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Acknowledgement

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

2021 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2021 - 5/31/2022

HERD: PR745 - RATTLESNAKE

HUNT AREAS: 70-72

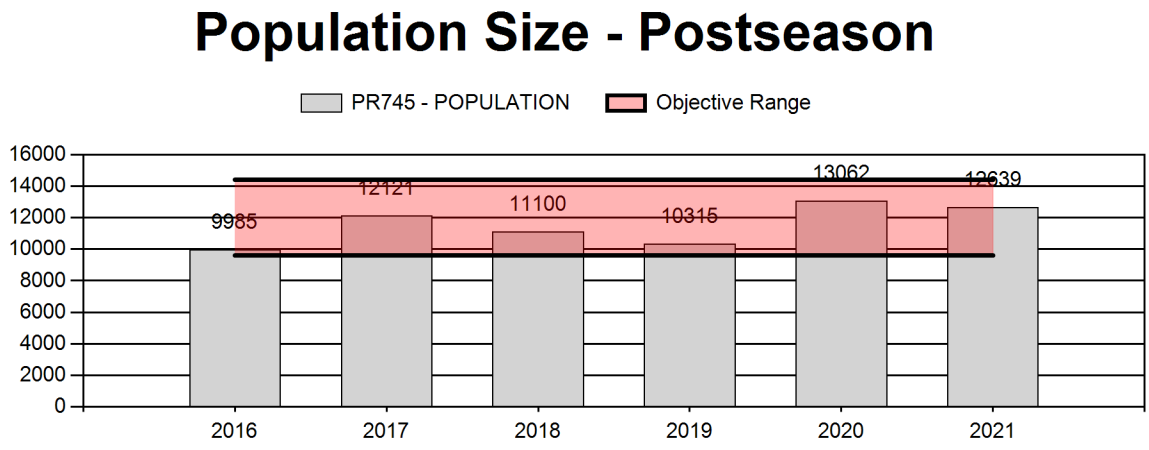
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	11,317	12,639	11,879
Harvest:	760	1,066	1,043
Hunters:	781	1,238	1,200
Hunter Success:	97%	86%	87%
Active Licenses:	870	1,367	1,310
Active License Success:	87%	78%	80%
Recreation Days:	2,354	4,028	3,950
Days Per Animal:	3.1	3.8	3.8
Males per 100 Females	56	68	
Juveniles per 100 Females	64	73	

Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	5%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/24/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	6%	6%
Males ≥ 1 year old:	23%	25%
Proposed change in post-season population:	-3.2%	-6.4%



2022 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	150	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	150	Doe or fawn
71	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	100	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	100	Doe or fawn
72	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	700	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	400	Doe or fawn

2021 Hunter Satisfaction: 81% Satisfied, 9% Neutral, 10% Dissatisfied

2022 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. Thus far, the winter of 2021-2022 has been mild, and overwinter survival is expected to improve compared to the previous two winters. Despite slowed population growth the last three years, good opportunity should remain for hunters in 2022, as the observed buck ratio remains high and the herd has remained at objective.

A three-year (2019-2021) analysis indicated the mean percentage of harvested males ≥ 1 year old was 16.0 percent, with a range from 12.9 to 18.5 percent. 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 prescribed male harvest should exceed 25% for the 2022 season.

Any antelope 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 HA70. Management goals are to continue to provide good buck harvest opportunity based on the recreational management strategy, while holding the population near

objective. Increased landowner concerns over the lack of pronghorn in HA 70 lead to a slight decrease in license issuance while maintaining enough to mitigate damage, if that were to occur.

2) **Population Modeling:** The model for this herd seems to depict population trends well. Four line-transect surveys provide independent abundance estimates that help align trends and improve older population estimates. The most recent line-transect survey for the herd was conducted in 2014; thus the model may not align as accurately with actual population size in the years since then. An additional line-transect survey will be conducted in 2022 to provide a new abundance estimate to realign the population model. In 2021, managers began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the IPM was approximately 12,639 (CL=11,395-13,836) antelope, which will be the official estimate. The postseason population estimate for this herd unit from the Constant-Juvenile and Constant-Adult spreadsheet model was approximately 12,599 antelope. Post season estimates from both models for 2021 were reported to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with PopR IPM in bio-year 2022. The IPM and the Constant-Juvenile and Constant-Adult models had very similar estimates.

3) **Objective Review:** No objective review was scheduled for 2022.

2021 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2021 - 5/31/2022

HERD: PR746 - NORTH NATRONA

HUNT AREAS: 73

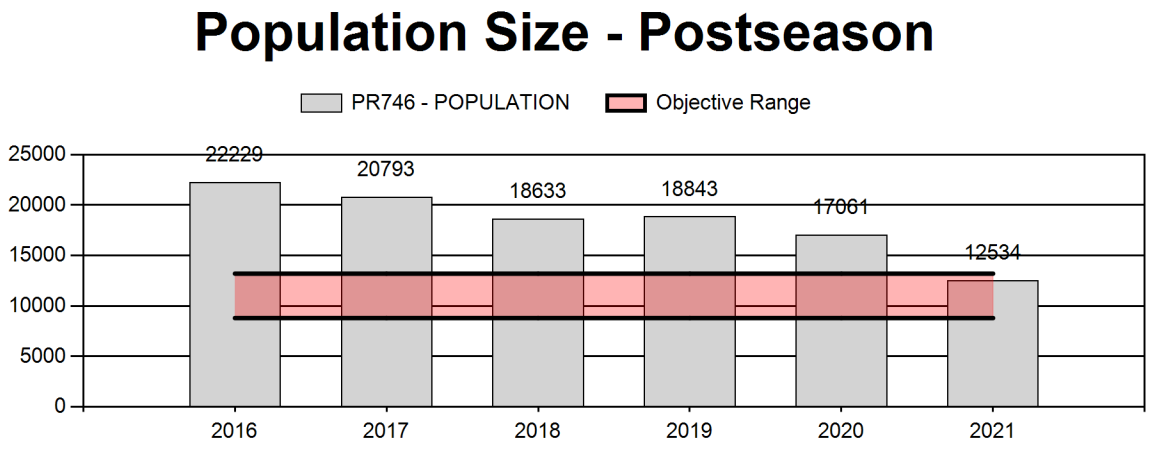
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	19,512	12,534	13,345
Harvest:	1,811	1,090	915
Hunters:	1,913	1,366	1,000
Hunter Success:	95%	80%	92 %
Active Licenses:	1,984	1,412	975
Active License Success:	91%	77%	94 %
Recreation Days:	5,909	4,276	3,575
Days Per Animal:	3.3	3.9	3.9
Males per 100 Females	63	54	
Juveniles per 100 Females	72	60	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	14%
Number of years population has been + or - objective in recent trend:	8
Model Date:	02/28/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	5%	3.3%
Males ≥ 1 year old:	22%	20.4%
Proposed change in post-season population:	-30.0%	6.4%



2022 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	800	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	200	Doe or fawn
	7			Aug.15	Oct. 31	50	Doe or fawn valid east of the Bucknum Road (Natrona County Road 125) and south of the Burlington Northern Santa Fe railroad right of-way

2021 Hunter Satisfaction: 66% Satisfied, 22% Neutral, 12% Dissatisfied

2022 Management Summary:

1) **Hunting Season Evaluation:** The model for this herd depicts near exponential growth from 2013-2016, when harvest pressure was low and 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. Classification survey totals have subsequently yielded lower numbers of pronghorn, with significantly lower observed fawn ratios. Low rates of production combined with higher rates of harvest have caused a rapid population decline in the last four years. Despite this precipitous drop in numbers, 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 relative to previous years when this population was near objective to manage the buck ratio towards recreational levels.

   A three-year (2019-2021) analysis indicated the mean percent of harvest for males ≥ 1 year old was 21.7 percent, with a range from 15.6 to 25 percent. 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-depended effects on horn growth. In 2022 managers made some large license reductions due to a sharp decrease in population abundance. The estimated male harvest of 20.4 percent for 2022 is reasonable based on classification survey trends, decreasing harvest success, and hunter satisfaction. Hunter satisfaction dropped dramatically in 2021 to a record low of 66 percent, compared to the five-year average of 93 percent.

The 2022 hunting season conservatively manages the North Natrona pronghorn herd around objective, while also reducing the buck ratio toward recreational management parameters. Type 1 licenses were decreased by 400 to temper the pace of harvest while still managing toward recreational limits. It should also be noted that buck ratios and harvest pressure are being examined in this herd as part of a cooperative research project (see "Additional Surveys" below). Type 6 licenses were also decreased by 300 to account for winter losses, drought conditions, and slowed production. Fifty Type 7 licenses were available to control pronghorn densities on agricultural properties in the southeast portion of the herd unit with an earlier opening date of August 15. A total of 1,050 licenses and a net reduction of 600 licenses were offered in 2022. The population should still maintain itself around the population objective while providing ample hunting opportunity.

2) **Population Modeling:** Five line-transect surveys provide independent abundance estimates which help align trends and improve population estimates. Another line transect was conducted in 2021 finding 9,543 antelope with a standard error of 1,284. The 2021 postseason population estimate for this herd was 12,534 antelope using the Semi-Constant Juvenile and Semi-Constant Adult survival spreadsheet model, which will be the official estimate. In 2021, managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimates for this herd unit from the IPM was approximately 12,092 (CL=10,696-13,375) pronghorn. Post season estimates from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with PopR IMP in bio-year 2022.

3) **Management Objective Review:** No review was scheduled for 2022. However, due to poor hunter success and satisfaction despite this population being at objective, managers have decided to review the objective in 2022.

4) **Additional Surveys:** In 2019, this herd became part of a harvest study conducted by WGFD and the Wyoming Cooperative Fish and Wildlife Research Unit. Goals of the project are to quantify changes in average pronghorn horn size relative to changes in buck ratios, buck age structure, population size, and environmental variables. In 2021, managers and researchers collected horn measurements and tooth samples from 139 harvested bucks. Average horn size for the herd was 64" Boone and Crockett and 71% of bucks sampled were laboratory at aged 4+ years old. The average cementum annuli tooth age was 4.79 years old. This statewide

research project will continue to include the North Natrona Pronghorn Herd for the 2022 hunting season.

