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2022 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2022 - 5/31/2023

HERD: PR745 - RATTLESNAKE

HUNT AREAS: 70-72

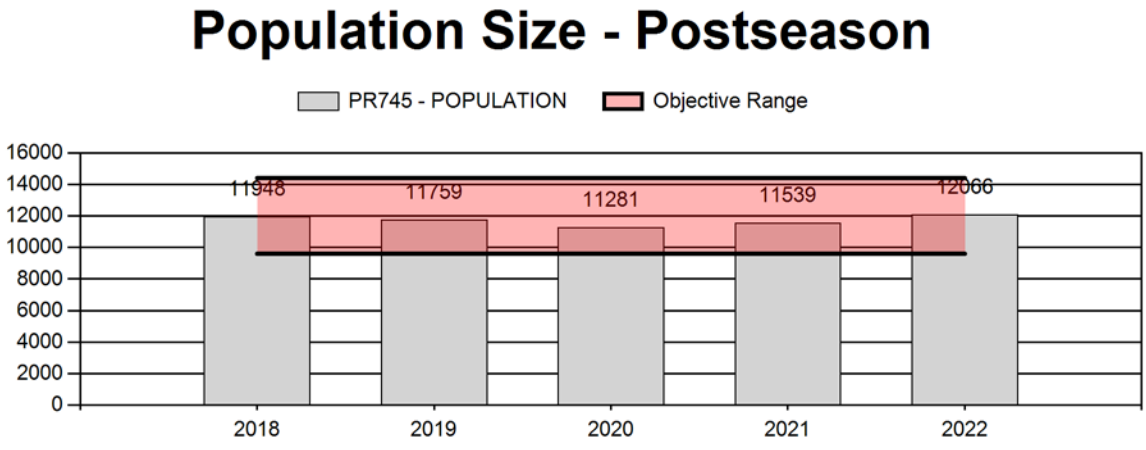
PREPARED BY: BRANDON WERNER

	2017 - 2021 Average	2022	2023 Proposed
Population:	11,395	12,066	12,624
Harvest:	898	1,096	694
Hunters:	954	1,198	850
Hunter Success:	94%	91%	82%
Active Licenses:	1,060	1,331	900
Active License Success:	85%	82%	77%
Recreation Days:	2,910	3,710	2,750
Days Per Animal:	3.2	3.4	4.0
Males per 100 Females	59	56	
Juveniles per 100 Females	63	64	

Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	1%
Number of years population has been + or - objective in recent trend:	1
Model Date:	04/03/2023

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

	JCR Year	Proposed
Females ;: 1 year old:	6%	.03%
Males ;: 1 year old:	19%	19%
Proposed change in post-season population:	7.5%	4.62%



2023 HUNTING SEASONS
RATTLESNAKE PRONGHORN HERD (PR745)

Hunt Area	Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
70	1		Sep. 14	Sep. 15	Oct. 31	100	Any antelope
71	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	100	Any antelope
72	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	700	Any antelope

2022 Hunter Satisfaction: 84% Satisfied, 7% Neutral, 9% Dissatisfied

2023 Management Summary

1) **Hunting Season Evaluation**: The severe winter of 2011 caused a drastic decline in this herd, which has since grown back to objective. This herd experienced a period of growth from 2014 to 2018, with above average fawn production and overwinter survival. However, winter severity in both 2018-2019 and 2019-2020 was above average through much of the herd unit. Observed fawn and yearling buck ratios declined, and herd growth slowed in these years. Severe drought during the 2020 and 2021 growing season resulted in poor range conditions, and herd growth continued to stall. Even with difficult conditions since 2018 the Rattlesnake Herd continues to maintain itself around objective. Growing conditions in 2022 were optimal and good fawn reproduction was observed in Hunt Areas 71 and 72, with Area 70 having lower production (Table 1). The winter of 2022-2023 was relatively harsh. Although pronghorn went into winter in good condition, there is a chance winter mortality was above normal.

   A three-year (2020-2022) analysis indicated the mean percentage of harvested males ≥ 1 year old was 19%. While this is below the management goal of 25% male harvest for recreational herds, portions of this herd were under special management until 2020. The projected harvest of males should be around 19% in the 2023 season. Based on good harvest success and hunter success, managers planned on increasing buck harvest in 2023 to around 25% of male harvest. However, due to the extreme 2022-2023 winter conditions, managers were hesitant to increase Type 1 licenses as winter mortality was not well understood.

   Type 1 license issuance was liberalized throughout the herd unit for the 2021 hunting season, and managers maintained the same doe and buck hunting opportunity in 2022 but with a slight reduction in Area 70. Due to high success and an over-objective antelope herd, managers wanted to increase harvest in Areas 71 and 72 in 2023. However, to be conservative given the extreme winter weather conditions, managers maintained Type

1 quotas but removed Type 6 licenses in all hunt areas. The Type 6 licenses were cut because winter mortality is difficult to assess until all of the snow has melted, but with significant snowfall over much of the winter and spring, managers eliminated these licenses out of an abundance of caution. Collared pronghorn in the adjacent Beaver Rim Herd experienced high mortality so it was believed that Rattlesnake pronghorn mortality was similar. However, after assessing the herd in late spring, managers concluded that Rattlesnake pronghorn did not experience significant overwinter mortality. Regardless, Areas 70, 71, and 72 saw a reduction of 650 Type 6 licenses. Management goals are to continue to provide good buck harvest opportunity based on the recreational management strategy while maintaining this herd near the population objective. Increased landowner concerns over the lack of pronghorn in Area 70, as well as low hunter success, led to a slight decrease in Type 1 license issuance while maintaining enough to mitigate damage if necessary.

2) **Objective Review:** No objective review was scheduled for 2023.

3) **Population Modeling:** The model for this herd represents a fair depiction of recent population trends, but does a poor job simulating population trends from 2000 through 2010 despite five independent abundance estimates resulting from line transect surveys. The most recent line-transect survey for the herd was conducted in 2022, resulting in an end-of-bioyear abundance estimate of 17,449 (14,142-20,756) pronghorn (Appendix A). In 2021, managers began using PopR Integrated Population Models (IPM) to estimate population indices for this herd.. The 2022 postseason population estimate for this herd unit from the IPM is approximately 12,066 (10,909-13,152) pronghorn. There is a sharp divergence between the most recent line transect estimate and the IPM model. Managers believe the 2022 line transect estimate may be over estimating abundance, which is likely why the IPM is unable to simulate through the 2022 line transect estimate. Finally, the model shows a modest population increase beginning in 2020, which has been observed on the landscape. However, the pace of growth simulated by the model may be slightly higher than what is actually occurring.

Table 1. 2018 - 2022 Preseason Classification

Summary for Pronghorn Herd PR745 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	Adult
2018	0	236	452	688	26%	1,187	45%	785	30%	2,660	2,290	20	38	58	± 4	66	± 4	42
2019	0	172	490	662	31%	988	46%	511	24%	2,161	2,263	17	50	67	± 5	52	± 4	31
2020	0	103	325	428	31%	622	45%	336	24%	1,386	1,995	17	52	69	± 7	54	± 6	32
2021	0	99	284	383	28%	561	42%	407	30%	1,351	2,355	18	51	68	± 7	73	± 7	43
2022	13,919	98	244	342	25%	614	45%	396	29%	1,352	2,398	16	40	56	± 6	64	± 6	41

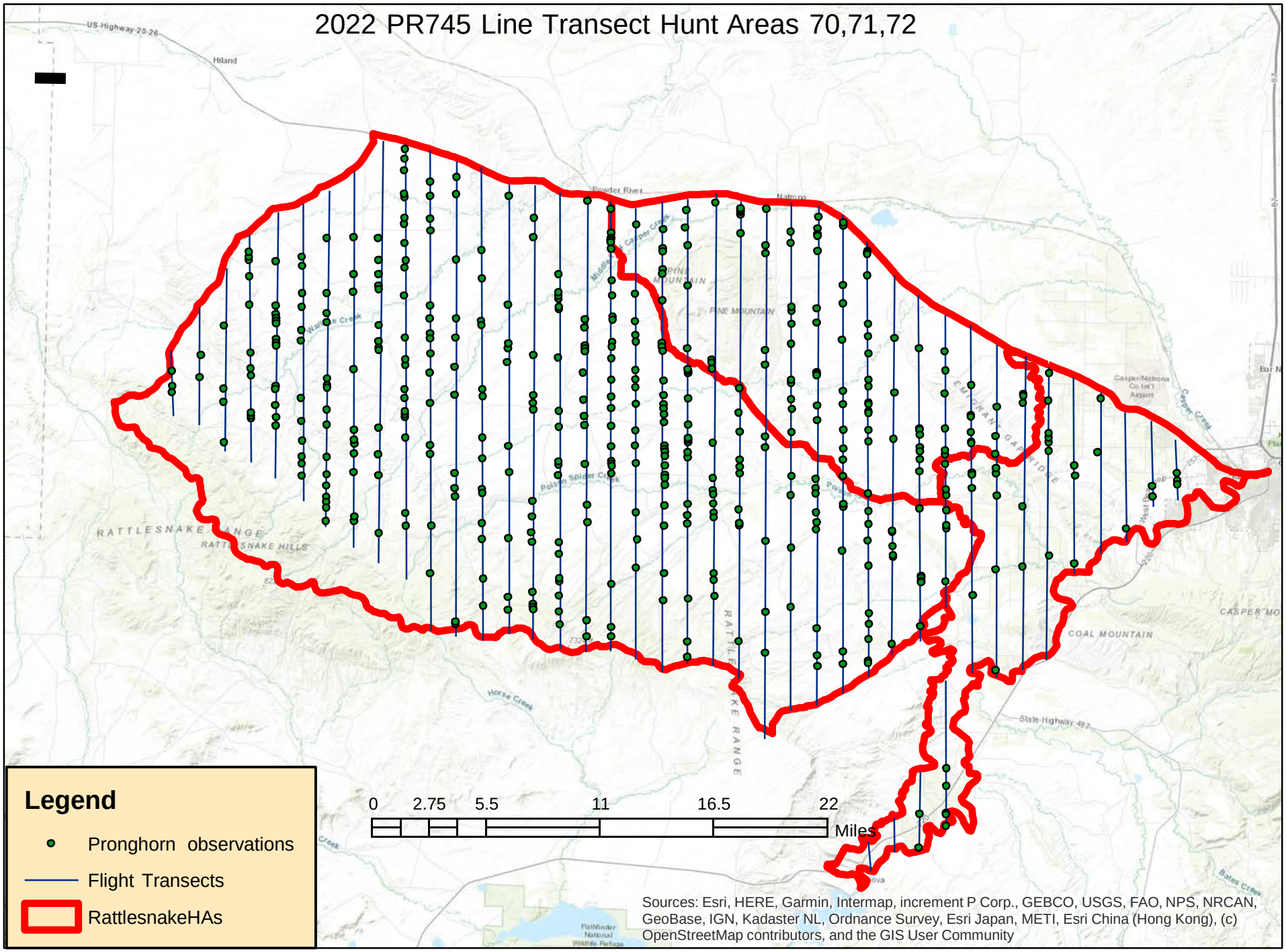
Appendix A. 2022 PR745 - RATTLESNAKE Pronghorn Line-Transect Summary

Survey Dates:	6/10/2022 - 6/11/2022
Survey Cost:	$ 3,572.20
Flight Service:	FLIGHT LINE
Aircraft:	HUSKY
Observers:	Werner

Weather Conditions:

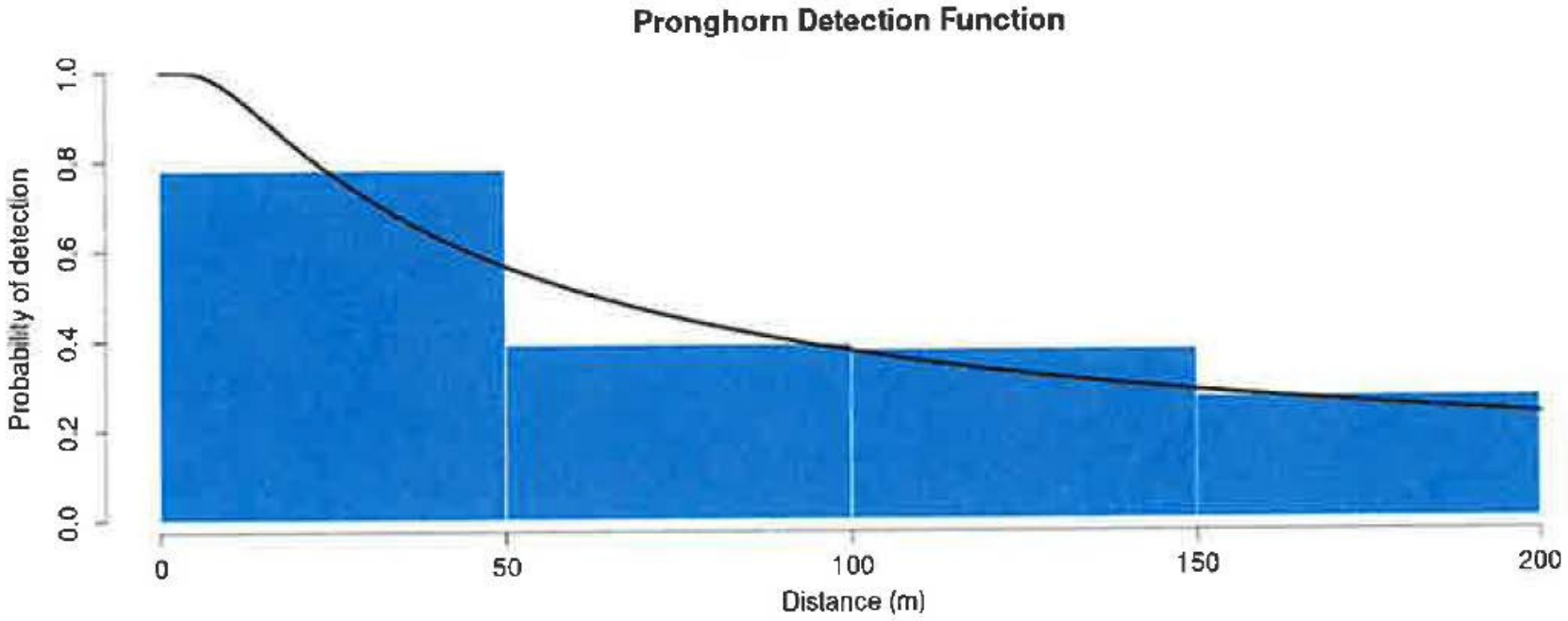
Temperature (Degrees Fahrenheit):	60
Cloud Cover (%):	15
Wind Speed (MPH):	10 - 20

Transect Limits:	0 to 0
Transect Direction:	North/South
Transect Interval (Minutes of Longitude):	0
Transect Length: (Mi.):	698
Transect Altitude (AGL):	320 ft.
Occupied Habitat (mi^2):	884
Density Estimate (Animals/mi^2 with Confidence Intervals):	19.74 (16.2 - 23.7)
Population Estimate (with Confidence Intervals):	17,449 (14,345 - 20,950)


2022 PR745 Line Transect Hunt Areas 70,71,72
US Highway 20-26
Hiland
Powder River
Natrona
PINE MOUNTAIN
RATTLESNAKE RANGE
RATTLESNAKE HILLS
Casper/Natrona Co Int'l Airport
Casper Creek
COAL MOUNTAIN
Horse Creek
State Highway 487
Bates Creek
Pathfinder National Wildlife Refuge
Legend
Pronghorn observations
Flight Transects
RattlesnakeHAs
0 2.75 5.5 11 16.5 22
Miles
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

2022 Rattlesnake Pronghorn Line Transect Histogram

Abundance estimate: 17,449 (95% CI = 14,345 - 20,950)
Probability of detection: 0.46
AICc: 4,952.55



2022 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2022 - 5/31/2023

HERD: PR746 - NORTH NATRONA

HUNT AREAS: 73

PREPARED BY: BRANDON WERNER

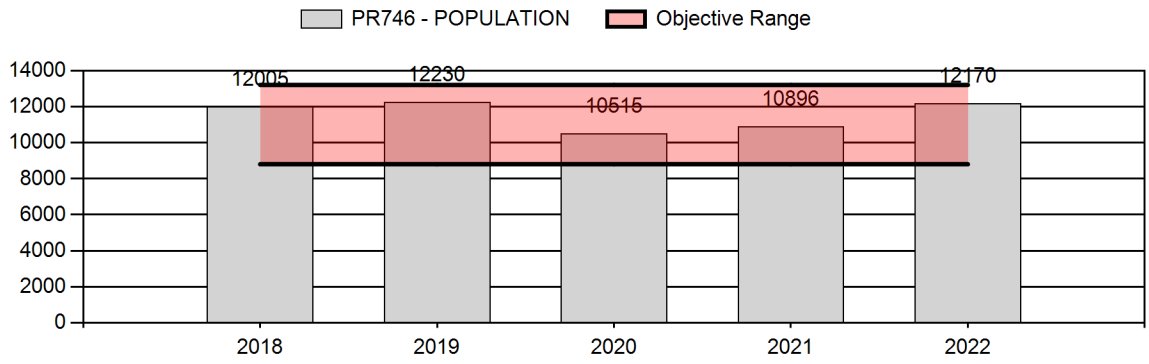
	2017 - 2021 Average	2022	2023 Proposed
Population:	11,753	12,170	13,191
Harvest:	1,786	675	520
Hunters:	1,924	869	590
Hunter Success:	93%	78%	88%
Active Licenses:	1,993	920	580
Active License Success:	90%	73%	90%
Recreation Days:	5,788	3,035	1,750
Days Per Animal:	3.2	4.5	3.4
Males per 100 Females	61	63	
Juveniles per 100 Females	67	84	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	11%
Number of years population has been + or - objective in recent trend:	9
Model Date:	02/24/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	3.3%	.03%
Males ≥ 1 year old:	16%	16%
Proposed change in post-season population:	11.9%	8.83%

Population Size - Postseason



2023 HUNTING SEASONS
NORTH NATRONA PRONGHORN HERD (PR746)

Hunt Area	Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
73	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	600	Any antelope
	7			Aug.15	Oct. 31	25	Doe or fawn valid east of Bucknum Road (Natrona County Road 125) and south of the Burlington Northern Santa Fe railroad right-of-way

2022 Hunter Satisfaction: 72% Satisfied, 11% Neutral, 17% Dissatisfied

2023 Management Summary:

1) **Hunting Season Evaluation:** The model for this herd depicts near exponential growth from 2013-2016, when harvest pressure was low and fawn production/survival were exceptional. Harvest pressure has since increased significantly, reducing this population incrementally each year. Both trends and population estimates seem to be well represented by the model for this herd. Severe winters in both 2018-2019 and 2019-2020 resulted in higher mortality rates. In addition, drought was present in this herd during 2020 and 2021, resulting in poor habitat conditions. Classification survey totals have subsequently yielded lower numbers of pronghorn, with significantly lower observed fawn ratios. Low rates of production combined with intentional high rates of harvest have caused dramatic population decline in the last five years, which was necessary to reduce this herd toward objective. Good spring moisture in 2022 resulted in good fawn production (Table 1). However, the winter of 2022-2023 was relatively harsh, leading managers to be conservative for the 2023 season. Despite this population decline, the herd remains around the population objective. The buck ratio for this herd remains moderate to high despite the designated recreational management strategy. As a result, high buck harvest was maintained to manage the buck ratio towards recreational levels.

A three-year (2020-2022) analysis indicated the mean percent of harvest for males ≥ 1 year old is 20%, with a range from 16-25%. While this is below the management goal of 25% male harvest for recreational herds, managers have greatly liberalized license issuance and harvest pressure in this herd from 2017-2021, in part due to ongoing research to assess density-dependent effects on horn growth. In 2022 and 2023 managers made significant license reductions due to a sharp decrease in population abundance. The estimated male harvest of 16% for 2023 is reasonable based on classification survey trends, decreasing

harvest success, and hunter satisfaction. Hunter success on Type 1 license has been declining for the past five years. Hunter satisfaction was a record low of 66% in 2021 and remained low in 2022 (72%), compared to the five-year average of 81%.

The 2023 hunting season conservatively manages the North Natrona Pronghorn Herd around objective. Type 1 licenses were decreased by 200 to temper the pace of harvest while still managing toward recreational standards. The 2022-2023 winter had extreme snow conditions. Type 6 licenses were eliminated to account for potential winter losses and poor long term fawn production. Type 7 licenses were reduced to 25, but remained available to control pronghorn densities on agricultural properties in the southeast portion of the herd unit. A total of 625 licenses were offered in 2023, a net reduction of 425. The population should remain near objective while providing ample hunting opportunity.

2) **Management Objective Review:** No review was scheduled for 2023. However, based on line transect estimates and population modeling, this objective may be far too low. This population is estimated to be near objective yet remains far lower than what managers feel the habitat can support and what the public desires. Field personnel will continue to evaluate whether habitats can support an increased objective in the future.

3) **Population Modeling:** Five line-transect surveys provide independent abundance estimates which help align trends and improve population estimates. A line transect was conducted in 2021, resulting in an end-of-bioyear abundance estimate of 9,543 pronghorn with a standard error of 1,284. Another line transect is scheduled for 2023. In 2021, WGFD managers began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2022 postseason population estimate for this herd unit was 12,127 (11,215-13,236) pronghorn using the using PopR Integrated Population Model. The model shows a substantial population decline from 2016-2020, followed by a significant increase beginning in 2020 and projected to continue through bio-year 2023. Managers believe this to be inaccurate based on low fawn production/survival, harvest success, and an obvious continued decline in pronghorn densities. However, in 2022 good fawn production was observed which is likely driving the simulated increase. While managers project this population to grow as simulated by the model, this growth may not be realized until 2024 at the earliest. The unrealistic growth projected by the model is the primary reason prescribed buck harvest will likely be below the established 25% minimum criteria in 2023.

4) **Additional Surveys:** In 2019, this herd became part of a harvest study conducted by WGFD and the University of Wyoming Cooperative Fish and Wildlife Research Unit. Goals of the project are to quantify average pronghorn horn size relative to changes in buck ratios, buck age structure, population size, and environmental variables. In 2022, managers and researchers collected horn measurements and tooth samples from 58 harvested bucks.

Average horn size for the herd was 65” Boone and Crockett, with 65% of bucks sampled being laboratory aged at 4+ years old. The average cementum annuli tooth age was 4.95 years old. This statewide research project was completed in 2022, final data analysis pending.

Table 1. 2018 - 2022 Preseason Classification Summary

for Pronghorn Herd PR746 - NORTH NATRONA

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2018	0	183	396	579	24%	1,080	45%	716	30%	2,375	2,947	17	37	54	± 4	66	± 5	43
2019	0	118	418	536	27%	887	45%	553	28%	1,976	3,068	13	47	60	± 5	62	± 5	39
2020	0	120	341	461	33%	590	43%	335	24%	1,386	2,017	20	58	78	± 8	57	± 6	32
2021	0	55	178	233	25%	429	47%	256	28%	918	1,961	13	41	54	± 7	60	± 7	39
2022	13,341	47	120	167	25%	266	40%	224	34%	657	2,640	18	45	63	± 10	84	± 12	52

2022 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2022 - 5/31/2023

HERD: PR748 - NORTH CONVERSE

HUNT AREAS: 25-26

PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Population:	23,732	23,783	25,010
Harvest:	2,240	1,471	1,475
Hunters:	2,426	1,673	1,675
Hunter Success:	92%	88%	88 %
Active Licenses:	2,533	1,729	1,750
Active License Success:	88%	85%	84 %
Recreation Days:	6,782	5,018	5,000
Days Per Animal:	3.0	3.4	3.4
Males per 100 Females	63	64	
Juveniles per 100 Females	71	78	

Population Objective (± 20%) : 28000 (22400 - 33600)

Management Strategy: Recreational

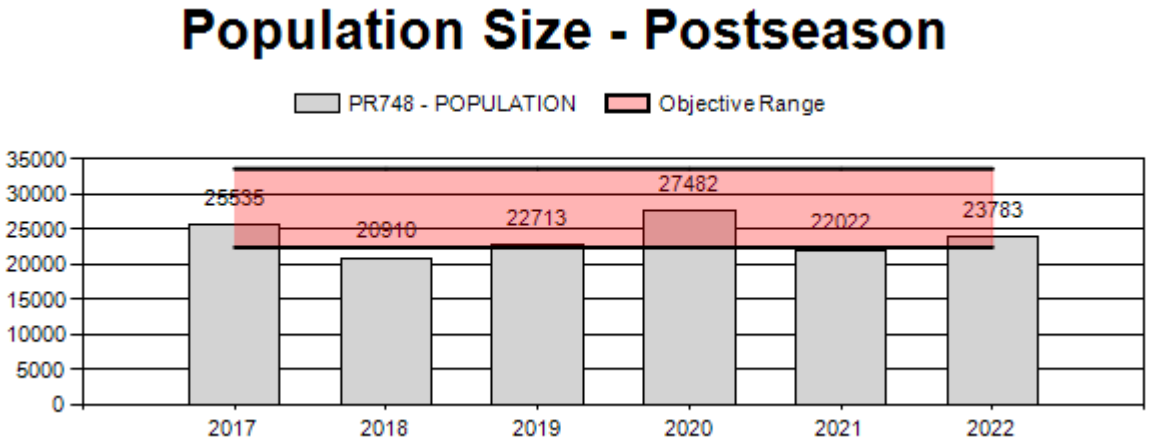
Percent population is above (+) or below (-) objective: -15.1%

Number of years population has been + or - objective in recent trend: 12

Model Date: 02/25/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	6.0%	3%
Males ≥ 1 year old:	28.0%	18.0%
Proposed change in post-season population:	-5.0%	5.0%



2023 HUNTING SEASONS

North Converse Pronghorn Herd Unit (PR748)

Hunt Area	Hunt Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
25	1	Aug. 15	Sep. 30	Oct. 1	Oct. 14	500	Any antelope
26	1	Aug. 15	Sep. 23	Sep. 24	Oct. 14	1100	Any antelope
26	6	Aug. 15	Sep. 23	Sep. 24	Oct. 14	150	Doe or fawn

2022 Hunter Satisfaction: 81% Satisfied, 9% Neutral, 10% Dissatisfied

2023 Management Summary

1) Hunting Season Evaluation: Pronghorn numbers decreased in 2021 but rebounded slightly in 2022. Higher amounts of spring and summer moisture alleviated some of the previous year's drought conditions. This herd unit has a large amount of private land with limited access to public land. There are some small parcels of public land available, although they quickly become saturated. Significant population declines have been detected in adjacent herds due to drought and winter severity in recent years. Hunt Area 25 Type 6 licenses were eliminated and Hunt Area 26 Type 6 licenses were decreased by 150.

In 2022, horn length measurements (N=80) were collected from harvested adult male pronghorn, with average horn length being 11.0 inches. A total of 20% of bucks were $\geq$ 13 inches. Managers can use these measurements to evaluate horn growth trends over time as this dataset grows.

This population trended upward from 2013-2018, however drought conditions and lower fawn ratios in the past three years as well as a widespread EHD outbreak in 2021 caused this population to decrease the last couple years. In addition, the increase in energy development, disturbance, and declining habitat throughout the herd unit in recent years may decrease the overall carrying capacity of this population over the long term. Preseason classification surveys showed increased fawn and yearling survival in 2022.

The 3-year average harvest for this herd unit is 19% of the model-based preseason population of >1 yr. old males. Type 1 license issuance was not increased in 2023 to meet the goal of 25% harvest as the limited access, decreased hunter success, and lower population numbers did not warrant an increase.

2) Population Modeling: In 2021, WGFD managers began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2022 postseason population estimate for this herd unit from the PopR IPM was approximately 23,800 (CL = 21,815-25,965) pronghorn.

A line transect survey was flown for this herd unit in June 2022. This provided an abundance estimate of approximately 30,000 pronghorn (CL = 22,983-37,131) (Appendix 1). As with past LT's flown in this herd unit, the estimated abundance exceeded modeled population estimates. Managers feel the modeled population estimate is more in line with reality and

that the LT is likely over-estimating this population. Finally, the IPM is simulating a significant population increase beginning in 2022 and projected throughout 2023. This is likely due to improved observed fawn ratios during 2022 preseason classifications. Based on predicted decreased overwinter survival due to winter severity in Bioyear 2022 and field personnel observations, this increase is likely not occurring. As a result, prescribed buck harvest will likely be below the established 25% minimum criteria for 2023.

Table 1.

2017 - 2022 Preseason Classification Summary

for Pronghorn Herd PR748 - NORTH CONVERSE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	27,642	154	329	483	30%	624	39%	510	32%	1,617	3,643	25	53	77	± 7	82	± 8	46
2018	23,662	189	336	525	23%	968	43%	748	33%	2,241	2,980	20	35	54	± 5	77	± 6	50
2019	25,619	147	448	595	27%	967	44%	619	28%	2,181	3,152	15	46	62	± 5	64	± 5	40
2020	30,086	144	348	492	29%	725	43%	477	28%	1,694	2,954	20	48	68	± 6	66	± 6	39
2021	20,247	140	300	440	27%	726	44%	475	29%	1,641	2,406	19	41	61	± 6	65	± 6	41
2022	27,079	182	318	500	26%	785	41%	612	32%	1,897	2,344	23	41	64	± 6	78	± 7	48

Estimate Pronghorn Abundance from Aerial Line-Transect Surveys

What is the size of the area (in square miles) the abundance estimate should be extrapolated to?

2519

Upload survey data file output from Cyber Tracker (xls or xlsx). Data must be in the first tab.

Browse... Data_PronghornLT_NorthConverse_2022 (1).xls

Upload complete

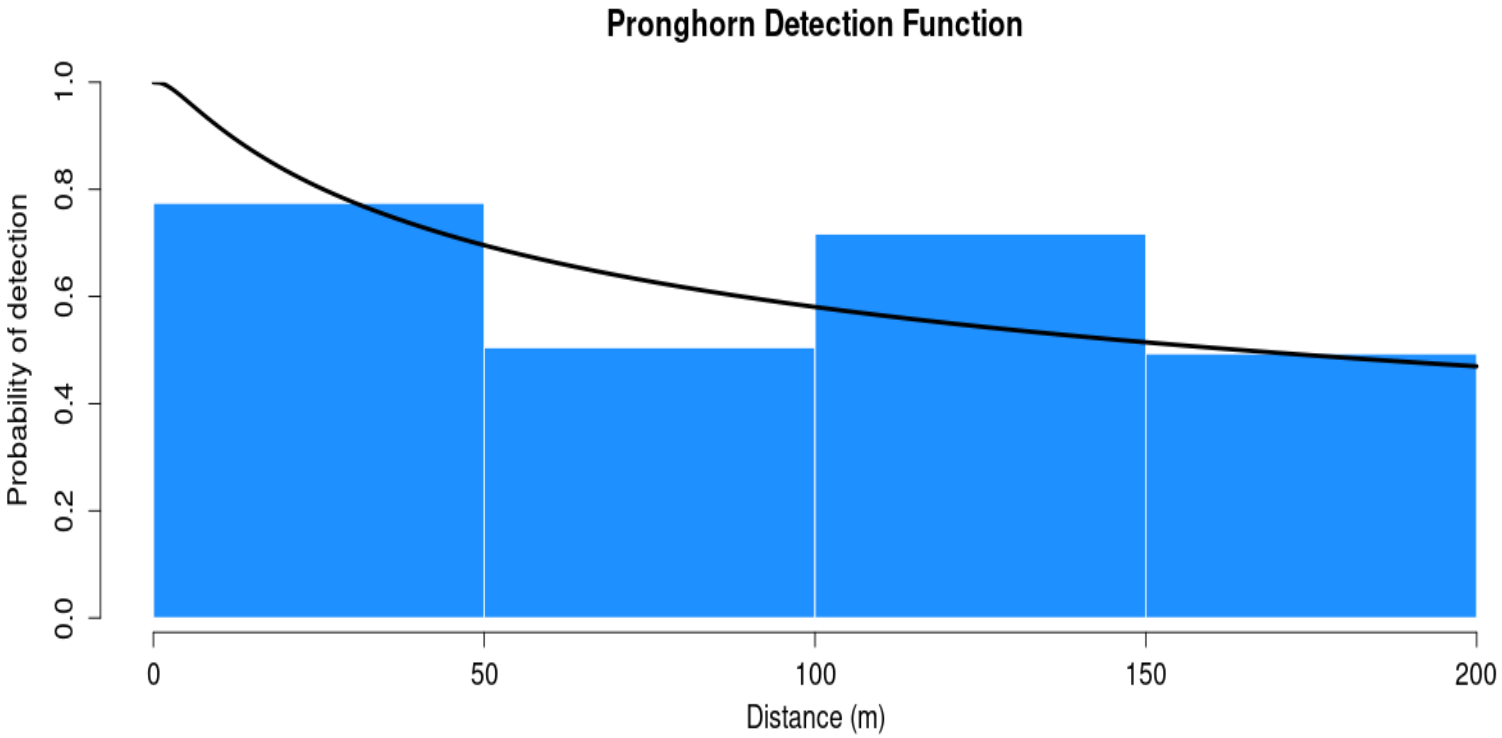
Detection function: What shape should the detection function have?

