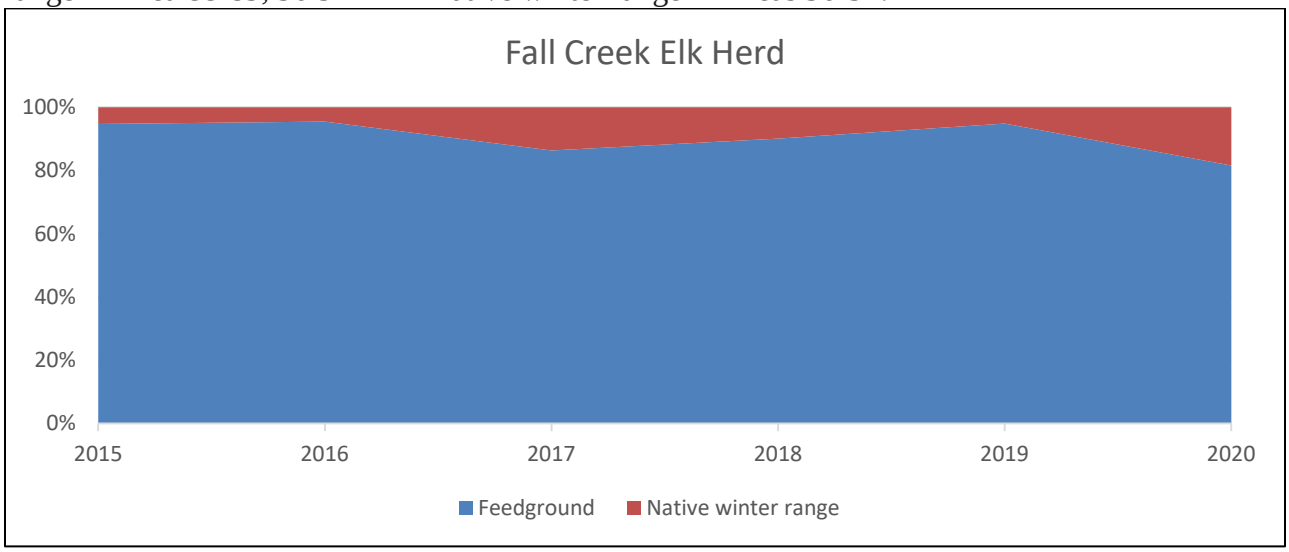


Figure 5. Percentage of elk classified on feedgrounds and native winter ranges in the Fall Creek Elk Herd, 2015-2020.

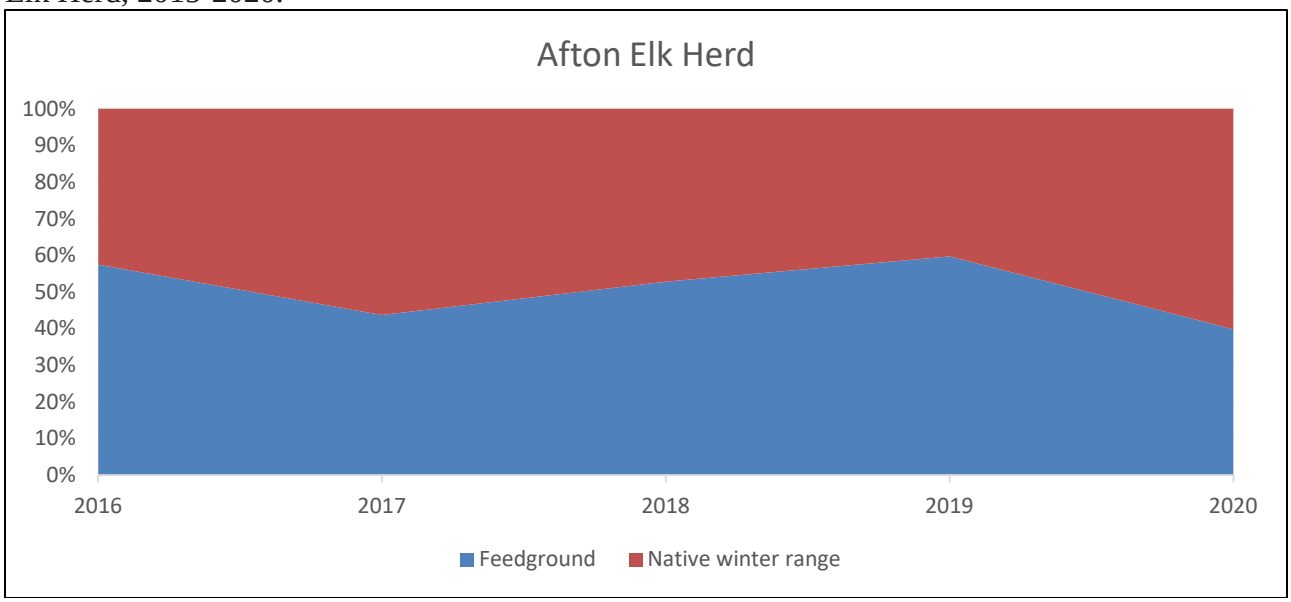


Figure 5. Percentage of elk classified on feedgrounds and native winter ranges in the Afton Elk Herd, 2015-2020.