2021 PR746 - NORTH NATRONA Pronghorn Line-Transect Summary

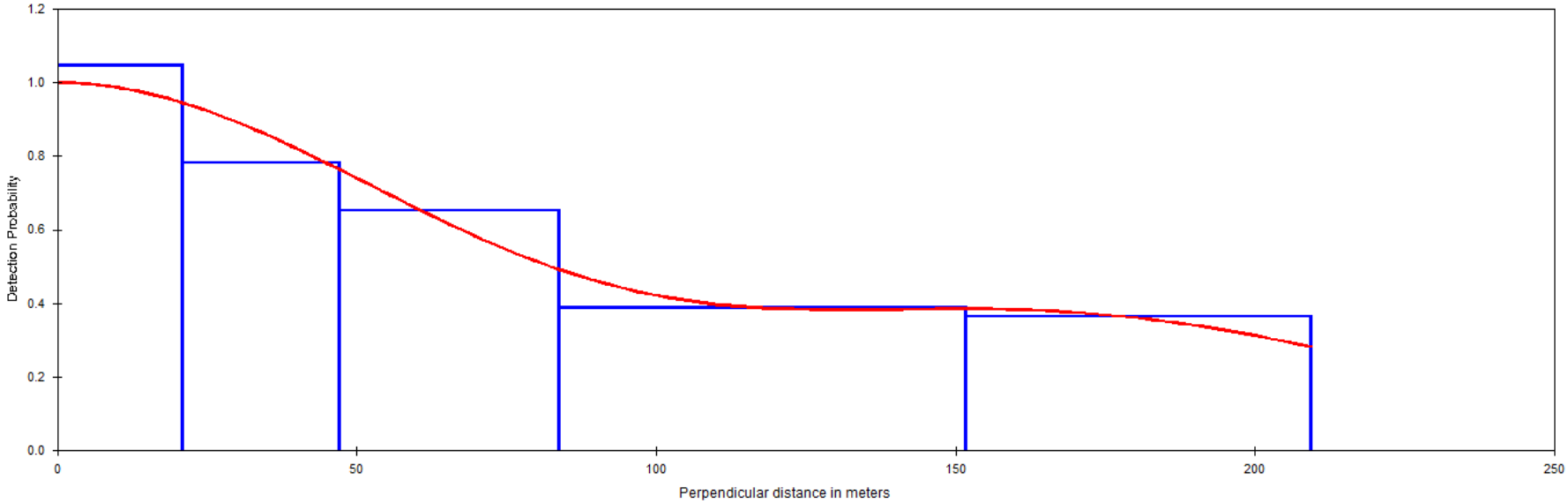
Survey Dates:	6/10/2022 - 6/12/2022
Survey Cost:	$ 2,660.00
Flight Service:	LAIRD FLYING SERVICE
Aircraft:	HUSKY
Observers:	Heather O'Brien

Weather Conditions:

Temperature (Degrees Fahrenheit):	60
Cloud Cover (%):	30
Wind Speed (MPH):	15 - 25

Transect Limits:	43.21657 to 106.79504
Transect Direction:	North/South
Transect Interval (Minutes of Longitude):	2.5
Transect Length: (Mi.):	2
Transect Altitude (AGL):	313 ft.
Occupied Habitat (mi^2):	1,120
Density Estimate (Animals/mi^2 with Confidence Intervals):	7.9 (6.09 - 10.3)
Population Estimate (with Confidence Intervals):	9,543 (7,320 - 12,441)

2021 North Natrona Line Transect Histogram



2021 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2021 - 5/31/2022

HERD: PR748 - NORTH CONVERSE

HUNT AREAS: 25-26

PREPARED BY: MATT HUIZENGA

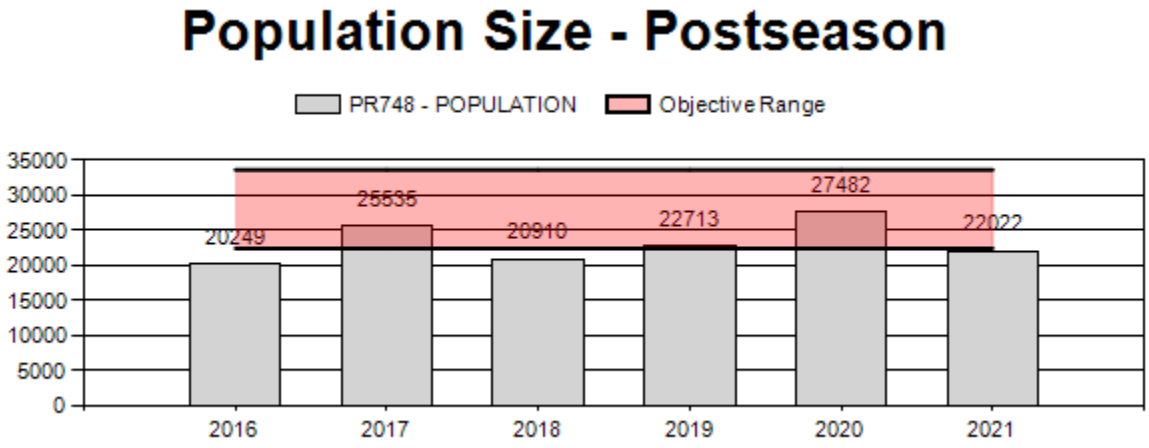
	2016 - 2020 Average	2021	2022 Proposed
Population:	23,378	22,022	20,400
Harvest:	2,186	1,775	1,300
Hunters:	2,316	2,054	1,400
Hunter Success:	94%	86%	93 %
Active Licenses:	2,431	2,117	1,450
Active License Success:	90%	84%	90 %
Recreation Days:	6,341	5,794	4,000
Days Per Animal:	2.9	3.3	3.1
Males per 100 Females	63	61	
Juveniles per 100 Females	74	65	

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

Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-21.4%
Number of years population has been + or - objective in recent trend:	11
Model Date:	02/09/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	4.4%	6.0%
Males ≥ 1 year old:	20.6%	28.0%
Proposed change in post-season population:	-7.3%	-5.0%



2022 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
25	6	Aug. 15	Sep. 30	Oct. 1	Oct. 14	100	Doe or fawn
26	1	Aug. 15	Sep. 23	Sep. 24	Oct. 14	1100	Any antelope
26	6	Aug. 15	Sep. 23	Sep. 24	Oct. 14	300	Doe or fawn

2021 Hunter Satisfaction: 82% Satisfied, 9% Neutral, 9% Dissatisfied

2022 Management Summary

1) Hunting Season Evaluation: Pronghorn numbers decreased in 2021 and are showing a downward trend within this herd. Drought conditions, poor fawn survival, and increasingly lower hunter success prompted managers to reduce the Type 1 licenses by 100 and Type 6 licenses by 100 in Hunt Area 25 and reduce the Type 1 licenses by 200 and Type 6 licenses by 200 in Hunt Area 26. 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 the severity of the winters in recent years. These factors have caused pronghorn to decline more in Hunt Area 25 than in Hunt Area 26.

In 2021, horn length measurements (N=74) were collected from adult male pronghorn, with average horn length being 11.4 inches. A total of 17.5% of bucks were $\geq$ 13 inches. Managers can use these measurements to evaluate horn growth trends over time as this dataset grows.

This population has trended upward over the past eight years, however drought conditions and lower fawn ratios in the past three years as well as a widespread EHD outbreak in 2021 are beginning to cause this population to decrease. In addition, the increase in energy development and disturbance throughout the herd unit in recent years may decrease the overall carrying capacity of this population over the long term.

In recent years, line transect surveys have not been conducted in this herd unit as topography is not conducive to maintaining a consistent altitude above ground level which these surveys require in order to produce an accurate abundance estimate with prior equipment and methods. Due to technology advancements and newer methodology, a line transect survey is being planned for 2022 to potentially provide a more accurate abundance estimate.

The 3-year average harvest for this herd unit is 23.5% of the model-based preseason population of >1 yr. old males. Type 1 license issuance was not increased in the previous year to meet the goal of 25% harvest as the limited access, decreasing hunter success, and declining numbers did not warrant an increase. However, due to the decreasing population, projected harvest for 2022 will meet the 25% harvest goal in spite of reduced license availability.

2) Population Modeling: The bio-year 2021 postseason population estimate for this herd unit from the WGFD spreadsheet model was approximately 23,000 pronghorn. In 2021, WGFD managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the PopR IPM was approximately 22,000 (CL = 19,910-24,186) pronghorn. Postseason population estimates from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with the PopR IPM in bio-year 2022. As estimates were very similar and the Department intends to transition next year, managers chose to use the IPM produced abundance estimate in 2021.

2021 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2021 - 5/31/2022

HERD: PR750 - BLACK THUNDER

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

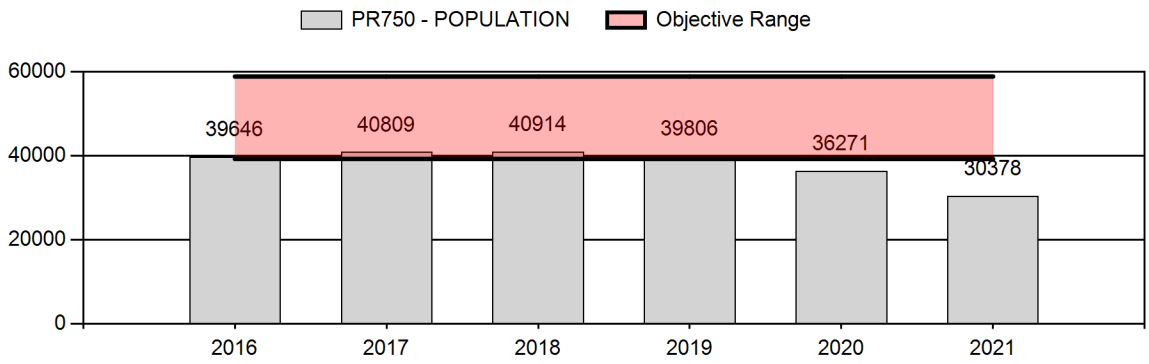
	2016 - 2020 Average	2021	2022 Proposed
Population:	39,489	30,378	31,191
Harvest:	4,177	2,432	1,805
Hunters:	4,619	2,775	2,100
Hunter Success:	90%	88%	86 %
Active Licenses:	5,037	2,982	2,190
Active License Success:	83%	82%	82 %
Recreation Days:	14,665	8,595	6,310
Days Per Animal:	3.5	3.5	3.5
Males per 100 Females	48	45	
Juveniles per 100 Females	68	63	