Hazard rate

How many bootstrapping iterations should be used to estimate the confidence interval? (Note that the AICc and point estimates are not affected by the number of bootstrap iterations)

- ○ 50 - fast, not suitable production-level analysis
- ◉ 1000 - slower, suitable for production-level analysis

Abundance estimate: 30,057 (95% CI = 24,188 - 37,791)
Probability of detection: 0.62
AICc: 4,584.73



Summary	Value
Number of transects	53.0
Total transect length surveyed (km)	1308.0
Total transect length surveyed (mi)	812.8
Number of individuals detected (any distance)	782.0
Number of individuals detected (within survey strip)	750.0
Mean flight height (ft) at detections after imputing missing flight heights	312.8

2022 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2022 - 5/31/2023

HERD: PR750 - BLACK THUNDER

HUNT AREAS: 4-9, 24, 27, 29
PREPARED BY: JOE SANDRINI

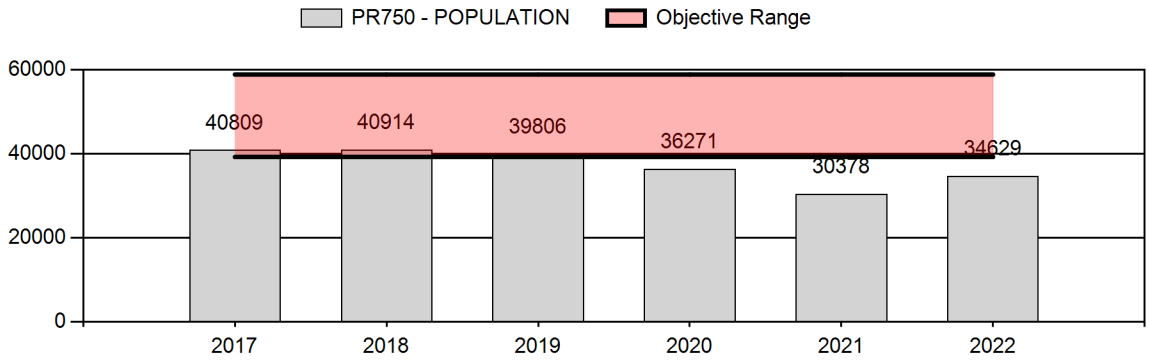
	2017 - 2021 Average	2022	2023 Proposed
Population:	37,636	34,629	34,399
Harvest:	3,875	1,942	1,566
Hunters:	4,271	2,172	1,750
Hunter Success:	91%	89%	89%
Active Licenses:	4,662	2,336	1,875
Active License Success:	83%	83%	84 %
Recreation Days:	13,362	7,007	5,650
Days Per Animal:	3.4	3.6	3.6
Males per 100 Females	47	34	
Juveniles per 100 Females	65	68	

Population Objective (± 20%) :	49000 (39200 - 58800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-29.3%
Number of years population has been + or - objective in recent trend:	17
Model Date:	04/04/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	20%	19%
Proposed change in post-season population:	-7.0%	-0.7%

Population Size - Postseason



Note: 2017-2022 values are JCR stored values and do not reflect esimates produced by current IPM

2023 Hunting Seasons
Black Thunder Pronghorn (PR750)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
4	1	Aug. 15	Sep. 30	Oct. 1	Nov. 20	75	Any antelope
5	1	Aug. 15	Sep. 30	Oct. 1	Nov. 20	100	Any antelope
6	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	125	Any antelope; also valid on private land in that portion of Area 8 in Weston County
7	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	250	Any antelope
8	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	175	Any antelope
9	1	Aug. 15	Sep. 30	Oct. 1	Oct. 31	250	Any antelope; also valid in that portion of Area 11 in Converse or Niobrara counties
24	1	Aug. 15	Sep. 30	Oct. 1	Oct. 20	150	Any antelope
24	2	Aug. 15	Sep. 30	Oct. 1	Oct. 20	300	Any antelope valid on private land
24	6	Aug. 15	Sep. 30	Oct. 1	Oct. 20	25	Doe or fawn
24	7	Aug. 15	Sep. 30	Oct. 1	Oct. 20	25	Doe or fawn valid on private land
27	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	125	Any antelope
29	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	75	Any antelope
29	2	Aug. 15	Sep. 30	Oct. 1	Oct. 31	300	Any antelope valid on private land
29	7	Aug. 15	Sep. 30	Oct. 1	Oct. 31	50	Doe or fawn valid on private land

2022 Hunter Satisfaction: 79.6% Satisfied 10.5% Neutral 9.9% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** After a low point in 2012, this herd grew steadily through 2018, but appears to have declined substantially since.[1] This decline has been due to consistently low recruitment (preseason fawn:doe ratios from 2018-2022 averaging 63 fawns per 100 does,

[1] The population graph presented above does not reflect decline in the past year due to changes in modeling technique increasing population estimates.

see Appendix 1); increased mortality of all age classes during the 2018-19 winter; what appears to have been substantial spring mortality in both 2019 and 2020; fairly severe and continued drought since the spring of 2020; and losses to both Blue Tongue Virus (BTV) and Epizootic Hemorrhagic Disease Virus (EHDV) in 2021 and 2022. To address the decline, harvest was reduced 20% in 2020, 33% more in 2021, and an additional 20% in 2022. With more conservative hunting season in place for 2023, harvest is projected to fall another 20% this year. Harvest reductions have resulted in active license success and effort remaining stable the past five-years, with success averaging 83% (std. dev. 0.7%) and effort 3.5 days per harvest (std. dev. 0.2 days). To help offset the continued population decline and attempt to maintain buck:doe ratios (along with hunter success) 350 fewer any-antelope and 350 fewer doe/fawn licenses were issued in 2023. Even with these changes, the herd's size is not projected to grow. Instead, it is anticipated to fall slightly. The observed, 2022 preseason buck:doe ratio was only 34:100, which the model cannot account for (see discussion below), but instead simulates at 39:100. However, the model does indicate substantially declining buck:doe ratios since 2018, predicting a value of just 36:100 in 2023. Consequently, even with the model portending the 2023 harvest will remove just 19% of the preseason population of adult bucks, it is very prudent to reduce buck harvest, especially in light of overall herd performance and given how the estimated percentage of bucks harvested from the population has fluctuated recently.[2]

2) **Population Modeling:** The bio-year 2022 post-season population estimate for this herd unit produced by the WGFD, SCJ-SCA spreadsheet model that has been used to date was about 31,700 pronghorn. In 2021, WGFD managers began using Integrated Population Models (IPM) in addition to the spreadsheet system to estimate pronghorn populations. The current (RTV-ASC-JSTV) IPM postseason population estimate produced for this herd was approximately 34,600 pronghorn (95% CL≈ 31,000 – 37,800). In contrast, last year's IPM was closer to the spreadsheet model estimate. Of note, several data points make modeling this population using either system tenuous. First, neither model can account for the relatively high 2014 & 2016 Line Transect (LT) estimates given the low 2019 LT results and elevated 2021 LT figures, nor model well recent changes in observed buck:doe ratios given reported harvest (Appendix 2).[3] Because the Department switched to reliance on IPMs for modeling pronghorn population this year, that model was used to provide the reported population estimate. However, the IPM simulates a slow population decline since 2014, whereas harvest statistics and observations of field personnel, hunters and landowners indicate a population increase followed by a substantial decrease, which the spreadsheet model does simulate.

3) **Concerns with this population:** There has been a general decline in observed fawn:doe ratios over the past 30^{+} years, which will likely continue with reductions in habitat quality and quantity due to aging sagebrush stands, increased cheatgrass cover, and unrelenting industrialization of pronghorn habitat by energy and wind development. We also suspect recruitment and survival of adults may continue to decline due to increased losses to disease if drier and warmer weather patterns persist.

[2] Model changes significantly altered this value from 50% in 2021 & 2022. More years' data and IPM use are needed before we are comfortable with the values of the percentage of bucks harvested that are being produced by the IPM.

[3] It is speculated that some of the fluctuations in these ratios may be due in part to changes in field personnel yielding inconsistency in age and sex composition counts.

Appendix 1
2017 - 2022 Preseason Classification Summary
for Pronghorn Herd PR750 - BLACK THUNDER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	45,477	631	1,033	1,664	22%	3,343	44%	2,526	34%	7,533	3,069	19	31	50	± 2	76	± 3	50
2018	45,886	413	908	1,321	23%	2,766	49%	1,613	28%	5,700	1,957	15	33	48	± 2	58	± 3	39
2019	44,809	262	817	1,079	23%	2,191	47%	1,374	30%	4,644	2,238	12	37	49	± 3	63	± 3	42
2020	40,266	204	657	861	21%	2,025	49%	1,235	30%	4,121	2,781	10	32	43	± 3	61	± 3	43
2021	34,181	239	633	872	22%	1,944	48%	1,233	30%	4,049	2,165	12	33	45	± 3	63	± 4	44
2022	42,177	174	490	664	17%	1,936	49%	1,325	34%	3,925	0	9	25	34	± 2	68	± 4	51

Appendix 2

Black Thunder Pronghorn (PR750)

Bio-Year 2021 Line Transect Results and Discussion

In June, 2022 a single observer, line transect (LT) survey was flown in occupied habitat within the Black Thunder Pronghorn Herd Unit (PR750). The lines flown were identical to those flown in Bio-Years 2016 & 2019 (on file with Newcastle sr. wildlife biologist), and three separate observers used (J. Sandrini, E. Peckham, & M. Huizenga). This effort required approximately 25 hours of flight time at a cost of about $7,900.00. The initial Distance analysis of the data collected was conducted by J. Sandrini using data entry and manipulation in an Excel Spreadsheet uploaded to the Distance 7.3 program. Results of that analysis are presented below. However, due to concerns with what seemed to be a high density estimate produced using this analysis given observations of field personnel, the LT data were also analyzed by J. Carlisle via a pooled, hierarchical method, and the lower estimate of that technique used in both the spreadsheet and integrated population models developed to estimate the 2022 post season population. The pooled, hierarchical estimate yielding the following:

N: 38,146
SE: 2,466
95% CI = 33,618 - 43,284

Initial Distance Results:

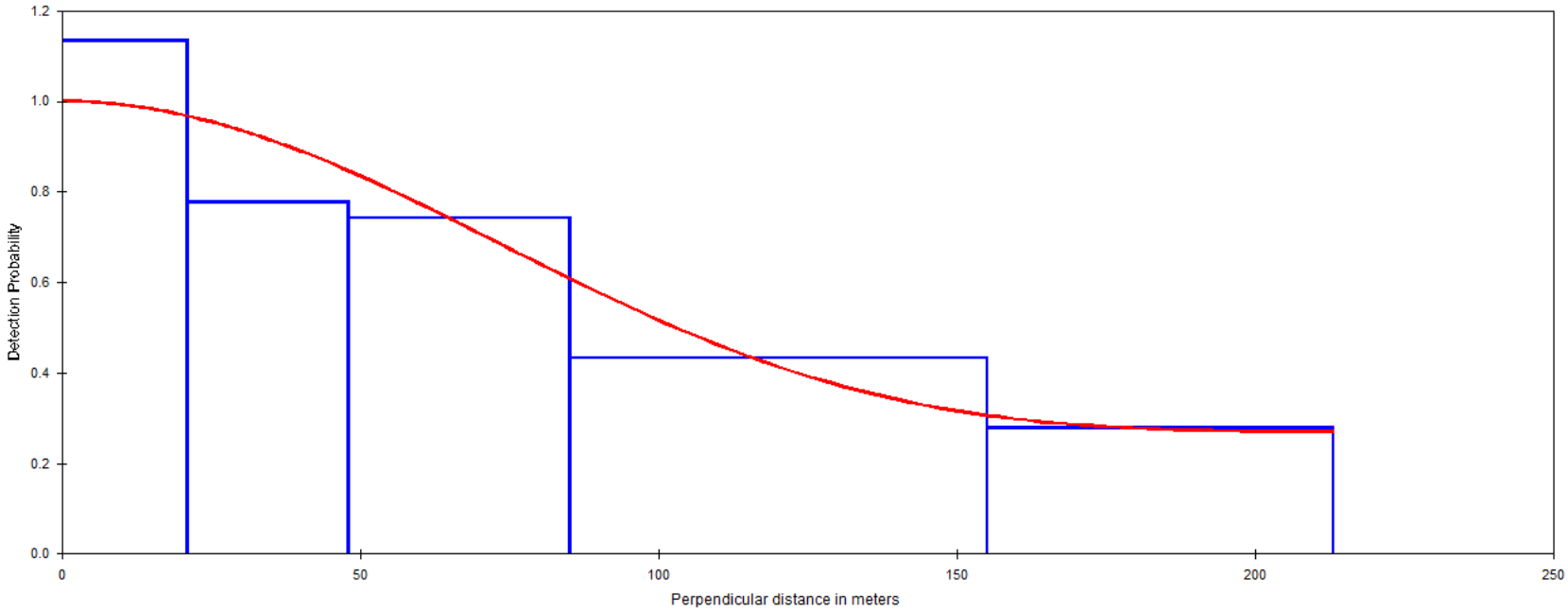
Model: Uniform key, k(y) = 1/W with Cosine adjustments of order(s) : 1, 2

Effort:	1618.565
Samples:	60
Width:	213.0000
Left:	0.0000000
Observations:	294

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	3.9626	0.49140	12.40	3.1035	5.0596
E(S)	1.4605	0.45730E-01	3.13	1.3732	1.5533
D	5.7873	0.74021	12.79	4.4994	7.4440
N	41090.	5255.5	12.79	31946.	52852.

Measurement Units	
Density:	Numbers/Sq. miles
ESW:	meters

Component Percentages of Var. (D)	
Detection probability:	32.6
Encounter rate:	61.4
Cluster size:	6.0


1.2
1.0
0.8
0.6
0.4
0.2
0.0
Detection Probability
0
50
100
150
200
250
Perpendicular distance in meters

2022 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2022 - 5/31/2023

HERD: MD740 - CHEYENNE RIVER

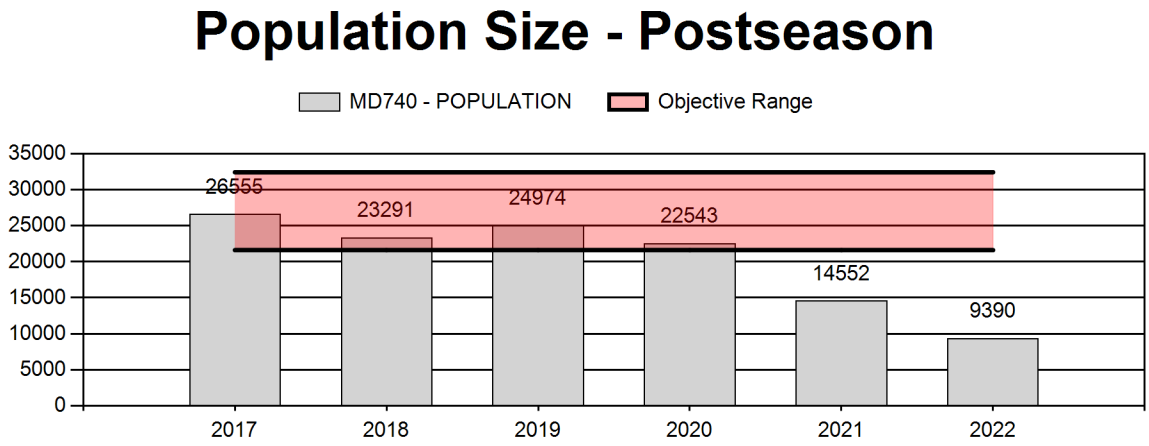
HUNT AREAS: 7-14, 21
PREPARED BY: JOE SANDRINI

	2017 - 2021 Average	2022	2023 Proposed
Population:	22,383	9,390	9,386
Harvest:	1,295	874	780
Hunters:	2,227	1,745	1,450
Hunter Success:	58%	50%	54 %
Active Licenses:	2,264	1,767	1,475
Active License Success:	57%	49%	53 %
Recreation Days:	8,874	7,753	6,200
Days Per Animal:	6.9	8.9	7.9
Males per 100 Females	39	28	
Juveniles per 100 Females	59	59	

Population Objective (± 20%) :	27000 (21600 - 32400)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-65.2%
Number of years population has been + or - objective in recent trend:	13
Model Date:	02/17/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	1.0%	1.0%
Males ≥ 1 year old:	33%	32%
Proposed change in post-season population:	-4%	0%



Note: 2017-2021 values are stored JCR program values and do not represent current IPM estimates

2023 Hunting Seasons
Cheyenne River Mule Deer (MD740)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
7	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
8	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
9	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
10	1	Sep. 1	Sep. 30	Oct. 1	Oct. 21	100	Antlered mule deer or any white-tailed deer
11	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
12	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
13	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
14	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer
21	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 15		Antlered mule deer or any white-tailed deer

2023 Region B Nonresident Quota: 1,000 licenses

2022 Hunter Satisfaction: 56% Satisfied 22% Neutral 22% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** With excellent productivity and survival in 2014 and 2015, this herd experienced noteworthy growth following a low point in 2012. However, since 2016 productivity and survival have generally declined, and Epizootic Hemorrhagic Disease (EHD) and Blue Tongue Virus (BTV) outbreaks have increased adult mortality, especially in 2021 and likely in 2022 as well. Consequently, this population has dropped since 2018. Similarly, buck:doe ratios generally declined as harvest of bucks remained fairly consistent while the population fell (see Appendix 1). Consequently, hunting seasons became more conservative in both 2021 and 2022. They were further limited in 2023, with a 9% reduction in both the Region B and 20% reduction in Area 10 Type 1 license quotas. Additionally, issuance of doe/fawn licenses valid for mule deer was eliminated through the removal of 75 doe/fawn licenses. The reduction in the Region B and Area 10 Type 1 quotas were intended to reduce buck harvest, maintain hunter success, and improve the buck:doe ratio, as this population is projected to only increase slightly given the anticipated harvest and average reproduction and survival. See Appendix 2 for Hunt Area 10 specific data. Access limitations also warranted license reductions

because landowners significantly curtail hunting access when this mule deer population declines.

2) **Chronic Wasting Disease (CWD) Management:** This is a Tier 1 surveillance herd, and was last prioritized for CWD sampling in 2020. Details concerning the most current prevalence data were reported in the 2021 JCR. To date, no CWD management actions have occurred in this herd unit.

3) **Population Modeling:** The bio-year 2022 post-season population estimate for this herd unit produced by the WGFD, SCJ-SCA spreadsheet model was about 12,300 mule deer, and indicated a 33% drop from 2021. Last year, WGFD managers began using Integrated Population Models (IPM) to estimate mule deer populations in addition to the spreadsheet system; and that year both models produced similar post-season population estimates. The bio-year 2022 (RTV-ASC-JSTV) IPM relied on license numbers as the effort variable, and produced a 2022 postseason population estimate approximately 25% below that of the spreadsheet model, at about 9,400 mule deer (95% CL≈ 8,300 – 10,400). It also indicated only a slight drop from 2021. It is notable that the IPM, in contrast to the spreadsheet model, shows essentially a stabile post-season population since 2010. Whereas the spreadsheet model simulates well the cycle this population seems to have experienced since then. However, with the switch this year to reliance IPM's for modeling mule deer populations, the IPM was used to provide the 2022 post-season population estimate for the herd and estimate the 2023 post-season population. Given the perceived reduction in mule deer number by field personnel and changes in harvest statistics, the 2022 IPM post-season population estimate can be deemed reasonable. However, the population trend produced by the IPM does not seem congruent with what appears to have happened on the ground in relation to population fluctuations over the past decade.

Appendix 1

2017 - 2022 Postseason Classification Summary

Mule Deer Herd MD740 - CHEYENNE RIVER

		MALES							FEMALE		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	26,555	264	413	109	12	0	798	21%	1,777	48%	1,143	31%	3,718	1,371	15	30	45	± 2	64	± 3	44
2018	23,291	132	399	114	8	0	653	20%	1,669	51%	970	29%	3,292	1,133	8	31	39	± 2	58	± 3	42
2019	24,974	110	172	75	6	5	368	18%	991	47%	731	35%	2,090	1,400	11	26	37	± 3	74	± 4	54
2020	22,543	121	219	92	9	0	441	22%	1,127	55%	465	23%	2,033	1,416	11	28	39	± 3	41	± 3	30
2021	14,552	80	114	31	1	0	226	15%	838	55%	453	30%	1,517	926	10	17	27	± 2	54	± 4	43
2022	9,390	120	182	73	4	0	379	15%	1,359	53%	807	32%	2,545	1,046	9	19	28	± 2	59	± 3	46

Appendix 2

Mule Deer Hunt Area 10

Post-Season Buck:Doe Ratios and Antler Classifications

&

Tooth Age and Antler Data from Harvested Mule Deer

Year	Post Season Buck Ratio	Post-Season Antler Classif. Percentages			Harvested Bucks			
		CLS 1	CLS 2	CLS 3	Median Age	Mean Antler Spread	Median Pts. Left	Median Pts. Right
2017	41 : 100	80%	19%	1%	4.5	20	4	4
2018	134 : 100	74%	23%	3%	4.5	19.9	4	4
2019	44 : 100	48%	52%	0%	4.5	19.8	4	4
2020	59 : 100	52%	35%	13%	5.5	19.1	4	4
2021	31 : 100	72%	28%	0%	5.5	19.1	4	4
2022	34 : 100	66%	34%	0%	6.5	18.4	5	4

2022 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2022 - 5/31/2023

HERD: MD751 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

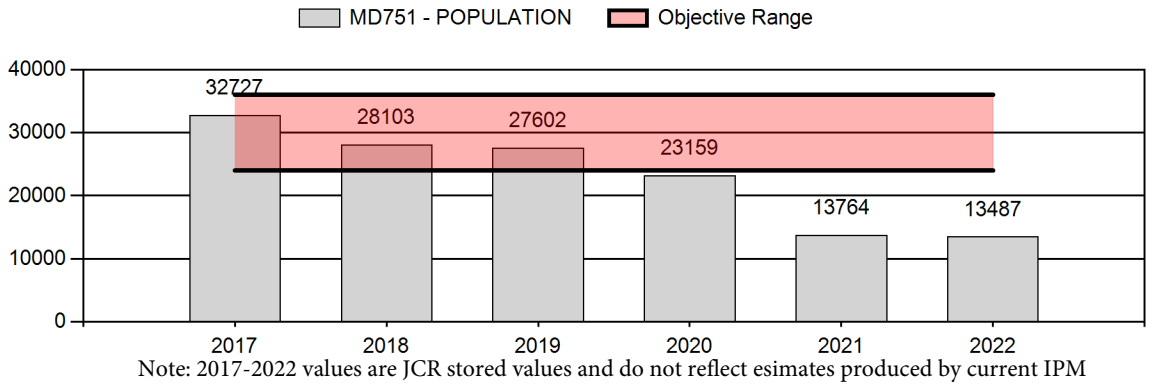
	2017 - 2021 Average	2022	2023 Proposed
Population:	25,071	13,487	14,058
Harvest:	2,179	1,510	913
Hunters:	5,364	4,050	2,300
Hunter Success:	41%	37%	40 %
Active Licenses:	5,563	4,216	2,300
Active License Success:	39%	36%	40 %
Recreation Days:	16,340	13,529	7,300
Days Per Animal:	7.5	9.0	8.0
Males per 100 Females	25	17	
Juveniles per 100 Females	63	55	

Population Objective (± 20%) :	30000 (24000 - 36000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-55.0%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/18/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	2%	2%
Males ≥ 1 year old:	42%	41%
Proposed change in post-season population:	-4.2%	+4.2%

Population Size - Postseason



Note: 2017-2022 values are JCR stored values and do not reflect esimates produced by current IPM

2023 Hunting Seasons
Black Hills Mule Deer (MD751)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
1	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
4	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer except the lands of the State of Wyoming's Ranch A property shall be closed
5	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer

2023 Region A nonresident quota: 2,000 licenses

2022 Hunter Satisfaction: 49% Satisfied 22% Neutral 29% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** For many years, this herd has exhibited population cycles. Following a population low after the 2010-11 winter, the herd rebounded due to excellent productivity and survival, notably in 2014 and 2015. It then peaked in 2016. Over same period, post-season buck:doe ratios climbed well above historic values. Since 2016, the population has declined substantially due to low annual recruitment, increased over-winter mortality in bio-year 2018, very low fawn survival since 2020 (3-year mean of 53 fawns:100 does post-season), and losses to Epizootic Hemorrhagic Disease (EHD) and Blue Tongue Virus (BTV) in 2021 and 2022. Because hunting seasons remained fairly consistent as the population initially dropped, post-season buck:doe ratios declined, returning to long-term values around 23 bucks per 100 does between 2018 and 2020 (Appendix 1). In response to the declining population and buck:doe ratios, more conservative hunting seasons have been implemented each year since 2020. Following a 27% reduction in non-resident Region A General licenses and issuance of 1,275 fewer doe/fawn licenses in 2022, the post-season buck:doe ratio dropped further, to 16:100, a level not seen in ten years. Consequently, the 2023 season is the most conservative in the past 50^{+} years, with no hunting of doe mule deer and a General License hunting season allowing only take of bucks closing on November 17. This date was chosen by the Wyoming Game and Fish Commission, as opposed to the Department's recommended date of November 15, following testimony by a number of outfitters. With the recent drop in buck numbers, hunter satisfaction declined markedly in 2021, and again in 2022,

with hunter satisfaction falling from 77% in 2020 to 49% in 2022. All of the other 2022 harvest survey metrics also point to a substantially reduced deer herd. See Appendix 2 for more thorough notation and detailed reasons for the conservative hunting season proposed and adopted.

2) **Chronic Wasting Disease (CWD):** Prior to the 2021 hunting season, about 1,100 mule deer from the Black Hills Herd Unit had been tested for CWD. The vast majority of those were hunter-harvested, of which less than 1% were found to have the disease. However, the relative number of deer testing positive each year generally increased. In 2021, this herd was prioritized as a Tier 1 surveillance herd, and 89 samples from adult, buck mule deer obtained. This number fell well short of desired sample size of 200. Additionally, a total of just 120 mature buck mule deer have been sampled from this herd unit over the last 3 years. This total is too low of a sample size to garner a reliable prevalence rate and associated confidence intervals. However, prevalence estimates and sample sizes for CWD sampling since 2020 are presented below (Table1). Although, as previously mentioned, reasonable confidence intervals cannot be established. In 2022, only 27 mature bucks were tested, which represented 2.3% of the reported buck mule deer harvest. To date, no CWD management actions have occurred in this herd unit.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%, n)	Yearling Males	Adult Females
2020-2022	**6.7% (**unk**, n= 120)**	7.7% (13)	0% (30)

Table 1. 2020-2022 CWD prevalence in hunter-harvested mule deer from the Black Hills Mule Deer Herd.

3) **Population Modeling:** The bio-year 2022 post-season population estimate for this herd produced by the WGFD spreadsheet model was about 17,450 mule deer. In 2021, WGFD managers began using Pop-R Integrated Population Models (IPM) to estimate mule deer populations. The 2022 Pop-R (RTV-ASC-JSTV) IPM postseason population estimate for this herd unit was approximately 13,500 mule deer (95% CL ≈ 12,600 – 14,250) using license number as the effort variable. IPM use was required in 2023 to estimate post-season mule deer populations. However, whereas the similarly structured spreadsheet model is highly correlated with preseason trend counts (0.83) the IMP is only marginally so (0.58). In addition, the IPM on average yields population estimates about 30% below those produced by the spreadsheet model, with greater differences in recent years. This is because the IPM produces less change from population highs to lows compared to the spreadsheet model.

Appendix 1

2017 - 2022 Postseason Classification Summary

Mule Deer Herd MD751 - BLACK HILLS

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	32,727	146	216	57	2	0	421	16%	1,343	50%	917	34%	2,681	1,429	11	20	31	± 2	68	± 4	52
2018	28,103	71	109	15	2	0	197	12%	884	53%	582	35%	1,663	1,297	8	14	22	± 2	66	± 4	54
2019	27,602	67	98	21	1	0	187	12%	822	51%	597	37%	1,606	1,508	8	15	23	± 2	73	± 5	59
2020	23,159	65	99	38	7	0	209	14%	884	58%	425	28%	1,518	1,462	7	16	24	± 2	48	± 4	39
2021	13,764	52	38	8	0	0	98	11%	497	57%	276	32%	871	942	10	9	20	± 3	56	± 5	46
2022	13,487	67	66	12	0	0	145	10%	869	58%	478	32%	1,492	905	8	9	17	± 2	55	± 4	47

BLACK HILL DEER SEASON PROPOSAL – TALKING POINTS:

Mule Deer mgmt. objective = 30,000 and postseason buck ratio 20 – 29 bucks per 100 does.

- 2022 Post-Season estimate = 13,500 and buck ratio was 16 per 100

White-Tailed Deer mgmt. objective = 55,000 and preseason buck ratio 25 – 44 bucks per 100 does

- 2022 Post-Season estimate = 27,200 and 2022 buck ratio was 25 bucks per 100 does

Fawn production and survival has been below that needed to sustain the populations of both sp. the past 3-yrs (mule deer) and 4-years (white-tailed deer)

- Mule Deer postseason ratios 2020 - 2022 = 48, 55, & 56 fawns per 100 does.
- White-Tailed Deer preseason ratios 2019 - 2022 = 59, 55, 53, & 52 fawns per 100 does.

Harvest reductions:

- From 2021 to 2022
    - Total days in HA's 1-3 decreased 27%
    - Total resident buck harvest (gen. lic.) decreased 20%
- Mule Deer = from about 2,400 bucks (2016 & 17) to 1,150 (2021 & 22).
    - *2022 buck harvest est. likely high given reduction in season and Region A quota in 2022. Predicted harvest for 2022 was 950.*
    - Doe harvest: from about 500 (each year 2019-21), to about 300 in 2022. *predicted 2022 doe harvest was 250*
- White-Tailed Deer = from about 4,300 (2016-18) to 1,900 in 2022
    - *Predicted 2022 harvest was 2,230.*
    - Doe harvest: from high of almost 2,600 (2018) to 550 last year
        - *Predicted over 1,200 but we pulled licenses sales, and only two-thirds of d/f tags that sold were used in all areas, for both types 6 & 7 licenses combined.*

Projected Harvests for 2023 with season as proposed:

- Mule Deer: About <u>900 bucks and no does</u>. *(although, my guess is in reality it will be closer to 700)*
- White-Tailed Deer: About <u>1,400 bucks and maybe 200 does</u>.

Date of Harvest: Percentage of take occurring after 11/15/2022 (i.e. last 5 days):

- Mule Deer (general licenses): 67 of 260 reported = 23%
- White-Tailed Deer (general licenses): 132 of 393 reported = 34%
- Both sp. all license types: 208 of 717 reported = 29%

Hunter Satisfaction:

- Mule Deer: ~ 83% (2015-2017) down to about 50% (2021 & 2022)
- White-Tailed Deer: ~81% (2015-2017) down to 55% (2021) & 49% (2022)

Hunter Success:

- Mule Deer: ~ 47% (2014 – 2017) down to 33% (2021) & 36% (2022)
- White-Tailed Deer: ~ 69% (2015-2017) down to 53% (2021) & 45% (2022)

Hunter Effort:

- Mule Deer: ~ 5.8 days per harvest (2015-2017) to ~ 9.2 days per harvest (2021 & 2022)
- White-Tailed Deer: ~ 5.7 days per harvest (2015-2017) to 7.8 (2021) & 9.3 (2022)

Preseason Trend Counts:

- Mule Deer. 2022 was second lowest since 1998 *(2011 was 25% lower, but 2010-11 winter losses were more wide spread, and EHD / BTV losses much greater north of the interstate than south in 2021-2022).*
- White-Tailed Deer: 2022 was lowest since 1998 *(next lowest was 2011 which was 22% higher).*

Season Date Continuity:

- Normally Hunt Areas 1-3 are open until 11/30, but have closed at times on 11/20. Hunt Areas 4-6 have closed on 11/20 for several decades due to the much higher proportion of mule deer and relatively little public land (except in HA 4, and here the public land harbors primarily WTD). Hunt Areas 1 - 3 averaged ~1,300 mule deer and 2,400^{+} white-tailed deer hunters between 2018 and 2022, whereas Hunt Areas 4 - 6 averaged 500 mule deer and ~ 600 white-tailed deer hunters between 2018 and 2022. If HA's 4, 5, & 6 were open longer than areas 1, 2, & 3, overcrowding and over harvest would result.
- PROPOSAL: Close the deer season on public land 11/15 and remain open on private land until 11/20. RESPONSE: We don't know how this would affect harvest. Several years of wild turkey hunter surveys in the Black Hills consistently revealed that one-third of the hunters hunted exclusively private land, 1/3 exclusively public land, and 1/3 both. Considering this, it doesn't seem to be a viable option as half to potentially two thirds of Black Hills deer hunters desire or seek to hunt private land at some point. This would increase hunter requests to landowners to allow late season hunting, and would create an inequity between hunters willing and able to pay an access fee and those unwilling or

unable. Most importantly, there is not a need to differentially increase harvest on private land versus public like we do for doe harvest. That is done due to the high hunter pressure public lands in the Black Hills receive, and the need to address deer damage on private lands versus public lands.