The Wyoming Game and Fish Department (WGFD) conducted Chronic Wasting Disease (CWD) surveillance in the Jackson elk herd and adjacent elk, deer, and moose herds during the 2020 hunting seasons. The highest yielding method of collecting biologic samples for subsequent CWD testing in the Jackson region comes from partnerships with local meat processors as well as hunter contacts in the field, especially those within Grand Teton National Park (GTNP) and the National Elk Refuge (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/GTNP law enforcement, GTNP biological staff, 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 required 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 are obtained though the cooperation of the local game meat processor (Matts Meats – Jackson). Employees save heads along with harvest date, location, and hunter contact information, which are retrieved 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 road-killed and hunter harvested animals within the Park. With increased interest in CWD testing over the last several years in the Jackson Region, a concerted effort has been made to educate and train the hunting public how to collect and submit samples collect from their own harvested animals. This educational effort includes providing public wildlife disease workshops in the region including sampling demonstrations, training interested individuals on a one-on-one basis and distributing sampling supplies to individuals upon request.

Personnel at the WGFD Wildlife Health Laboratory use the IDEXX enzyme-linked immunosorbent assay (ELISA) to analyze lymph node samples for CWD. Any IDEXX-positive samples would then be confirmed with the Bio-Rad ELISA. Samples positive on both ELISAs would be confirmed by immunohistochemistry. Results are reported to hunters typically within three weeks of sample submission. Hunters can obtain results by accessing the Department's web site, and hunters that submit a positive sample are personally notified via phone and letter.

The WGFD collected and tested a total of 1127 lymph nodes from 947 elk, 165 deer, and 15 moose for CWD within the Department's Jackson Region in 2020 (specific hunt areas (HA) are listed in Tables 2-4). One (1) new CWD case in the Jackson Region was detected during the 2019 hunting season; an adult female elk was harvested by a hunter in GTNP during the Elk Reduction Program (ERP) in December, and subsequently sampled by GTNP personnel. Detailed sampling efforts from specific geographic areas follow.

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 (est)	% 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	11,000	2.25%	1768	13.97%
2015	301	11,200	2.69%	1183	25.44%
2016	558	10,766	5.18%	1482	37.65%
2017	394	10,877	3.58%	1144	34.44%
2018	365	9,627	3.97%	1336	27.32%
2019*	223	10,985	2.03%	791	22.76%
2020*	718	10,734	6.69%	1304	55.06%

*** Mandatory surveillance GTNP and NER**

Jackson elk herd, Sublette deer (North Jackson)

During the surveillance year (April 1-March 31) 2020, WGFD collected 718 lymph nodes from elk sampled within the Jackson elk herd (HAs 70-83; Tables 1-2). HAs 75 and 77 comprised the majority of samples, and the most effective means of sample collection was through field contacts (i.e., approaching hunters with downed animals and removing lymph nodes in the field; Figure 1). The high proportion of samples obtained via field contacts emphasizes the importance of having trained personnel in the field every day. Head-drop barrels were only moderately successful in gathering samples; many hunters make use of the barrels only if they have been contacted previously in the field by department personnel. An additional 36 samples from the Jackson herd were collected from targeted elk or feedground mortalities, the majority of which were collected on the NER during feeding operations January-March 2021.

A total of 26 samples were collected from deer within the area of the Jackson elk herd (Table 3). A substantial proportion of the contributions to the overall deer sample size came from field contacts made by WGFD staff and samples collected by hunters and returned to the Jackson

Regional Office. The majority of deer harvested in this area are typically bucks killed in backcountry areas. Whole carcasses and intact heads are rarely encountered during field checks, limiting opportunities for collecting testable lymph nodes.