Population Objective (± 20%) :	49000 (39200 - 58800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-38.0%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/16/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	52%	51%
Proposed change in post-season population:	-17%	-1%

Population Size - Postseason



2022 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
5	7	Aug. 15	Sep. 30	Oct. 1	Nov. 20	75	Doe or fawn valid on private land
6	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	175	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	300	Any antelope; also valid in that portion of Area 11 in Converse or Niobrara counties
9	6	Aug. 15	Sep. 30	Oct. 1	Oct. 31	75	Doe or fawn; also valid in that portion of Area 11 in Converse or Niobrara counties
24	1	Aug. 15	Sep. 30	Oct. 1	Oct. 20	175	Any antelope
24	2	Aug. 15	Sep. 30	Oct. 1	Oct. 20	325	Any antelope valid on private land
24	6	Aug. 15	Sep. 30	Oct. 1	Oct. 20	50	Doe or fawn
24	7	Aug. 15	Sep. 30	Oct. 1	Oct. 20	100	Doe or fawn valid on private land
27	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	175	Any antelope
29	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	100	Any antelope
29	2	Aug. 15	Sep. 30	Oct. 1	Oct. 31	350	Any antelope valid on private land
29	7	Aug. 15	Sep. 30	Oct. 1	Oct. 31	150	Doe or fawn valid on private land

2021 Hunter Satisfaction: 81.5% Satisfied 9.9% Neutral 8.6% Dissatisfied

2022 Management Summary

1) **Hunting Season Evaluation:** After a nadir in 2012, this herd grew steadily through 2018, but has declined substantially since then. The decline has been due to consistently reduced recruitment, with preseason fawn:doe ratios holding steady around 60 fawns:100 does (Appendix 1); increased mortality of all age classes during the 2018-19 winter; what appears to have been increased 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. As a result, harvest was reduced 20% during the 2020 hunting season and another 33% in 2021. The more conservative hunting seasons resulted in hunter success and effort remaining stable. To help offset the continued population decline and maintain buck:doe ratios (along with hunter success) license issuance was reduced another 26% in 2022, with 725 fewer any-antelope and 225 fewer doe/fawn licenses being issued. This included the elimination of three types of doe/fawn licenses (Area 4 Type 6; Area 7 Type 8; & Area 27 Type 7). The closing date for all license types in Area 24 was also moved back to October 20th, which is closer to its historic closing date and warranted given the lower numbers of antelope and loss of habitat to development. Changes to the 2022 hunting season should allow this herd to grow very slightly and maintain the pre-season buck:doe ratio into 2023 at about 43:100, with 51% of the preseason population of adult bucks being taken in 2022, compared to the most recent three-year average of 53%.

2) **Population Modeling:** The bio-year 2021 postseason population estimate for this herd unit produced by the WGFD, SCJ-SCA spreadsheet model was about 43,500 pronghorn. In 2021, WGFD managers also began using Pop-R Integrated Population Models (IPM) to estimate pronghorn populations. The 2021 Pop-R (TVR-CA-TVJ) IPM postseason population estimate for this herd unit was approximately 30,400 (CL≈ 27,800 – 32,600) pronghorn; and was chosen to estimate this population as it dovetails well with field personnel observations and harvest statistics compared to last year's reported population estimate. It also models recent observed buck:doe ratios better. Of note, several data points make modeling this herd's population using either system tenuous. First, none of the models can account for the relatively high 2014 & 2016 Line Transect (LT) estimates given the low 2019 LT results. Secondly, the relatively low observed buck:doe ratio in 2020 followed by a high observed ratio in 2021 given low fawn production and reported harvest constrains model precision. Part of the latter problem may be that recent changes in field personnel have likely contributed to increased inconsistency in age and sex composition counts.

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.

2021 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2021 - 5/31/2022

HERD: MD740 - CHEYENNE RIVER

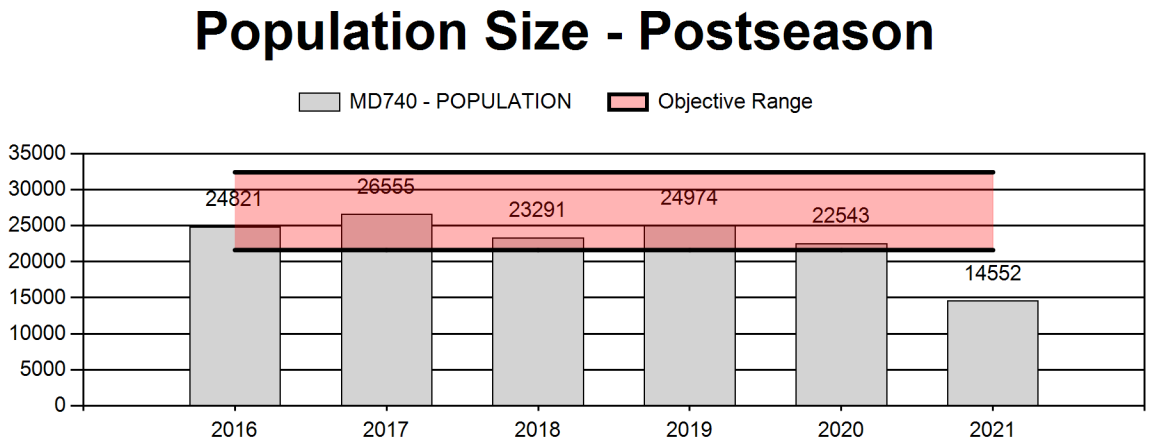
HUNT AREAS: 7-14, 21
PREPARED BY: JOE SANDRINI

	2016 - 2020 Average	2021	2022 Proposed
Population:	24,437	14,552	13,495
Harvest:	1,323	1,062	784
Hunters:	2,214	2,061	1,500
Hunter Success:	60%	52%	52 %
Active Licenses:	2,244	2,125	1,545
Active License Success:	59%	50%	51 %
Recreation Days:	8,629	9,135	6,750
Days Per Animal:	6.5	8.6	8.6
Males per 100 Females	43	27	
Juveniles per 100 Females	61	54	

Population Objective (± 20%) :	27000 (21600 - 32400)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-46.1%
Number of years population has been + or - objective in recent trend:	11
Model Date:	02/16/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	1%	0.05%
Males ≥ 1 year old:	36%	30%
Proposed change in post-season population:	-35%	-7%



2022 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	125	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
12,13, 14	7	Sep. 1	Sep. 30	Oct. 1	Nov. 30	50	Doe or fawn valid on private land
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
21	7	Sep. 1	Sep. 30	Oct. 1	Oct. 31	25	Doe or fawn valid on private land

2022 Region B Nonresident Quota: 1,100 licenses

2021 Hunter Satisfaction: 59% Satisfied 19% Neutral 22% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** With excellent productivity and survival in 2014 and 2015, this herd experienced noteworthy growth following a 2012 nadir. 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. As a result, the population has dropped since 2018. Similarly, buck:doe ratios generally declined as harvest of bucks remained fairly consistent while the population fell (Appendix 1). Consequently, hunting seasons became more conservative in 2021. They were further limited in 2022, with an 18% reduction in both the Region B and Area 10 Type 1 license quotas, and 225 fewer doe/fawn licenses issued, which included elimination HA 9 Type 7 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 decline further into 2023. Access limitations also warranted license reductions because landowners significantly curtail hunting access when this mule deer population declines.

2) **Population Modeling:** The bio-year 2021 post-season population estimate for this herd unit produced by the WGFD, SCJ-SCA spreadsheet model was about 18,300 mule deer. In 2021, WGFD managers also began using Pop-R Integrated Population Models (IPM) to estimate mule deer populations. The 2021 Pop-R (TVR-CA-TVJ) IPM postseason population estimate for this herd unit was approximately 14,550 (CL = 13,000 – 16,000) mule deer. The IPM was chosen to estimate the herd's 2021 post-season population, as it dovetails well with field personnel observations and harvest statistics compared to the 2020 reported population estimate. Additionally, both the spreadsheet and IPM models produced similar estimates of approximately 13,000 deer for post-season 2022. Given observed fawn:doe ratios and using reasonable, estimated survival rates, both models failed to track the relatively high observed buck:doe ratios of 2016 and 2020, and the low 2021 value. Recent changes in field personnel have likely contributed composition count variability; and the while the number of deer classified in 2021 was above the desired sample size, it was not well distributed as helicopter time was limited due to weather.

3) **Chronic Wasting Disease Management:** Prior to 2019, approximately 1,860 mule deer from this herd unit (the vast majority of which were hunter-harvested) were tested for CWD, with 2.5% testing positive. Although, annual positivity rates generally increased during this timeframe. In 2020, the herd was prioritized as a Tier 1 surveillance herd, and that year 158 samples collected. Prevalence estimates and sample sizes for CWD sampling since 2019 are presented below (Table1). During 2021, the Department obtained 26 samples from adult mule deer bucks bringing the total sampled since 2019 to 197, essentially meeting the goal of 200 samples to establish an estimated prevalence rate. Deer tested in 2021 represented 2.6% of the reported buck harvest, with sampling distribution again being reasonably spread throughout the herd unit. In 2021, the only two CWD positive deer came from HA14, which continues to have the highest positivity rate in the herd unit. 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	**12.7% (7.4 – 18.2%, n=197)**	6.7% (30)	0% (9)

Table 1. CWD prevalence for hunter-harvested mule deer in the Cheyenne River Mule Deer Herd, 2019-2021.