Common misconceptions about deer season in the Black Hills:

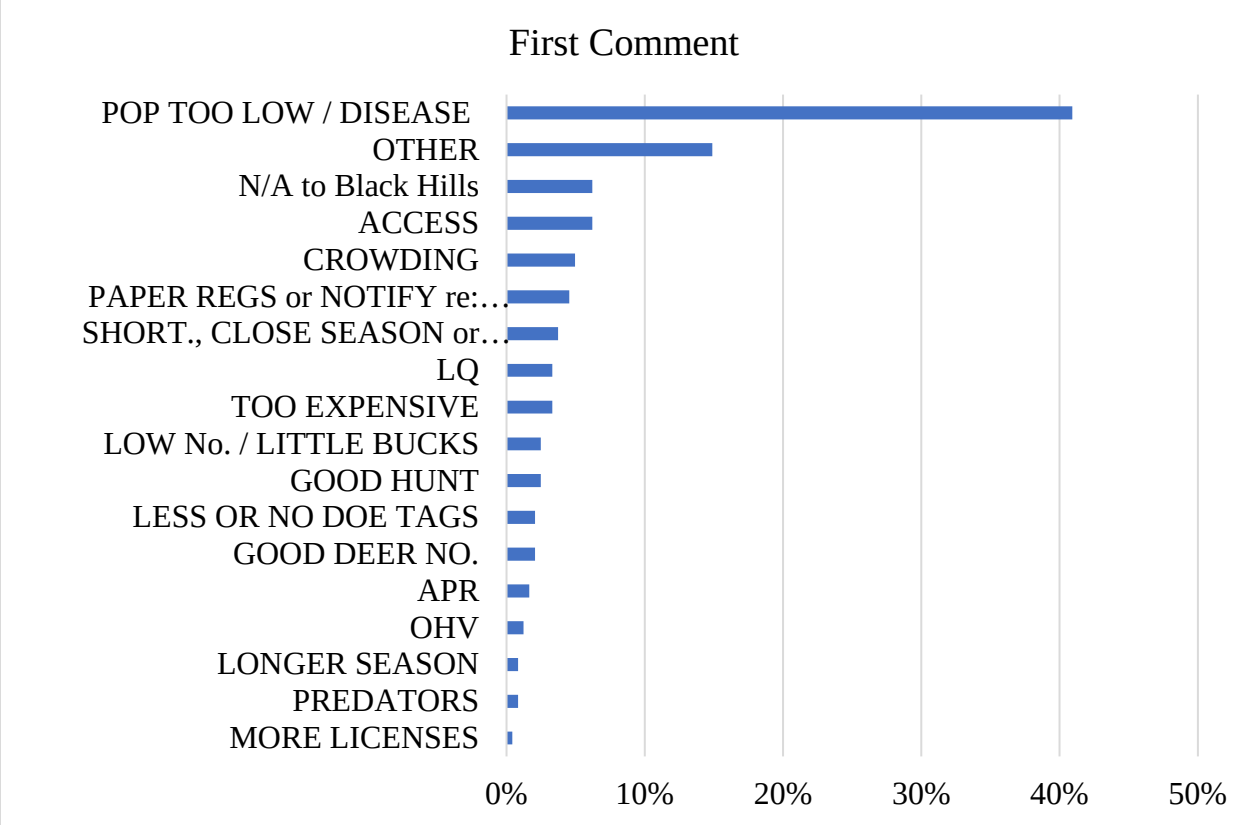
- Landowners want a season longer than proposed.
    - 2010 survey of Area 1, 2, and 3 landowners: When presented with five alternative season structures intended to increase escapement of mule deer bucks, no alternative was significantly supported. Support was greatest for moving from a 30-day to 20-day season. However, an equal number of respondents were opposed to such a season. Overall, responding landowners were highly opposed to October hunting seasons. Likewise, respondents opposed separating take of mule deer and white-tailed deer by species during November by nearly 2 to 1, and there was even more dissatisfaction with a proposed October mule deer and November white-tailed deer seasons. Issuing separate, limited quota tags for an October mule deer season garnered the strongest opposition (almost 3 to 1 compared to those in support). But, if these same limited quota licenses were to be valid in November, opposition to them (while significant) was half as great.
    - All but two unsolicited phone calls from landowners supported shorter season or asked to close the season.
    - Several Area 1 & 3 landowners submitted written comments on landowner survey noting they seriously cut back, or closed, deer hunting on their property last year, and plan to do the same this year.
        - Landowner in HA 1 - "We did not allow any hunting in fall of 2022 and will not again in 2023. We have no deer (whitetail) here at the home place and don't even see tracks. At the summer pasture (mule deer) there are very few and were dying of CWD last fall. We recommend absolutely NO licenses to be sold for Crook County."
        - Landowner in HA 1 - “Less permits, bucks only you had a lot of upset hunters with the removal of doe/fawn. I agree there should have been less doe fawn permits and why were they not withdrawn earlier?”
        - Landowner in HA 3 - "I limited hunting this last season and some of my neighbors didn't have hunters - let the deer population grow!”
        - Landowner in HA 3- “Disease and lions have ravaged our deer numbers both WT and mule deer.”
        - Landowner in HA 1 – “We have almost zero WT and very few mule deer. Close the seasons for a couple of years.”
        - Outfitter - Requested limited quota for mule deer.

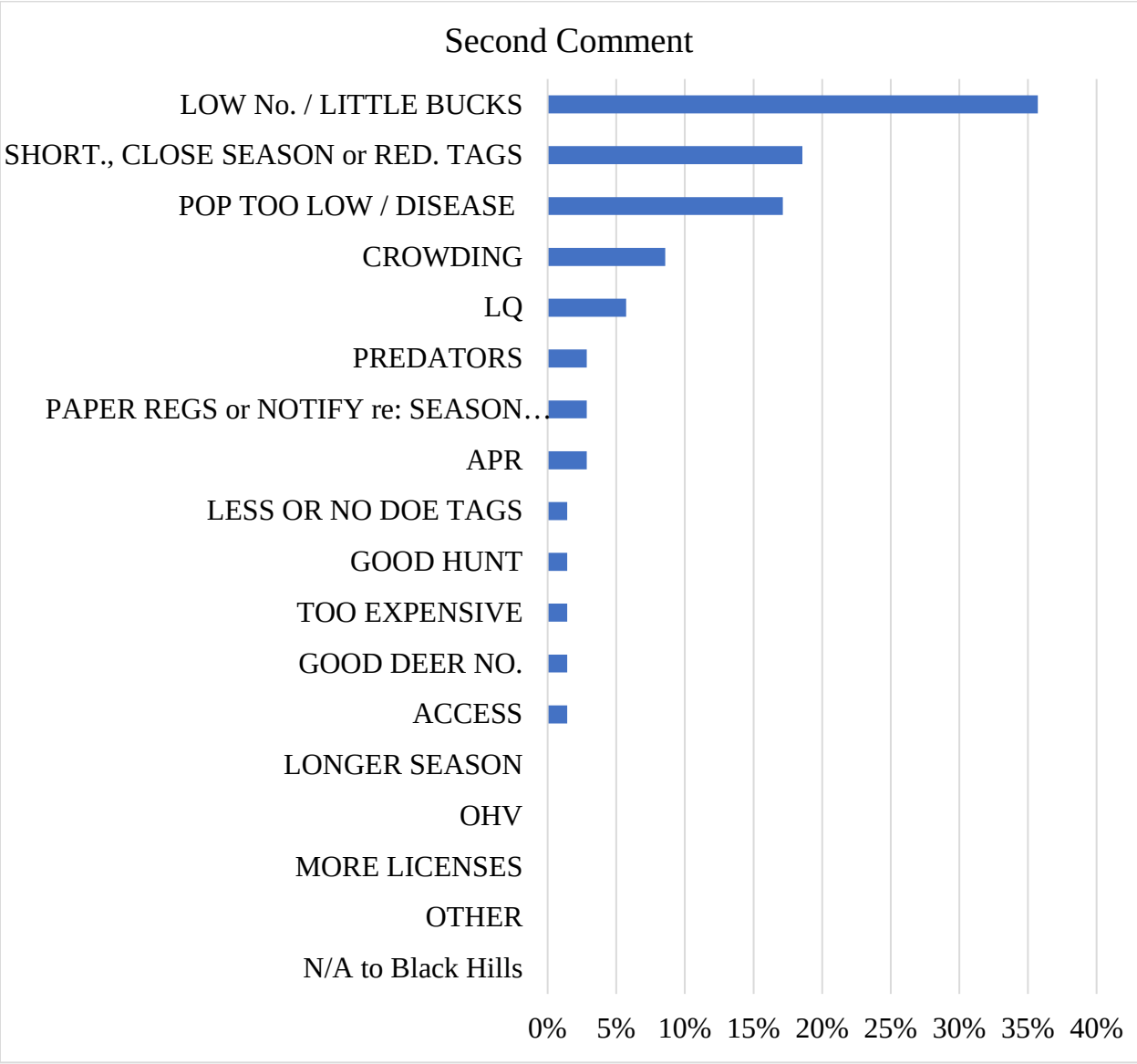
- About 50% of landowners responding to annual Sheridan Region survey wanted a more conservative deer season in 2023. Slightly less than 50% wanted the same. A small fraction wanted more liberal. (sample size was small however)

- "Everyone comes up to the Black Hills to hunt a deer after season close in the other parts of the State." FACT CHECKED: 26% of Black Hills deer hunters in 2022 reported hunting in a second hunt area outside of the Black Hills. Stated another way, 74% of resident hunters in the Black Hills hunted the Black Hills exclusively in 2022.
  - However – if hunting seasons are significantly curtailed in other parts of the state due to the 2022-23 winter, it is very conceivable that more hunters will shift to hunting in NE Wyoming if they believe hunting is as good or better than last year; or may replace antelope opportunity with public land deer hunting in the Black Hills.
- APRs are the answer:
  - APR are not needed as vast majority of the bucks harvested are already 3 points on a side or better (2020-2022 data combined):
  - Field Check Data:
    - 85% of all buck field checked were 2 yrs. old or older (both sp.)
    - Mule Deer: 24% were class 2 and 3 bucks.
  - Tooth Age Data Harvest Bucks
    - Average Age of Harvested Bucks (both sp.) = 4.5
    - 50% of harvested bucks (both sp.) were 4.5 or older
  - Outside the Black Hills, initial 2023 hunting season proposals: 18 Hunt Areas with APRs for mule deer, none for WTD. These have been implemented to appease the public and likely have not accomplished much.
- 15 Day season is too short.
  - Only way to limit resident hunters is by season length.
    - Historical harvest data indicates the number of active resident licenses drops proportionately to the change in season length. *Note: Exact numbers are a little hard to get because res. and non-res. gen. lic. are pooled in Gen. Lic. active license data, and changes in d/f tag issuance cannot be separated out from total active licenses for an area by residency; plus some folks hunt both mule deer and wtd on Gen. Lic. in the same year yielding duplicate active license data when sp. are combined for analysis.*
  - Outside the Black Hills, *initial* 2023 hunting season proposals: 92 Hunt Areas in the State with some type of Gen. Lic. mule deer season. 71 have less than 20 day season. Shortest is 5 days, longest 24 days. Average and Median season length of Gen. Lic. mule deer seasons outside the Black Hills is 14 days.

- After changes to season proposals Gen. lic season lengths were proposed to be reduced by
  - 1 area - 43%
  - 5 areas - 45%
  - 14 areas – 29%
- Black Hills season proposal (closing Nov. 15) represents a 25% reduction in season length in all hunt areas from 2022. Note: Our winter of 22-23 was the summers of 2021 and 2022 with large EHD and BTV die-offs and low reproduction & recruitment that was due to several factors, including likely impacts from disease (either direct mortality, or decreased productivity from compromised does [bucks too maybe – unk.])

2022 Deer Harvest Survey Comments




Second Comment
LOW No. / LITTLE BUCKS
SHORT., CLOSE SEASON or RED. TAGS
POP TOO LOW / DISEASE
CROWDING
LQ
PREDATORS
PAPER REGS or NOTIFY re: SEASON…
APR
LESS OR NO DOE TAGS
GOOD HUNT
TOO EXPENSIVE
GOOD DEER NO.
ACCESS
LONGER SEASON
OHV
MORE LICENSES
OTHER
N/A to Black Hills
0%
5%
10%
15%
20%
25%
30%
35%
40%

2022 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: MD755 - NORTH CONVERSE

HUNT AREAS: 22

PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Population:	6,659	4,630	4,484
Harvest:	278	225	225
Hunters:	370	343	350
Hunter Success:	75%	66%	64 %
Active Licenses:	370	343	350
Active License Success:	75%	66%	64 %
Recreation Days:	1,436	1,654	1,200
Days Per Animal:	5.2	7.4	5.3
Males per 100 Females	47	49	
Juveniles per 100 Females	63	67	

Population Objective (± 20%) : 9000 (7200 - 10800)

Management Strategy: Special

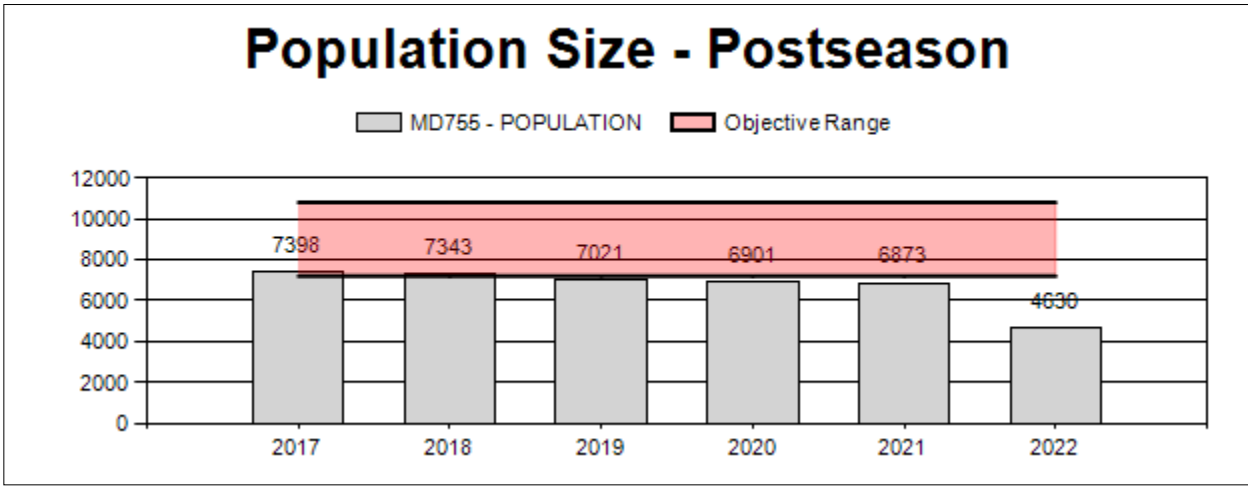
Percent population is above (+) or below (-) objective: -48.6%

Number of years population has been + or - objective in recent trend: 14

Model Date: 02/25/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	14.5%	20%
Proposed change in post-season population:	-3.3%	-3.0%



NOTE: 2017 - 2021 values stored in JCR database and do not reflect current model estimates

2023 HUNTING SEASONS

North Converse Deer Herd Unit (MD755)

Hunt Area	License Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
22	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	400	Antlered mule deer or any white-tailed deer

2022 Hunter Satisfaction: 76% Satisfied, 12% Neutral, 12% Dissatisfied

2023 Management Summary

1) Hunting Season Evaluation: The 2023 season structure was conservative in an effort to promote population growth and maintain buck ratios within special management parameters. This hunt area is predominantly private land with much of the public land inaccessible to hunters. Public land mule deer hunting is very limited in this area. Many of the large landowners have concerns over mule deer populations and have limited the number of hunters they allow. License issuance is largely based on access to private lands and limited to prevent saturation of available public lands.

The North Converse Herd Unit experienced a dramatic reduction in population in 2011 likely caused by years of drought and a harsh winter. Since that time, the population has shown a slight upward trend, but has remained below objective. Fawn ratios from 2019-2021 have been significantly lower than average and have resulted in poor recruitment and therefore a declining population. Fawn ratios rebounded in 2022, however higher than average snowfall throughout the winter likely impacted fawn recruitment after classifications were completed. The Herd Unit has been subjected to a very high level of energy development disturbance over the past decade. Impacts from this development on the long-term carrying capacity of mule deer habitats are unknown, but potentially significant.

Additional Management Data Collected In the North Converse Herd Unit Includes:

- In 2022, we collected antler spread measurements (n=11) from harvested adult male mule deer. Class II bucks represented only 20% of all bucks sampled, while Class I bucks represented the other 80%. Managers realize this is a small sample size and not statistically relevant, however it does assist with tracking trends over time.
- Buck ratios have been consistently high in this herd. (Table 1, Appendix 1) They have averaged 42 bucks:100 does over the past three years. Managers did however see a drop in the buck ratio in 2021, possibly as a result of EHD.

2) Chronic Wasting Disease Management: There were no CWD management actions taken in the North Converse herd unit in 2022. To date, we do not have any meaningful CWD prevalence data for this herd.

3) Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2022 postseason population estimate for this herd unit was 4,630 (CL = 3,836-5,448) mule deer.

The post-season population estimate in 2021 was derived from the Spreadsheet model while the estimate for 2022 was provided by the IPM. The IPM estimate is quite lower than the previous estimates. Managers plan to incorporate a sightability estimate in future years to better anchor the IPM estimates.

Table 1.

2017 - 2022 Postseason Classification Summary

for Mule Deer Herd MD755 - NORTH CONVERSE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	7,398	41	98	42	7	0	188	22%	383	44%	295	34%	866	1,588	11	38	49	± 5	77	± 7	52
2018	7,343	36	75	16	0	0	127	31%	159	39%	123	30%	409	1,825	23	57	80	± 12	77	± 12	43
2019	7,021	51	93	41	1	0	186	20%	460	51%	262	29%	908	1,644	11	29	40	± 4	57	± 5	41
2020	6,901	25	82	41	2	0	150	23%	326	50%	173	27%	649	1,240	8	38	46	± 6	53	± 6	36
2021	6,873	7	22	14	0	0	43	17%	138	55%	72	28%	253	964	5	26	31	± 7	52	± 10	40
2022	4,630	14	45	13	1	0	73	23%	148	46%	99	31%	320	0	9	40	49	± 9	67	± 11	45

Appendix 1.

Mule Deer Composition Stratified Random Sampling Summary
2022-2023 Survey Year
MD755 North Converse

- Average time to fly 2-square mile polygon
    - 7.23 Minutes
- Average time to fly high vs. low density polygon
    - 9 Lows – 8.00 Minutes/Low
    - 17 Highs – 6.82 Minutes/High
- Total survey time (including all ferry time between polygons), excluding ferry time to get chopper prior to survey
    - 5.43Hours
- Weather conditions
    - Visibility –Clear and sunny.
    - Wind – 10-15 MPH
- What percentage of actual polygons flown were high's vs. low's?
    - 65% Highs
    - 35% Lows
- How many total deer were classified?
    - 320 Total Deer
- Assessment of polygons that were flown (should high's be changed to low's, or vice versa?)
    - 468 could be moved from low to high. 5 observations, 26 deer
    - 546 could be moved from high to low. No observations. Marginal habitat.
    - 578 could be moved from low to high. 5 observations, 12 deer.
    - 1048 Should be moved from low to high. 11 observations, 45 deer.
- Should any polygons that were flown be completely excluded?
    - No
- Save screenshot of polygons flown
    - In Folder
- Save Google Earth image of polygons flown
    - In Folder
- What were total survey costs for this survey?
    - Survey Time - 4.7 Hours @ $875/hr = $4,112.50
    - Ferry Time - .2 Hrs @ $875/hr = $175.00
    - Fuel Truck – 100 miles @ $2/mi. = $200.00
    - Pilot/Driver Per Diem – 2 people @ $175/day x 1 day = $350.00
    - Total Survey Cost = $4,837.50
- Classification Ratios
    - Fawns:100 Does – 67
    - Yearling bucks:100 Does – 9
    - Class 1: 100 Does – 30
    - Class 2 : 100 Does – 9
    - Class 3 : 100 Does – 1

    - Adult Bucks : 100 Does – 40
    - All Bucks : 100 Does - 49
- Date they were entered into the WOS
    - 12/15/2022

2022 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: MD756 - SOUTH CONVERSE

HUNT AREAS: 65

PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Population:	5,597	3,538	3,532
Harvest:	276	249	250
Hunters:	780	696	700
Hunter Success:	35%	36%	36 %
Active Licenses:	780	696	700
Active License Success:	35%	36%	36 %
Recreation Days:	3,147	2,804	2,800
Days Per Animal:	11.4	11.3	11.2
Males per 100 Females	41	41	
Juveniles per 100 Females	59	74	

Population Objective (± 20%) : 12000 (9600 - 14400)

Management Strategy: Private Land

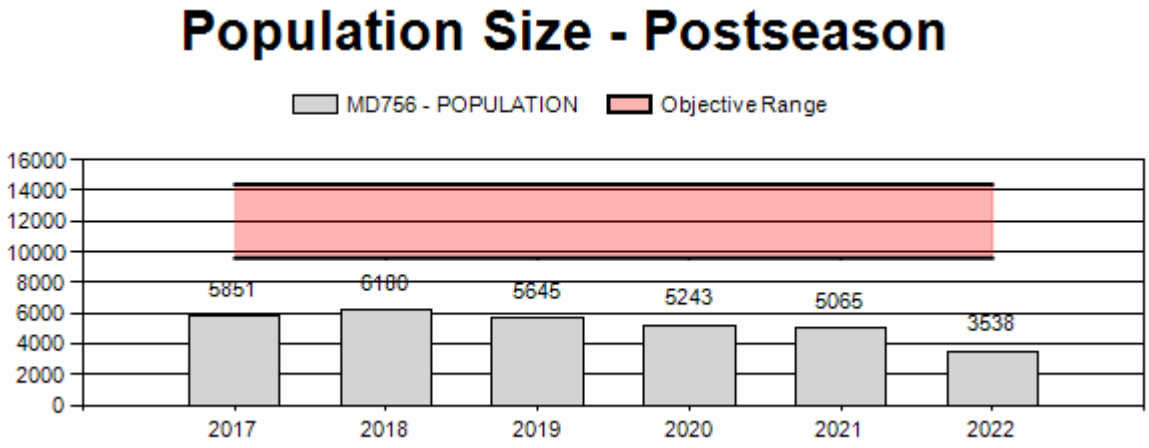
Percent population is above (+) or below (-) objective: -70.5%

Number of years population has been + or - objective in recent trend: 15

Model Date: 02/25/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	23.7%	28.0%
Proposed change in post-season population:	-5.8%	0%



NOTE: 2017 - 2021 values stored in JCR database and do not reflect current model estimates

2023 HUNTING SEASONS

South Converse Deer Herd Unit (MD756)

Hunt Area	License Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
65	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 24		Antlered mule deer or any white-tailed deer

2023 Region J nonresident quota: 900 licenses

2022 Hunter Satisfaction: 50% Satisfied, 22% neutral, 27% Dissatisfied

2023 Management Summary

1) Hunting Season Evaluation: The 2022 season structure was modified to reduce the season length to 10 days and remove the 3-point or better antler point restriction. The 2023 season structure remained the same. This area historically has maintained high buck ratios and high CWD prevalence. After hitting a low point in 2012, mule deer numbers grew through 2017 due to favorable environmental conditions, and have started to show a downward trend. Therefore seasons are more conservative.

After a generally dry, mild 2020/2021 winter, the herd unit was hit with a significant spring storm in March of 2021 which caused higher winter mortality. Above average snowfall and periods of frigid temperatures throughout the 2022/2023 winter likely caused higher winter mortality as well.

A stratified random deer composition/abundance survey was conducted in November 2022 by helicopter. Managers classified 377 mule deer with above average fawn ratios of 74 fawns:100 does and sustained high buck ratios at 41 bucks:100 does. Both show the highest fawn and buck ratios in the area since 2018 (Table 1).

After the lowest harvest reported in Hunt Area 65 since 1991 in 2019, mule deer harvest in 2021 was again back up to similar harvest as prior years. Harvest decreased in 2022, likely an effect of the shorter season length. However it did not differ significantly from the previous 10-year average. In 2022, we collected antler spread measurements (n=136) from adult male mule deer harvested in the South Converse Herd Unit. Of all bucks sampled, 72% were Class I, 26% were Class II, and 2% were Class III bucks. As expected, the percentage of Class I bucks greatly increased in 2022 with the removal of the antler point restriction.

2) Management Objective Review: This herd unit was slated for an objective review in 2023. 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 2028; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3) Chronic Wasting Disease Management: This is a Tier 2 surveillance herd that was prioritized for CWD sampling beginning in 2022 and will continue through 2023. Mandatory

CWD testing was required in the South Converse Herd Unit in 2022. To date, we have collected 147 samples during this focal period. Prevalence data will be reported in the 2023 JCR when this focal surveillance period is complete. A more in-depth discussion on CWD within this herd will occur in 2023.

4) Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2022 postseason population estimate for this herd unit was 3,538 (CL = 2,684 – 4,604) mule deer.

The post-season population estimate in 2021 was derived from the Spreadsheet model while the estimate for 2022 was provided by the IPM. The IPM estimate is significantly lower than the previous estimates.

Managers flew a composition/abundance survey in November 2022 which produced an abundance estimate of 4,480 (CL = 1,738 - 7221) deer (Appendix 1). Managers also flew a sightability survey in January 2023 which produced an abundance estimate of 4,422 (CL = 3,209 – 5,676) deer (Appendix 2). The IPM model estimate falls within the CL, however after running multiple different iterations of IPM models, none accurately fit with the estimated population based on these abundance estimates. Managers believe the abundance estimate is a better representation of the actual population number.

Table 1.

2017 - 2022 Postseason Classification Summary

for Mule Deer Herd MD756 - SOUTH CONVERSE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	5,851	70	103	38	3	0	214	22%	453	46%	319	32%	986	1,315	15	32	47	± 5	70	± 6	48
2018	6,180	41	79	23	8	0	151	22%	299	44%	237	34%	687	1,571	14	37	51	± 6	79	± 8	53
2019	5,645	78	133	31	0	0	242	21%	608	52%	321	27%	1,171	1,281	13	27	40	± 3	53	± 4	38
2020	5,243	52	70	25	2	0	149	21%	388	55%	167	24%	704	1,030	13	25	38	± 4	43	± 5	31
2021	5,065	17	16	4	0	0	37	13%	167	59%	79	28%	283	794	10	12	22	± 5	47	± 8	39
2022	3,538	33	15	23	1	0	72	19%	175	46%	130	34%	377	0	19	22	41	± 7	74	± 10	53

Appendix 1.

Mule Deer Composition Stratified Random Sampling Summary
2022-2023 Survey Year
MD756 South Converse

- Average time to fly 2-square mile polygon
    - 7.71 Minutes
- Average time to fly high vs. low density polygon
    - 6 Lows – 7 Minutes/Low
    - 18 Highs – 7.94 Minutes/High
- Total survey time (including all ferry time between polygons), excluding ferry time to get chopper prior to survey
    - 4.62 Hours
- Weather conditions
    - Visibility – Lower visibility with clouds, but high snow cover first day. Second day clear and sunny.
    - Wind – 10-15 MPH
- What percentage of actual polygons flown were high's vs. low's?
    - 75% Highs
    - 25% Lows
- How many total deer were classified?
    - 377 Total Deer
- Assessment of polygons that were flown (should high's be changed to low's, or vice versa?)
    - Polygons were stratified correctly.
- Should any polygons that were flown be completely excluded?
    - No
- Save screenshot of polygons flown
    - In Folder
- Save Google Earth image of polygons flown
    - In Folder
- What were total survey costs for this survey?
    - Survey Time – 3.5 hrs. @ $875/hr. = $3,062.50
    - Ferry Time – 0.2 hrs. @ $875/h.r = $175.00
    - Fuel Truck – 227 miles @ $2/mi. = $454.00
    - Pilot/Driver Per Diem – 2 people @ $175/day x 1 day = $350.00
    - Total Survey Cost = $4,041.50
- Classification Ratios
    - Fawns:100 Does – 74
    - Yearling bucks:100 Does – 19
    - Class 1: 100 Does – 9
    - Class 2 : 100 Does – 13
    - Class 3 : 100 Does – 1
    - Adult Bucks : 100 Does – 22
    - All Bucks : 100 Does - 41

- Date they were entered into the WOS
    - 12/15/2022

Appendix 2.

Sightability Model Results

Friday February 10, 2023

Settings

Species	Survey Type	DAU	Bio Year
Mule Deer	Sightability	South Converse 756	2022 - 2023

Input Data

Sampling Design

DAU	Bio Year	Stratum	Subunits Available	Subunits Sampled	Prop Sampled
South Converse 756	2023	High	104	82	0.788
South Converse 756	2023	Low	342	85	0.249
South Converse 756	2023	Other	114	1	0.009

Count Data

GMU	SubUnit	Stratum	Groups Counted	Total Animals
South Converse 65	37	Low	3	14
South Converse 65	36	Low	1	5
South Converse 65	54	Low	1	0
South Converse 65	74	High	2	28
South Converse 65	19	Low	3	65
South Converse 65	34	High	1	10
South Converse 65	32	Low	1	0
South Converse 65	16	Low	1	2
South Converse 65	15	Low	1	0
South Converse 65	3	Low	1	0

1–10 of 168 rows Previous **1** 2 3 4 5 ... 17 Next

Results

Estimates

Species	Survey Type	DAU	Bio Year	Demographic	Raw Count	↓ Estimate	LCL	UCL
Mule Deer	Sightability	South Converse 756	2022 - 2023	Total	1583.00	4442.88	3209.73	5676.04

Sampling Design

Species	Survey Type	DAU	BioYear	StratumID	Stratum	Sampled	Available	Prop. Sampled
Mule Deer	Sightability	South Converse 756	2022 - 2023	17	High	82	104	0.788
Mule Deer	Sightability	South Converse 756	2022 - 2023	19	Low	85	342	0.249
Mule Deer	Sightability	South Converse 756	2022 - 2023	0	Other	1	114	0.009
						168	560	0.300

Detection Probability

Summary

Probability of Detection	Observations
0.1 - 0.3	7
0.3 - 0.5	101
0.5 - 0.7	55
0.7 - 0.9	44
0.9 - 1	66
	273

Details

GMU	SubUnit	Stratum	GroupSize	VegClass*	Activity*	SnowCover*	CovarBeta	Theta
South Converse 65	37	Low	5	2	1	0	-0.63079	2.60566
South Converse 65	37	Low	4	2	0	0	0.66478	1.44877
South Converse 65	37	Low	5	2	1	0	-0.63079	2.60566
South Converse 65	36	Low	5	0	0	0	0.04752	1.87957
South Converse 65	54	Low	0	0	0	0	-0.24990	2.16984
South Converse 65	74	High	4	4	2	0	3.19243	1.03525
South Converse 65	74	High	24	4	0	0	1.50772	1.19113
South Converse 65	19	Low	13	0	2	0	3.39775	1.02948
South Converse 65	19	Low	31	2	0	0	2.27082	1.08591
South Converse 65	19	Low	21	2	0	0	1.67599	1.16341

1–10 of 273 rows

Previous **1** 2 3 4 5 ... 28 Next

* Recoded for model - see covariates table

Covariates

	Name	Type	Description	Model Value	Beta
	Intercept	Intercept			-0.249895
▶	VegClass	Categorical	Conifer	1	-0.655615
▶	VegClass	Categorical	Grassland/Open	2	0.676739
▶	VegClass	Categorical	Juniper/Mahogany	3	-1.428629
▶	VegClass	Categorical	Aspen/Riparian/Brush	4	0.330026
▶	Activity	Categorical	Bedded	1	-1.355053
▶	Activity	Categorical	Moving	2	2.874367
▶	SnowCover	Categorical	-1 - 20	1	0.495283
▶	SnowCover	Categorical	20 - 79	2	-0.630864
▶	GroupSize	Continuous			0.059483

2022 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: MD757 - BATES HOLE/HAT SIX

HUNT AREAS: 66-67

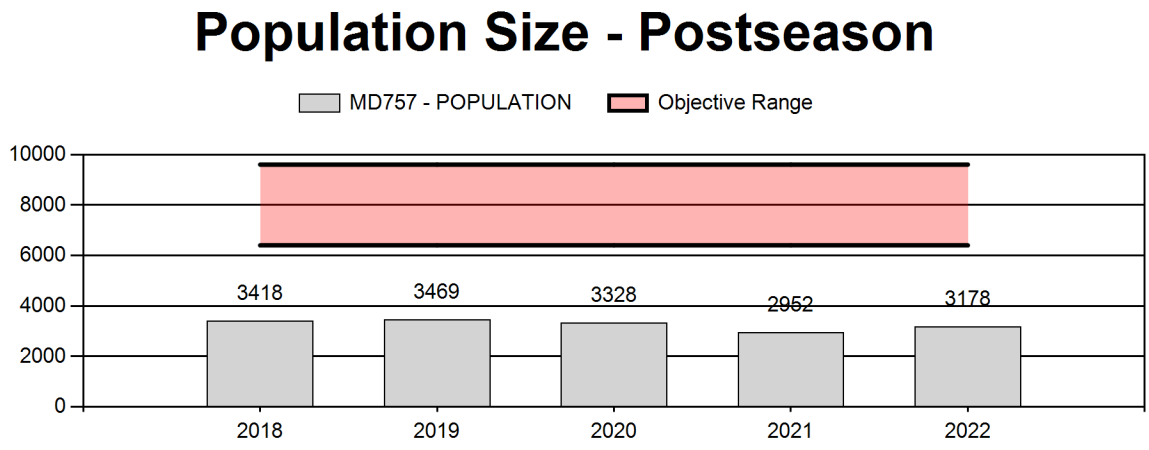
PREPARED BY: BRANDON WERNER

	2017 - 2021 Average	2022	2023 Proposed
Population:	3,318	3,178	3,261
Harvest:	284	224	230
Hunters:	841	711	700
Hunter Success:	34%	32%	33%
Active Licenses:	841	711	700
Active License Success:	34%	32%	33%
Recreation Days:	3,006	2,529	2,500
Days Per Animal:	10.6	11.3	10.9
Males per 100 Females	30	30	
Juveniles per 100 Females	64	65	

Population Objective (± 20%) :	8000 (6400 - 9600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-60.3%
Number of years population has been + or - objective in recent trend:	22
Model Date:	02/21/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	33%	31%
Proposed change in post-season population:	3.2%	2.61%



2023 HUNTING SEASONS
BATES HOLE / HAT SIX MULE DEER HERD (MD757)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
66	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 21		Antlered mule deer or any white-tailed deer

2023 Region D Nonresident Quota: 300

2022 Hunter Satisfaction: 42% Satisfied, 24% Neutral, 34% Dissatisfied

2023 Management Summary:

1) **Hunting Season Evaluation:** After being at very low levels through 2013, this population grew through 2016 but then declined until 2022 when a slight population increase was observed. Postseason classifications have yielded mediocre fawn ratios in the 60s per 100 does for the last seven years. Antler-point restrictions (APRs) of three (3) points or more on either antler are used in the herd in some years, with the goal of conserving younger age-class bucks and reducing harvest pressure in years when the buck ratio is low. Managers applied an APR to the hunting season in 2019, with the plan to leave it in place for a three-year cycle. However, due to extreme weather conditions managers were unable to perform ground and aerial surveys in 2021. It was therefore impossible to determine buck ratios, although buck numbers were likely low given continual population decline. Therefore, the APR was maintained for the 2022 season. Managers were able to effectively classify deer postseason in 2022 (Tables 1 & 3). Good moisture was observed in 2022 but the fawn ratios stayed relatively similar to the five-year average at 65:100 does. Buck ratios were also about average at 30:100 does. Hunter success in 2022 (32%) was nearly identical to the five-year average of 31%. Nonresident hunters increased their harvest success drastically to 58%, with a five-year average of just 24%. The improved success rate likely stems from hunters having a difficult time accessing much of the hunt area in 2021 due to winter storms, resulting in lower harvest and a surplus of bucks for 2022. The weather was mild in the 2022 season and hunters had an easier time accessing the hunt area. Tooth samples and antler measurements were collected from 68 harvested mule deer bucks in 2022. The average cementum annuli tooth age of those sampled was 4.0 years old, with a median age of 4.5, and average antler spread of 17.9 inches.