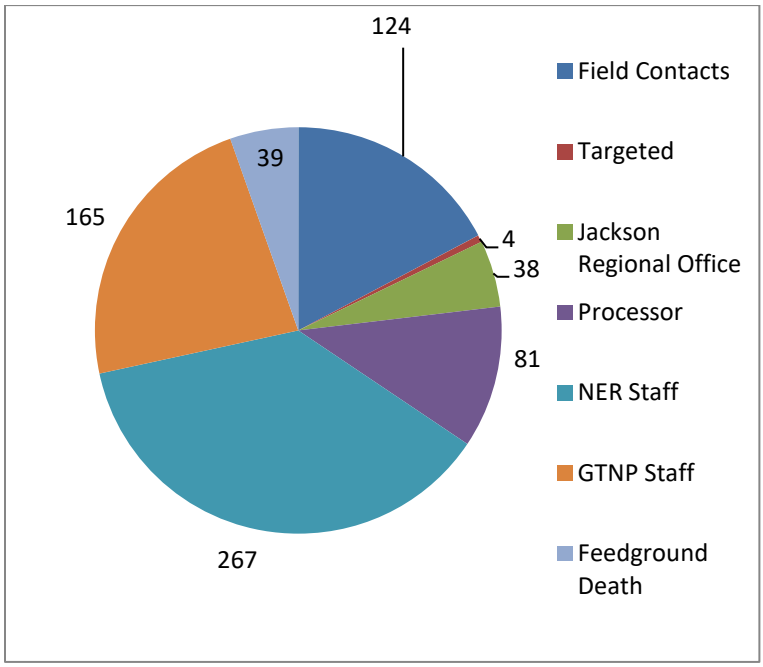


Figure 1. Collection method of 718 total elk CWD samples obtained in the Jackson elk herd, 2020.

Fall Creek elk herd, Sublette deer (South Jackson)

Elk HAs 84 and 85, covering the Snake River Range and much of the lower Hoback River basin, make up the Fall Creek elk herd (Figure 2, Table 2). Samples were collected from 138 elk in this herd, the majority of which came from hunter-killed animals. Deer HAs 151 and 152 correspond to the area covered by the Fall Creek elk herd (Table 3). In 2020, we collected 34 total CWD samples from deer in these areas. A significant proportion of samples came from opportunistically sampling road-killed animals and collecting samples from local area processors.

Afton elk herd, Wyoming Range deer (Salt and Greys Rivers)

Elk HAs 88, 89, 90, and 91 comprise the Afton elk herd (Table 2). In 2019, the Afton Elk Herd was identified as a priority CWD sampling herd by the internal CWD Management Team, with the goal of collecting at least 200 CWD samples from the herd in order to more accurately analyze disease data (can be collected over multiple years). A total of 86 samples were collected this year, primarily from hunter-killed animals collected at the Alpine Check Station. Jackson wild game processors, taxidermists and field checks also contributed in attaining these samples. Deer HAs 144 and 145 correspond to the area covered by the Afton elk herd (Table 3). The majority of samples obtained from these areas were pulled from carcasses that came through the hunter check station set up on the Greys River road in Alpine. The check station was attended by WGFD personnel during approximately 10 days of anticipated heavy hunter-traffic. A total of 84 samples were collected in deer HAs 144 and 145 in 2020.

Jackson region moose

A total of 15 moose were sampled in the Jackson Region during 2020 (Table 4). One (1) moose sample was obtained in 2020 from HA 23, considered "CWD endemic" because of a single positive moose euthanized there in 2008. Thirty-Three percent (33%) of all moose samples (5 of 15) obtained were from road-killed animals. Five (5) hunter-harvested moose samples from the Sublette Moose herd were collected and one (1) from the Jackson Moose Herd, reflective of the reduced number of tags issued in these herds due to declining populations. Three (3) moose was removed by WGFD personnel due to injury/illness during 2020.

Table 2. Elk samples tested for CWD collected in the Jackson Region, 2020.

ELK						
	Hunt Area	**Hunter-Killed**	**Targeted**	**Feedground Death**	**Road killed**	**Total**
Jackson Elk Herd	70					0
	71	4				4
	72					0
	73	1				1
	74					0
	75	177	1			178
	77	400		39		439
	78	33	2		1	36
	80	41	2			43
	81	8	2			10
	82	6	1			7
	83					0
	Total	**670**	**8**	**39**	**1**	**718**
Fall Creek Elk Herd	84	86	5	8	10	109
	85	24	1	3	1	29
	Total	**110**	**6**	**11**	**11**	**138**
Afton Elk Herd	88			2		2
	89	61	1			62
	90	7				7
	91	15				15
	Total	**83**	**1**	**2**	**0**	**86**

Table 3. Deer samples (mule and white-tail) tested for CWD in the Jackson Region, 2020.