Appendix 1

Hunt Area 10

Tooth Age and Antler Data from Harvested Mule Deer
&
Post-Season Buck:Doe Ratios

Year	Median Age	Mean Antler Spread	Median Points Left	Median Points Right	Post Season Buck:Doe Ratio
2017	4.5	20.0	4	4	41 : 100
2018	4.5	19.9	4	4	134 : 100
2019	4.5	19.8	4	4	44 : 100
2020	5.5	19.1	4	4	59 : 100
2021	5.5	19.1	4	4	31 : 100

2021 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2021 - 5/31/2022

HERD: MD751 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

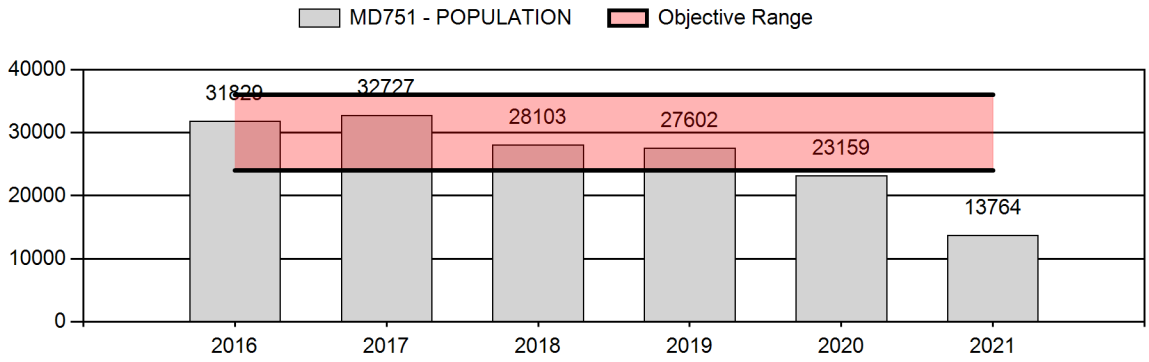
	2016 - 2020 Average	2021	2022 Proposed
Population:	28,684	13,764	12,916
Harvest:	2,388	1,720	1,425
Hunters:	5,474	5,033	4,200
Hunter Success:	44%	34%	34%
Active Licenses:	5,678	5,257	4,500
Active License Success:	42%	33%	32 %
Recreation Days:	16,389	15,991	13,400
Days Per Animal:	6.9	9.3	9.4
Males per 100 Females	28	20	
Juveniles per 100 Females	65	57	

Population Objective (± 20%) :	30000 (24000 - 36000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-54.1%
Number of years population has been + or - objective in recent trend:	5
Model Date:	02/16/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	4%	3%
Males ≥ 1 year old:	88%	89%
Proposed change in post-season population:	-38%	-6%

Population Size - Postseason



2022 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. 20		Antlered deer off private land; any deer on private land
1, 2, 3	7	Sep. 1	Sep. 30	Nov. 1	Nov. 20	2,000	Doe or fawn valid on private land
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
4	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land except the lands of the State of Wyoming's Ranch A property shall be closed
4	7	Sep. 1	Sep. 30	Nov. 1	Nov. 20	175	Doe or fawn valid on private land
5	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
5	6	Sep. 1	Sep. 30	Nov. 1	Nov. 20	50	Doe or fawn
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land

2022 Region A nonresident quota: 2,750 licenses

2021 Hunter Satisfaction: 59% Satisfied 22% Neutral 26% 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, this herd rebounded due to excellent productivity and survival 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 steadily due to low, annual recruitment, increased over-winter mortality in bio-year 2018, very low fawn numbers in 2020 and 2021, and losses to Epizootic Hemorrhagic Disease (EHD) and Blue Tongue Virus (BTV) in 2021. Because hunting seasons remained fairly consistent as the population dropped, post-season buck:doe ratios have declined returning to long-term values around 20-23 bucks per 100 does (Appendix 1). Consequently, more conservative hunting seasons were implemented beginning in 2020. Nevertheless, hunter satisfaction declined substantially in 2021, and was driven by significantly more dissatisfied

resident hunters. In response to the declining population and hunter sentiments, the 2022 changes entailed a 27% reduction in non-resident, Region A General licenses and issuance of 1,275 fewer doe/fawn licenses. Continued issuance of Type 7 licenses at this level is predicted to result in about 450 antlerless mule deer being harvested. Because Type 7 licenses are valid only on private land, and are primarily used (about two-thirds of them) to harvest white-tailed deer, managers are reluctant to reduce issuance further. This is because allowing harvest of sympatric, antlerless whitetails gives those landowners with higher whitetail densities the opportunity control numbers, while landowners with low deer numbers can simply prohibit access and harvest.

2) **Population Modeling:** The bio-year 2021 post-season population estimate for this herd unit produced by the WGFD, SCJ-SCA spreadsheet model was about 20,450 mule deer. In 2021, WGFD managers also began using Pop-R Integrated Population Models (IPM) to estimate mule deer populations. The 2021 Pop-R (TVR-CA-TVJ) IPM postseason population estimate for this herd unit was approximately 13,800 (CL = 12,750 – 14,900) mule deer. The IPM was chosen to estimate the herd's 2021 post-season population. Both the spreadsheet and IPM models show very similar population trends, with post-season population of estimates of the two models since 2016 being almost perfectly correlated. Similarly, post-season population estimates from both models are about 81% correlated with pre-season trend counts. However, the spreadsheet model exhibited a wider fluctuation between population peaks and valleys, along with post-season estimates since 2016 that are about 38% greater than the IPM. Both models struggled to deal with relatively high buck:doe ratios in three of the last 6 years given observed fawn:doe ratios. Recent changes in field personnel may have contributed composition count variability; and the number of deer classified in 2021 was below the desired sample size and not well distributed, as helicopter time was limited due to weather.

3) **Chronic Wasting Disease (CWD):** Prior to the 2021 hunting season, about 1,100 mule deer from the Black Hills 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 has 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. Prevalence estimates and sample sizes for CWD sampling in 2021 are presented below (Table1). However, due to the relatively small sample size, reasonable confidence intervals cannot be established. Bucks tested in 2021 represented 8.9% of the reported buck mule deer harvest from the herd unit. The 2021 samples were well distributed given the proportion of mule deer in each Hunt Area. 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
2021	**6.7% (**unk**, n=89)**	0% (8)	0% (24)

Table 1. 2021 CWD prevalence in hunter-harvested mule deer from the Black Hills Mule Deer Herd.

2021 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2021 - 5/31/2022

HERD: MD755 - NORTH CONVERSE

HUNT AREAS: 22

PREPARED BY: MATT HUIZENGA

	2016 - 2020 Average	2021	2022 Proposed
Population:	7,062	6,865	7,150
Harvest:	270	256	225
Hunters:	340	398	300
Hunter Success:	79%	64%	75%
Active Licenses:	340	398	300
Active License Success:	79%	64%	75 %
Recreation Days:	1,279	1,629	1,100
Days Per Animal:	4.7	6.4	4.9
Males per 100 Females	47	31	
Juveniles per 100 Females	65	52	

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

Management Strategy: Special

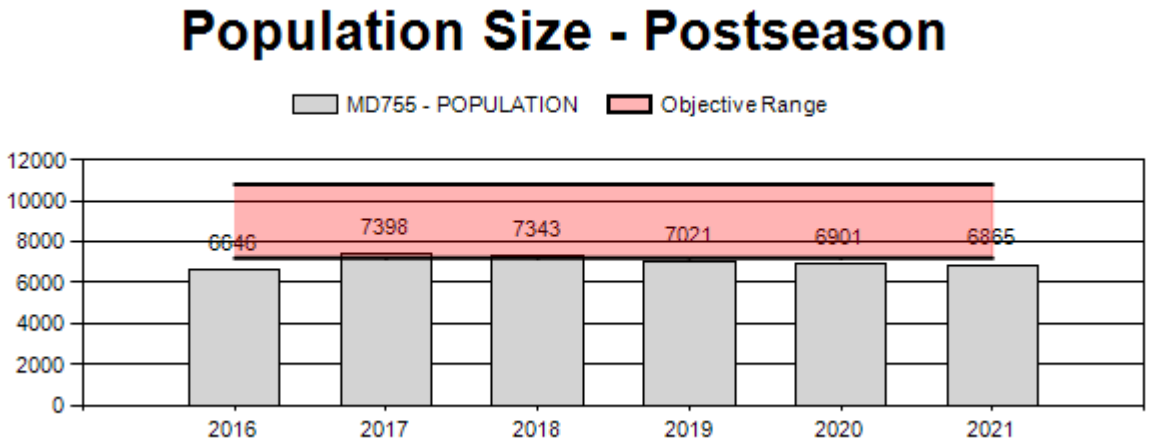
Percent population is above (+) or below (-) objective: -23.7%

Number of years population has been + or - objective in recent trend: 13

Model Date: 02/22/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	15.4%	14.5%
Proposed change in post-season population:	-3.9%	-3.3%



2022 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

2021 Hunter Satisfaction: 63% Satisfied, 15% Neutral, 22% Dissatisfied

2022 Management Summary

1) Hunting Season Evaluation: The 2022 season structure was conservative in an effort to promote population growth and maintain buck ratios within special management parameters. Type 1 licenses were reduced by 100 from the 2021 season. 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 since remained fairly stable below objective over the past 5 years. Fawn ratios since 2019 have been significantly lower than average and have resulted in poor recruitment and therefore a declining population. The North Converse 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 Includes:

- In 2021, we collected antler spread measurements (n=11) from adult male mule deer harvested in the North Converse Herd Unit. Class II bucks represented 55% of all bucks sampled, while Class I bucks represented the other 45%. 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. They have averaged 39 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 2021. To date, we do not have any meaningful CWD prevalence data for this herd.