   For the 2023 hunting season, managers prescribed a seven-day general license season, which is typical for the herd. The APR limitation was removed to reduce pressure on mature bucks, better distribute harvest across all age classes of bucks, and provide more opportunity for sportsmen.

Managers recommend removal of the APR for at least two consecutive years, assuming buck ratios remain adequate. This will provide more consistency and less confusion for hunters.

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,254	75	57 (50%)	41 (36%)	16 (14%)	189	12	9	6	2	18	29
2009	1,320	59	61 (54%)	41 (37%)	10 (9%)	171	8	8	6	1	15	23
2010	1,479	82	49 (49%)	42 (42%)	9 (9%)	182	9	5	5	1	11	20
2011	1,248	47	52 (56%)	33 (36%)	7 (8%)	139	7	8	5	1	14	21
2012	1,272	28	55 (59%)	30 (32%)	9 (9%)	122	4	8	4	1	13	17
2013	1,483	86	50 (61%)	25 (30%)	7 (9%)	168	10	6	3	1	10	20
2014	1,403	83	79 (71%)	26 (23%)	7 (6%)	195	12	12	4	1	17	29
2015	2,061	164	97 (70%)	29 (21%)	13 (9%)	303	16	9	3	1	13	29
2016	1,836	132	198 (85%)	31 (13%)	4 (2%)	365	15	22	3	1	26	41
2017	1,165	54	108 (80%)	23 (17%)	4 (3%)	189	9	18	4	1	22	31
2018	734	32	59 (89%)	7 (11%)	0 (0%)	98	8	15	2	0	17	26
2019	1,050	55	89 (86%)	10 (10%)	4 (4%)	158	10	17	2	1	19	29
2020	555	43	41 (87%)	6 (13%)	0 (0%)	90	15	15	2	0	17	32
2021*	0	0	0	0	0	0	0	0	0	0	0	0
2022	509	34	30 (66%)	15 (33%)	0 (0%)	79	13	11	5	0	17	30

*No classifications completed in 2021 due to extreme weather

Table 1. Antler classification analysis for Area 66 within the Bates Hole/Hat Six Mule Deer Herd Unit, 2008 – 2022.

2) **Management Objective Review:** There was no review scheduled for 2023.

3) **Mule Deer Initiative Habitat Information:** As part of the Mule Deer Initiative, managers collect Rapid Habitat Assessment (RHA) and precipitation data throughout the herd unit in some years (Appendix A). Limited RHA data was collected within the Bates Hole – Hat Six Mule Deer Herd during the 2022 reporting period. Numerous habitat treatments are ongoing and being planned including sagebrush treatments, riparian restoration, noxious weed control, juniper removal, and wildlife friendly fence conversions.

4) **Chronic Wasting Disease Management:** Elevated Chronic Wasting Disease (CWD) surveillance efforts have occurred in this herd in recent years due to ongoing CWD research. Over the past three years, a total of 162 adult male mule deer were sampled, which is below the sample goal of 200. Hunting seasons were conservative during the surveillance period, with very few females or yearling males sampled due to APR and harvest limitations. Sample distribution of mature males was even through most of the area, except the northeastern part of the herd unit. This area contains predominantly private lands with limited hunting access, and has lower densities of deer compared to the central and western portions of the herd. It should also be noted that Area 67 is closed to hunting; thus no samples from harvested deer were collected from that portion of the herd unit. The majority of positive animals were harvested in the west and central parts of the herd unit. This herd is exhibiting a high prevalence of CWD (28%) in adult bucks, which has been sustained over the past five-years of intensive CWD surveillance (Table 2). Managers believe this high prevalence is a contributing to poor adult survival in this herd. To date, no meaningful CWD management actions have occurred in this herd unit. In 2019 a multi-year research project was initiated in this herd by WGFD in collaboration with the University of Wyoming. This study has focued on interactions between mountain lion predation, mule deer, and CWD. Results from this study will be reported when available.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*	
	Adult Males (CI = 95%)	Yearling Males
2020-2022	**28% (16.5-36%, n=162)**	14% (7)

Table 2. CWD prevalence for hunter-harvested male mule deer in the Bates Hole – Hat Six Mule Deer Herd, 2020 - 2022.

5) **Population Modeling:** The model for this herd depicts a population that has been consistently under objective and remained relatively stable over the past four years. A sightability survey conducted in 2023 provided an abundance estimate of 3,686 (CI=2,575-4,797), which slightly increased the overall trend and population estimate in the model (Appendix B). A composition/abundance survey was also conducted in 2022 resulted in a low precision estimate of 5,054 (CI=1,622-8458), although only classification data from this survey will be reported due to only one abundance estimate being allowed into the PopR Integrated Population Models (IPM) per year (Appendix C) . There were three survival estimates from adult female mule deer research in this herd unit plotted into the IPM, along with two abundance estimates. The low survival (73% in 2017, 66% in 2021, and 72% in 2022) of the adult does is an indicator of why the population has remained stagnant. Estimates from fawn survival were not yet analyzed and will not be used in the population estimate in 2023. These independent estimates will contribute additional discrete data points which should improve model performance over time. The 2022 postseason population estimate for this herd unit from the IPM is approximately 3,164 (CI=2,786-3,582) mule deer, which is well below the objective, Based on the composition/abundance and sightability survey estimates, the 2022 population estimate produced by the IPM is likely conservative.

Appendix A
Weather Data for the Bates Hole / Hat Six Mule Deer Herd Unit

Precipitation

From October 2021 through September 2022 (Water Year 2022), precipitation in the Bates Hole / Hat Six Mule Deer Herd Unit was almost 0.6 inches higher than the 30-year average for the same water year timeframe (Figure 1). The growing season (April-June) precipitation in 2022 (5.1 inches) was also about 0.9 inches lower than the 30 year growing season average. Precipitation during this time of year is extremely important for shrubs because this is when the majority of annual growth occurs. During July and August of 2022, typically the driest months during the summer, the Bates Hole / Hat Six Mule Deer Herd Unit received 2.8 inches of precipitation which is 0.9 inches above the 30-year average for July and August. The herd unit received 1.4 inches of precipitation during September and October 2022, which is about half of the 30-year average of 2.7 inches. Precipitation received during this timeframe is beneficial to help jumpstart plant growth the following growing season. While the overall precipitation for water year 2022 was about normal, the below average fall precipitation was not ideal for creating adequate fall green up conditions to assist with mule deer body condition going into winter. The winter of 2022-2023 was extreme with record snowfall taking place. Despite the below average fall moisture and the extreme winter the deer faired out pretty well. The 2023 water year precipitation thus far has been above average, and may provide adequate precipitation for habitat recovery from previous years of below average precipitation.

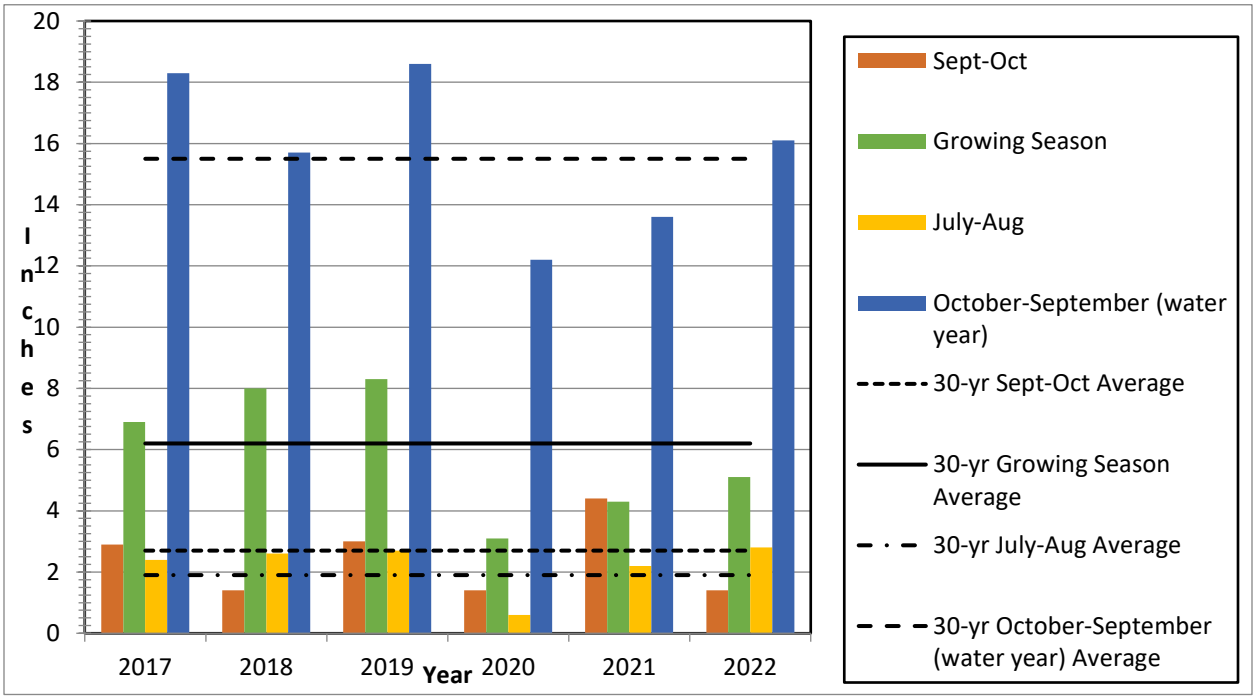


Figure 1. Seasonal precipitation received compared to 30-year averages within the Bates Hole / Hat Six Mule Deer Herd Unit.

Appendix B. 2023 MD 757 Bates Hole/Hat Six Sightability Results

Surveyors: Brandon Werner, Ryan Snell, Kelcey Burguess

Date: 1/18, 1/19, 1/22, 1/23, 1/24

Total Polygons Surveyed: 157 total surveyed, 96 high density 80%, 62 of low densities 20%

Total Survey Time: 11.6 hours with Wildlife Services, 13.8 with Helicopter solutions

Weather: The weather was relatively similar all of days with Casper and Muddy Mountain having snow or fog in the morning. These areas were typically avoided until the afternoons. The temperature range during flight time was between 10-26 degrees with winds ranging from 6-30 mph. All of the days were partly cloudy in the morning becoming mostly sunny in the afternoons with visibility of about 3-8 miles.

Results: Of the 157 polygons flown, mule deer were observed in 68 of them. The total number of deer counted was 1629. The probability of detection was 1.37 and sampling of 1.65. The abundance estimate is 3673 deer (CI 2574 – 4796). Heavy snow loads lead deer to be in better habitat, this lead to many polygons having zero deer in them. Once deer were located in a polygon there was typically several observations. One polygon, number three was avoided due to close proximity to town. l. Snow conditions for deer detectability was perfect.

Costs: Wildlife services costs were $687 per hour, Helicopter solutions costs were $875 per hour, $350 in per diem per day, and $2 per mile for the fuel truck.

Wildlife Services Flight Time $687 x 11.6 = $7,980

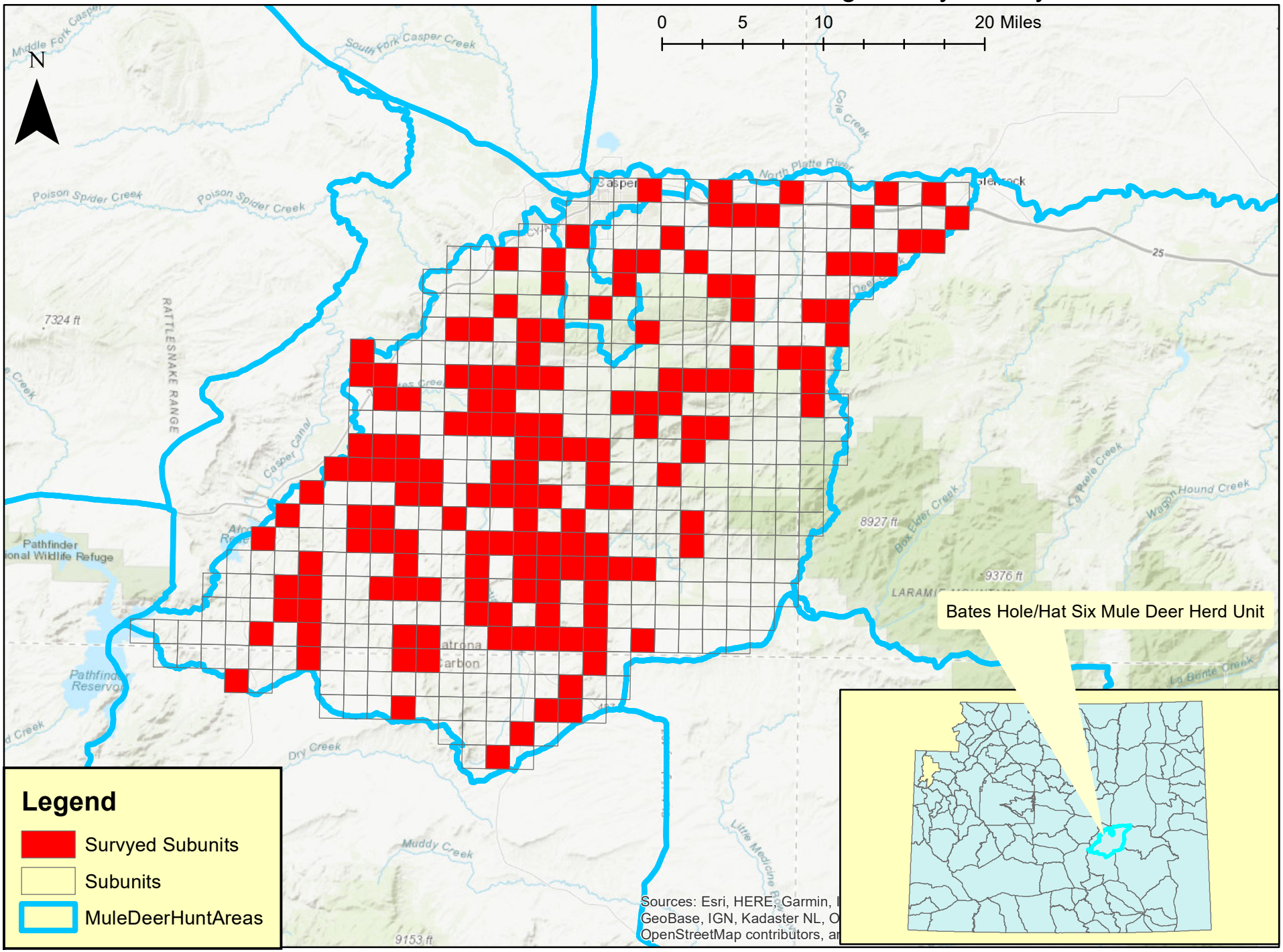
Helicopter Solutions Flight time $875 x 13.8 = $12,075

Per Diem $350 x 3 = $1,050

Fuel truck $2 mile x 1005 = $2,010

Total = $23,115

2023 Bates Hole/Hat Six Mule Deer Herd Unit Sightability Survey



Appendix C. 2022 MD 757 Bates Hole-Hat Six Aerial Classification Results

Surveyors: Brandon Werner, Kelsey Burguess **Date:** 11/15

Total Polygons Surveyed: Twenty-seven polygons were selected to be surveyed, however only 25 were flown (Appendix A). Polygon 132, 133 were skipped to due landowner concerns with concurrent elk seasons. Of the 25 surveyed polygons, 19 were high density and six low (76% high 24% low).

Total Survey Time: 7 Flight hours averaging 11:27 a polygon (12:38 high, 7:11 low)

Weather: The weather on November 15 was ideal to classify deer. A fresh blanket of snow covered most of the survey area expect the Bolton Creek drainage. Temperature ranged between 14-34 degrees, the wind was almost nonexistent in the morning at 4 mph but moved up to 20 mph gusts in the afternoon. The day started out partly cloudy and became mostly sunny in the afternoon. Visibility of 3-8 miles was good most of the morning but fog on Casper Mountain caused us to move to some lower polygons for a short period of time.

Results: Of the 25 polygons surveyed, mule deer were observed in 18 of them. The polygons in which no deer were observed were 56, 126, 143, 148, 152, 331, and 450. Of these polygons 57% were low density and 43% high. A total of 509 deer were observed which surpasses the 300-500 sample goal. With this high sample size the classifications will have a high confidence interval. The results include; 260 does, 170 fawns, 34 yearling bucks, 30 Class I bucks, and 15 Class II bucks. These results based on ratios of 100 does equate to 65 fawns, 13 yearling bucks, and 17 adults bucks. The total buck to doe ratio is 30 bucks per 100 does. These results are about average for the last five years excluding 2021 in which classifications were not completed due to extreme weather conditions.

Costs: Flight costs were $875 per hour, $350 in per diem per day, and $2 per mile for the fuel truck.

Flight time $875 x 7hrs = $6,125

Per Diem $350 x 1 day= $350

Fuel truck $2 mile x 207 miles = $414

Total = $6,889

2023 Bates Hole/Hat Six Mule Deer Herd Unit Stratifed Random Sampling

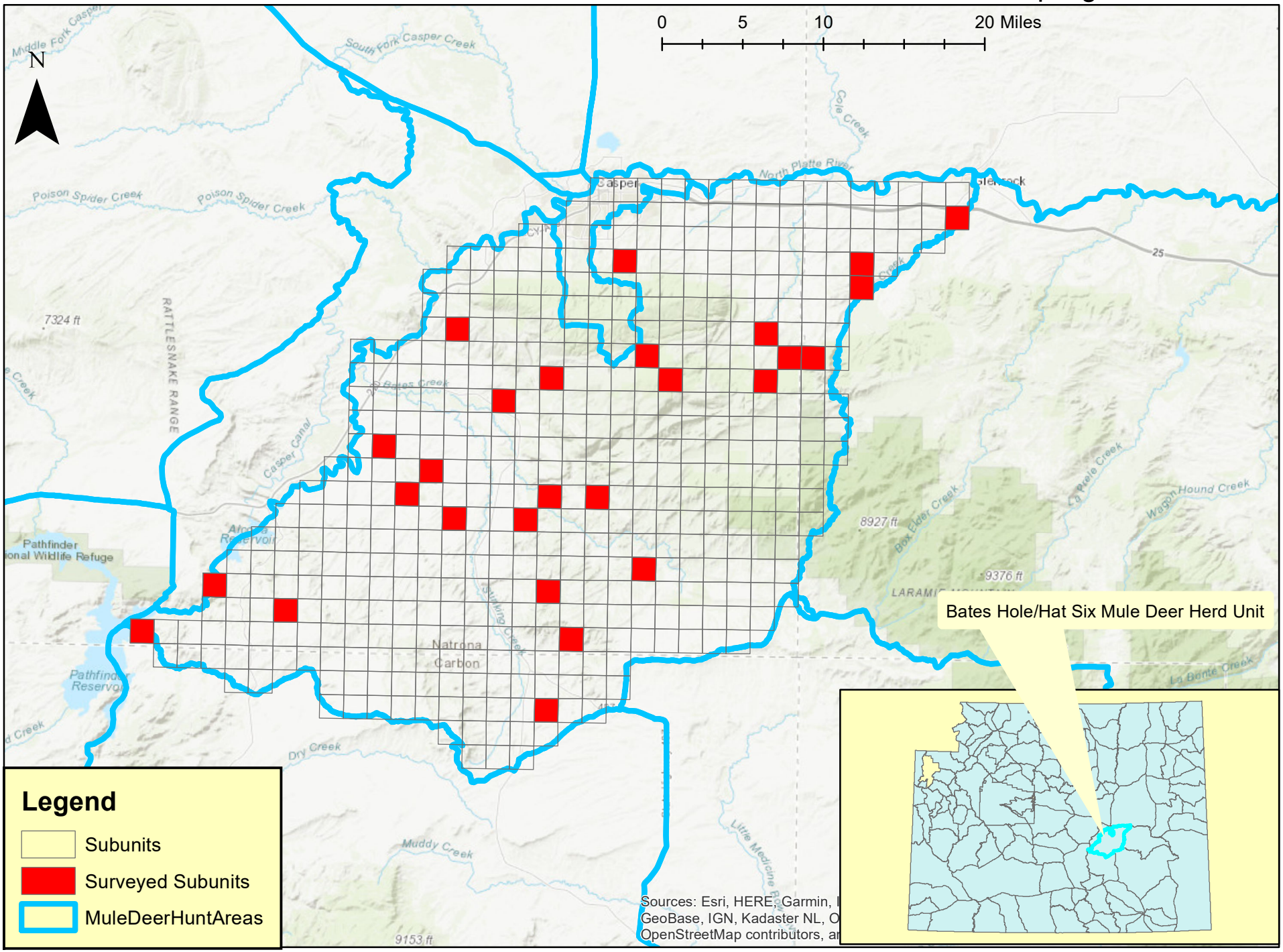
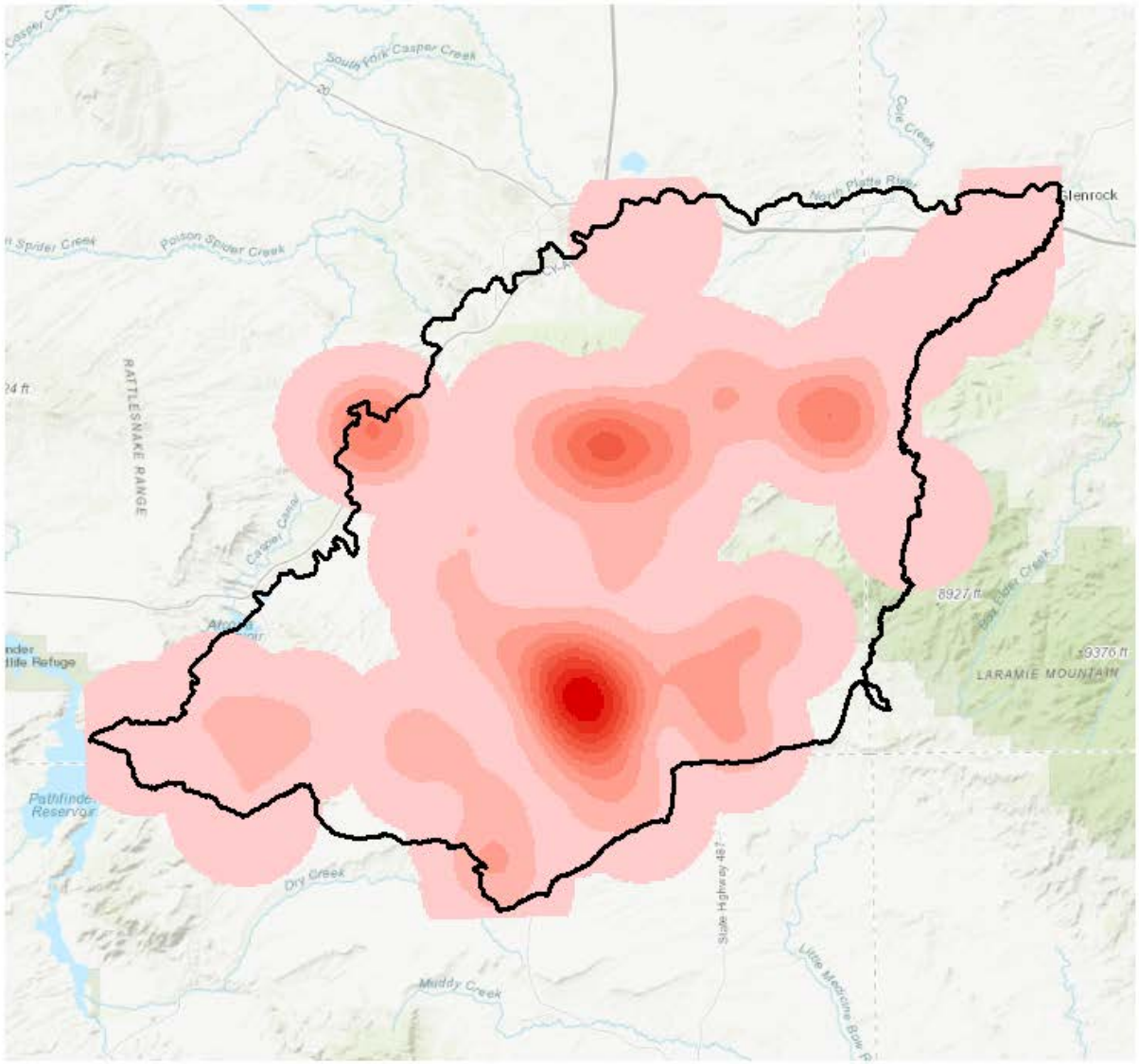


Table 3. 2018 - 2022 Postseason Classification Summary

for Mule Deer Herd MD757 - BATES HOLE/HAT SIX

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2018	3,418	32	59	7	0	0	98	13%	384	52%	252	34%	734	1,161	8	17	26	± 3	66	± 6	52
2019	3,469	55	89	10	4	0	158	15%	536	51%	356	34%	1,050	1,058	10	19	29	± 3	66	± 5	51
2020	3,328	43	41	6	0	0	90	16%	278	50%	187	34%	555	1,070	15	17	32	± 5	67	± 7	51
2021	2,952	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2022	3,178	34	30	15	0	0	79	16%	260	51%	170	33%	509	906	13	17	30	± 5	65	± 8	50

2018 - 2022 Density of Hunter Harvested Chornic Wasting Disease Positive Mule Deer in the Bates Hole/Hat Six Herd Unit



Wyoming Game and Fish Department

Wildlife Heatlh Lab

BatesHole-HatSix

CWD Prevalence

High

Low

2022 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: MD758 - RATTLESNAKE

HUNT AREAS: 88-89

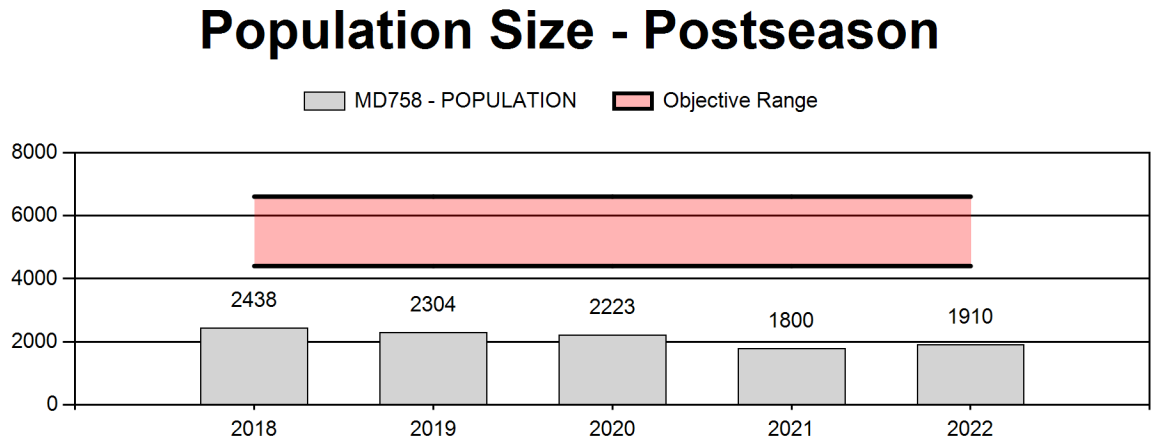
PREPARED BY: BRANDON WERNER

	2017 - 2021 Average	2022	2023 Proposed
Population:	2,227	1,910	1,844
Harvest:	235	133	183
Hunters:	448	301	325
Hunter Success:	52%	44%	56%
Active Licenses:	448	301	300
Active License Success:	52%	44%	61%
Recreation Days:	1,602	1,140	1,350
Days Per Animal:	6.8	8.6	7.4
Males per 100 Females	46	34	
Juveniles per 100 Females	67	63	

Population Objective (± 20%) :	5500 (4400 - 6600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-65.3%
Number of years population has been + or - objective in recent trend:	17
Model Date:	02/21/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	1%	16%
Males ≥ 1 year old:	27%	29%
Proposed change in post-season population:	0.6%	-3.58%



2023 HUNTING SEASONS
RATTLESNAKE MULE DEER HERD (MD758)

Hunt Area	Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
88	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 21		Antlered mule deer or any white-tailed deer
88	7	Sep. 1	Sep. 30	Oct. 15	Dec. 15	50	Doe or fawn valid on private land
89	1	Sep. 1	Sep. 30	Oct. 15	Oct. 31	125	Antlered deer

2022 Hunter Satisfaction: Herd Unit: 62% Satisfied, 18% Neutral, 20% Dissatisfied

HA 88: 53% Satisfied, 21% Neutral, 26% Dissatisfied
HA 89: 76% Satisfied, 16% Neutral, 8% Dissatisfied

2023 Management Summary:

1) **Hunting Season Evaluation:** The model for this herd depicts a population that declined until 2013, grew from 2013 to 2018 during years of improved fawn production and overwinter survival, and then saw a gradual decline from 2018-2021 as fawn production decreased.

   Postseason classification data was collected using a stratified random-sample survey design via helicopter in 2022. The resulting sample size (N=262) was under the sample goal of 300-500 deer, meaning more flight time may be required to bolster sample size given low deer densities in this herd (Appendix A). The proportion of larger mature (Class II & Class III) bucks has been decreasing as overall population size has been declining in recent years after harsh winter conditions in 2019-2020 followed by severe drought (Table 1). Fawn ratios increased in 2022 but were still mediocre in the mid-60s (Table 4). Harvest success on Area 89 Type 1 licenses increased to 79% in 2022, the highest in five years. General license success in Area 88 was only 31%, which is still below the five-year average of 37%.

   Tooth samples and antler measurements were also collected from 18 harvested adult male mule deer from Area 89 in 2022. The average cementum annuli tooth age of those sampled was 6.1 years, the highest recorded in history of the hunt area. The median age was 5.5, and the average antler spread was 22.9 inches, the largest in six years (Table 2). In Area 89, with increased harvest success and buck ratios reaching the upper threshold of special management, managers increased Type 1 license issuance for the 2023 season.

The 2023 season will continue to provide quality hunting opportunity in Area 89. For Area 89, a total of 125 Type 1 licenses were available for antlered deer, which is an increase of 25 licenses compared to 2022. For Area 88, managers prescribed a 7-day general license season with licenses valid for antlered mule deer or any white-tailed deer. New for 2023, managers prescribed a Chronic Wasting Disease (CWD) management hunt in Area 88 with a Type 7 license valid for doe or fawn on private land from October 15-December 15 with a quota of 50 (see Section 3).

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,220	71	126 (74%)	40 (23%)	5 (3%)	242	11	20	6	1	27	38
2009	848	31	74 (53%)	54 (39%)	12 (9%)	171	7	17	13	3	33	40
2010	778	38	59 (54%)	45 (41%)	6 (5%)	148	9	14	11	1	26	35
2011	1,009	48	114 (62%)	61 (33%)	9 (5%)	232	9	21	11	2	34	43
2012	503	17	61 (84%)	10 (14%)	2 (3%)	90	6	22	4	1	26	32
2013	548	11	53 (74%)	18 (25%)	1 (1%)	83	4	17	6	0	24	27
2014	684	37	66 (65%)	30 (29%)	6 (6%)	139	12	22	10	2	34	46
2015	896	80	90 (69%)	38 (29%)	3 (2%)	211	20	22	9	1	28	48
2016	717	45	78 (74%)	25 (24%)	3 (2%)	151	13	22	7	1	30	42
2017	762	31	53 (39%)	78 (58%)	4 (3%)	166	10	16	24	1	42	51
2018	620	46	64 (73%)	22 (25%)	2 (2%)	134	21	29	10	1	40	61
2019	281	13	37 (79%)	9 (19%)	1 (2%)	60	9	26	6	1	34	43
2020	485	24	45 (61%)	25 (34%)	4 (5%)	98	10	18	10	2	30	40
2021	190	3	23 (64%)	9 (25%)	1 (3%)	36	3	20	9	1	29	32
2022	262	14	14 (45%)	16 (52%)	1 (3%)	31	11	11	12	1	24	34

Table 1. Antler classification analysis for Area 89 within the Rattlesnake Mule Deer Herd Unit, 2008-2021.