DEER					
	Hunt Area	**Hunter-Killed**	**Targeted**	**Road killed**	**Total**
Sublette Deer - North Jackson	148	5	1		6
	150	1	3	3	7
	155	3	1	1	5
	156	8			8
	GTNP				0
	Total	**17**	**5**	**4**	**26**
Sublette Deer - South Jackson	151	9		3	12
	152	10	3	9	22
	Total	**19**	**3**	**12**	**34**
Wyoming Range Deer - Salt and Greys River	144	63		1	64
	145	8	1	11	20
	Total	**71**	**0**	**1**	**84**

Table 4. Moose samples tested for CWD in the Jackson Region, 2020.

MOOSE					
MOOSE					
	Hunt Area	**Hunter-Killed**	**Targeted**	**Road killed**	**Total**
Jackson Moose	16/37	1	1		2
	17				0
	18	1			1
	19		2		2
	GTNP				0
	Total	**2**	**0**	**0**	**5**
	Hunt Area	**Hunter-Killed**	**Targeted**	**Road killed**	**Total**
Sublette Moose	20	3	4	2	9
	21				0
	23	1			1
	Total	**4**	**4**	**2**	**10**

* Moose Area 16 is located in Targhee Moose but included in Jackson Moose data for brevity.

Preliminary Results for 2020-2021 Jackson and Sublette Moose Herd Health Assessment

SUMMARY OF FINDINGS

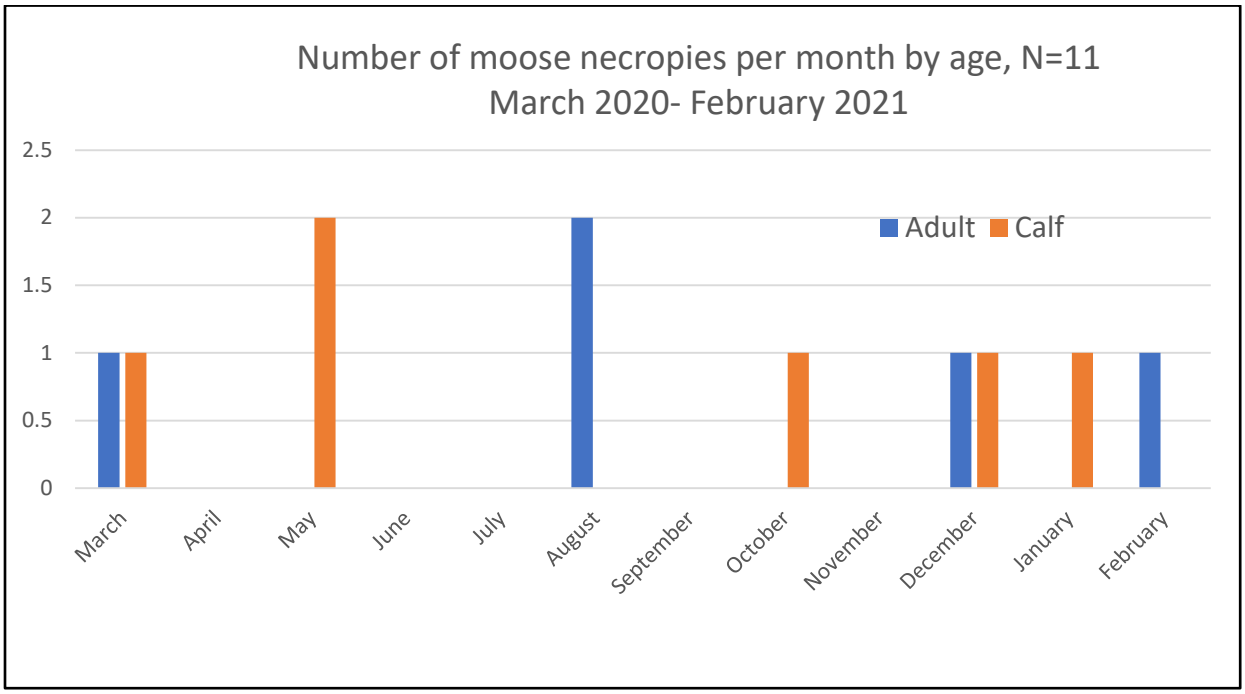
A three-year collaborative study is being conducted on moose heath and winter ticks with Wyoming Game and Fish Department (WGFD), Veterinary Initiative for Endangered Wildlife (VIEW), Montana State University (MSU) and US Geological Survey (USGS). This project began in response to a larger moose mortality event in the winter of 2018-2019 where approximately 30 moose died in the greater Jackson area. Parasitism (Winter ticks, arterial worm, etc.), climactic variables, predation and other factors have influenced moose populations across the country, yet little is known about the population wide health of the Jackson and Sublette herds. After year one, information has been found in regard to winter ticks and other diseases prevalence. Through rigorous necropsies, we have identified several mortality factors, including high parasite loads (winter tick, arterial worms) with poor body condition, infectious disease, trauma and possible toxin.