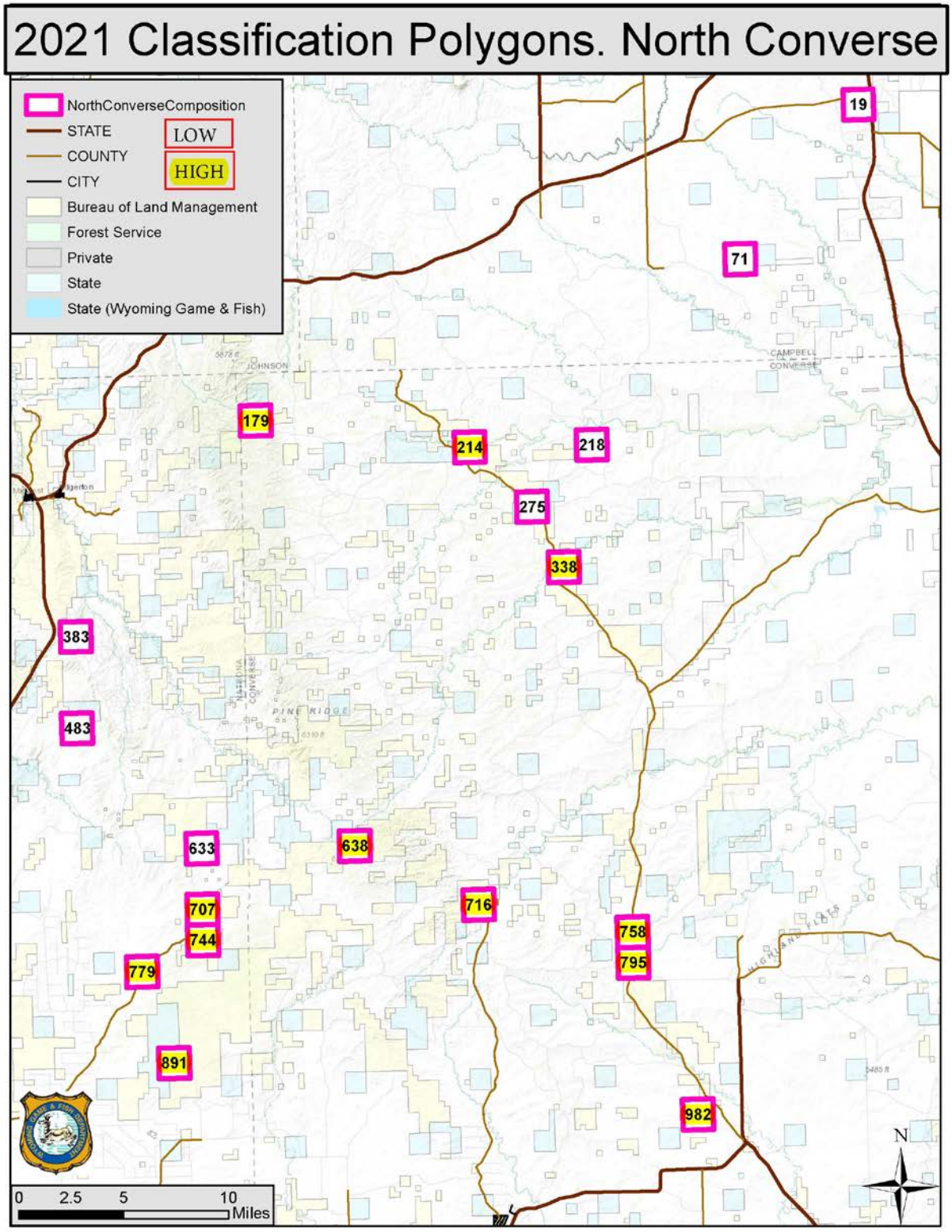
3) Population Modeling: The bio-year 2021 postseason population estimate for this herd unit from the WGFD spreadsheet model was approximately 6,900 mule deer. In 2021, WGFD managers also began using PopR Integrated Population Models (IPM) to estimate population

indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the PopR IPM was approximately 3,200 (CL = 2,700-3,700) mule deer. Postseason population estimates from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with the PopR IPM in bio-year 2022. Managers chose to use the SCJ,SCA Spreadsheet model for 2021 as it more accurately reflected current believed post-hunt population estimates. The IPM model estimate was significantly lower than previous estimates.

Attachment 1.

Stratified Random Sampling Summary

- 12 High Density Polygons sampled
- 6 Low Density Polygons sampled
- Survey Time – ~5 Hours
- Total Mule Deer Observed – 253
- YF Ratio – 0.49
    - CI 0.48-0.50
- MF Ratio – 0.42
    - CI 0.41-0.43
- Sample goal not reached
    - Survey time insufficient
    - Number of polygons insufficient due to low deer densities
    - Fog/Wind impacted survey efforts


2021 Classification Polygons. North Converse
NorthConverseComposition
STATE
COUNTY
CITY
Bureau of Land Management
Forest Service
Private
State
State (Wyoming Game & Fish)
LOW
HIGH
19
71
179
214
218
275
338
383
483
633
638
707
744
716
758
795
779
891
982
JOHNSON
CAMPBELL
CONVERSE
PINE RIDGE
0 2.5 5 10
Miles
N

2021 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2021 - 5/31/2022

HERD: MD756 - SOUTH CONVERSE

HUNT AREAS: 65
PREPARED BY: MATT HUIZENGA

	2016 - 2020 Average	2021	2022 Proposed
Population:	5,636	5,065	5,000
Harvest:	273	298	275
Hunters:	762	820	750
Hunter Success:	36%	36%	37 %
Active Licenses:	762	820	775
Active License Success:	36%	36%	35 %
Recreation Days:	2,904	3,764	3,000
Days Per Animal:	10.6	12.6	10.9
Males per 100 Females	42	22	
Juveniles per 100 Females	58	47	

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

Management Strategy: Private Land

Percent population is above (+) or below (-) objective: -57.8%

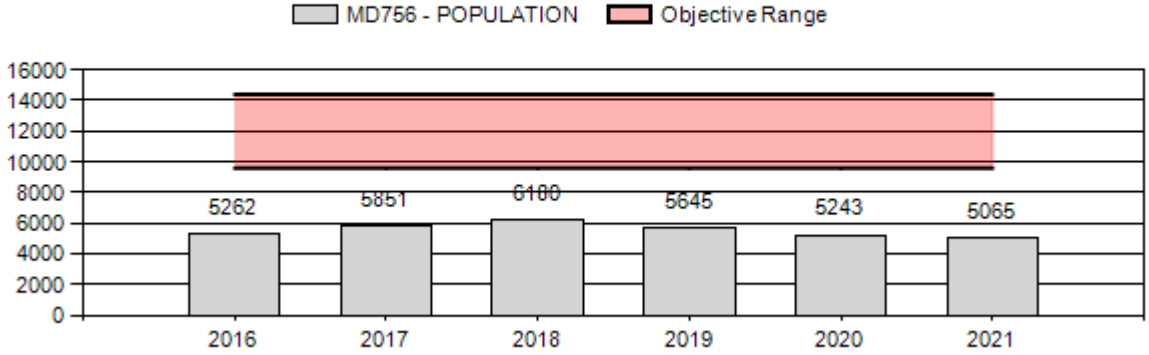
Number of years population has been + or - objective in recent trend: 14

Model Date: 02/11/2022

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:	20.9%	23.7%
Proposed change in post-season population:	-5.5%	-5.8%

Population Size - Postseason



2022 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

2022 Region J nonresident quota: 900 licenses

2021 Hunter Satisfaction: 43% Satisfied, 22% neutral, 35% Dissatisfied

2022 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 2021 season was the fourth year of the extended 17-day season and antler point restriction. Managers planned to remove the point restriction based on research showing negative effects if left in place longer than 3-4 years and had little support to continue with the longer season without a point restriction in place. 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. Due to persistent extreme winds in December, deer classification flights were cancelled in this herd unit. Ground classifications were completed later than usual with a smaller than desired sample size (n=283). Managers are confident in observed juvenile and yearling ratios, but suspect actual mature buck ratios to be markedly higher than classification efforts show. Fawn ratios have shown a marked decrease since 2018, which will likely lead to continued population stagnation or decline.

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. In 2021, we collected antler spread measurements (n=16) from adult male mule deer harvested in the South Converse Herd Unit. Of all bucks sampled, 44% were Class I bucks and 56% were Class II. No Class III bucks were checked by field personnel in 2021.

2) Chronic Wasting Disease Management: The South Converse herd unit was intensively surveyed in 2018. At that time, CWD prevalence (n=51) was 39% in adult male mule deer. The 2021 hunting season remained open through Oct. 31 with a 3-point or better antler point restriction in an effort to increase harvest of mature mule deer bucks to potentially reduce CWD spread and prevalence in this herd. This will be a priority surveillance herd in 2022 with mandatory CWD sampling in place.

3) Population Modeling: The bio-year 2021 postseason population estimate for this herd unit from the WGFD spreadsheet model was approximately 5,100 mule deer. In 2021, WGFD managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the PopR IPM was approximately 4,000 (CL = 3,500-4,800) mule deer. Postseason population estimates from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with the PopR IPM in bio-year 2022. Managers chose to use the SCJ,SCA spreadsheet model for 2021 as it provided a more acceptable post season population estimate. This herd unit is slated for a sightability survey/abundance estimate within the next few years to anchor the population model.

2021 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2021 - 5/31/2022

HERD: MD757 - BATES HOLE/HAT SIX

HUNT AREAS: 66-67

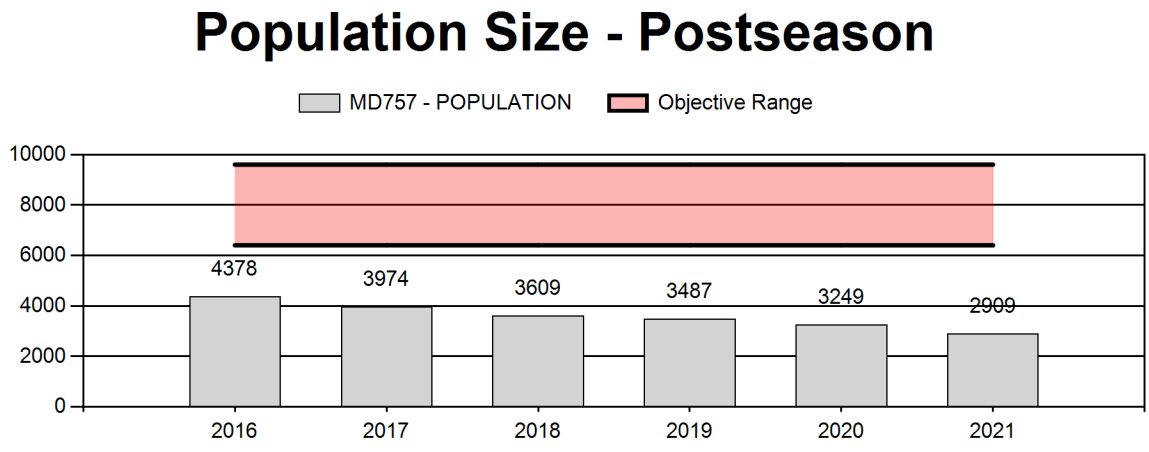
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	3,739	2,909	2,797
Harvest:	324	190	200
Hunters:	897	666	625
Hunter Success:	36%	29%	32%
Active Licenses:	897	666	625
Active License Success:	36%	29%	32%
Recreation Days:	3,291	2,287	2,150
Days Per Animal:	10.2	12.0	10.8
Males per 100 Females	33	0	
Juveniles per 100 Females	65	0	

Population Objective (± 20%) :	8000 (6400 - 9600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-63.6%
Number of years population has been + or - objective in recent trend:	21
Model Date:	02/28/2022

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:	42%	45%
Proposed change in post-season population:	-10%	-3.4%



2022 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 three (3) points or more on either antler or any white-tailed deer

2022 Region D Nonresident Quota: 300

2021 Hunter Satisfaction: 48% Satisfied, 18% Neutral, 34% Dissatisfied

2022 Management Summary:

1) **Hunting Season Evaluation:** After being at very low levels through 2012, this population grew through 2017 but has since declined. 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. Without this crucial data it is impossible to determine buck ratios, although buck numbers are likely low given continual population decline. Therefore, the APR was maintained for the 2022 season. During the 2021 season hunters had a difficult time accessing much of the hunt area due to several large winter storms during the short seven-day season. Because of this harvest success remained low (29%) for the second year compared to the five-year average of 33 percent. Severe drought conditions persisted during the 2021 growing season. The influence of drought on deer distribution, winter storms, constraints of the APR, and low total deer numbers likely all contributed to low harvest success in 2021. Tooth samples and antler measurements were collected from 31 harvested mule deer bucks in 2021. The average cementum annuli tooth age of those sampled was 3.8 years old, with a median age of 3.5, and average antler spread of 16 inches.