	2012	2014	2015	2016	2017	2018	2019	2020	2021	2022
Average Tooth Age	5.07	5.83	5.88	5.67	5.4	5.09	5.18	5.05	5.41	6.1
Median Tooth Age	4.5	6.5	5.5	5.5	5.5	4.5	5.5	5.5	5.5	5.5
Average Antler Spread	20	23	23	23	23	20	21	20	21.25	22.9
Total Sample Size (N)	37	13	8	12	20	54	20	28	24	18

Table 2. Hunter-submitted tooth age and antler measurement data from Area 89 deer, 2012-2022.

2) **Management Objective Review:** No review was scheduled in 2023.

3) **Chronic Wasting Disease Management:** This herd will be a priority for CWD surveillance in 2023. Due to the addition of the Type 7 license, this herd will require mandatory sampling in 2023 to better understand CWD distribution in this herd unit and prevalence across sex and age classes. The last time this herd unit was under priority CWD surveillance was in 2019 and 2020. Prevalence estimates and sample sizes are presented in Table 3. For that surveillance period, a total of 86 adult male mule deer were sampled, which was below the sample goal of 200 (Table 3). Hunting seasons were conservative during the surveillance period, with very few females sampled due to harvest limitations. CWD prevalence from harvested deer was considerably higher in Area 88 (33%) compared to Area 89 (5%). According to the Wyoming Game and Fish Department CWD Management Plan, a potential way to reduce CWD on the landscape is to identify "hot spots" or areas where CWD is concentrated and reduce deer densities. An analysis of harvest locations from CWD-positive deer in Area 88 indicated many agricultural fields are CWD hot spots. Increased buck harvest is not warranted in Area 88 due to low buck ratios of resident deer. Managers therefore prescribed reducing doe mule deer densities in Area 88, which contains both irrigated landscapes and riparian habitats. This may provide a focused and meaningful way to reduce CWD prevalence while limiting the transmission to adjacent Area 89.

Year(s)	Percent CWD-Positive and (n)-*Hunter Harvest Only*
	Adult Males (CI=95%)
2019-2020	**14% (9.4-18.5%, n=86)**

Table 3. CWD prevalence for hunter-harvested adult male mule deer in the Rattlesnake Mule Deer Herd, 2019-2020.

4) **Population Modeling:** The trends depicted by the model are reasonable, and results from an independent abundance estimate were added to the 2019 bio-year which helps align the model for more accurate population estimates. In 2021, managers also began using PopR Integrated Population Models (IPM) to estimate population indices for this herd. The 2022 postseason population estimate for this herd unit from the IPM is approximately 1,910 (CL=1,693-2,124) mule deer, which is well below objective.

Table 4. 2018 - 2022 Postseason Classification Summary

for Mule Deer Herd MD758 - RATTLESNAKE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2018	2,438	79	109	27	2	0	217	24%	407	45%	286	31%	910	1,270	19	34	53	± 5	70	± 6	46
2019	2,304	34	65	21	1	0	121	19%	345	53%	184	28%	650	1,410	10	25	35	± 4	53	± 5	39
2020	2,223	24	45	25	4	0	98	20%	248	51%	139	29%	485	881	10	30	40	± 5	56	± 7	40
2021	1,800	3	23	9	1	6	48	22%	124	56%	48	22%	220	786	2	31	39	± 8	39	± 8	28
2022	1,910	14	14	16	1	0	45	17%	133	51%	84	32%	262	803	11	23	34	± 7	63	± 10	47

Appendix A. 2022 MD 758 Rattlesnake Aerial Classification Results

Surveyors: Brandon Werner, Austin Swingholm, Kelsey Burguess

Date: 11/15 late afternoon-evening and 11/16 morning

Total Polygons Surveyed: 27, 22 of high density and 5 of low density (81% high 19% low)

Total Survey Time: 7 Flight hours averaging 9:29 a polygon (9:56 high, 8:01 low)

Weather: The weather on November 15 and 16 were relatively similar. Snow covered the ground in the high country such as Horse Heaven and the Rattlesnake Mountains creating a good back drop to see deer. The low lands such as Poison Spider and most of HA 88 did not have snow. The temperature range during flight time was between 19-39 degrees with winds ranging from 6-20 mph. Both days were partly cloudy in the morning becoming mostly sunny in the afternoons with visibility of about 3-8 miles.

Results: Of the 27 polygons flown, mule deer were observed in 17 of them. The polygons in which no deer were observed were 386, 286, 452, 320, 267, 181, 95, 191, 249, and 166. Of the polygons with no observations 80% were of high deer density. A total of 262 deer were observed. This includes 133 does, 84 fawns, 14 yearling bucks, 14 class I bucks, 16 class II bucks, and 1 class III buck. The ratios based on 100 does for the whole herd unit. The ratios come back to 34 males (11 yearling and 23 adult) and 63 fawns. The ratios differ greatly from HA 88 to HA 89.

Costs: Flight costs were $875 per hour, $350 in per diem per day, and $2 per mile for the fuel truck.

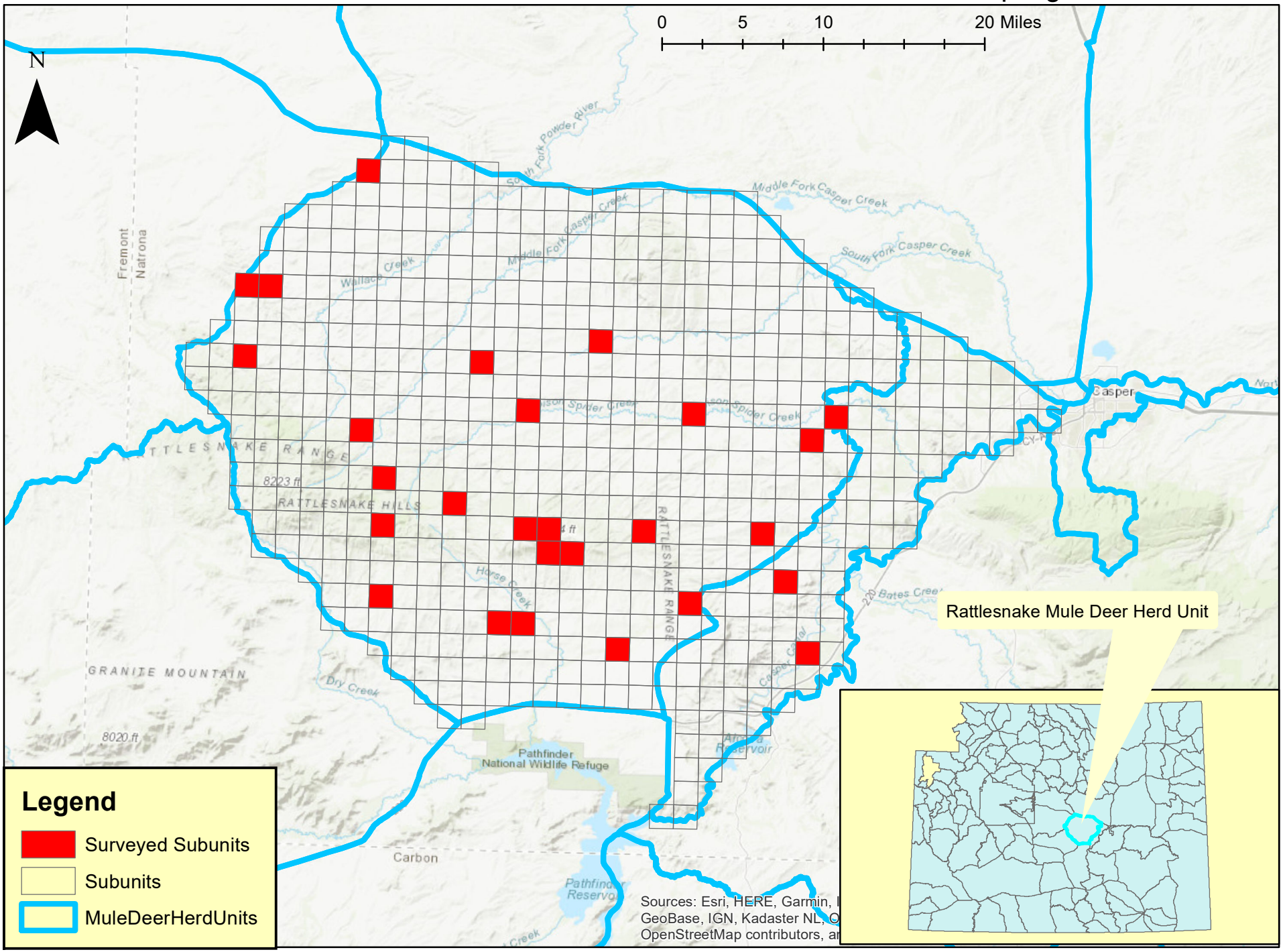
Flight time $875 x 7hrs = $6,125

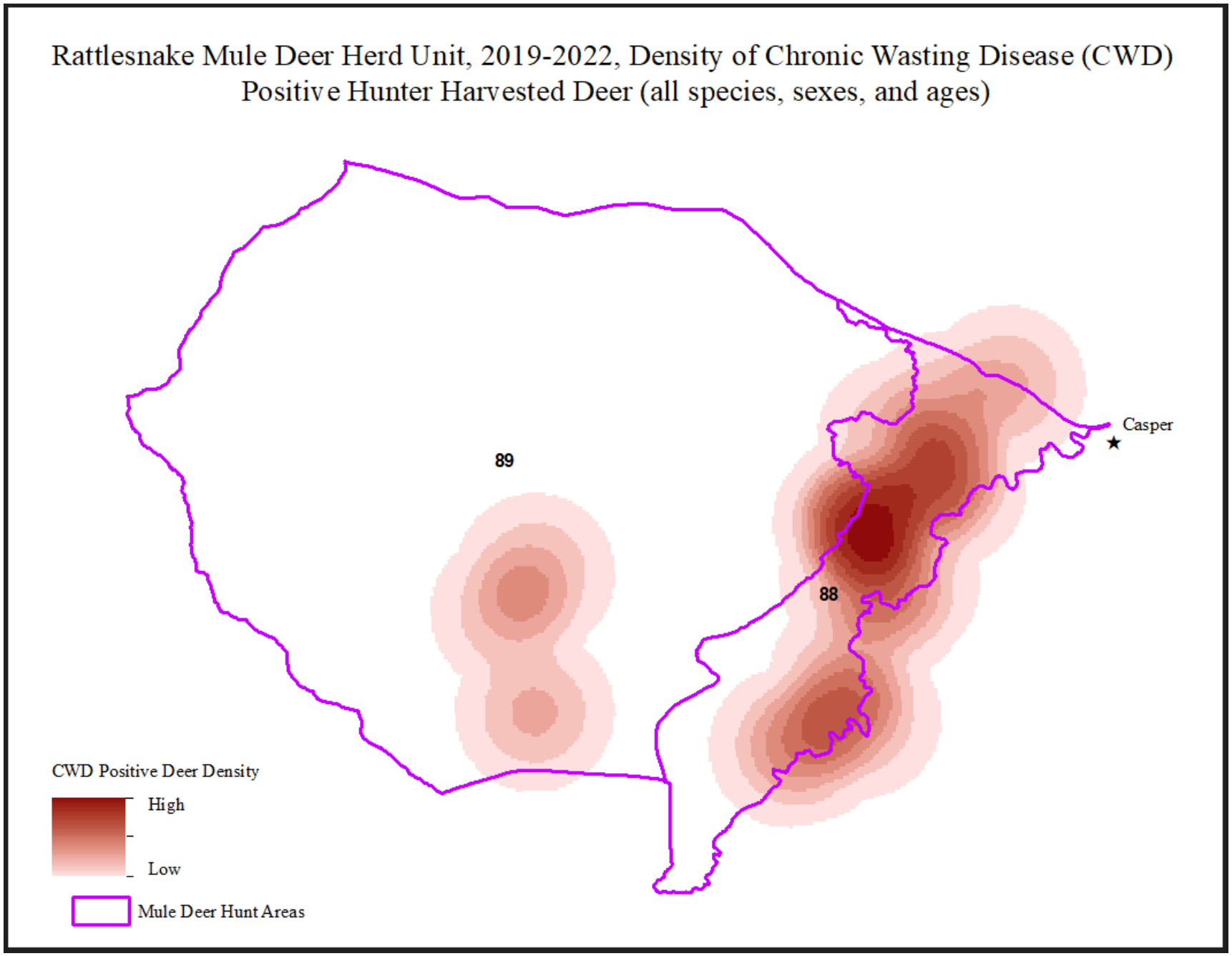
Per Diem $350 x 1 day= $350

Fuel truck $2 mile x 196 miles = $392

Total = $6,867

2023 Rattlesnake Mule Deer Herd Unit Stratifed Random Sampling




Rattlesnake Mule Deer Herd Unit, 2019-2022, Density of Chronic Wasting Disease (CWD) Positive Hunter Harvested Deer (all species, sexes, and ages)
89
88
Casper
CWD Positive Deer Density
High
Low
Mule Deer Hunt Areas

2022 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: MD759 - NORTH NATRONA

HUNT AREAS: 34

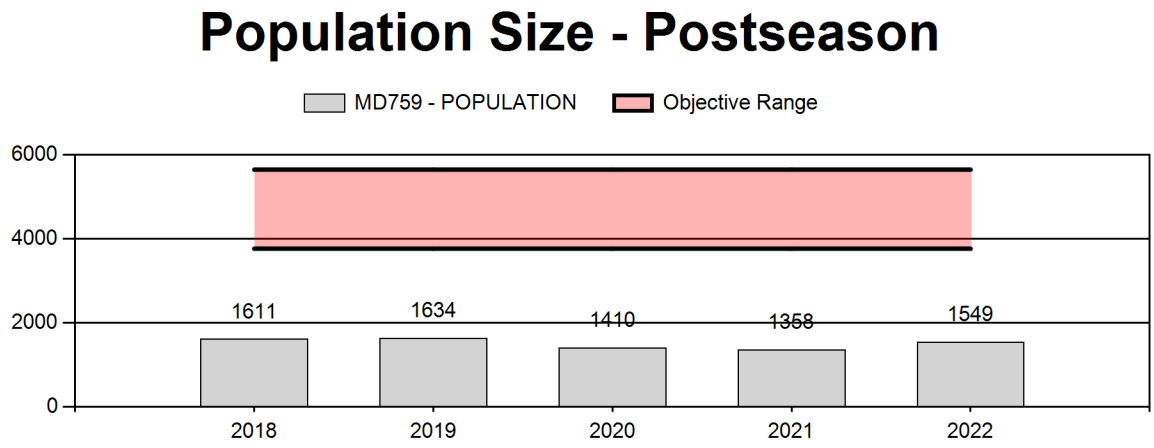
PREPARED BY: BRANDON WERNER

	2017 - 2021 Average	2022	2023 Proposed
Population:	1,541	1,549	1,498
Harvest:	209	133	126
Hunters:	269	183	150
Hunter Success:	78%	73%	84%
Active Licenses:	281	201	150
Active License Success:	74%	66%	84%
Recreation Days:	1,193	866	750
Days Per Animal:	5.7	6.5	6.0
Males per 100 Females	44	32	
Juveniles per 100 Females	55	71	

Population Objective (± 20%) :	4700 (3760 - 5640)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-67.0%
Number of years population has been + or - objective in recent trend:	8
Model Date:	02/21/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	2%	3%
Males ≥ 1 year old:	33%	29%
Proposed change in post-season population:	-3.9%	-3.4%



2023 HUNTING SEASONS
NORTH NATRONA MULE DEER HERD (MD759)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
34	1	Sep. 1	Sep. 30	Oct. 15	Oct. 31	125	Antlered mule deer or any white-tailed deer
	7			Aug 15	Dec. 15	50	Doe or fawn valid east of Bucknum Road (Natrona County Road 125) and south of the Burlington Northern Santa Fe railroad right-of-way

2022 Hunter Satisfaction: 59% Satisfied, 14% Neutral, 27% Dissatisfied

2023 Management Summary:

1) **Hunting Season Evaluation:** Declining deer numbers, buck ratios at the bottom of the management threshold, decreased harvest success, and deteriorating hunter satisfaction lead managers to prescribe a more conservative harvest for 2023. Following significant losses during the harsh winter of 2011, this herd recovered and increased gradually until 2017. Moderate fawn production/survival from 2017-2019 resulted in a slowly declining herd, with the decline accelerating from 2019-2021, resulting in a population that is now well below objective.

   Sex and age composition surveys utitlized aerial stratified random sampling in 2021 but resulted in a small sample size (N=207). Consistent, extreme winds during the survey period only allowed part of the herd unit to be flown. Observed buck and fawn ratios were much lower than 5-year averages, but are plausible given the harsh winter conditions of 2019-2020 followed by severe drought during the growing season and continuing into 2021. Fawn production/survival has decreased drastically over the past four years, leading to population decline. Due to flight budget constraints, this herd was ground classified in 2022 with a sample size of 391 mule deer. Fawn ratios improved from recent years to 71:100 does (Table 4). However, buck ratios remained low (Table 1). Harvest success on Type 1 licenses was about average at 76% in 2022. Tooth samples and antler measurements were collected from 29 harvested mule deer in 2022 (Table 2). The average cementum annuli tooth age of those sampled was 5.34 years old, the oldest average age since 2013. The median age was 5.5 and average antler spread was 19.8, both of which are five-year highs.

A total of 125 Type 1 antlered mule deer licenses were available for the 2023 season. Due to ongoing damage issues and Chronic Waste Disease (CWD) concerns, 50 Type 7 licenses were available in 2023 and were valid within the agricultural region in the southeastern part of the herd unit. These licenses were designed to increase female mule deer and white-tailed deer harvest in this segment of the herd herd to reduce deer densities and potential CWD transmission. A total reduction of 75 deer licenses was made for the hunt area compared to the 2022 season.

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,023	59	111 (73%)	36 (24%)	5 (3%)	211	11	20	7	1	28	39
2009	1,009	51	87 (60%)	44 (31%)	13 (9%)	195	9	16	8	2	26	35
2010	905	47	55 (46%)	44 (37%)	21 (18%)	167	10	12	9	4	25	35
2011	760	52	64 (63%)	34 (33%)	4 (4%)	154	13	16	8	1	25	38
2012	868	36	91 (78%)	20 (17%)	6 (5%)	153	7	18	4	1	23	30
2013	637	28	60 (75%)	19 (24%)	1 (1%)	108	8	18	6	0	23	32
2014	1,033	51	84 (72%)	30 (26%)	2 (2%)	167	12	19	7	1	26	38
2015	1,065	78	93 (80%)	22 (19%)	1 (1%)	194	17	21	5	0	26	43
2016	1,208	68	105 (73%)	36 (25%)	3 (2%)	144	12	18	6	1	26	37
2017	924	57	124 (78%)	34 (21%)	2 (1%)	217	14	31	8	1	40	54
2018	745	56	116 (86%)	17 (13%)	2 (1%)	191	16	32	4	1	38	53
2019	234	11	27 (90%)	3 (10%)	0 (0%)	41	10	23	3	0	26	36
2020	622	21	81 (76%)	24 (23%)	1 (1%)	127	6	22	6	0	29	34
2021	207	8	18 (72%)	5 (3%)	0 (0%)	31	8	14	4	0	18	25
2022	391	23	27 (69%)	11 (28%)	1 (3%)	62	12	14	6	1	20	32

Table 1. Antler classification analysis for the North Natrona Mule Deer Herd Unit, 2008-2022.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Average Age	5.4	5.27	5.27	4.85	4.6	4.7	4.8	5.1	5.25	5.34
Median Age	5.5	4.5	4.5	5.5	4.5	4.5	4.5	5.5	5.5	5.5
Average Antler Spread	21.2	20	20.9	21.5	20.7	19.9	18.1	18.1	18.5	19.8
Sample Size (N) =	52	44	32	40	51	49	58	72	33	29

Table 2. Lab tooth age and antler spread data from North Natrona harvested mule deer, 2013-2022.

2) Management Objective Review: No herd review was scheduled in 2023.

3) Chronic Wasting Disease Management: This herd was not a priority for CWD surveillance in 2022. This herd was a priority for CWD surveillance in 2019 and 2020 (Table 3). The most current prevalence data was reported in the 2020 JCR. Data suggests management of high deer densities on irrigated landscapes may provide a focused and meaningful way to reduce CWD prevalence (Figure 1). Compiled CWD data shows the highest prevalence of CWD occurs in the agricultural portion of this hunt area. Continued issuance of Type 7 licenses that focus harvest pressure on agricultural lands may help reduce CWD transmission in this herd.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*	
	Adult Males (CI = 95%)	Yearling Males
2019-2020	**6% (3.4-15.6%, n=157)**	0% (1)

Table 3. CWD prevalence for hunter-harvested male mule deer in the North Natrona Mule Deer Herd, 2019 – 2020.

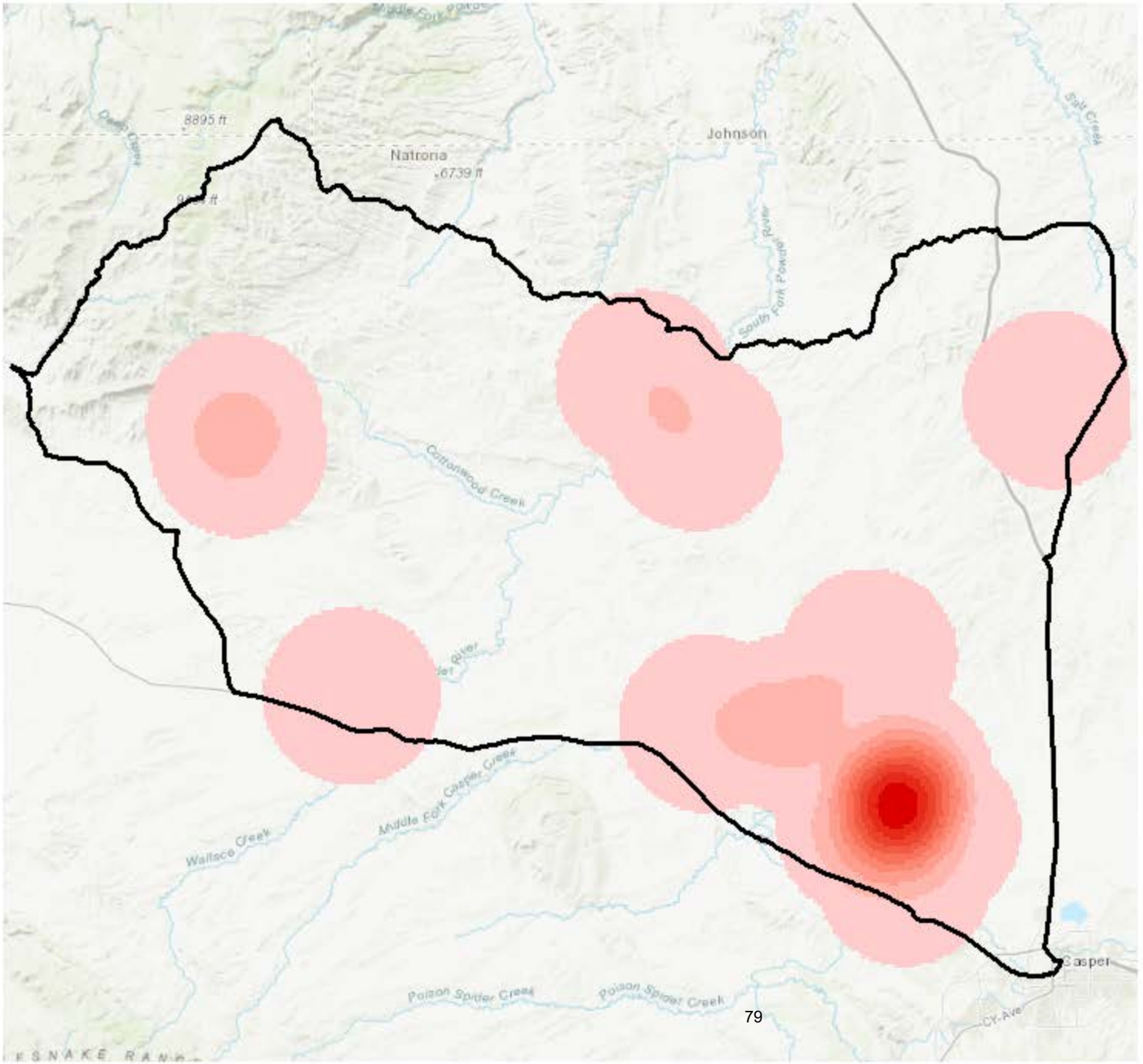
4) Population Modeling: In 2021, managers began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2022 postseason population estimate for this herd from the IPM is approximately 1,549 (CL=1,238-1,811) mule deer, which is well below objective.

Table 4. 2018 - 2022 Postseason Classification Summary

for Mule Deer Herd MD759 - NORTH NATRONA

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2018	1,611	56	116	17	2	0	191	26%	360	48%	194	26%	745	1,223	16	38	53	± 4	54	± 5	35
2019	1,634	11	27	3	0	0	41	18%	114	49%	79	34%	234	1,134	10	26	36	± 8	69	± 12	51
2020	1,410	21	81	24	1	0	127	20%	370	59%	125	20%	622	1,096	6	29	34	± 3	34	± 3	25
2021	1,358	8	18	5	0	0	31	15%	125	60%	51	25%	207	479	6	18	25	± 6	41	± 8	33
2022	1,549	23	27	11	1	0	62	16%	192	49%	137	35%	391	743	12	20	32	± 5	71	± 9	54

Figure 1. 2018 - 2022 Density of Hunter Harvested Chornic Wasting Disease Positive Mule Deer in the North Natrona Herd Unit



Wyoming Game and Fish Department

Wildlife Heatlh Lab

North Natrona

CWD Prevalence

High

Low

2022 - JCR Evaluation Form

SPECIES: White tailed Deer
PERIOD: 6/1/2022 - 5/31/2023

HERD: WD706 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

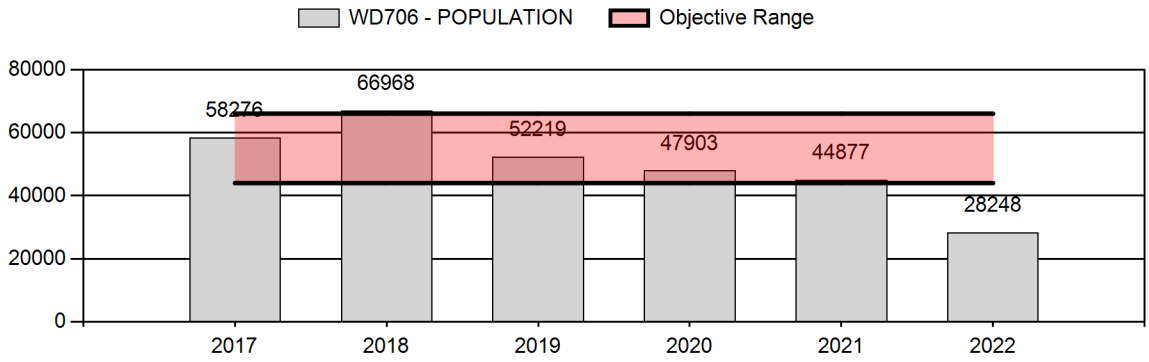
	2017 - 2021 Average	2022	2023 Proposed
Population:	54,049	28,248	33,114
Harvest:	5,949	2,572	1,924
Hunters:	9,611	5,714	4,232
Hunter Success:	62%	45%	45%
Active Licenses:	10,098	6,004	4,150
Active License Success:	59%	43%	46%
Recreation Days:	37,724	23,859	15,400
Days Per Animal:	6.3	9.3	8.0
Males per 100 Females	33	25	
Juveniles per 100 Females	63	52	

Population Objective (± 20%) :	55000 (44000 - 66000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-48.6%
Number of years population has been + or - objective in recent trend:	4
Model Date:	03/31/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	1.0%	1.8%
Males ≥ 1 year old:	33.2%	23.3%
Proposed change in post-season population:	-34%	+17%

Population Size - Postseason



Note: 2017-2021 values are stored JCR program values and do not reflect current model estimates

2023 Hunting Seasons
Black Hills White-Tailed Deer (WD706)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
1	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
1,2,3	8	Sep. 1	Sep. 30	Nov. 1	Nov. 17	250	Doe or fawn white-tailed deer valid on private land
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
4	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 15		Antlered deer; except the lands of the State of Wyoming's Ranch A property shall be closed
4	8	Sep. 1	Sep. 30	Nov. 1	Nov. 17	25	Doe or fawn white-tailed deer valid on private land
5	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 17		Antlered deer

2023 Region A nonresident quota: 2,000 licenses

2022 Hunter Satisfaction: 49% Satisfied 23% Neutral 28% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** This herd experiences cyclic population fluctuations due to weather, changes in harvest, and periodic disease outbreaks. Following a population low after the 2010-11 winter, this herd grew consistently and peaked about 25% above objective in 2017. The population then began to decline with increased harvest and reduced recruitment. This decline was exasperated by substantial mortality during the 2018-19 winter and a truly significant die off from Epizootic Hemorrhagic Disease (EHD) and Blue Tongue Virus (BTV) in 2021, followed by further EHD and BTV mortalities in 2022. As a result of two back to back years of EDH / BTV outbreaks, some ranches reported losing in excess of 75% of their resident white-tailed deer, most particularly in the northern half of the herd unit.

   With the declining population, hunting seasons have become more conservative each year since 2020, and notably more so in 2022 and 2023. However, even with changes to hunting seasons, hunter success dropped from an average of 65% between 2014 and 2020 to 53% in 2021 and 45% in 2022. Similarly, hunter effort, which averaged 6.2 days per harvest between 2014 and 2020 increased to 7.8 and 9.3 days per harvest in 2021 and 2022, respectively. These changes in harvest statistics have been born out in hunter satisfaction, which fell from about 80% in 2017 & 2018 to around 70% in 2019 & 2020, then to 55% in 2021 and just 49% in 2022. See Appendix 2 for detailed "talking points" related to the decline in deer numbers and justification for the hunting seasons proposed and adopted.

Changes to the hunting season in 2022 entailed a 27% reduction in non-resident, Region A General licenses and closing the season on November 20 in all Hunt Areas. Type 7 license issuance was also cut by 1,275 to reduce antlerless harvest, and unsold Type 7 licenses (864 total) were pulled from sale prior to the start of the season due to losses to disease. With these changes, total buck harvest declined 33% and doe/fawn harvest dropped 62%.

In 2023, the Region A quota was reduced another 27% to 2,000 and the closure of all deer hunting moved to November 17 following Commission action on the initial proposal to close November 15. These changes were necessary to mitigate the decline in buck numbers following four years of poor recruitment (Appendix 1). Adjusting the Region A quota has been the only proven method to limit nonresident take, and season length resident take. Doe/fawn license issuance was reduced another 88% in 2023, and all doe/fawn licenses issued were converted to a Type 8 allowing only harvest of white-tailed does and fawns on private land. Issuance of these Type 8 licenses was provided to allow landowners who so desire the opportunity control white-tailed deer numbers. Even with the recent changes in harvest, this whitetail population is projected to have dropped to a point 50% below objective in 2022. Given average recruitment and survival rates in the coming year, the number of Black Hills white-tailed deer is projected to grow to 40% below objective in 2023.

2) **Chronic Wasting Disease (CWD):** Prior to the 2021 hunting season, just over 2,300 white-tailed deer from the Black Hills Herd Unit had been tested for CWD. The vast majority of those were hunter-harvested deer, of which about 2% were found to have the disease. However, annual prevalence rates had generally increased. In 2021, this herd was prioritized as a Tier 1 surveillance herd, and 291 samples were collected. Prevalence estimates and sample sizes for CWD testing conducted between 2020 and 2022 are presented below (Table1). During 2022, we obtained 56 samples from adult buck white-tailed deer, which represented 2.9% of the reported buck harvest. Interestingly, of all the white-tailed deer tested to date that have been reportedly harvested on the Black Hills National Forest (BHNF), only three have tested positive. On the BHNF there is very high hunting pressure almost exclusively focused on bucks, and this hunting pressure results in lower buck:doe ratios and mostly younger age classes of buck deer compared to what is observed on surrounding private lands. To date, no CWD management actions have occurred in this herd unit.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%, n)	Yearling Males	Adult Females
2019-2021	**6.8%** (4.0% - 10.3%, n=307)	3.2% (31)	10.0% (120)

Table 1. 2019-2021 CWD prevalence for hunter-harvested white-tailed deer in the Black Hills White-Tailed Deer Herd.

3) **Population Modeling:** Population estimates for this herd continue to rely on the Department's spreadsheet system. This model purposely inflates the number of bucks observed during preseason classifications by 30%, as historically this seems to be about the number of bucks missed on average during classification efforts. The model also accounts for archery harvest that occurs prior to these classifications. However, estimates produced by the model are tenuous at best. This is because the herd borders two states and therefore does not represent a closed

population; sightability of bucks during pre-season classifications can vary widely; and average survival rates estimated by the model are not realistic in some years. It also appears that for some reason the modeled population estimates at times lag about a year behind what is happening on the ground. However, pre-season population estimates are well correlated with pre-season trend counts (0.85) along with hunter effort (-0.83) and success (0.83). Therefore, the trends produced by the model seem realistic.