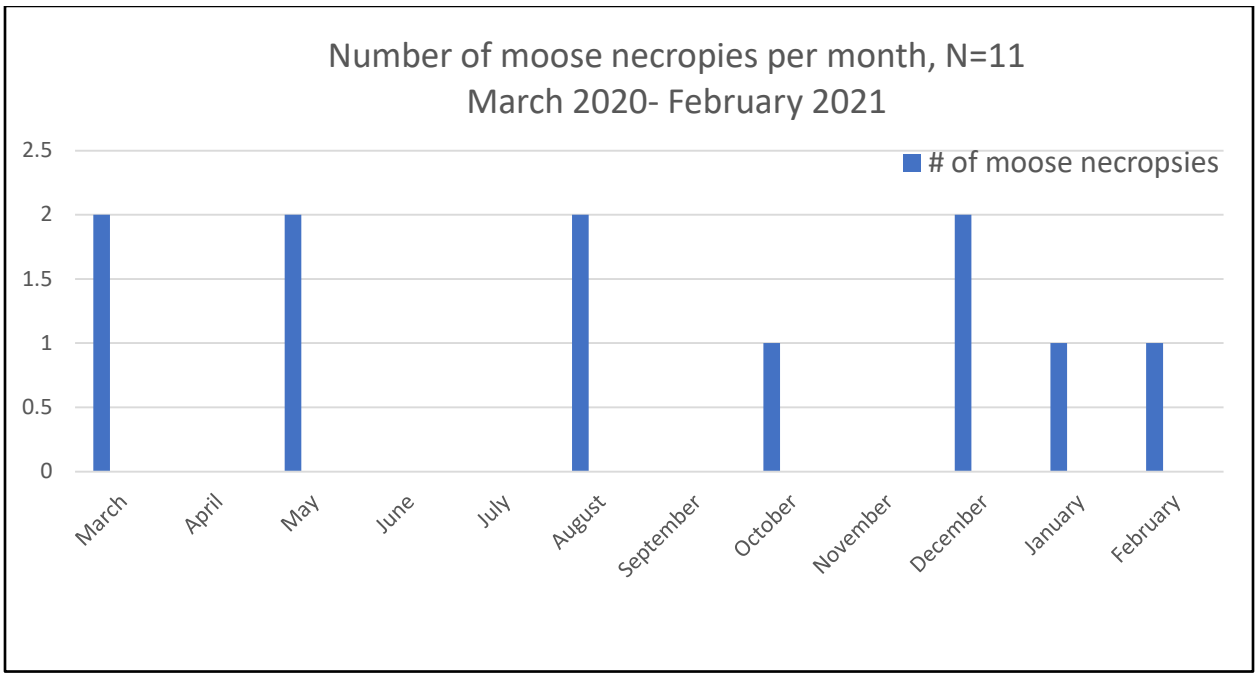
The objective of this project is to develop a heard health assessment for a variety of pathogens, with an emphasis on winter tick (*Dermacentor albipictus)* and arterial worm (*E. schneideri),* for the Jackson and Sublette County Shiras moose populations, through live animal sampling and necropsies. Our preliminary results evaluated six live moose and eleven necropsied moose in the area. Our live moose results conclude that there is exposure in the herd to several pathogens that may or may not be causing morbidity, including *Anaplasma*, Bovine viral diarrhea virus 1 &2, Parainfluenza virus 3, and West Nile virus. Parasitic diseases, both endo and ecto parasites include *Capillaria* sp., and *Dermacentor albipictus.* On live animal captures there was a moderate tick burden on most moose, further assessment is being conducted by MSU.