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

Table 1. Antler classification analysis for **Area 66** within the Bates Hole/Hat Six Mule Deer Herd Unit, 2008 – 2021.

For the 2022 hunting season, managers prescribed a seven-day general license season, which is typical for the herd. With low deer numbers and harvest success managers decided to reduce the Region D nonresident quota from 400 to 300. The APR limitation remained, as an improved buck ratio and lower harvest pressure was still desired. For future seasons, 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.

2) **Population Modeling:** The model for this herd depicts a population that has been consistently under objective with a declining population trend over the past five years. Harvest data is difficult for the model to interpret, with APRs and lack of female harvest constraining harvest totals especially in recent years. Overwinter survival data from a GPS-collar study were added as an additional data point to the model in 2017. A sightability survey conducted in 2019 provided an abundance estimate, which significantly lowered the overall trend and population estimate in the model. These independent estimates will contribute additional discrete data points which should improve model performance. Another full sightability survey is planned in 2022. In 2021, managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the IPM was approximately 2,909 (CL=2,222-3,747) mule deer, which is the official estimate. The population estimate for this herd unit from the WGFD spreadsheet model was approximately 2,655 mule deer. Post season estimates from both

models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with PopR IMP in bio-year 2022.

3) **Management Objective Review:** There was no review scheduled for 2022.

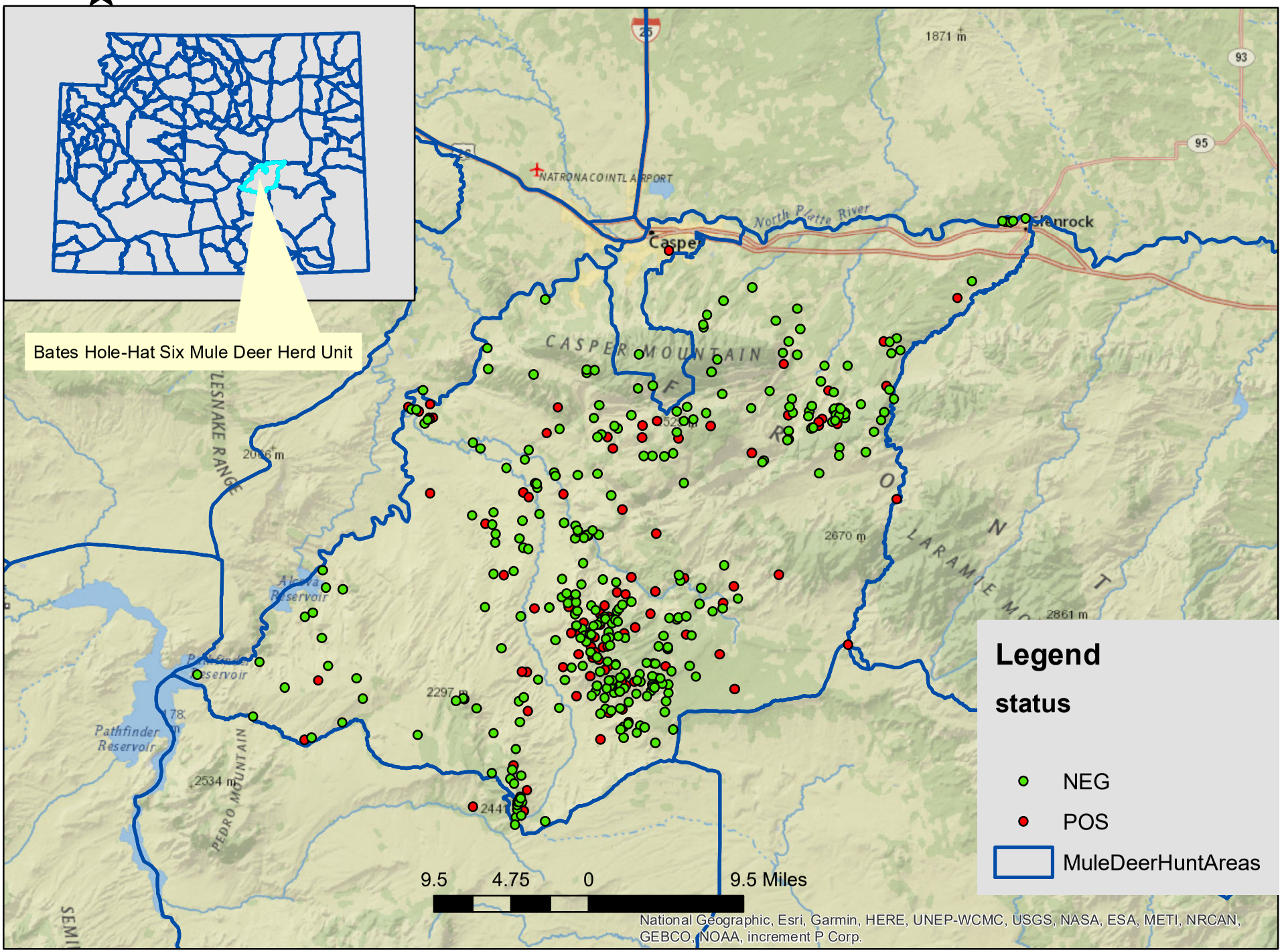
4) **Chronic Wasting Disease Management:** Elevated CWD surveillance efforts have occurred in this herd in recent years due to ongoing CWD research. Prevalence estimates and samples sizes are presented in Table 2. Over the past three years, a total of 109 adult male mule deer were sampled, which was 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 reasonable, although few samples were collected from 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. 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 will focus on interactions between mountain lion predation, mule deer, and Chronic Wasting Disease. Results from this study will not be reported for multiple years.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*	
	Adult Males (CI = 95%)	Yearling Males
2019-2021	**26% (24-27%, n=109)**	0% (6)

Table 2. CWD prevalence for hunter-harvested male mule deer in the Bates Hole – Hat Six Mule Deer Herd, 2019 - 2021.

5) **Mule Deer Initiative Habitat Information:** As part of the Mule Deer Initiative, managers collect Rapid Habitat Assessment (RHA) data throughout the herd unit in some years. However, no RHA data were collected within the Bates Hole – Hat Six Mule Deer Herd during the 2021 reporting period. Projects are ongoing such as noxious weed control, juniper removal, and riparian improvements.

2015-2021 Hunter-Kill CWDTested Mule Deer Bates Hole-Hat Six Herd Unit



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

Precipitation

From October 2020 through September 2021 (Water Year 2021), precipitation in the Bates Hole / Hat Six Mule Deer Herd Unit was almost 2 inches lower than the 30-year average for the same water year timeframe (Figure 1). The growing season (April-June) precipitation in 2021 (4.3 inches) was also about 2 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 2021, typically the driest months during the summer, the Bates Hole / Hat Six Mule Deer Herd Unit received 2.2 inches of precipitation which is a little above the 30-year average for July and August. The herd unit received 4.4 inches of precipitation during September and October 2021, which is much greater than the 30-year average of 2.7 inches. Precipitation received during this timeframe is beneficial to help jumpstart plant growth the following growing season. The precipitation received in the latter half of the water year helped create adequate fall green up conditions to assist with mule deer body condition going into winter. However, given the water year precipitation and the effects from drought in 2020, habitat conditions have been negatively affected by these conditions. While habitat conditions in upper Bates Hole are faring better, lower Bates Hole is showing the effects of poor water years. The 2022 water year precipitation thus far has been very poor, with a very mild winter. Significant moisture will have to be received between May through September for this herd unit to experience a normal water year. Thus, it is likely that the 2022 water year may also be poor which will further exacerbate the effects of the low precipitation from 2020 and 2021.

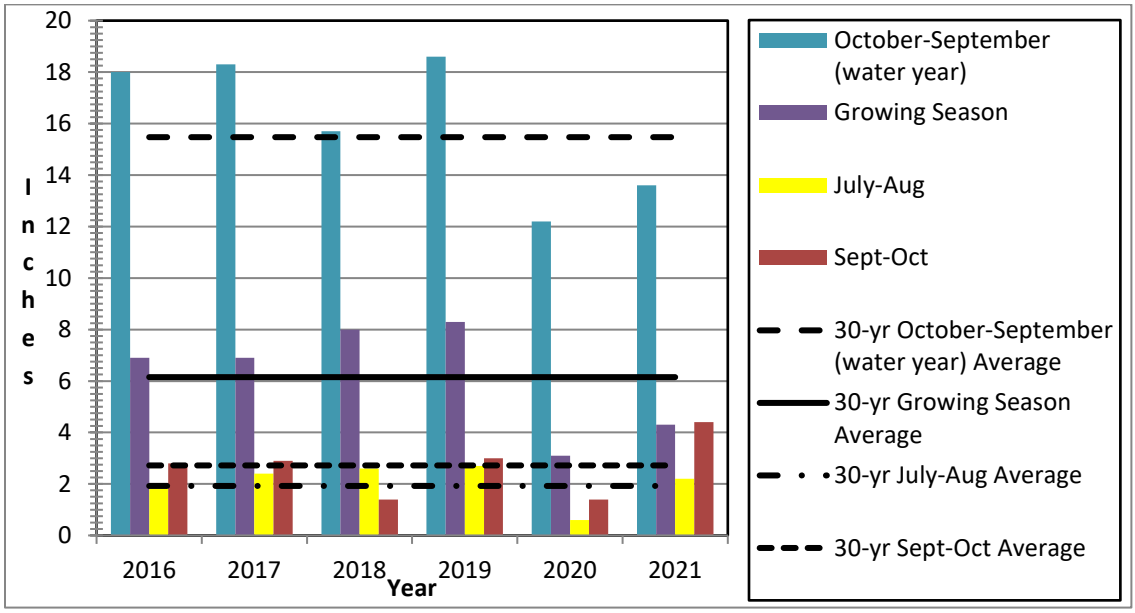


Figure 1. Seasonal precipitation received compared to 30-year averages within the Bates Hole / Hat Six Mule Deer Herd Unit.