Appendix 1
2017 - 2022 Preseason Classification Summary
for White tailed Deer Herd WD706 - BLACK HILLS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	65,541	144	321	465	17%	1,331	49%	947	35%	2,743	1,605	11	24	35	± 0	71	± 0	53
2018	74,769	246	429	675	19%	1,721	47%	1,228	34%	3,624	1,641	14	25	39	± 0	71	± 0	51
2019	58,425	95	226	321	14%	1,246	54%	733	32%	2,300	1,221	8	18	26	± 0	59	± 0	47
2020	53,763	137	286	423	18%	1,239	53%	680	29%	2,342	0	11	23	34	± 0	55	± 0	41
2021	49,541	80	210	290	14%	1,124	56%	601	30%	2,015	936	7	19	26	± 0	53	± 0	43
2022	30,560	62	110	172	14%	702	57%	368	30%	1,242	0	9	16	25	± 0	52	± 0	42

BLACK HILL DEER SEASON PROPOSAL – JUSTIFICATION POINTS:

Mule Deer mgmt. objective = 30,000 and postseason buck ratio 20 – 29 bucks per 100 does.

- 2022 Post-Season estimate = 13,500 and buck ratio was 16 per 100

White-Tailed Deer mgmt. objective = 55,000 and preseason buck ratio 25 – 44 bucks per 100 does

- 2022 Post-Season estimate = 27,200 and 2022 buck ratio was 25 bucks per 100 does

Fawn production and survival has been below that needed to sustain the populations of both sp. the past 3-yrs (mule deer) and 4-years (white-tailed deer)

- Mule Deer postseason ratios 2020 - 2022 = 48, 55, & 56 fawns per 100 does.
- White-Tailed Deer preseason ratios 2019 - 2022 = 59, 55, 53, & 52 fawns per 100 does.

Harvest reductions:

- From 2021 to 2022
    - Total days in HA's 1-3 decreased 27%
    - Total resident buck harvest (gen. lic.) decreased 20%
- Mule Deer = from about 2,400 bucks (2016 & 17) to 1,150 (2021 & 22).
    - *2022 buck harvest est. likely high given reduction in season and Region A quota in 2022. Predicted harvest for 2022 was 950.*
    - Doe harvest: from about 500 (each year 2019-21), to about 300 in 2022. *predicted 2022 doe harvest was 250*
- White-Tailed Deer = from about 4,300 (2016-18) to 1,900 in 2022
    - *Predicted 2022 harvest was 2,230.*
    - Doe harvest: from high of almost 2,600 (2018) to 550 last year
        - *Predicted over 1,200 but we pulled licenses sales, and only two-thirds of d/f tags that sold were used in all areas, for both types 6 & 7 licenses combined.*

Projected Harvests for 2023 with season as proposed:

- Mule Deer: About <u>900 bucks and no does</u>. *(although, my guess is in reality it will be closer to 700)*
- White-Tailed Deer: About <u>1,400 bucks and maybe 200 does</u>.

Date of Harvest: Percentage of take occurring after 11/15/2022 (i.e. last 5 days):

- Mule Deer (general licenses): 67 of 260 reported = 23%
- White-Tailed Deer (general licenses): 132 of 393 reported = 34%
- Both sp. all license types: 208 of 717 reported = 29%

Hunter Satisfaction:

- Mule Deer: ~ 83% (2015-2017) down to about 50% (2021 & 2022)
- White-Tailed Deer: ~81% (2015-2017) down to 55% (2021) & 49% (2022)

Hunter Success:

- Mule Deer: ~ 47% (2014 – 2017) down to 33% (2021) & 36% (2022)
- White-Tailed Deer: ~ 69% (2015-2017) down to 53% (2021) & 45% (2022)

Hunter Effort:

- Mule Deer: ~ 5.8 days per harvest (2015-2017) to ~ 9.2 days per harvest (2021 & 2022)
- White-Tailed Deer: ~ 5.7 days per harvest (2015-2017) to 7.8 (2021) & 9.3 (2022)

Preseason Trend Counts:

- Mule Deer. 2022 was second lowest since 1998 *(2011 was 25% lower, but 2010-11 winter losses were more wide spread, and EHD / BTV losses much greater north of the interstate than south in 2021-2022).*
- White-Tailed Deer: 2022 was lowest since 1998 *(next lowest was 2011 which was 22% higher).*

Season Date Continuity:

- Normally Hunt Areas 1-3 are open until 11/30, but have closed at times on 11/20. Hunt Areas 4-6 have closed on 11/20 for several decades due to the much higher proportion of mule deer and relatively little public land (except in HA 4, and here the public land harbors primarily WTD). Hunt Areas 1 - 3 averaged ~1,300 mule deer and 2,400^{+} white-tailed deer hunters between 2018 and 2022, whereas Hunt Areas 4 - 6 averaged 500 mule deer and ~ 600 white-tailed deer hunters between 2018 and 2022. If HA's 4, 5, & 6 were open longer than areas 1, 2, & 3, overcrowding and over harvest would result.
- PROPOSAL: Close the deer season on public land 11/15 and remain open on private land until 11/20. RESPONSE: We don't know how this would affect harvest. Several years of wild turkey hunter surveys in the Black Hills consistently revealed that one-third of the hunters hunted exclusively private land, 1/3 exclusively public land, and 1/3 both. Considering this, it doesn't seem to be a viable option as half to potentially two thirds of Black Hills deer hunters desire or seek to hunt private land at some point. This would increase hunter requests to landowners to allow late season hunting, and would create an inequity between hunters willing and able to pay an access fee and those unwilling or

unable. Most importantly, there is not a need to differentially increase harvest on private land versus public like we do for doe harvest. That is done due to the high hunter pressure public lands in the Black Hills receive, and the need to address deer damage on private lands versus public lands.

Common misconceptions about deer season in the Black Hills:

- Landowners want a season longer than proposed.
    - 2010 survey of Area 1, 2, and 3 landowners: When presented with five alternative season structures intended to increase escapement of mule deer bucks, no alternative was significantly supported. Support was greatest for moving from a 30-day to 20-day season. However, an equal number of respondents were opposed to such a season. Overall, responding landowners were highly opposed to October hunting seasons. Likewise, respondents opposed separating take of mule deer and white-tailed deer by species during November by nearly 2 to 1, and there was even more dissatisfaction with a proposed October mule deer and November white-tailed deer seasons. Issuing separate, limited quota tags for an October mule deer season garnered the strongest opposition (almost 3 to 1 compared to those in support). But, if these same limited quota licenses were to be valid in November, opposition to them (while significant) was half as great.
    - All but two unsolicited phone calls received from landowners supported shorter season or asked to close the season.
    - Several Area 1 & 3 landowners submitted written comments on Sheridan Region landowner survey noting they seriously cut back, or closed, deer hunting on their property last year, and plan to do the same this year.
        - Landowner in HA 1 - "We did not allow any hunting in fall of 2022 and will not again in 2023. We have no deer (whitetail) here at the home place and don't even see tracks. At the summer pasture (mule deer) there are very few and were dying of cwd last fall. We recommend absolutely NO licenses to be sold for Crook County."
        - Landowner in HA 1 - “Less permits, bucks only you had a lot of upset hunters with the removal of doe/fawn. I agree there should have been less doe fawn permits and why were they not withdrawn earlier?”
        - Landowner in HA 3 - "I limited hunting this last season and some of my neighbors didn't have hunters - let the deer population grow!”
        - Landowner in HA 3- “Disease and lions have ravaged our deer numbers both WT and mule deer.”
        - Landowner in HA 1 – “We have almost zero WT and very few mule deer. Close the seasons for a couple of years.”
        - Outfitter - Requested limited quota for mule deer.

  - About 50% of landowners responding to annual SR survey wanted a more conservative deer season in 2023. Slightly less than 50% wanted the same. A small fraction wanted more liberal. (sample size was small however)

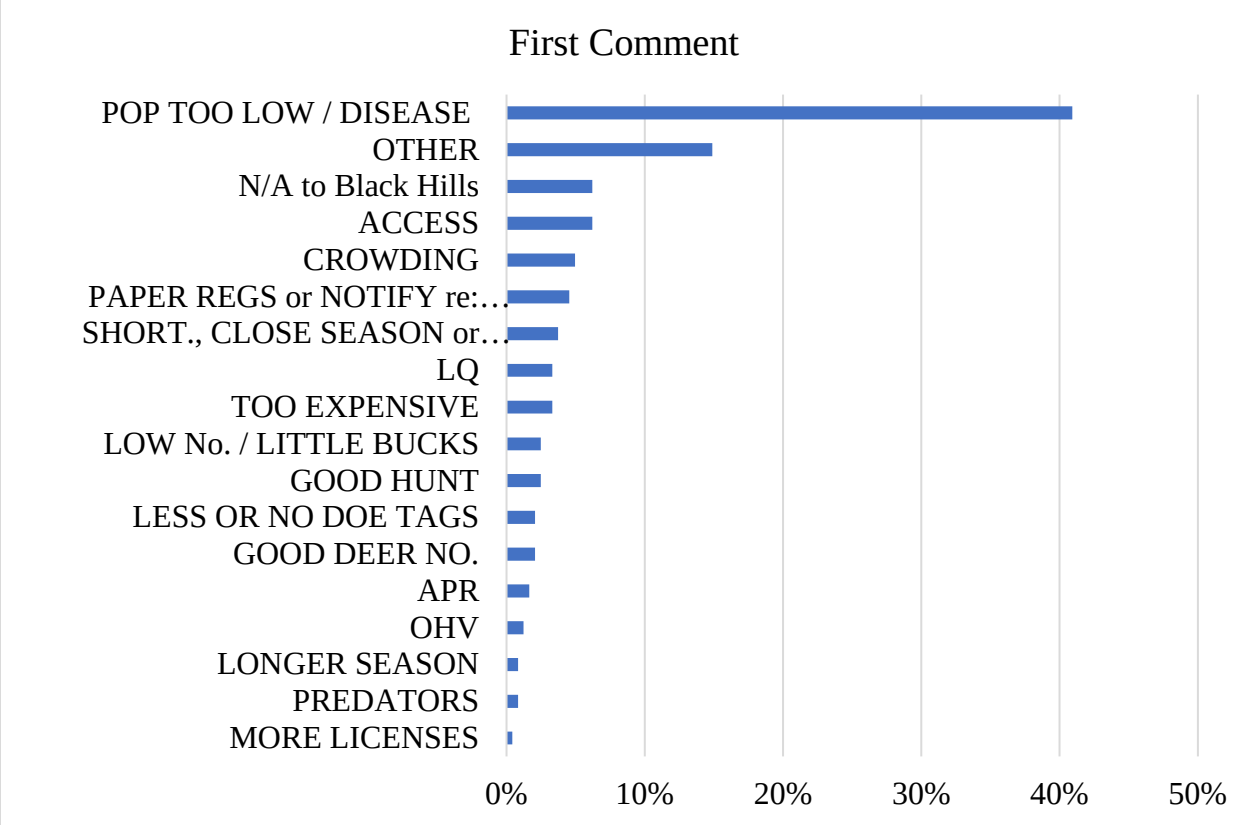
- "Everyone comes up to the Black Hills to hunt a deer after season close in the other parts of the State." FACT CHECKED: 26% of Black Hills Deer in 2022 reported hunting in a second hunt area outside of the Black Hills. Stated another way, 74% of resident hunters in the Black Hills hunted the Black exclusively in 2022.
  - However – if hunting seasons are significantly curtailed in other parts of the state due to the 2022-23 winter, it is very conceivable that more hunters will shift to hunting in NE Wyoming if they believe hunting is as good or better than last year; or may replace antelope opportunity with public land deer hunting in the Black Hills.

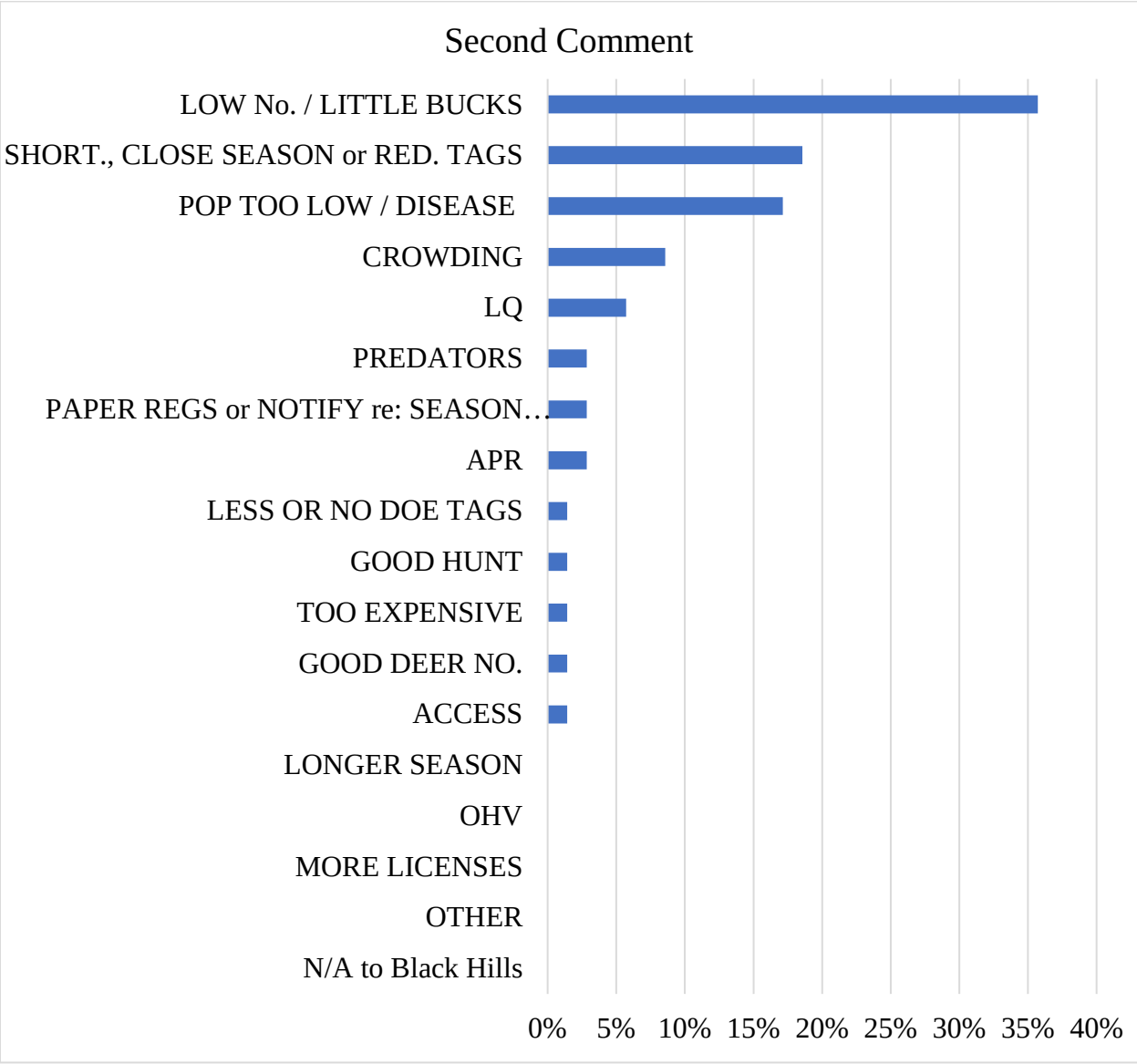
- APRs are the answer:
  - APR are not needed as vast majority of the bucks harvested are already 3 points on a side or better (2020-2022 data combined):
  - Field Check Data:
    - 85% of all buck field checked were 2 yrs. old or older (both sp.)
    - Mule Deer: 24% were class 2 and 3 bucks.
  - Tooth Age Data Harvest Bucks
    - Average Age of Harvested Bucks (both sp.) = 4.5
    - 50% of harvested bucks (both sp.) were 4.5 or older
  - Outside the Black Hills, initial 2023 hunting season proposals: 18 Hunt Areas with APRs for mule deer, none for WTD. These have been implemented to appease the public and likely have not accomplished much.

- 15 Day season is too short.
  - Only way to limit resident hunters is by season length.
    - Historical harvest data indicates the number of active resident licenses drops proportionately to the change in season length. *Note: Exact numbers are a little hard to get because res. and non-res. gen. lic. are pooled in Gen. Lic. active license data, and changes in d/f tag issuance cannot be separated out from total active licenses for an area by residency; plus some folks hunt both mule deer and wtd on Gen. Lic. in the same year yielding duplicate active license data when sp. are combined for analysis.*
  - Outside the Black Hills, *initial* 2023 hunting season proposals: 92 Hunt Areas in the State with some type of Gen. Lic. mule deer season. 71 have less than 20 day season. Shortest is 5 days, longest 24 days. Average and Median season length of Gen. Lic. mule deer seasons outside the Black Hills is 14 days.

- After changes to season proposals Gen. lic season lengths were proposed to be reduced by
  - 1 area - 43%
  - 5 areas - 45%
  - 14 areas – 29%
- Black Hills season proposal (closing Nov. 15) represents a 25% reduction in season length in all hunt areas from 2022. Note: Our winter of 22-23 was the summers of 2021 and 2022 with large EHD and BTV die-offs and low reproduction & recruitment that was due to several factors, including likely impacts from disease (either direct mortality, or decreased productivity from compromised does [bucks too maybe – unk.]) One confounding problem (in addition to low recruitment) requiring more cuts this year is the fact we did not cut enough in 2021 following die offs (too late in the game), and then in 2022 should have realized we needed more cuts than we did.

2022 Deer Harvest Survey Comments




Second Comment
LOW No. / LITTLE BUCKS
SHORT., CLOSE SEASON or RED. TAGS
POP TOO LOW / DISEASE
CROWDING
LQ
PREDATORS
PAPER REGS or NOTIFY re: SEASON…
APR
LESS OR NO DOE TAGS
GOOD HUNT
TOO EXPENSIVE
GOOD DEER NO.
ACCESS
LONGER SEASON
OHV
MORE LICENSES
OTHER
N/A to Black Hills
0%
5%
10%
15%
20%
25%
30%
35%
40%

2022 - JCR Evaluation Form

SPECIES: White tailed Deer

PERIOD: 6/1/2022 - 5/31/2023

HERD: WD707 - CENTRAL

HUNT AREAS: 7-14, 21-22, 34, 65-67, 88-89

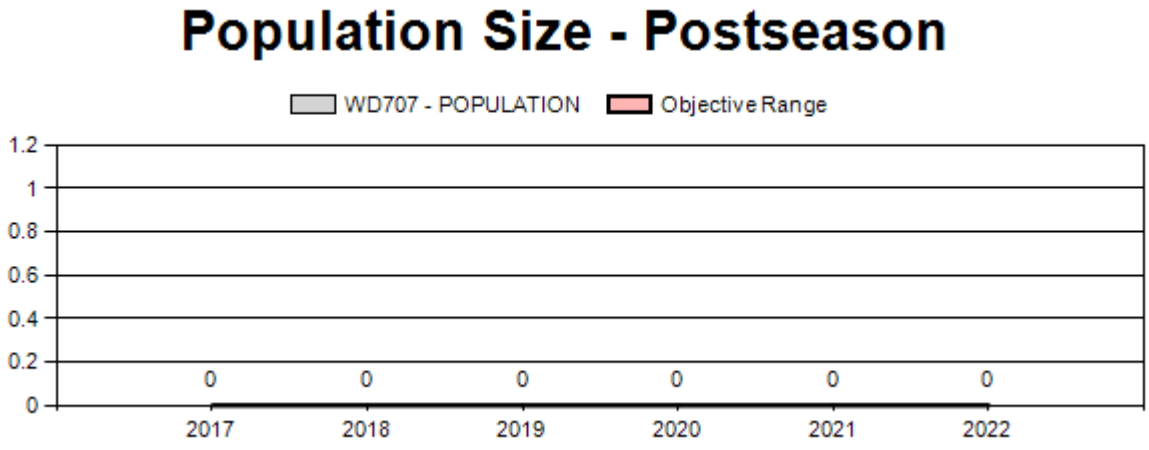
PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Population:	0	N/A	N/A
Harvest:	1,358	949	1,100
Hunters:	2,669	2,044	2,200
Hunter Success:	51%	46%	50%
Active Licenses:	3,066	2,325	2,500
Active License Success:	44%	41%	44 %
Recreation Days:	11,098	9,123	9,000
Days Per Animal:	8.2	9.6	8.2
Males per 100 Females	39	0	
Juveniles per 100 Females	69	0	

Population Objective (± 20%) :	0 (0 - 0)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	0
Model Date:	None

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

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



2023 HUNTING SEASONS

Central White-Tailed Deer Herd Unit (WD707)

Hunt Area	License Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
8	3	Sep. 1	Sep. 30	Oct. 1	Nov. 30	25	Any white-tailed deer
10	3	Sep. 1	Sep. 30	Oct. 1	Nov. 30	25	Any white-tailed deer
10	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	25	Doe or fawn white-tailed deer
11	Gen			Oct. 16	Nov. 30		Any white-tailed deer
11,12, 13,14	3	Sep. 1	Sep. 30	Oct. 1	Nov. 30	200	Any white-tailed deer
11,12, 13,14	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	200	Doe or fawn white-tailed deer
12	Gen			Oct. 16	Nov. 30		Any white-tailed deer
13	Gen			Oct. 16	Nov. 30		Any white-tailed deer
14	Gen			Oct. 16	Nov. 30		Any white-tailed deer
21	8	Sep. 1	Sep. 30	Oct. 1	Oct. 31	50	Doe or fawn white-tailed deer valid on private land.
22	3	Sep. 1	Sep. 30	Oct. 1	Nov. 30	100	Any white-tailed deer
22	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	150	Doe or fawn white-tailed deer
34	3	Sep. 1	Sep. 30	Oct. 15	Nov. 30	50	Any white-tailed deer
34	7			Aug. 15	Dec. 15	50	Doe or fawn valid east of Bucknum Road (Natrona County Road 125) and south of the Burlington Northern Santa Fe railroad right-of-way
34	8			Aug. 15	Dec. 15	50	Doe or fawn white-tailed deer
65	3	Sep. 1	Sep. 30	Oct. 15	Nov. 30	350	Any white-tailed deer, also valid in that portion of Area 66 in Converse County
65	8	Sep. 1	Sep. 30	Oct. 15	Dec. 31	700	Doe or fawn white-tailed deer, also valid in that portion of Area 66 in Converse County

66,88,89	3	Sep. 1	Sep. 30	Oct. 15	Nov. 30	100	Any white-tailed deer
66,88,89	8			Aug. 15	Oct. 14	100	Doe or fawn white-tailed deer valid in Area 88
66,88,89	8	Sep. 1	Sep. 30	Oct. 15	Nov. 30		Doe or fawn white-tailed deer

Note: The above season limitations are restricted to only those lines in the Chapter 6 Regulation that directly affect white-tailed deer hunting. Additional general and limited quota seasons occur in Hunt Areas 7-14, 21, 34, 65-66, 88, and 89 but are not captured here.

2022 Hunter Satisfaction: 56% Satisfied, 22% Neutral, 22% Dissatisfied

2023 Management Summary

1) Hunting Season Evaluation: The 2023 season structure was kept somewhat liberal to allow for high hunter opportunity within the recreational management strategy. White-tailed deer numbers had grown substantially from a low in 2013 through 2020, and harvest also increased each year through 2020. Due to a massive EHD die-off in 2021, managers were forced to reduce licenses in 2022 given the sharp reduction of white-tailed deer. Managers observed numbers increasing in some locations in 2022 and increased licenses in those areas for 2023. Observed buck ratios of 34 bucks:100 does (n=792) were well over minimum objective ratios ($\geq$20 bucks:100 does postseason). The majority of white-tailed deer classifications come from Hunt Areas 9, 11, and 65. Hunt Area 34 Type 3 licenses were decreased by 25 and a new Type 8 license was added with 50 licenses available. Hunt Area 65 Type 3 licenses were increased by 50 and Type 8 licenses were increased by 200. Combined Hunt Areas 66, 88, & 89 Type 3 and Type 8 licenses were each increased by 50. All limited quota white-tailed deer licenses for the Central White-tailed Deer Herd Unit sold out in 2022.

2) Chronic Wasting Disease Management: CWD sample sizes within the Central White-Tailed Deer Herd Unit were not sufficient to report an accurate prevalence for most hunt areas. Increased sampling effort was put forth in Hunt Areas 65 and 66 in conjunction with intensive mule deer and elk surveillance in 2022. In Hunt Area 65, from 2020-2022 managers were able to obtain 114 CWD samples from adult white-tailed deer. Of those samples, 11 were positive for a prevalence of 9.6%. Managers are working on a small-scale CWD project in Hunt Area 65 tracking CWD status within an area known for high densities of white-tailed deer northwest of Douglas.

3) Population Modeling: There is no population model constructed for this herd unit.

Table 1.

2017 - 2022 Postseason Classification Summary

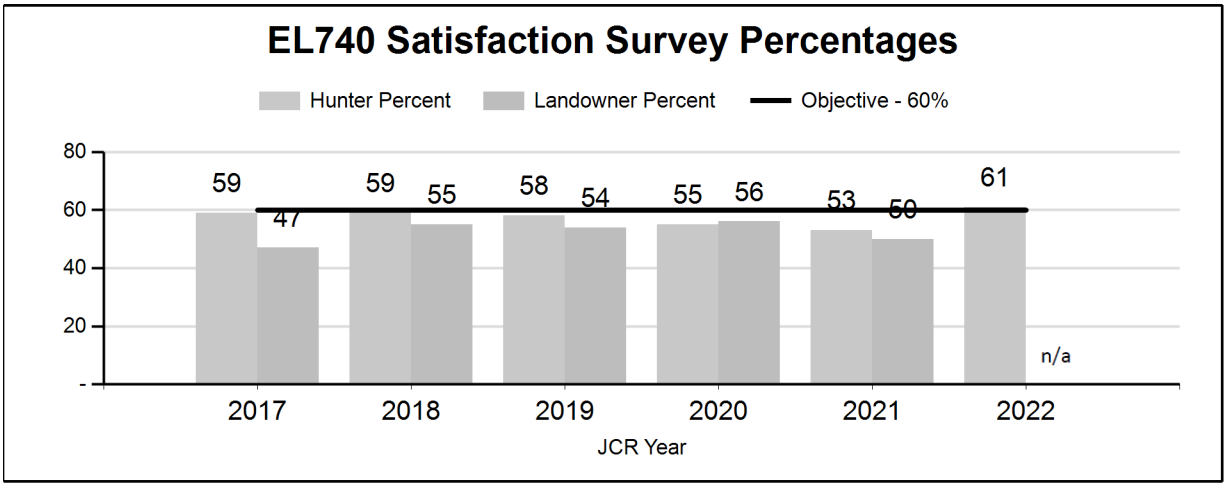
for White tailed Deer Herd WD707 - CENTRAL

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	0	69	114	183	21%	404	45%	301	34%	888	0	17	28	45	± 0	75	± 0	51
2018	0	90	161	251	19%	601	46%	456	35%	1,308	0	15	27	42	± 0	76	± 0	54
2019	0	41	65	106	13%	420	51%	299	36%	825	0	10	15	25	± 0	71	± 0	57
2020	0	84	244	328	21%	772	49%	466	30%	1,566	0	11	32	42	± 0	60	± 0	42
2021	0	19	36	55	19%	151	52%	87	30%	293	964	13	24	36	± 0	58	± 0	42
2022	0	44	98	142	18%	421	53%	228	29%	791	0	10	23	34	± 0	54	± 0	40

2022 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2022 - 5/31/2023
HERD: EL740 - BLACK HILLS
HUNT AREAS: 1, 116-117
PREPARED BY: JOE SANDRINI

	2017 - 2021 Average	2022	2023 Proposed
Hunter Satisfaction Percent	57%	61%	60%
Landowner Satisfaction Percent	52%	n/a	60%
Harvest:	711	859	1,050
Hunters:	1,919	2,143	2,850
Hunter Success:	37%	40%	37%
Active Licenses:	1,997	2,187	3,170
Active License Success:	36%	39%	33%
Recreation Days:	18,117	20,544	25,200
Days Per Animal:	25.5	23.9	24
Males per 100 Females:	47	0	
Juveniles per 100 Females	44	0	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			N/A%
Number of years population has been + or - objective in recent trend:			5



2023 Hunting Seasons
Black Hills Elk (EL740)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
1	1	Sep. 1	Sep. 30	Oct. 15	Nov. 30	100	Any elk
1	4	Sep. 1	Sep. 30	Oct. 15	Nov. 30	75	Antlerless elk
116	Gen	Sep. 1	Sep. 30	Oct. 15	Nov. 10		Any elk
116	Gen			Nov. 11	Nov. 30		Antlerless elk
116	1	Sep. 1	Sep. 30	Nov. 11	Dec. 31	100	Any elk valid off national forest
	1			Jan. 1	Jan. 31		Antlerless elk valid off national forest
116	7			Aug. 15	Jan 31	300	Cow or calf valid off national forest
117	1	Sep. 1	Sep. 30	Oct. 15	Nov. 30	600	Any elk
117	1			Dec. 1	Jan. 31		Antlerless elk
117	2	Sep. 1	Sep. 30	Oct. 15	Jan. 31	250	Antlered elk five (5) points or less on either antler or antlerless elk
117	4	Sep. 1	Sep. 30	Oct. 15	Jan. 31	100	Antlerless elk
117	6	Sep. 1	Sep. 30	Oct. 15	Jan. 31	175	Cow or calf
117	7			Aug. 15	Jan. 31	750	Cow or calf valid off national forest; also valid on national grassland

2022 Hunter Satisfaction: 61% Satisfied 21% Neutral 18% Dissatisfied

Landowner Satisfaction JCR[1] 18% Below 49% At 34% Above

Landowner Satisfaction Surveyed[2] 43% Satisfied 14% Neutral 43% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** Changes to the 2023 hunting season primarily entailed alteration of license quotas in Hunt Area (HA) 117. These changes consisted of an increase of 200 Type 1, 50 type 2, and 250 Type 7 licenses, while Type 4 and 6 license issuance was reduced by 50 and 75 licenses, respectively. These changes were intended to augment harvest on the licenses types with the greatest harvest success (Types 1, 2 & 7), hopefully meet the demand for Type 7 licenses, and further encourage harvest all of age classes of bulls. In addition to the license quota changes in HA 117, the HA 116 Type 1 license season was extended from December 31

[1] Bio-Year 2015 – 2021 data. Landowner response when asked if elk numbers are below, at, or above desired level.
[2] Bio-Year 2015 – 2021 data. These figures are from landowner survey asking specifically about satisfaction in the same manner as the hunter harvest survey.

to January 31 for the taking of antlerless elk. This was done to encourage cow harvest by license holders unable to fill their tag during the any elk portion of the season.

The harvest strategy for this herd continues to be harvesting as many elk as possible given the limited access to private land afforded to hunters. To facilitate harvest, a Hunt Management Coordinator has been hired each of the last six years to assist hunters with admittance to private land. It is estimated this program has increased elk harvest on average about 60 elk each year, with about 80 being harvested in 2022. The 2023 hunting season is expected to result in a total harvest of about 1,050 total elk. Based upon an estimated preseason herd composition of 45:100:30 (calf:cow:bull) and a recruitment rate of 40 yearling elk per 100 cows, the anticipated 2023 elk harvest of adult elk would remove the annual, yearling recruitment from a preseason herd of about 4,400 head (all age and sex classes).

2) **Management Objective Review:** Management of the Black Hills Elk Herd Unit (E740) has significantly challenged Department personnel for over three decades. Due to its interstate nature and the historic difficulty of obtaining meaningful classification data, population estimation was abandoned in 1996. Over the past thirty years, elk numbers and occupied habitat increased dramatically, along with depredation complaints. Consequently, herd unit and hunt area boundaries have been expanded and hunting seasons consistently liberalized. However, limited access to private land for hunters has allowed continued herd growth. Recognizing the impracticality of managing elk numbers towards a numerical objective, the herd has been managed under the Department's criteria for landowner and hunter satisfaction since 2013. To date, despite numerous alterations to hunting season structure, damage complaints persist and satisfaction levels remain unchanged. Consequently, the per se management direction has been to reduce and prevent elk damage in recent years. Therefore, the Department is investigating adopting a depredation-based management objective, one that retains reasonable hunter success and satisfaction, addresses damage complaints, and does not require herd composition surveys. This proposal will be further developed over the next year, but for now we continue with the satisfaction-based objectives, together with a sub-objective of bull harvest consisting of 20% 0.5-2 yrs. old, 60% 3-5 yrs. old, and 20% 6+ yrs. old (Appendix 1).