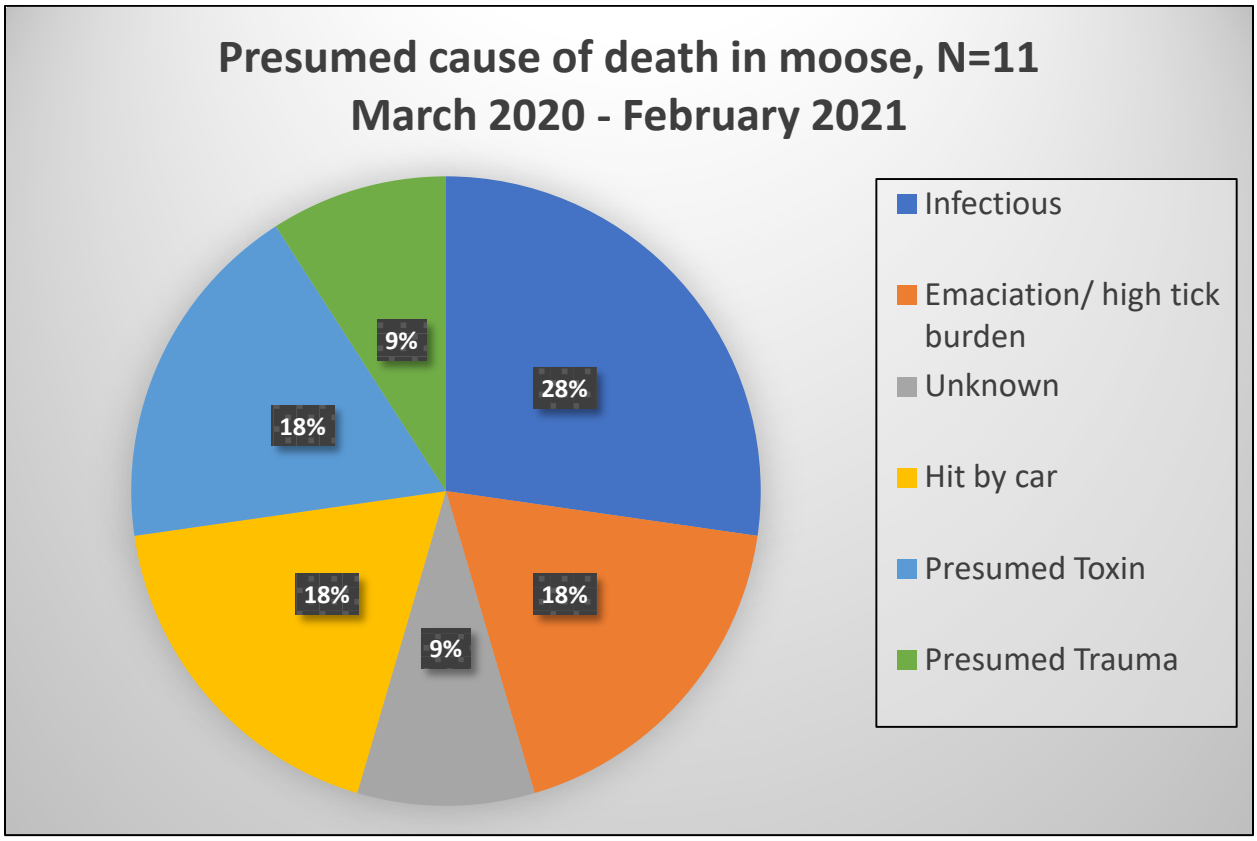
Eleven moose were necropsied during the year. Results conclude that there was exposure to *Anaplasma* and fecal exam results included *Nematodirus* sp., *Dictyocaulus* sp., *Protostrongylus* sp. *E. schneideri* was found in 2/11 moose on gross examination. Lungworms were found in 1/11 moose. One of the collared moose (Yellow 22) was found as a skeleton and a necropsy was not able to be performed. *Dermacentor albipictus* was found on all moose, but results varied due to condition of the carcass, side the carcass was on and movement of the ticks post-mortem.

Most of the deaths occurred during the winter months. Out of the eleven moose that died, six were calves and five were adults. Several causes of death were identified in the study, 28% died due to infectious disease, 18% due to emaciation with high tick burden, 18% due to vehicular trauma, 18% from a presumed toxin, 9% due to unknown cause, and 9% due to presumed trauma. In the infectious disease category one moose died from pericarditis, one calf from sepsis with parasitic infection and a high tick burden and the last one from pneumonia/ endocarditis/ sepsis. The presumed toxin in these cases was antifreeze from a bucket in someone’s yard. Our

results conclude that calves are more susceptible to winter ticks having a significant impact on mortality than adults.






Presumed cause of death in moose, N=11
March 2020 - February 2021
28%
18%
9%
18%
18%
9%
Infectious
Emaciation/ high tick burden
Unknown
Hit by car
Presumed Toxin
Presumed Trauma

Fall 2020 Jackson Winter Tick Project Report

Image 1: Photograph of moose calf in R Park courtesy of Zach Andres (@zandres87 on Instagram)

Summary

Winter ticks (*Dermacentor albipictus*) are a potential threat to the ~500 moose that call Jackson Hole home, so in 2020 researchers with USGS, WGFD, GTNP, and Montana State University initiated several projects to better understand winter tick-moose interactions in the area. In August 2020 researchers began the Jackson Winter Tick Project to regularly sample for winter ticks at 25 private residences and 10 BLM or county-owned properties in Wilson as well as sites in Grand Teton National Park (GTNP) and Bridger-Teton National Forest-Blackrock District (BTNF). Researchers sampled >36 km of tick and moose habitat every month, the equivalent of walking along the NER road from Jackson to Twin Creek Ranch seven times or walking along HWY 191 from Jackson to Moose!