2021 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2021 - 5/31/2022

HERD: MD758 - RATTLESNAKE

HUNT AREAS: 88-89

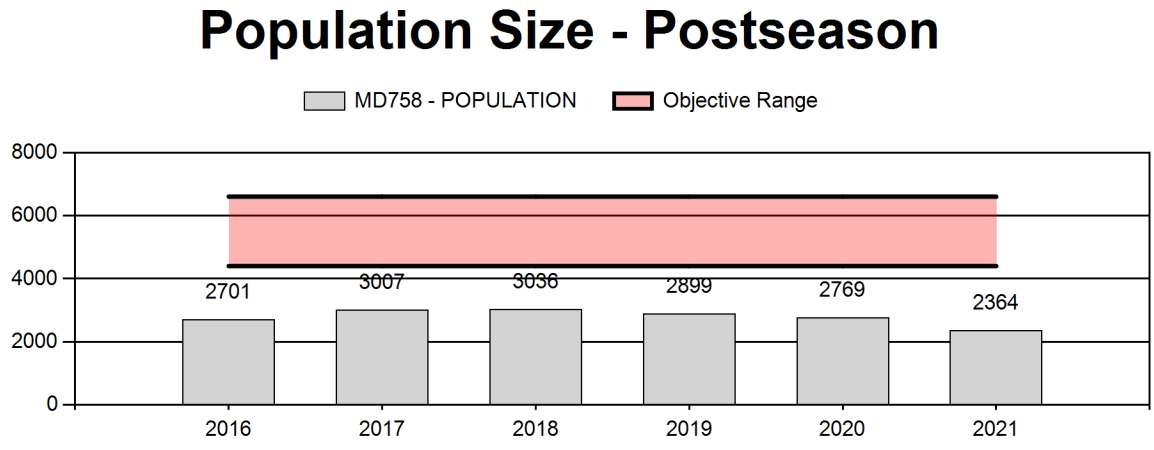
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	2,882	2,364	2,378
Harvest:	237	151	128
Hunters:	435	402	375
Hunter Success:	54%	38%	34%
Active Licenses:	435	402	375
Active License Success:	54%	38%	34%
Recreation Days:	1,527	1,616	1,450
Days Per Animal:	6.4	10.7	11.3
Males per 100 Females	45	32	
Juveniles per 100 Females	68	34	

Population Objective (± 20%) :	5500 (4400 - 6600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-57.0%
Number of years population has been + or - objective in recent trend:	16
Model Date:	02/28/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	0.3%	0.3%
Males ≥ 1 year old:	25.2%	23.7%
Proposed change in post-season population:	-15.2%	0.6%



2022 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
89	1	Sep. 1	Sep. 30	Oct. 15	Oct. 31	100	Antlered deer

2021 Hunter Satisfaction: Herd Unit: 54% Satisfied, 20% Neutral, 26% Dissatisfied

HA 88: 40% Satisfied, 22% Neutral, 38% Dissatisfied
HA 89: 73% Satisfied, 16% Neutral, 11% Dissatisfied

2022 Management Summary:

1) **Hunting Season Evaluation:** The model for this herd depicts a population that declined until 2013, then grew during years of improved fawn production and overwinter survival, and has gradually declined from 2018-present as fawn production and overwinter survival have decreased. Postseason classification data was collected using a new stratified random-sample survey design via helicopter in 2021. The resulting sample size (N=189) was significantly smaller compared to previous years. This was somewhat expected because the new survey design focuses on subunits stratified by high and low deer densities within the herd unit and does not only focus on areas with adequate habitat or known concentrations of deer. Managers believe the resulting demographic data reasonably represents the population, as the survey was well-distributed across the herd unit. The proportion of mature age class (Class II & Class III) bucks decreased during postseason classification surveys (Table 1), as overall population size seems to be declining in recent years after harsh winter conditions in 2019-2020 followed by severe drought. Harvest success on Type 1 licenses increased to 73% in 2021. General license success in Area 88 plummeted and was only 22%, which is well below the 5-year average of 40%.

   Tooth samples and antler measurements were also collected from 24 harvested male mule deer from Area 89 in 2021 (Table 2). The average cementum annuli tooth age of those sampled was 5.41 years, the median age was 5.5, and the average antler spread was 21.25 inches. Stagnant harvest success combined with three years of poor fawn production lead managers to prescribe a more conservative season in 2022.

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

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

	2009	2012	2014	2015	2016	2017	2018	2019	2020	2021
Average Tooth Age	5.6	5.07	5.83	5.88	5.67	5.4	5.09	5.18	5.05	5.41
Median Tooth Age	5.5	4.5	6.5	5.5	5.5	5.5	4.5	5.5	4.5	5.5
Average Antler Spread	22	20	23	23	23	23	20	20.95	19.7	21.25
Total Sample Size (N)	59	37	13	8	12	20	54	20	28	24

Table 2. Hunter-submitted tooth age and antler measurement data from Area 89 deer, 2009-2021.

The 2022 season continues to provide quality hunting opportunity while reducing harvest pressure to offset population decline. For Area 88, managers prescribed a 7-day general license season with licenses valid for antlered mule deer or any white-tailed deer. For Area 89, a total of 100 Type 1 licenses were available for antlered deer, which is a decrease of 25 licenses compared to 2021.

2) **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. The 2021 postseason population estimate for this herd

was 2,364 mule deer using the Time-Specific Juvenile and Constant Adult Survival spreadsheet model, which will be the official estimate. In 2021, managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd unit from the IPM was approximately 2,679 (CL=2,307-3,047) mule deer. Post season estimate from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with PopR IMP in bio-year 2022.

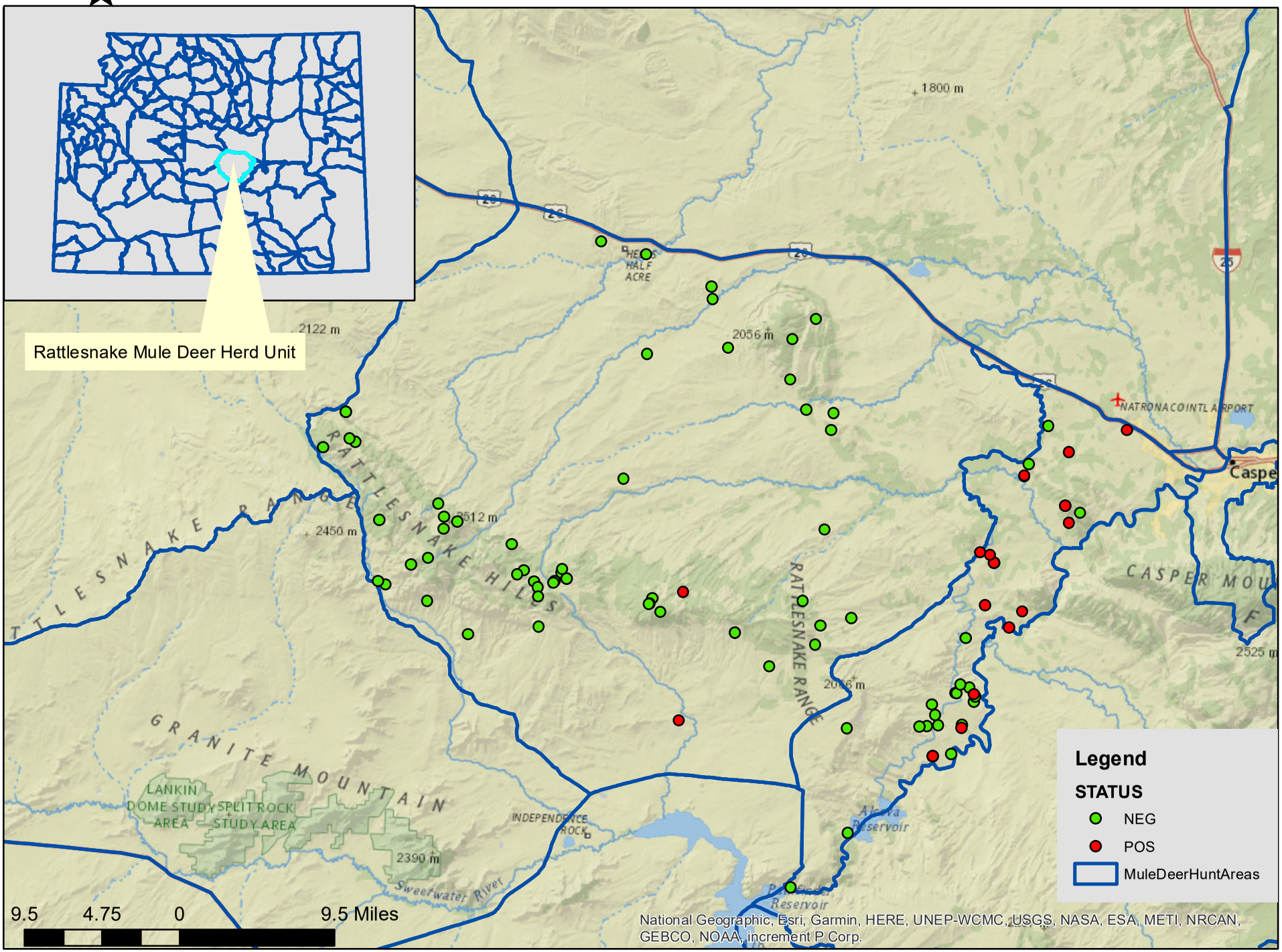
3) Management Objective Review: No review was scheduled in 2022.