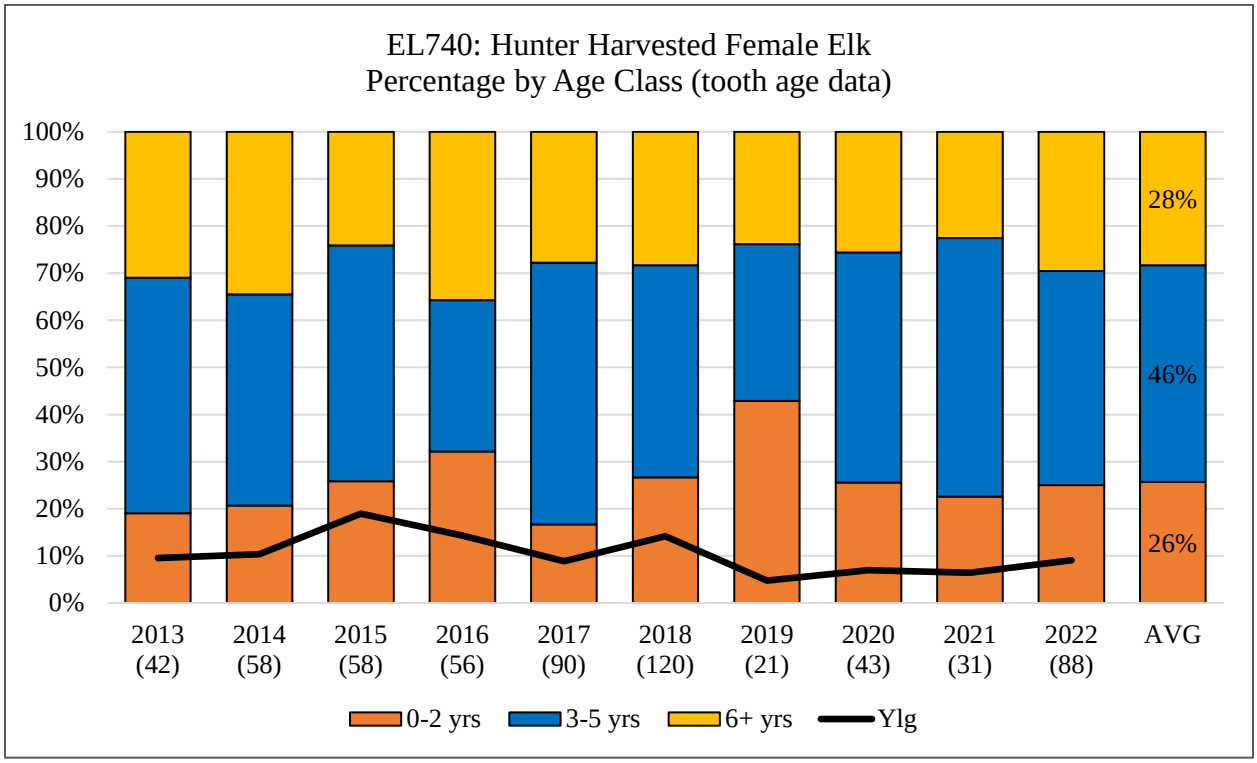
3) **Chronic Wasting Disease (CWD):** To date, about 270 elk from the Black Hills have been tested for CWD, with 96 hunter-harvested elk tested since 2020. The vast majority of these elk were harvested by hunters in HA 117, especially those enrolled in the HMAP. Three hunter-harvested elk from HA 117 have tested positive for the disease, one in each of the 2018, 2020, and 2022 hunting seasons. The only other CWD-positive elk found in the Black Hills have been two targeted surveillance elk, one from HA 117, and one from HA 1. However, very few elk from HA 116 have been tested.

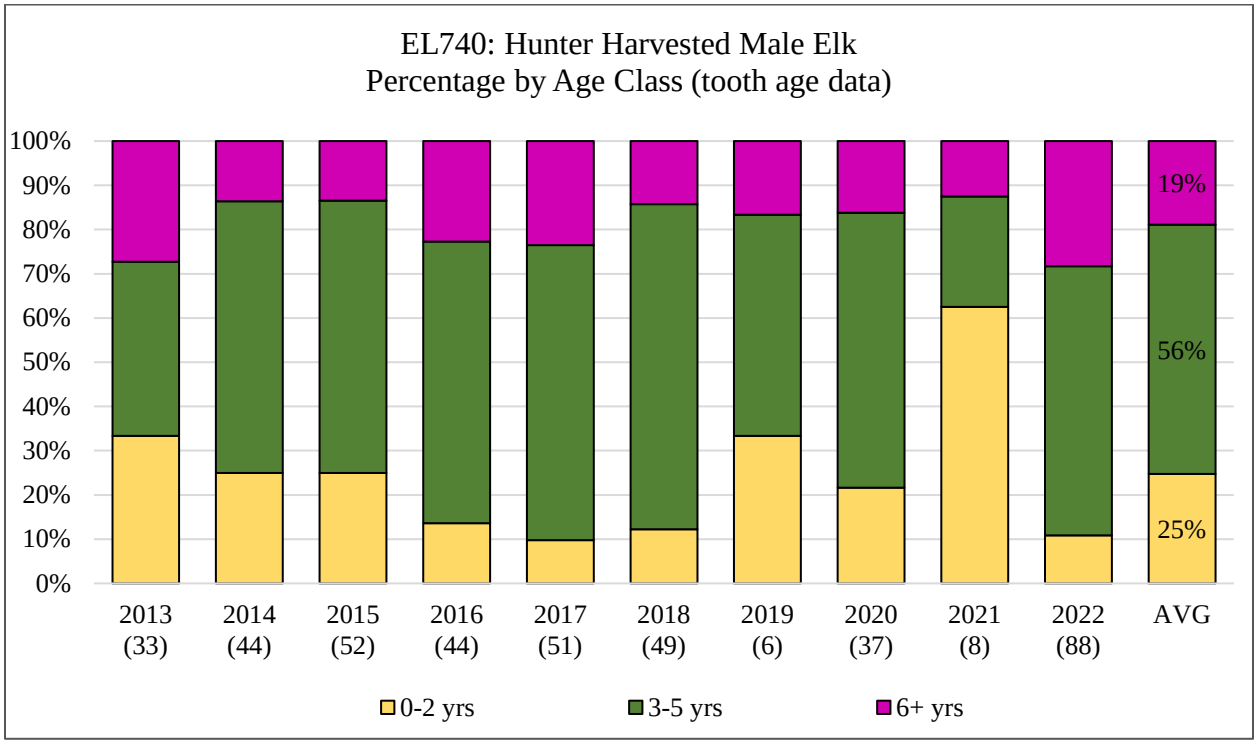
4) **Population Data:** In late February of 2016 and 2020, The Department partially funded South Dakota Game Fish & Parks (SDGF&P) helicopter-based, late winter elk sightability surveys. This funding was used to survey a significant portion of occupied elk habitat in HAs 1 & 117. In 2016, 31 subunits were surveyed and 923 elk observed. This yielded a sightability estimate of 1,091 elk within the survey area (95% CI = 988 - 1,521). In 2020, 42 subunits were flown and 1,519 elk found. This effort produced a sightability estimate of 1,687 elk (95% CI = 1,584 - 2,118). Directly comparing the 31 subunits flown in both 2016 and 2020 revealed a 36% increase in the number of elk observed in those sub-areas. However, changes in elk distribution may have influenced the magnitude of the observed change.

Appendix 1

EL740 – Annual, Hunter Harvested Elk

Age Classes (tooth age data) by Percentage, with Sample Size





2022 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2022 - 5/31/2023

HERD: EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

HUNT AREAS: 7, 19

PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Population:	13,319	12,540	11,341
Harvest:	2,215	2,066	2,500
Hunters:	4,824	4,814	4,800
Hunter Success:	46%	43%	52 %
Active Licenses:	4,898	4,935	4,900
Active License Success:	45%	42%	51 %
Recreation Days:	35,466	40,517	40,000
Days Per Animal:	16.0	19.6	16
Males per 100 Females	42*	25*	
Juveniles per 100 Females	42	40	

Population Objective (± 20%) : 5000 (4000 - 6000)

Management Strategy: Special

Percent population is above (+) or below (-) objective: 151%

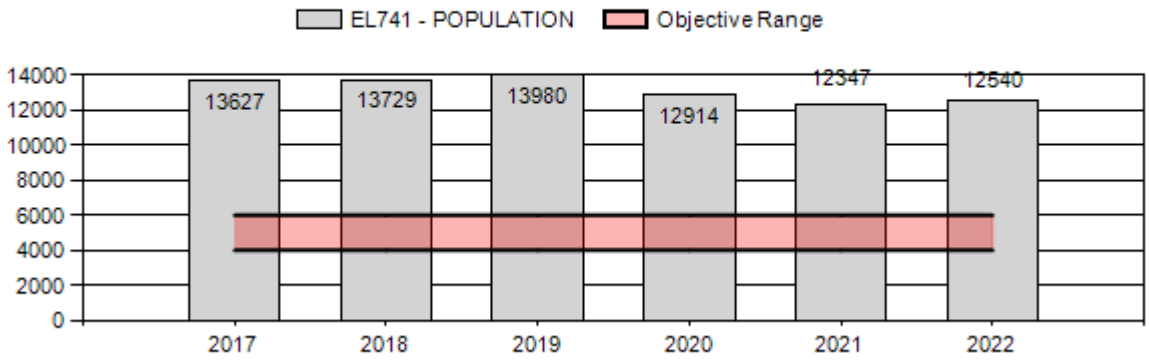
Number of years population has been + or - objective in recent trend: 22

Model Date: 02/25/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	19.3%	16.4%
Males ≥ 1 year old:	23.7%	20.8%
Proposed change in post-season population:	-14.9%	-16.2%

Population Size - Postseason



*Not accurate ratios - see narrative

2023 HUNTING SEASONS
Laramie Peak/Muddy Mountain Elk Herd Unit (EL741)

Hunt Area	Type	Archery Dates Opens	Archery Dates Closes	Season Dates Opens	Season Dates Closes	Quota	Limitations
7	1	Sep. 1	Sep. 30	Oct. 15	Nov. 20	1500	Any elk
7	1			Nov. 21	Dec. 31		Antlerless elk
7	2			Nov. 21	Dec. 31	350	Antlered elk five (5) points or less on either antler; valid in Converse County
7	4			Aug. 15	Oct. 14	1200	Antlerless elk valid on private land in Albany and Carbon Counties; also valid in all of Platte County; not valid in Converse County
7	4	Sep. 1	Sep. 30	Oct. 15	Dec. 31		Antlerless elk valid in the entire area
7	6			Aug. 15	Oct. 14	2250	Cow or calf valid on private land in Albany and Carbon Counties; also valid in all of Platte County; not valid in Converse County
7	6	Sep. 1	Sep. 30	Oct. 15	Dec. 31		Cow or calf valid in the entire area
7	7	Sep. 1	Sep. 30	Jan. 1	Jan. 31	50	Cow or calf
19	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	150	Any elk
19	1			Dec. 1	Dec. 14		Any elk
19	1			Dec. 15	Jan. 31		Antlerless elk
19	2	Sep. 1	Sep. 30	Nov. 1	Nov. 20	175	Any elk
19	2			Dec. 1	Dec. 14		Any elk
19	2			Dec. 15	Jan. 31		Antlerless elk
19	4	Sep. 1	Sep. 30	Oct. 1	Oct. 14	125	Antlerless elk
19	4			Nov. 21	Jan. 31		Antlerless elk
19	5	Sep. 1	Sep. 30	Nov. 1	Jan. 31	125	Antlerless elk
19	6	Sep. 1	Sep. 30	Oct. 1	Oct. 14	225	Cow or calf
19	6			Nov. 1	Jan. 31		Cow or calf

2022 Hunter Satisfaction: 62% Satisfied, 21% Neutral, 17% Dissatisfied

2023 Management Summary

1) Hunting Season Evaluation: The 2023 season structure continued to be liberal in an effort to maximize harvest to reduce this population toward objective. Elk numbers in this herd unit continue to remain far above objective despite very liberal license issuance and long season length. For the 2023 season, the existing season structure was unchanged due to concerns of

public land saturation. However, to address public and landowner comments, Converse County was removed from the Hunt Area 7 Type 4 and Type 6 August 15-October 14 season dates. Data from the last 4 years showed an average of 12% of the total harvest on Type 4 and Type 6 licenses occurred in August and September. This change is to address increased concerns of pressure causing elk to form into large groups early in the season, elk being displaced from accessible areas before the other seasons open, and to improve the quality of public land hunting. Managers plan to address continued elk damage issues in Converse County with Chapter 34 Auxiliary Management Seasons.

A fairly mild fall provided good access throughout the early hunting seasons. Above average early winter snows restricted some access and caused earlier elk movements to lower elevations. Continued higher than average snow through December and January made later season access even more difficult. This likely attributed to lower than average hunter success and increased days to harvest.

No flight time was allocated to the Laramie Peak/Muddy Mountain herd unit in 2022, however managers were able to classify a large number of elk in conjunction with deer sightability surveys (Table 1). All classifications were done by helicopter (n=4,404). The TSJ,CA Spreadsheet model was used to estimate the post-hunt population in 2022. The last abundance estimate was completed in February 2019 for this herd unit, which estimated a total of 11,182 elk. This gave managers a much more accurate population estimate which increased confidence in model estimates going forward. This herd unit will remain well above objective for the foreseeable future. Access for female harvest will need to significantly increase throughout the entire herd unit before harvest will effectively reduce the population.

As noted in the evaluation form, reported male classification ratios are not representative of actual ratios. The lack of aerial surveys and limited ground access in recent years allows managers to obtain a good sample size of cows and calves for a juvenile ratio, but limited bull classifications which skews male:female ratios in years we do not fly intensive surveys.

In 2022, managers collected antler class data (n=254) from hunter-harvested bull elk. Class II (>=6 points, heavy 5x5) bulls made up 41% of the sample. This percentage was much lower than previous years, however this also included samples from the Type 2 bull harvest. Antler classification data has also been collected since 2008 during postseason classification surveys. Class II bulls are showing a downward trend while Class I bulls are showing an increase. This contradicts tooth age date which shows the average age of harvested bulls is increasing.

In 2022-23, managers evaluated the idea of a potential general season opportunity in Area 7. A large landowner and sportsman input process was conducted, with a synopsis provided in Appendix 1.

2) Management Objective Review: This herd unit was slated for an objective review in 2023. 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 2028; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3) Chronic Wasting Disease Management: This is a Tier 1 surveillance herd that was prioritized for CWD sampling in 2022. Prevalence estimates and sample sizes are presented below (Table 2). We were able to surpass the sampling goal of 200 elk. Sample distribution was well spread throughout the hunt areas. This herd unit has stayed consistently around 5-8% prevalence for a number of years. To date, no meaningful CWD management actions have occurred in this herd unit.

Table 1.

2017 - 2022 Postseason Classification Summary

for Elk Herd EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2017	13,627	211	339	550	19%	1,645	57%	674	23%	2,869	499	13	21	33	± 2	41	± 2	31
2018	13,729	853	1,630	2,483	27%	4,855	52%	2,021	22%	9,359	602	18	34	51	± 1	42	± 1	28
2019	13,980	120	188	308	16%	1,125	60%	454	24%	1,887	888	11	17	27	± 2	40	± 3	32
2020	12,914	132	130	262	14%	1,153	60%	518	27%	1,933	898	11	11	23	± 2	45	± 3	37
2021	12,347	120	202	322	25%	638	51%	303	24%	1,263	745	19	32	50	± 4	47	± 4	32
2022	12,540	212	368	580	15%	2,331	61%	923	24%	3,834	630	9	16	25	± 1	40	± 2	32

Table 2. CWD prevalence for hunter-harvest elk in the Laramie Peak/Muddy Mountain Elk Herd, 2020-2022.

		2020			2021			2022			3 Year Prevalence				95% Confidence (2020-2022)			
HA/HU	Species	Tested	# Pos	Prev	Tested	# Pos	Prev	Tested	# Pos	Prev	Tested	# Pos	Prev	Ratio	Lower	Upper	F-low	F-high
7	Elk	104	9	8.7%	71	2	2.8%	188	11	5.9%	363	22	6.1%	0.1	3.6%	9.0%	1.6	1.5
19	Elk	15	1	6.7%	20	1	5.0%	34	0	0.0%	69	2	2.9%	0.0	0.3%	10.1%	8.3	2.5
Laramie Peak/Muddy Mtn 741 Casper 2022 Survey Tier 2	Elk	119	10	8.4%	91	3	3.3%	222	11	5.0%	432	24	5.6%	0.1	3.4%	8.2%	1.6	1.4

Appendix 1. Area 7 General License Opportunity Outreach Summary

Beginning in Fall 2022, managers began evaluating the possibility of implementing a General season opportunity in Hunt Area 7. Initial survey efforts involved a short, informal survey handed out in the field during hunting seasons. These surveys came back with around a 50/50 split for and against the idea. In order to get a better evaluation of public opinion, an email survey was then designed and sent out to all sportspersons who applied for any elk license in Area 7 in the last 5 years. There were 22,342 recipients (14,383 Residents & 8,868 Non-residents). The formal survey received 4,737 completed responses. Managers also met with affected landowners to discuss the possibility. After careful consideration, public outreach, and reviewing survey results, **wildlife managers decided not to pursue implementing a General hunting season in Elk Hunt Area 7**. More specifically, local and broad public feedback indicated substantial concern of overcrowding on public lands, over-pressured elk, and decreased hunter success and hunting quality.

Initial Informal Sportsman Field Survey

WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

Elk Area 7 General Season Hunter Survey

October 2022

Goals of a general season structure

- Harvest levels have remained stagnant – may potentially increase harvest
- Increased opportunity and flexibility - get licenses in hands of people with access
- Increased opportunity may lead to more elk movement between public and private lands

1. **Select your Residency**
   a. Nonresident
   b. Resident

2. **Where are you hunting?**
   a. Public land (Including Walk-In Areas and HMA's)
   b. Private land
   c. Both

3. **What is your top priority for hunting in Elk Hunt Area 7?**
   a. Trophy
   b. Meat
   c. Getting outside w/ friends & family
   d. Hunting close to home
   e. Other
   f. Explain:_____
   _____
   _____

4. **Would you support incorporating a general license opportunity in Elk Hunt Area 7? This could be incorporated in a variety of ways (i.e., all general, LQ archery and general rifle, general antlerless only, etc.)**
   a. Yes
   b. No

5. **Aside from improved access, how can we improve the hunting experience, hunt quality, and opportunity to hunt in Elk Hunt Area 7?**
   _____
   _____
   _____
   _____
   _____

Formal Emailed Survey

The Wyoming Game and Fish Department is conducting this survey to understand sportsperson opinion on elk management and hunting in the Laramie Peak area (Elk Hunt Area 7). You are receiving this email because you applied for a license in Elk Hunt Area 7 within the last 5 years.

Key information

The Laramie Peak/Muddy Mountain Herd Unit encompasses Elk Hunt Areas 7 & 19. This herd has a population objective of 5,000 elk postseason. The current population estimate is 12,500 elk. Elk management is very challenging in this herd due to the mixture of private and public lands. As this population has increased, hunter satisfaction has declined, bull quality has diminished, public land hunting quality has deteriorated (during rifle season), and land management issues have increased. These challenges arise from a high percentage of elk occupying private lands, a problem which seems to have grown worse over the past decade.

Current hunting structure

The current season structure and license quotas are not working to bring the population towards objective. The Wyoming Game and Fish Department (Department) currently issues 5,350 licenses per year in Hunt Area 7, which results in 4,800-5,000 hunters in the field each year. This number of hunters far exceeds that of any other limited quota hunt area in the state and is comparable to major general-license herds in southeast Wyoming such as the Sierra Madre herd (about 5,300 elk hunters in 2021) and Snowy Range herd (about 5,500 elk hunters in 2021).

Potential addition of general license opportunity

As outlined below, the primary goal of adding a general license to the season structure in Elk Hunt Area 7 would be to increase harvest, especially on private lands, by providing more flexibility and opportunity to hunters and landowners. The Department acknowledges there are pros and cons to adopting a general season framework, and wants to preserve public land hunting quality to the extent possible. Adding a general license could be accomplished in multiple ways ranging from a complete shift to general licenses or a combination of general and limited quota licenses (e.g., limited quota only for archery, general and limited quota for rifle, general only for rifle, etc.).

Goals of a general season structure:

- Increase elk harvest
- Increase opportunity and flexibility - get licenses in the hands of people with access
- Increased opportunity may lead to more elk movement between public and private lands

As we consider management options in this important elk herd, we thank you for your time and consideration in completing this survey.

1. When you hunt in Elk Hunt Area 7, where do you hunt? Select all that apply.
    a. Public Land
    b. Private Land
    c. Walk-in Areas and/or Hunter Management Areas
    d. I have not held a license for Elk Hunt Area 7

2. What is your top priority for hunting in Elk Hunt Area 7? Select all that apply.
    a. Trophy/Antlers
    b. Meat
    c. Getting outside w/ friends & family
    d. Hunting close to home
    e. Other
    Explain:_____
    _____

3. There are numerous variations of potential general license season structures, with the primary options presented in the table below. Would you support incorporating a general license opportunity in Elk Hunt Area 7? Indicate your preferred option if answering "yes".
    a. Yes

Option	Description	Archery	Rifle - any elk	Rifle - antlerless only
1	Gen for all hunting	Gen	Gen	Gen
2	LQ archery only, Gen rifle	Type 9	Gen	Gen
3	LQ archery only, LQ rifle any elk, Gen rifle antlerless only	Type 9	Type 1	Gen (and LQ)
4	LQ archery only, LQ and Gen rifle any elk and late antlerless elk	Type 9	Type 1 & Gen	Gen (and LQ)
5	LQ archery + rifle, LQ rifle any elk, Gen rifle antlerless only	Type 1	Type 1	Gen (and LQ)
6	LQ archery + rifle, LQ and Gen rifle any elk and late antlerless elk	Type 1	Type 1 & Gen	Gen (and LQ)
7	Other (please explain) _____ _____ _____			

Gen = General license LQ = Limited Quota license

    b. No
    If no, why not? _____

_____
_____
_____

4. Do you feel being able to hunt Area 7 on a general license would increase your opportunity to harvest an elk?
    a. Yes
    b. No
        i. Why not?

5. If unsuccessful for an Area 7 - Type 1 Limited Quota license, do you tend to purchase a General license to hunt a different area, an antlerless or cow/calf license for Area 7, or do not hunt that year?
    a. General
    b. Antlerless or Cow/Calf
    c. Do not hunt
    d. Other_____

6. If General licenses were allowed in Area 7, would you hunt there?
    a. Yes
    b. No

7. WGFD recognizes access is the most significant issue related to elk harvest success in this hunt area. Aside from increasing access, how can we improve the hunting experience, hunt quality, and opportunity to hunt in Elk Hunt Area 7?

    _____
    _____

8. What are your major concerns if Area 7 had a General season?

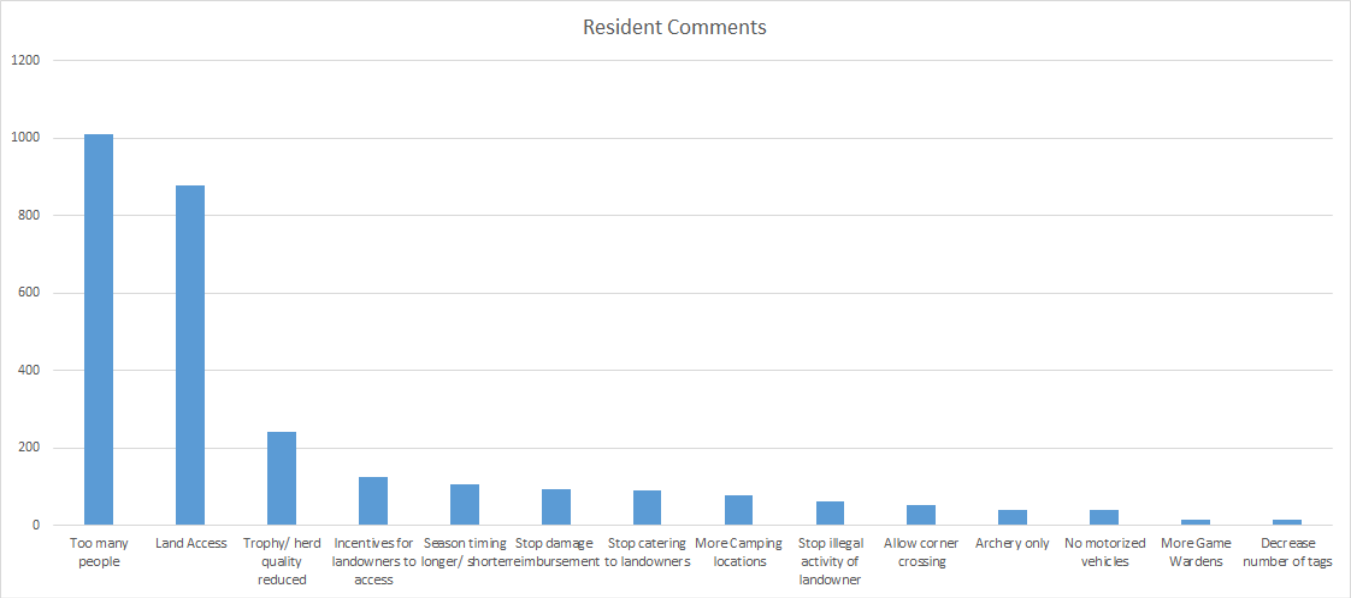
_____
_____
_____

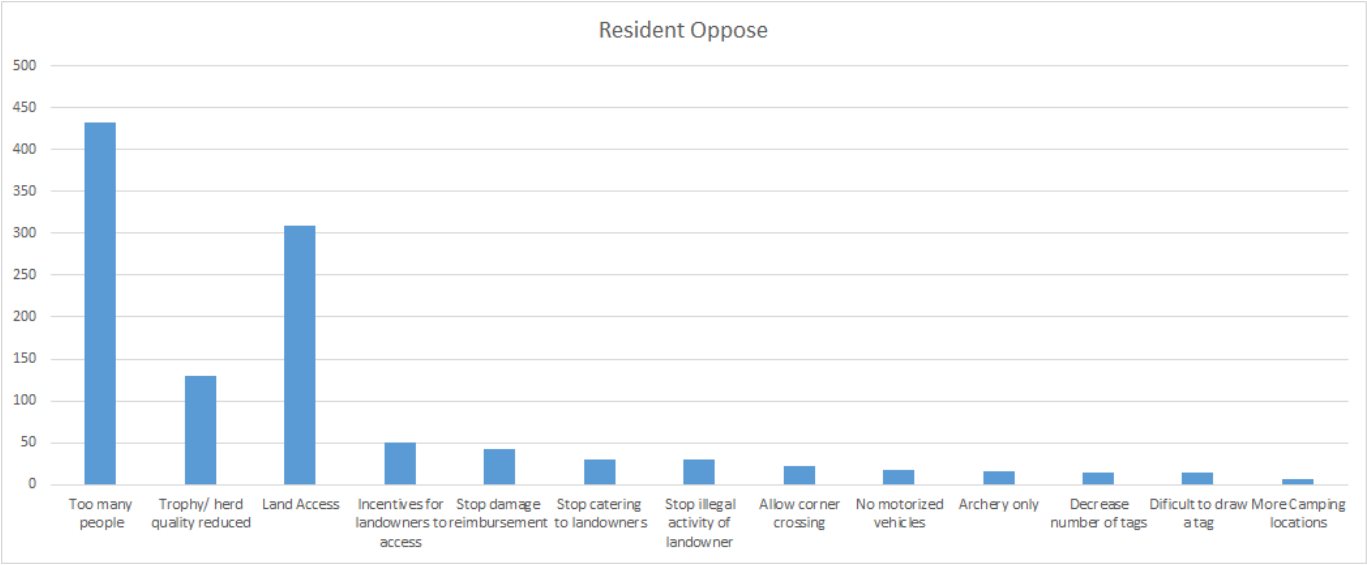
Hunt Area 7 Survey Written Comment Summary

There were 3 main topics that dominated written comments received from the survey. They are as follows:

- **Overcrowding:** People are concerned with too many people on the landscape, especially out of state hunters, landowners fear an increase in trespassing as a result of overcrowding, and increased litter and wear and tear on the landscape as a result of overcrowding. They feel the increase in hunter numbers will adversely affect landowner relationships making it even harder to obtain permission on private land.
- **Access:** People feel there isn't enough public land to support the increased number of hunters. Folks feel there isn't enough land, or access to land, for the number of hunters currently.
- **Trophy/Herd quality will diminish:** Hunters feel that making HA7 General will adversely impact the trophy quality and overall herd health over time. Many asked for antler restrictions, general permit for cows only, limited time for general permit then return to limited draw.

An analysis of these comments is provided in the graphs below.


Resident Comments
1200
1000
800
600
400
200
0
Too many people
Land Access
Trophy/ herd quality reduced
Incentives for landowners to access
Season timing longer/ shorter
Stop damage reimbursement
Stop catering to landowners
More Camping locations
Stop illegal activity of landowner
Allow corner crossing
Archery only
No motorized vehicles
More Game Wardens
Decrease number of tags


Resident Oppose
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50
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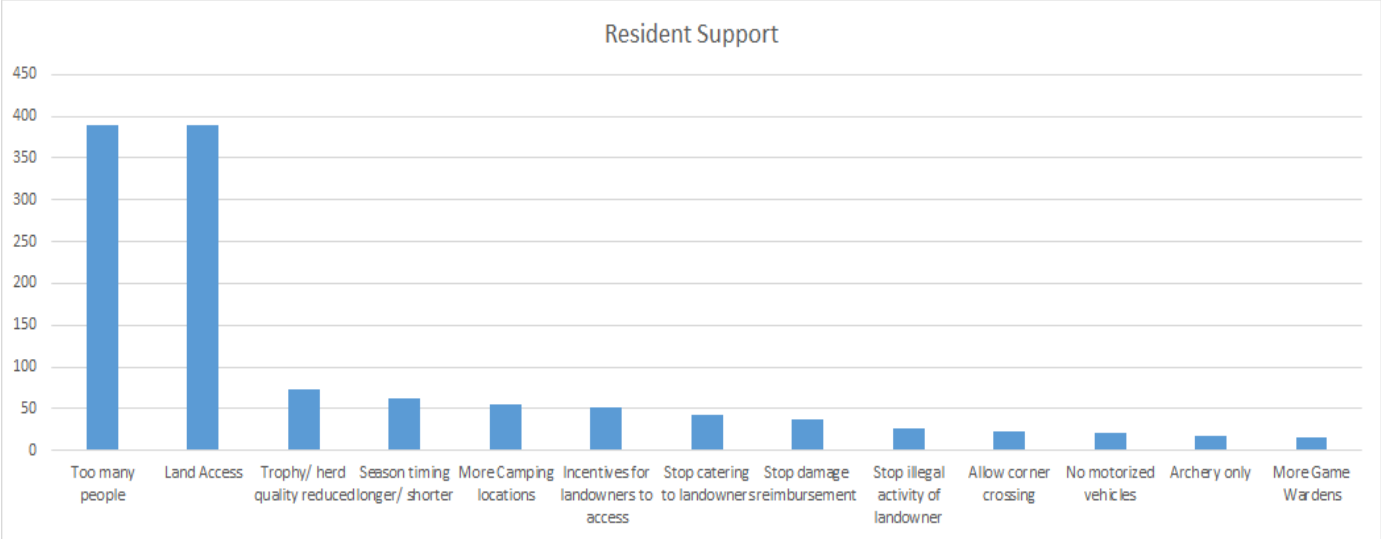
Too many people
Trophy/ herd quality reduced
Land Access
Incentives for landowners to access
Stop damage reimbursement
Stop catering to landowners
Stop illegal activity of landowner
Allow corner crossing
No motorized vehicles
Archery only
Decrease number of tags
Dificult to draw a tag
More Camping locations