From August-November researchers collected **>7,000 winter ticks**, **67% from grasses/forbs** (avg height: 18 inches), **19.4% from non-willow shrubs** (avg height: 23 inches), and **13.6% from willow** (avg height: 33 inches). Ticks were first detected on September 21st and detection ended November 24th at which point <5 ticks were detected per site. Similar numbers of ticks were detected from sites in GTNP and BTNF vs sites in

Wilson. Knowing when winter ticks are active and what habitat they are associated with can help moose managers target their efforts to reduce moose exposure to this potentially dangerous parasite. Thank you very much for your support during the first year of the Jackson Winter Tick Project, without your participation this valuable information could not have been collected.

Images 2 & 3: On the left is a picture of a single winter tick larvae next to a fine point Sharpie marker. On the right is an image of >12 winter tick larvae questing on a Goldenrod leaflet; winter tick larvae tend to cluster on vegetation like this as a large ball or 'bomb' with hundreds of larvae grouped together! 'Questing' refers to host-seeking behavior, which for winter ticks involves climbing up to the top of a blade of grass or shrub as a cluster and waiting for a host (typically moose, elk, mule deer) to pass by. Photos courtesy of Zach Andres.

Future Projects:

We will be continuing projects researching moose-winter tick interactions into 2021 and would welcome any additional support you may be able to provide. The following is an outline of anticipated projects and ways you can help:

1. Winter tick deployment study

We would like to learn more about the climate conditions (temperature, humidity, UV exposure) that control winter tick larvae survival in different habitat types. This project will involve deploying ~20 engorged female ticks (ticks filled with blood) in a habitat on a property inside a small 1x1 meter enclosure fence and an attached climate condition measurement tool. The enclosure would be erected in late April and stay in place all summer until researchers would arrive September-November to collect larvae. If you are interested, please email me at tkoser@usgs.gov!

- Participation needed: Volunteer property owners to allow researchers to deploy winter ticks and collect larvae.

2. Non-invasive moose health study

The residential moose that frequent homes around Wilson may be experiencing health issues, but we are still unsure how much of a role winter ticks may be playing. We are looking for help from Wilson residents to collect snow urine and fecal samples as well as take pictures of local moose to determine body condition and hair loss. All sampling would take place April 15th - May 31st. If you are a member of Jackson Hole Wildlife Foundation, then you can simply upload moose pictures to their Nature Mapping platform, if you are not then you can contact me, Troy Koser (tkoser@usgs.gov), and I can provide sampling equipment and a location to upload moose photos. If you are interested, please email me at tkoser@usgs.gov!

- Participation needed: Snow urine and fecal samples collected from moose around Wilson between April 15th and May 31st. Also needed are photographs of moose during this time period.

Table 1: Total ticks collected in different habitat types across GTNP and BTNF from August-November. Habitat type refers to the dominant vegetation type present at the site while vegetation refers to the specific vegetation available for winter ticks to quest upon.

Region	**Location Type**	**Habitat Type**	**Vegetation for questing ticks**	**Total Ticks**
North (Public Lands)	National Park/National Forest	Sagebrush	-	300
North (Public Lands)	National Park/National Forest	Willow	-	701
North (Public Lands)	National Park/National Forest	Conifer	Shrub	45
North (Public Lands)	National Park/National Forest	Conifer	Grass/forb	1357
North (Public Lands)	National Park/National Forest	Cottonwood	Shrub	-
North (Public Lands)	National Park/National Forest	Cottonwood	Grass/forb	141
North (Public Lands)	National Park/National Forest	Aspen	Grass/forb	-
North (Public Lands)	National Park/National Forest	Aspen	Shrub	1160
TOTAL				**3704**

Table 2: Total ticks collected in different habitat types across residential and public properties in Wilson from August-November. Habitat type refers to the dominant vegetation type present at the site while vegetation refers to the specific vegetation available for winter ticks to quest upon.

Region	**Location Type**	**Habitat Type**	**Vegetation for questing ticks**	**Total Ticks**
South (Private and Public Lands)	Residential Properties	Sagebrush	-	-
South (Private and Public Lands)	Residential Properties	Willow	-	-
South (Private and Public Lands)	Residential Properties	Conifer	Shrub	-
South (Private and Public Lands)	Residential Properties	Conifer	Grass/forb	81
South (Private and Public Lands)	Residential Properties	Cottonwood	Shrub	-
South (Private and Public Lands)	Residential Properties	Cottonwood	Grass/forb	235
South (Private and Public Lands)	Residential Properties	Aspen	Grass/forb	19
South (Private and Public Lands)	Residential Properties	Aspen	Shrub	27
TOTAL				**362**
South (Private and Public Lands)	Public Properties	Grass	-	627
South (Private and Public Lands)	Public Properties	Willow	-	345
South (Private and Public Lands)	Public Properties	Conifer	Shrub	-
South (Private and Public Lands)	Public Properties	Conifer	Grass/forb	-
South (Private and Public Lands)	Public Properties	Cottonwood	Shrub	786
South (Private and Public Lands)	Public Properties	Cottonwood	Grass/forb	1551

South (Private and Public Lands)	Public Properties	Aspen	Grass/forb	-
South (Private and Public Lands)	Public Properties	Aspen	Shrub	-
TOTAL				**3309**

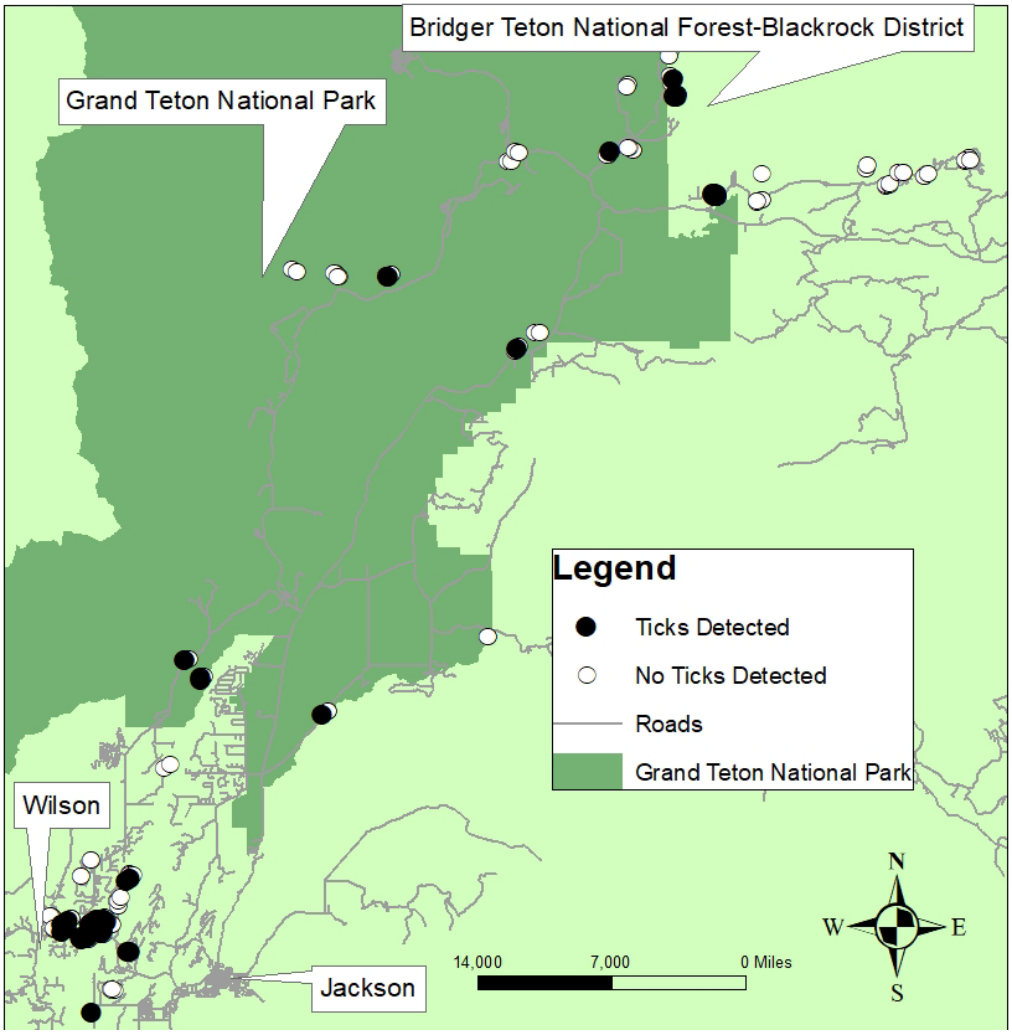


Image 4: Map of tick sampling locations in Fall 2020. 'North' region comprised of sites on GTNP and BTNF while the 'South' region included sites around Wilson.

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Grand Teton National Park
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Jackson Hole Land Trust
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Teton County and Bureau of Land Management
Teton Conservation District