Resident Support
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250
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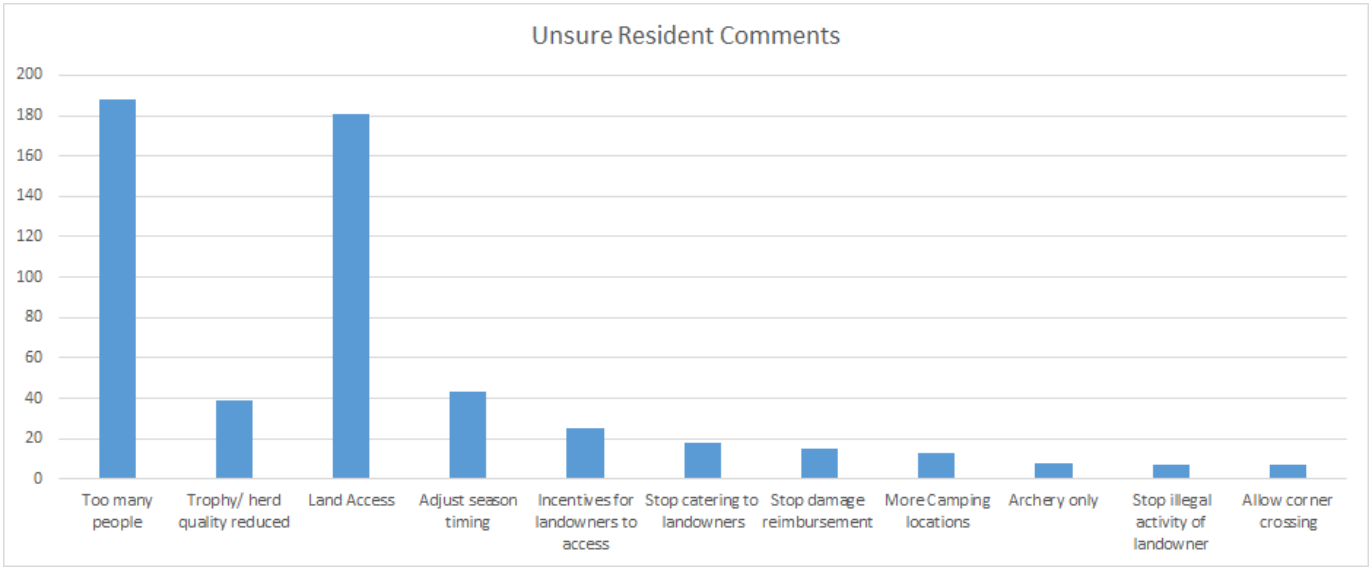
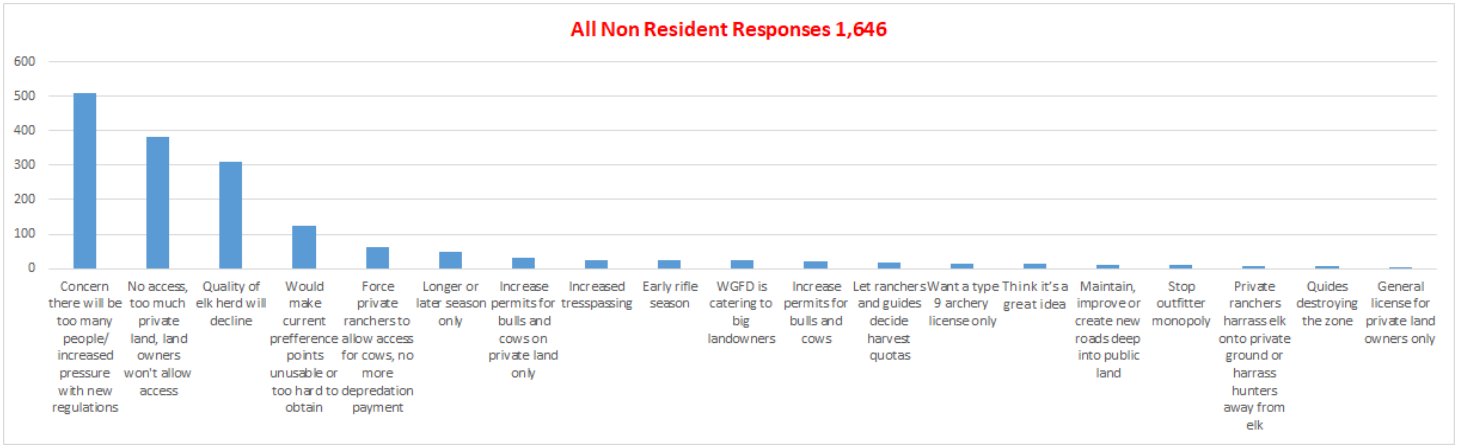
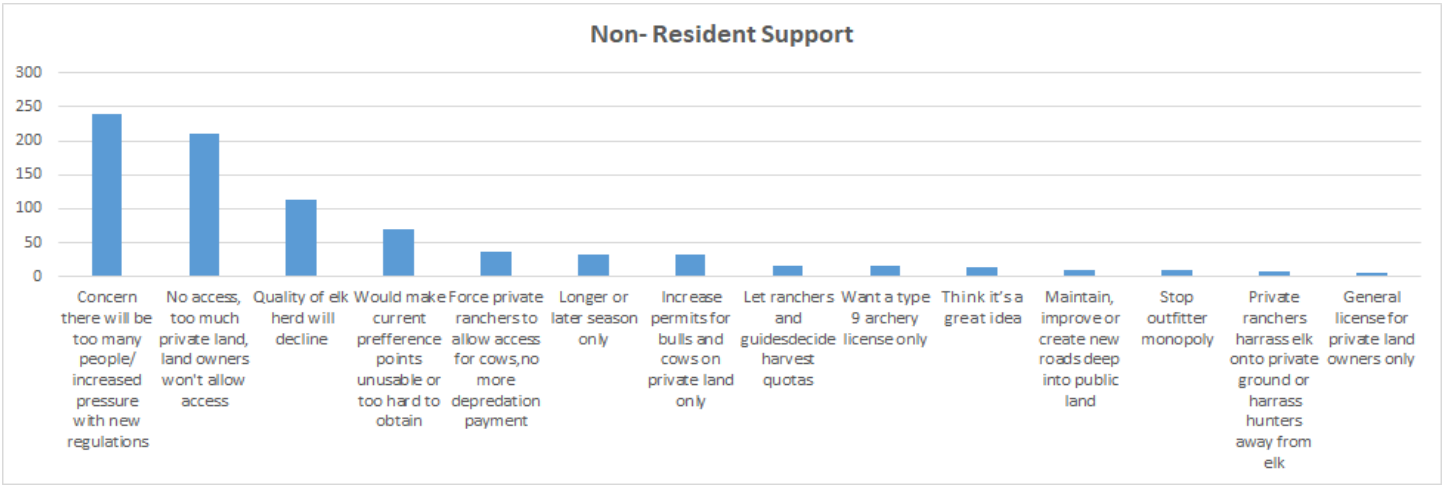
Too many people
Land Access
Trophy/ herd quality reduced
Season timing longer/ shorter
More Camping locations
Incentives for landowners to access
Stop catering to landowners
Stop damage reimbursement
Stop illegal activity of landowner
Allow corner crossing
No motorized vehicles
Archery only
More Game Wardens


Unsure Resident Comments
200
180
160
140
120
100
80
60
40
20
0
Too many people
Trophy/ herd quality reduced
Land Access
Adjust season timing
Incentives for landowners to access
Stop catering to landowners
Stop damage reimbursement
More Camping locations
Archery only
Stop illegal activity of landowner
Allow corner crossing


All Non Resident Responses 1,646
600
500
400
300
200
100
0
Concern there will be too many people/ increased pressure with new regulations
No access, too much private land, land owners won't allow access
Quality of elk herd will decline
Would make current prefference points unusable or too hard to obtain
Force private ranchers to allow access for cows, no more depredation payment
Longer or later season only
Increase permits for bulls and cows on private land only
Increased tresspassing
Early rifle season
WGFD is catering to big landowners
Increase permits for bulls and cows
Let ranchers and guides decide harvest quotas
Want a type 9 archery license only
Think it's a great idea
Maintain, improve or create new roads deep into public land
Stop outfitter monopoly
Private ranchers harrass elk onto private ground or harrass hunters away from elk
Quides destroying the zone
General license for private land owners only


Non- Resident Support
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Concern there will be too many people/ increased pressure with new regulations
No access, too much private land, land owners won't allow access
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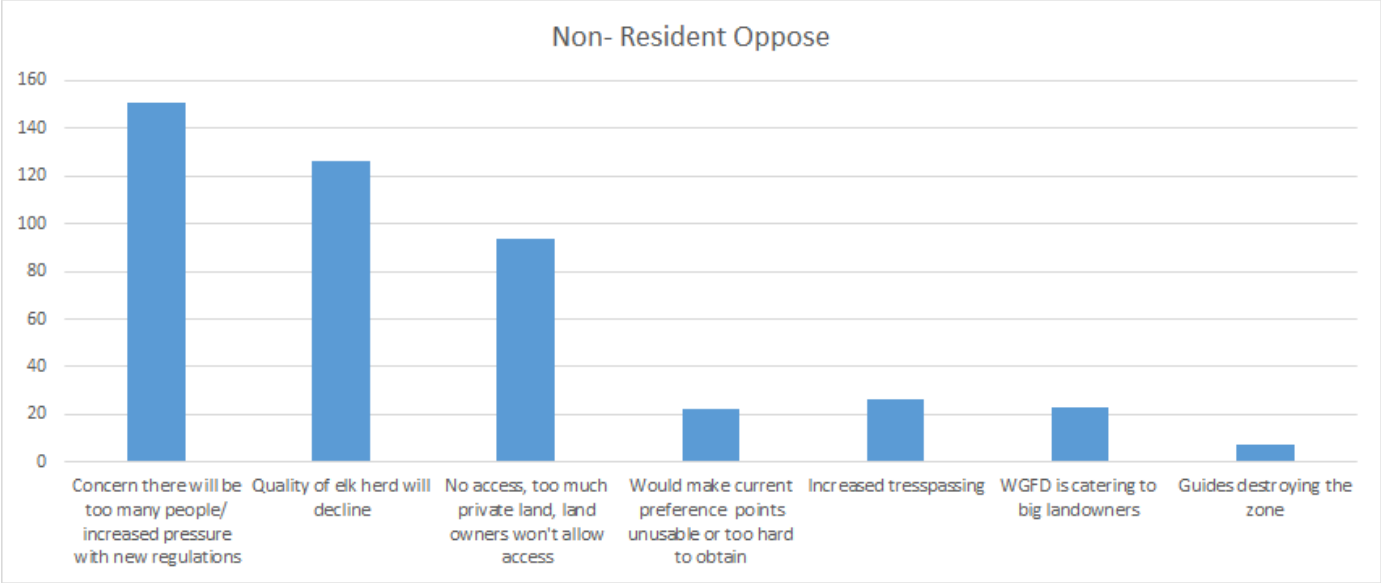
Non- Resident Oppose
160
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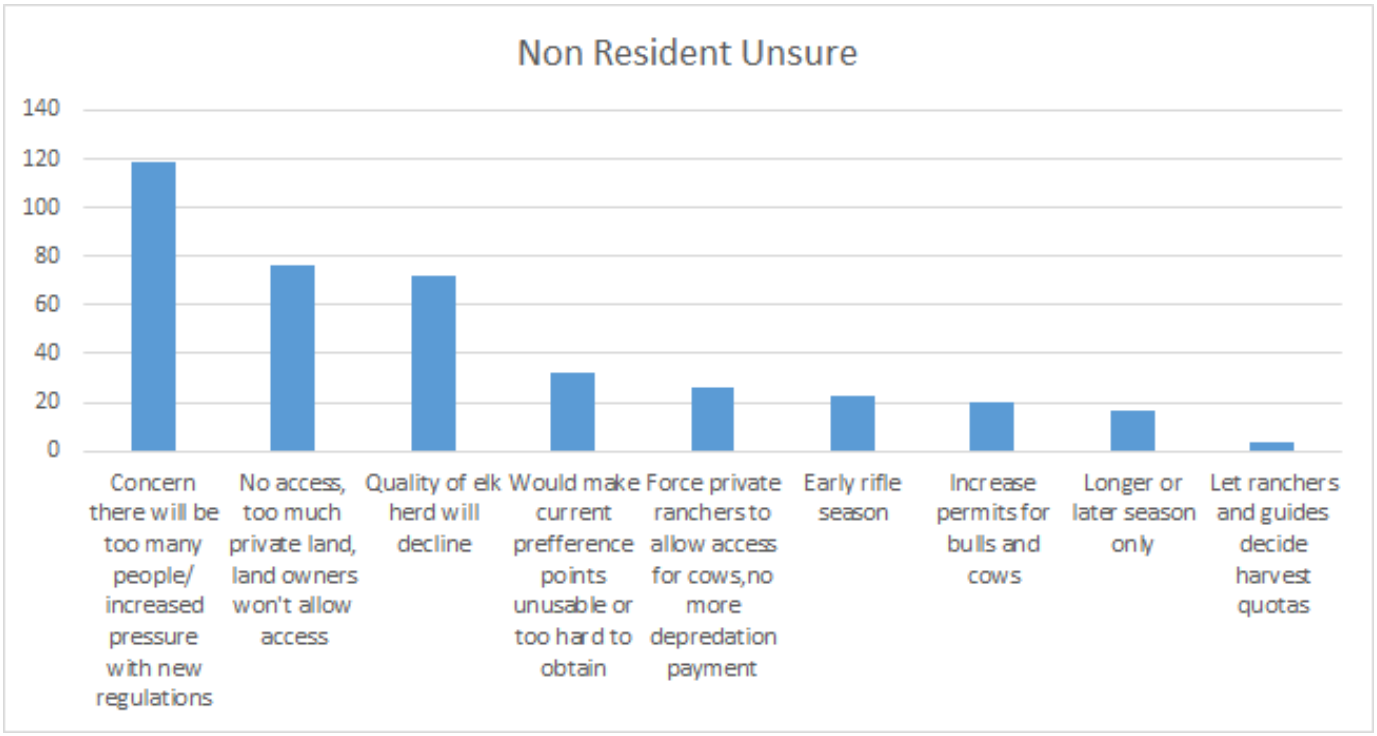
Concern there will be too many people/ increased pressure with new regulations
Quality of elk herd will decline
No access, too much private land, land owners won't allow access
Would make current preference points unusable or too hard to obtain
Increased tresspassing
WGFD is catering to big landowners
Guides destroying the zone


Non Resident Unsure
140
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60
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20
0
Concern there will be too many people/ increased pressure with new regulations
No access, too much private land, land owners won't allow access
Quality of elk herd will decline
Would make current prefference points unusable or too hard to obtain
Force private ranchers to allow access for cows,no more depredation payment
Early rifle season
Increase permits for bulls and cows
Longer or later season only
Let ranchers and guides decide harvest quotas

Response to Public

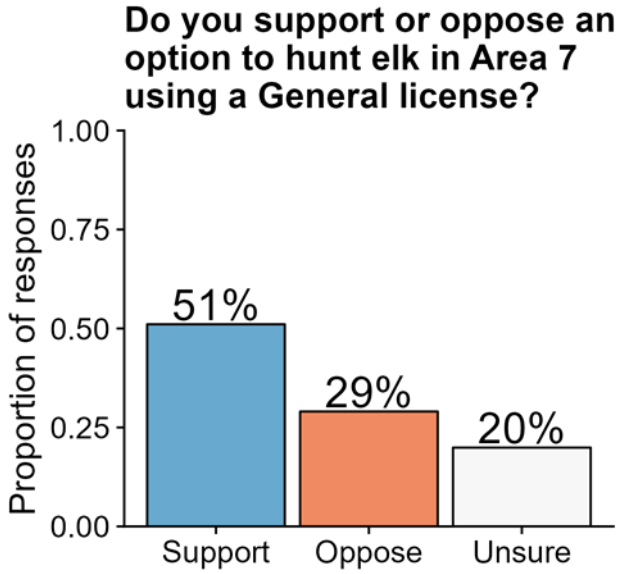
Area 7 General Season Decision and Survey Results

3/7/2023

Dear Wyoming Elk Hunter,

Thank you for completing the recent survey regarding elk management and the potential to incorporate a General license in Elk Hunt Area 7. After careful consideration, public outreach, and reviewing survey results **wildlife managers have decided not to pursue implementing a General hunting season in Elk Hunt Area 7**. More specifically, local and broad public feedback indicated substantial concern of overcrowding on public lands, over-pressured elk, and decreased hunter success and hunting quality. Although 51% of survey respondents (50% resident, 53% nonresident) indicated they supported a General season, a large majority of these same respondents included written comments expressing major concerns, thus indicating less support for a General season than these statistics indicate (see graph below). A link to the full survey results is also provided below.

Despite substantial challenges, the Wyoming Game and Fish Department will continue to explore ways to better manage this elk herd into the future. Again, we thank you for your time and thoughtful consideration, which enabled us to thoroughly evaluate this concept.



2022 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2022 - 5/31/2023

HERD: EL742 - RATTLESNAKE

HUNT AREAS: 23

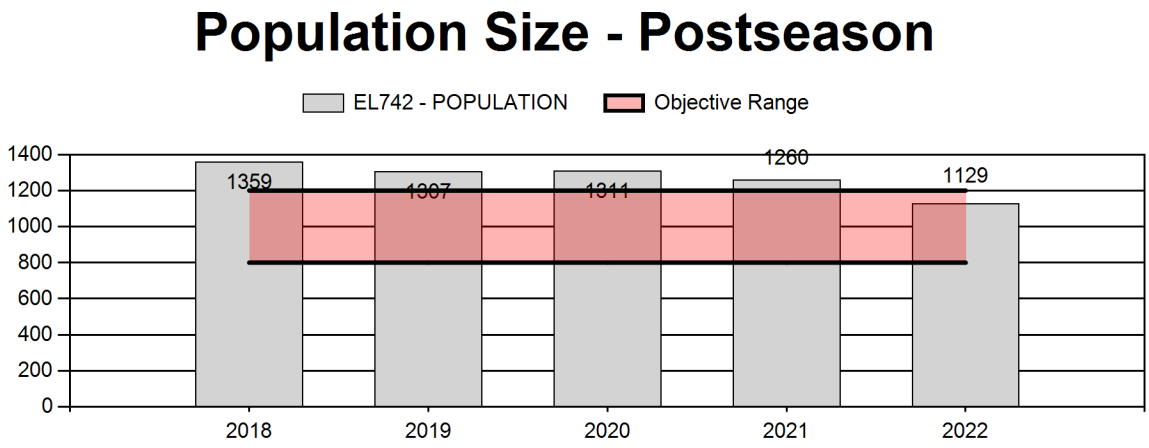
PREPARED BY: BRANDON WERNER

	2017 - 2021 Average	2022	2023 Proposed
Population:	1,323	1,129	1,006
Harvest:	166	193	170
Hunters:	410	380	390
Hunter Success:	40%	51%	44%
Active Licenses:	451	424	435
Active License Success:	37%	46%	39%
Recreation Days:	4,039	2,910	3,000
Days Per Animal:	24.3	15.1	17.6
Males per 100 Females	31	23	
Juveniles per 100 Females	37	45	

Population Objective (± 20%) :	1000 (800 - 1200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	13%
Number of years population has been + or - objective in recent trend:	31
Model Date:	02/24/2023

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

	JCR Year	Proposed
Females ≥ 1 year old:	9.7%	12.1%
Males ≥ 1 year old:	25.5%	27.2%
Proposed change in post-season population:	-12%	-10.89%



2023 HUNTING SEASONS
RATTLESNAKE ELK HERD (EL742)

Hunt Area	Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
23	1	Sep. 1	Sep. 30	Oct. 1	Oct. 31	150	Any elk
				Nov. 15	Dec. 15		Any elk
	4	Sep. 1	Sep. 30	Oct. 1	Oct. 31	175	Antlerless elk
				Nov. 15	Dec. 15		Antlerless elk; Also valid in area 128 east of Castle Gardens Road (Fremont County Road 507), east of Wyoming Highway 136, east of Ore Road (Fremont County Road 5), and north of Beaver Rim Road (B.L.M Road 2401)
	6	Sep. 1	Sep. 30	Oct. 1	Oct. 31	200	Cow or calf
				Nov. 15	Dec. 15		Cow or calf; Also valid in area 128 east of Castle Gardens Road (Fremont County Road 507), east of Wyoming Highway 136, east of Ore Road (Fremont County Road 5), and north of Beaver Rim Road (B.L.M Road 2401)

2022 Hunter Satisfaction: 76% Satisfied, 15% Neutral, 9% Dissatisfied

2023 Management Summary:

1) **Hunting Season Evaluation:** The 2022 season structure was maintained as it has been for the last several years, with the goal of maximizing cow harvest in an over-objective herd with

constrained public access. Harvest success on Type 1 licenses tends to be good from year to year, in the 50-60th percentile. Harvest on females is consistently poor due to large numbers of cows and calves taking refuge on one property that allows no hunting access. However, during the 2021 and 2022, season large cow and calf groups consistently moved from this property with no access and onto adjacent public lands. Success on Type 4 and 6 licenses increased considerably. Hunter satisfaction has been steadily increasing as well. Managers suspect the confirmed presence of wolves in this area may be responsible for increased elk movements and smaller group sizes over the past two years.

Additional licenses in this unit would likely reduce harvest success and satisfaction due to hunter crowding on accessible lands. With no additional access to improve female harvest, this herd will likely continue to grow and disperse into adjacent areas. Field managers will continue working with landowners to improve access and increase harvest. In late 2021 and 2022 large groups of elk moved from Area 23 into Area 128. However, Type 4 license holders had a hard time accessing those elk in Area 128 due to winter conditions so the harvest was minimal in that area. In 2023, the Type 6 was added to the available licenses to harvest cow or calf elk in Area 128 from November 15 to December 15 in Area 128. The Type 4 and 6 licenses is restricted in Area 128 and is valid east of Castle Gardens Road (Fremont County Road 507), east of Wyoming Highway 136, and east of Ore Road (Fremont County Road 5) and north of Beaver Rim Road (B.L.M Road 2401). Hunters will be concentrated in the northeast part of Area 128 where elk cross the Dry Creek Road and Gas Hills Road from Area 23 and into Area 128. Managers are exploring a possible hunt area boundary change in 2024 to incorporate this portion of Area 128 into Area 23.

2) **Management Objective Review:** This herd was up for an objective review in 2023. We maintained this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status data included in this document and a change is not warranted. We will review this herd objective again in 2028; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3) **Population Modeling:** Small herd size, disparate harvest of males versus females, skewed classification data, and an open population make accurate modeling of this herd difficult. The addition of an abundance estimate for the 2019 bio-year helped to better align the model. The model selected for the 2023 semi-constant juvenile and semi-constant adult survival. This model was selected because of a lower AIC value while providing an estimate in which managers' find applicable. A total of 802 elk were classified in 2022. The model shows a post hunt population of 1,129 for 2022 and 1,006 elk in 2023. With the increased harvest the last two years, this herd may now be trending toward objective.

Table 1. 2018 - 2022 Postseason Classification

Summary for Elk Herd EL742 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2018	1,359	131	107	238	18%	776	60%	274	21%	1,288	441	17	14	31	± 1	35	± 1	27
2019	1,307	66	216	282	27%	603	58%	155	15%	1,040	428	11	36	47	± 2	26	± 1	18
2020	1,311	27	59	86	20%	275	63%	76	17%	437	481	10	21	31	± 4	28	± 4	21
2021	1,260	52	2	54	7%	476	60%	267	34%	797	512	11	0	11	± 1	56	± 3	50
2022	1,129	47	64	111	14%	476	59%	215	27%	802	483	10	13	23	± 2	45	± 3	37

2022 - JCR Evaluation Form

SPECIES: Elk

HERD: EL743 - PINE RIDGE

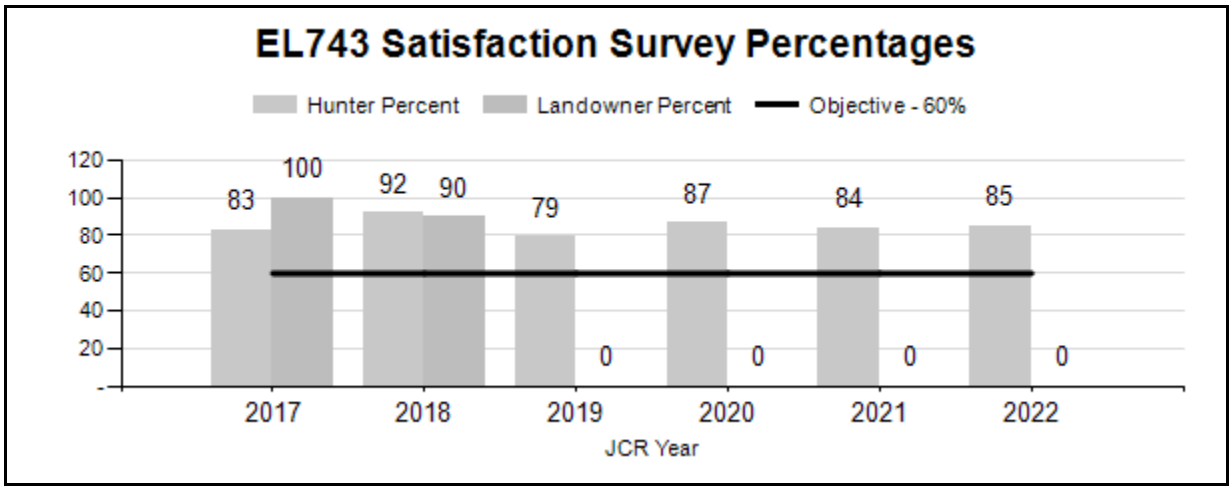
HUNT AREAS: 122

PERIOD: 6/1/2022 - 5/31/2023

PREPARED BY: MATT HUIZENGA

	2017 - 2021 Average	2022	2023 Proposed
Hunter Satisfaction Percent	85%	85%	85%
Landowner Satisfaction Percent	34%	0%	0%
Harvest:	135	204	300
Hunters:	167	294	400
Hunter Success:	81%	69%	75%
Active Licenses:	178	307	350
Active License Success:	76%	66%	86%
Recreation Days:	589	891	1,200
Days Per Animal:	4.4	4.4	4
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	4



2023 HUNTING SEASONS

Pine Ridge Elk Herd Unit (EL743)

Hunt Area	License Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
122	1	Sep. 1	Sep. 30	Oct. 1	Nov. 30	150	Any elk
122	1			Dec. 1	Dec. 31		Antlerless elk
122	6	Sep. 1	Sep. 30	Oct. 1	Dec. 31	350	Cow or calf

2022 Hunter Satisfaction: 85% Satisfied, 8% Neutral, 7% Dissatisfied

2022 Landowner Satisfaction: 0% Below desired levels, 0% At or about at desired levels, 100% Above desired levels

2023 Management Summary

1) Hunting Season Evaluation: The majority of elk are located on private land or inaccessible public land in this area. Licenses are therefore issued based primarily on the amount of private land access allowed by landowners. The 2023 season structure was set to increase harvest to address a landowner-perceived growing population and minimize over-crowding of the minimal public land access points. As a result of the lack of public access, Type 6 licenses generally do not sell out for this area; however that changed in 2021. Type 6 licenses were increased by 100 in 2022 and all except 12 sold. To increase harvest potential to limit herd growth and provide additional hunter opportunity, an additional 25 Type 1 licenses and 50 Type 6 licenses were added for 2023. The season opening date was changed in 2021 to Oct. 1 to allow for increased harvest opportunity. Landowners adjacent to public lands were not in favor of the change due to concurrent deer and antelope seasons resulting in already crowded conditions at the limited public access points. For 2022 managers changed the Type 1 opening date back to Oct. 15 to address those concerns. With increasing elk numbers and change in distribution, that sentiment shifted and managers returned the opening date to Oct. 1 for 2023.

There is no population model for this herd. Minimum population size and trend is based off aerial winter trend counts and landowner input. Population estimates since 2013 have stayed steady between 800-1,000 elk in this herd. Landowner input indicates the current population size likely exceeds 1,000. Harvest alone is likely insufficient to curtail population growth, and managers believe elk may be emigrating from this herd.

Winter trend counts have been quite variable over the years. Under ideal conditions, personnel found a total of 840 elk in 2013, 566 elk in 2016, and 648 elk in 2017. Counts have been attempted along with helicopter deer classification flights in some years with limited success. A directed fixed-wing classification flight was conducted in February 2023 with a total count of

898 elk. Given the small average group size observed during this flight, coupled with widespread elk distribution, this population likely exceeds past estimates of 800-1,000 elk.

Hunter success in this area over the past five years is quite high, averaging 81% harvest success with an average of 4.4 days to harvest. While managers always prefer to better manage this population through increased harvest, license issuance is almost entirely dependent upon how many hunters landowners are willing to take. Therefore, prescribed license increases for 2023 are somewhat modest.

2) Chronic Wasting Disease Management: To date, no meaningful CWD prevalence data is available within this herd unit and no CWD management actions have occurred. This herd has not been prioritized for CWD surveillance because historically harvest has been too low to obtain an adequate sample size for a statistically valid prevalence.

2022 - JCR Evaluation Form

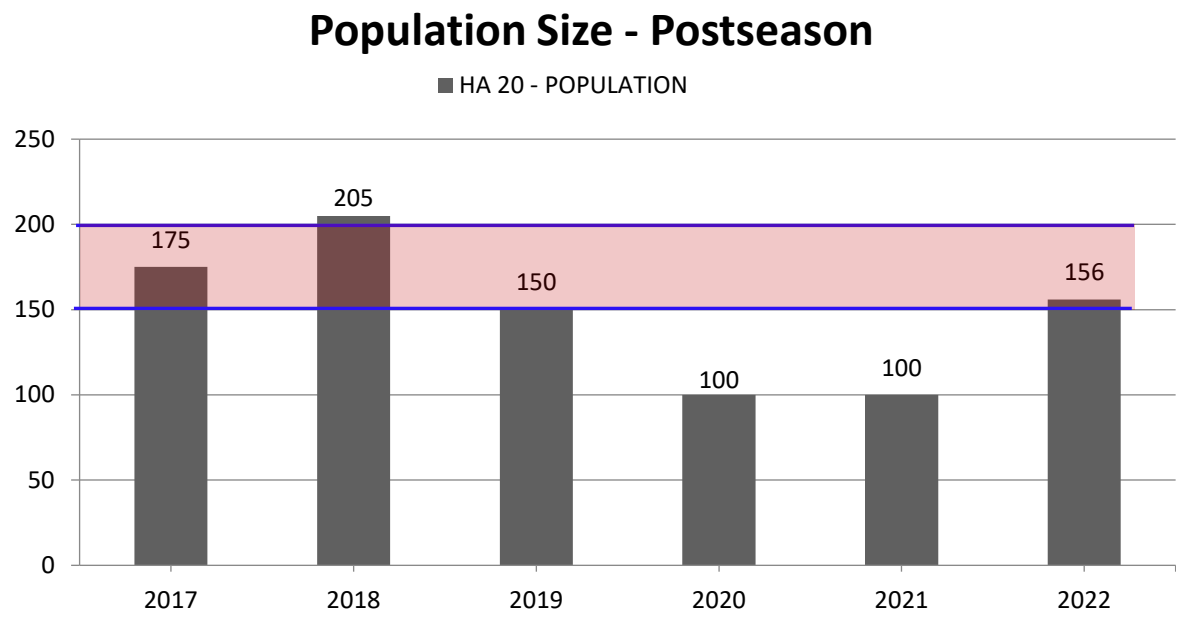
PERIOD: 6/1/2022 - 5/31/2023

HERD: BH720 (Non-Herd Unit)

HUNT AREAS: 20 (Kouba Canyon) PREPARED BY: JOE SANDRINI

	2017 - 2022 Average	2022	2023 Proposed
Population:	148	156	175
Harvest:	2.5	1	2
Hunters:	2.5	1	2
Hunter Success:	100%	100%	100%
Active Licenses:	2.5	1	2
Active License Success:	100%	100%	100%
Recreation Days:	9.2	5	7
Days Per Animal:	3.7	5.0	3.5
Males per 100 Females[1]	104	98	
Juveniles per 100 Females[2]	39	60	

Population Objective (± 20%):	150-200
Management Strategy:	Joint Management with South Dakota
Percent population is above (+) or below (-) objective:	At Objective
Number of years population has been + or - objective in recent trend:	1
Model Date:	No Model (population est. from ground survey)



[1] Based on mean of observed values, 10/01/22 – 02/01/2023

[2] Based on mean of observed values, 10/01/22 – 02/01/2023

2023 HUNTING SEASONS

BIGHORN SHEEP HUNT AREA 20 (KOUBA CANYON)

BH720 (NON-HERD UNIT)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
20	1	Aug. 15	Sep. 30	Oct. 1	Nov. 30	2	Any ram (2 resident)

2022 Hunter Satisfaction: *Bighorn Sheep (BHS) Hunters Not Surveyed*

2023 Management Summary

1) **Hunting Season Evaluation:** At the start of the 2021 bio-year, there were 24 ewes and 17 rams with active VHF radio collars in this herd. Over the next 12 months, five of the collared ewes and eight of the collared rams died, yielding an annual mortality rate 21% for collared ewes and 47% for collared rams, with two of the collared rams being harvested by hunters. Bighorn sheep observations during the 2021-22 winter indicated a large proportion of radio-collared sheep in the herd and virtually no lambs. Poor lamb survival and lower numbers of observed sheep suggested this herd had declined. A sightability flight flown in mid-February of 2022 detected 75 total sheep, including 22 of the 23 collared sheep known to be in the survey area. However, it did not produce a useable population estimate. In November of 2022, South Dakota Game Fish and Parks (SDGF&P) ran five ground based surveys in this herd. The fifth and final survey produced the best results with 76 bighorn sheep observed. This survey also yielded the most precise mark-resight estimate of 156 sheep, with a 95% confidence interval of 96 – 254, relying on a Poisson distribution. The age and sex classifications made during the final ground based survey yielded a ratio of 58 rams:100 ewes: 47 lambs, while the total of all the classifications made during the surveys yielded 98 rams: 100 ewes: 60 lambs. Also of note, the sole Wyoming hunter in 2022 reported seeing 30 - 40 different mature rams.
   Following the perceived population decline in bio-year 2021, this hunt area went from three Wyoming licenses available to one for the 2022 season, while SDGF&P continued to issue three licenses. After discussions with SDGF&P, it was decided to issue two Wyoming licenses for the 2023 hunting season. This should provide success for two resident hunters. In addition, three rams will likely be harvested in South Dakota, as they are on the second year of their 2-year regulation cycle that calls for three licenses. If the combined interstate harvest objective of five rams is met in 2023, it probably will meet the management objective of harvesting no more than 10% of the rams or 50% of the class IV rams.
2) **Management Objective:** In 2012, joint management criteria for this herd were agreed upon with SDGF&P. This management framework includes an interstate population objective of 150 to 200 sheep. Additionally, hunting seasons are to be implemented when there is a combined Wyoming and South Dakota population of at least 75 to 100 sheep. These seasons are intended to provide trophy ram hunting, such that harvest of rams in relation to population

demographics allows for replacement of Class IV (¾ curl) rams taken. To this end, harvest should not normally exceed 50% of the known number of Class IV rams, and annual harvest should not exceed 10% of the total rams.

3) **Population Estimation and Research Projects:** Garnering an accurate population estimate of this herd is vital to its management, and three methods have been tried, all with limited success:

- A ground-based mark-resight survey relying on radio-collared BHS was developed as part of a graduate student project in 2013. Most years, this method has produced estimates with very wide confidence intervals due to the limited number of radio-collared sheep available. Mark-resight data have been analyzed using a modified Lincoln-Peterson estimate, and one based upon a Poisson distribution, along with a detection rate function. Completing these surveys as designed in recent years has become difficult due to more restricted access to private land. However, it did produce a useable estimate for 2022.

- A forward-looking infrared (FLIR) survey was attempted in June, 2018. However, the FLIR system was not able to effectively detect BHS.

- Between December 2019 and February 2022, a project was piloted to develop a helicopter-based sightability model for this herd. The study was conducted in tandem with SDGF&P. In mid-February of 2022, a sightability flight was flown. However, detection of sheep along survey transects not relying on radio collar signals was extremely low, resulting in an estimate with exceedingly wide confidence intervals. It appeared that the bighorn sheep were very sensitive to the presence of a helicopter and sought hiding cover to avoid detection. As such, this method was deemed untenable for producing a reliable population estimate.