4) Chronic Wasting Disease Management: This herd was not a priority for CWD surveillance in 2021. This herd was prioritized for CWD sampling in 2019 and 2020. Prevalence estimates and sample sizes are presented in Table 1. For that surveillance period, a total of 86 adult male mule deer were sampled, which was below the sample goal of two hundred. Hunting seasons were conservative during the surveillance period, with very few females sampled due to harvest limitations. Sample distribution from harvested males was skewed, with a higher number of samples coming from Area 89. However, CWD prevalence from harvested deer was considerably higher in Area 88. If CWD prevalence is in fact higher in Area 88 compared to Area 89, management of deer densities in this hunt area, which contains both irrigated landscapes and riparian habitats, may provide a focused and meaningful way to reduce CWD prevalence.

Year(s)	Percent CWD-Positive and (n)-*Hunter Harvest Only*
	Adult Males (CI=95%)
2019-2020	**13.95% (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.

2019-2020 Hunter-Kill CWD Tested Mule Deer Rattlesnake Herd Unit

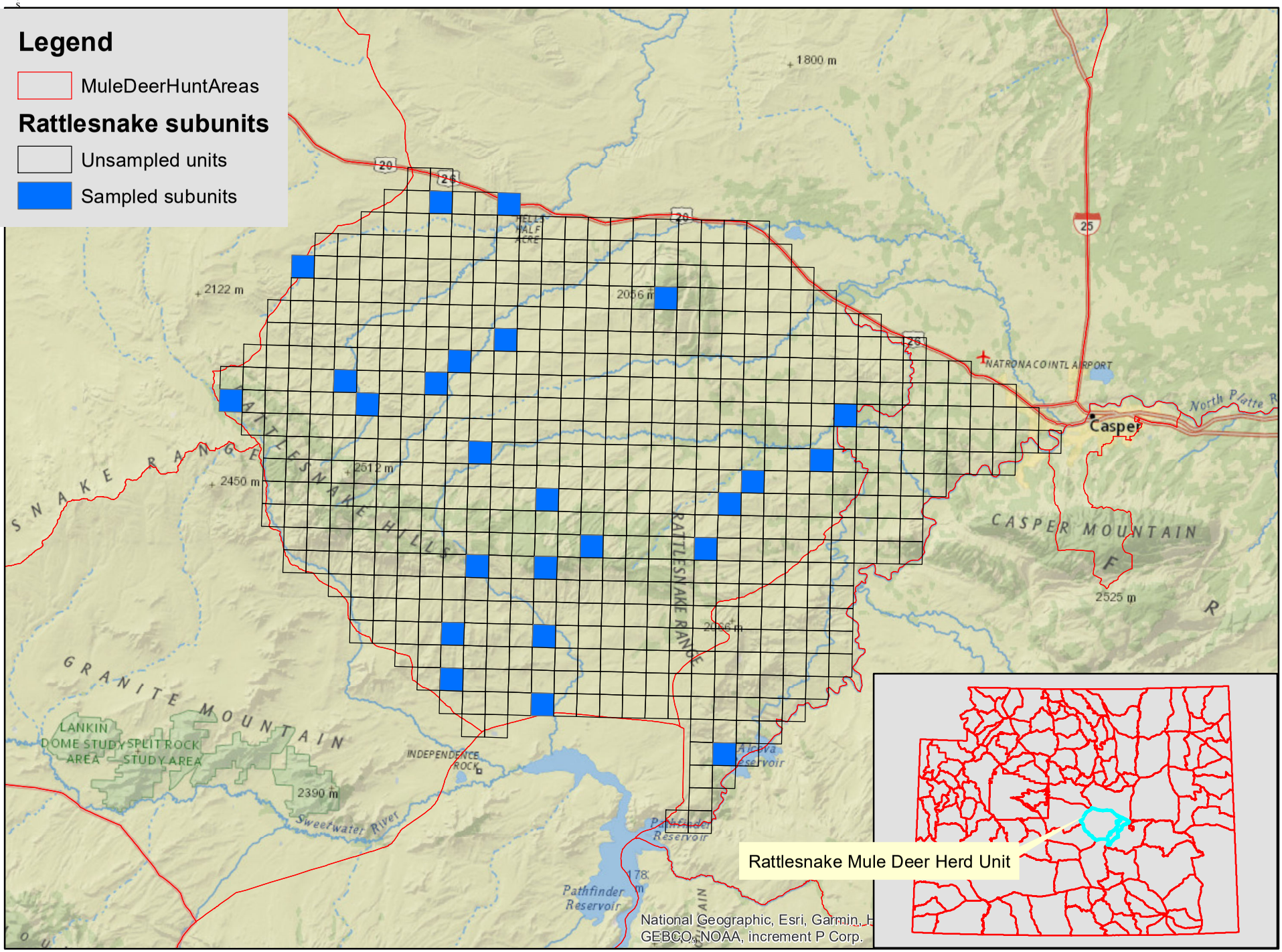


2021 MD758 Stratified Random Sampling

- 6 hours of helicopter flight time on December 3, 2021
- Total of 189 deer detected
- Sample goal of 300-500 deer, likely not achieved due to overall population being 57% under objective
- Rhat Max of Point Est: 1.32
- Rhat Max of Upper CI: 1.93
- Proportion < 1.1: 0.65
- Model projection post season population estimate: 2,688 (2,064-3,421)
- 25/25 sample units surveyed, 16 high density, 9 low density

Sample unit	Density
Kendrick-97	High
Rattlesnake-8	High
Rattlesnake-48	High
Rattlesnake-78	High
Rattlesnake-132	High
Rattlesnake-184	High
Rattlesnake-188	High
Rattlesnake-209	High
Rattlesnake-215	High
Rattlesnake-271	High
Rattlesnake-286	High
Rattlesnake-378	High
Rattlesnake-396	High
Rattlesnake-399	High
Rattlesnake-452	High
Rattlesnake-474	High
Kendrick-10	Low
Rattlesnake- 5	Low
Rattlesnake-159	Low
Rattlesnake-309	Low
Rattlesnake-326	Low
Rattlesnake-334	Low
Rattlesnake-383	Low
Rattlesnake-448	Low
Rattlsnake-488	Low

2021 Rattlesnake Deer Herd Unit Stratified Random Sampling



2021 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2021 - 5/31/2022

HERD: MD759 - NORTH NATRONA

HUNT AREAS: 34

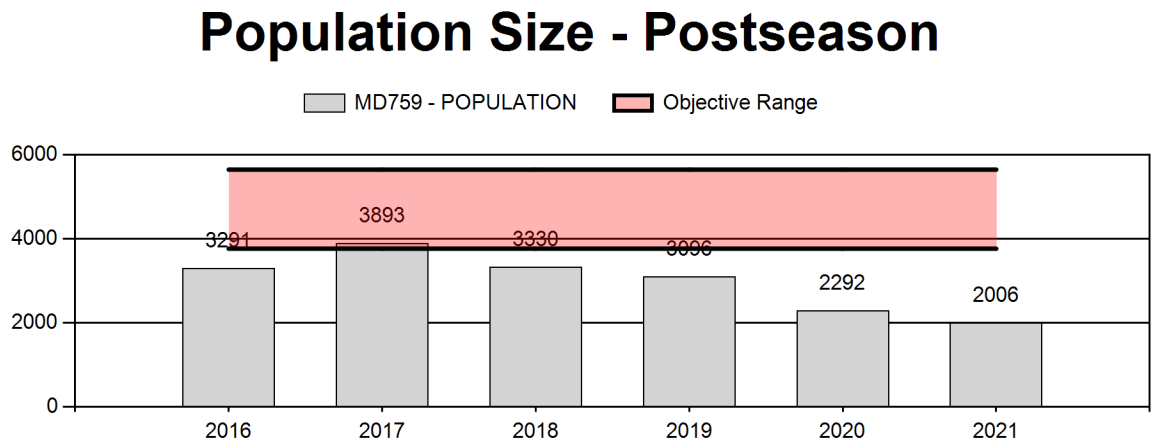
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	3,180	2,006	1,880
Harvest:	212	129	134
Hunters:	268	191	160
Hunter Success:	79%	68%	84 %
Active Licenses:	280	195	200
Active License Success:	76%	66%	67 %
Recreation Days:	1,248	844	795
Days Per Animal:	5.9	6.5	5.9
Males per 100 Females	43	25	
Juveniles per 100 Females	62	41	

Population Objective (± 20%) :	4700 (3760 - 5640)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-57.3%
Number of years population has been + or - objective in recent trend:	7
Model Date:	02/25/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	2.3%	3.3%
Males ≥ 1 year old:	24%	24%
Proposed change in post-season population:	-12%	-6.2%



2022 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	150	Antlered mule deer or any white-tailed deer
	7			Aug 15	Dec. 15	100	Doe or fawn valid east of the Bucknum Road (Natrona County Road 125) and south of the Burlington Northern Santa Fe railroad right of-way

2021 Hunter Satisfaction: 58% Satisfied, 12% Neutral, 30% Dissatisfied

2022 Management Summary:

1) **Hunting Season Evaluation:** 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-present, resulting in a population that is now well below objective.

   A new aerial observation technique took place in 2021 resulting in a small sample size (N=207). The new design focuses on subunits within the herd unit and does not only focus on areas with adequate habitat or known concentrations of deer. The 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 continuing into 2021. Fawn production/survival has decreased drastically over the past four years, leading to population decline. Harvest success on Type 1 licenses has declined in the same time period and was only 64% in 2021, which is a 10-year low. Tooth samples and antler measurements were collected from 33 harvested mule deer in 2021. The average cementum annuli tooth age of those sampled was 5.25 years old, with a median age of 5.5 and average antler spread of 18.5 inches. Declining deer numbers, decreased harvest success, and deteriorating hunter satisfaction lead managers to prescribe a more conservative harvest for 2022.

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Age	5.4	5.27	5.27	4.85	4.6	4.7	4.8	5.1	5.25
Median Age	5.5	4.5	4.5	5.5	4.5	4.5	4.5	4.5	5.5
Average Antler Spread	21.2	20	20.9	21.5	20.7	19.9	18.1	18.2	18.5
Sample Size (N) =	52	44	32	40	51	49	53	72	33

Table 1. Lab tooth age and antler spread data from Hunt Area 34 harvested deer, 2013-2021.

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 (25%)	18 (72%)	5 (3%)	0 (0%)	31	6	10	4	0	18	25

Table 2. Antler classification analysis for the North Natrona Mule Deer Herd Unit, 2008-2021.

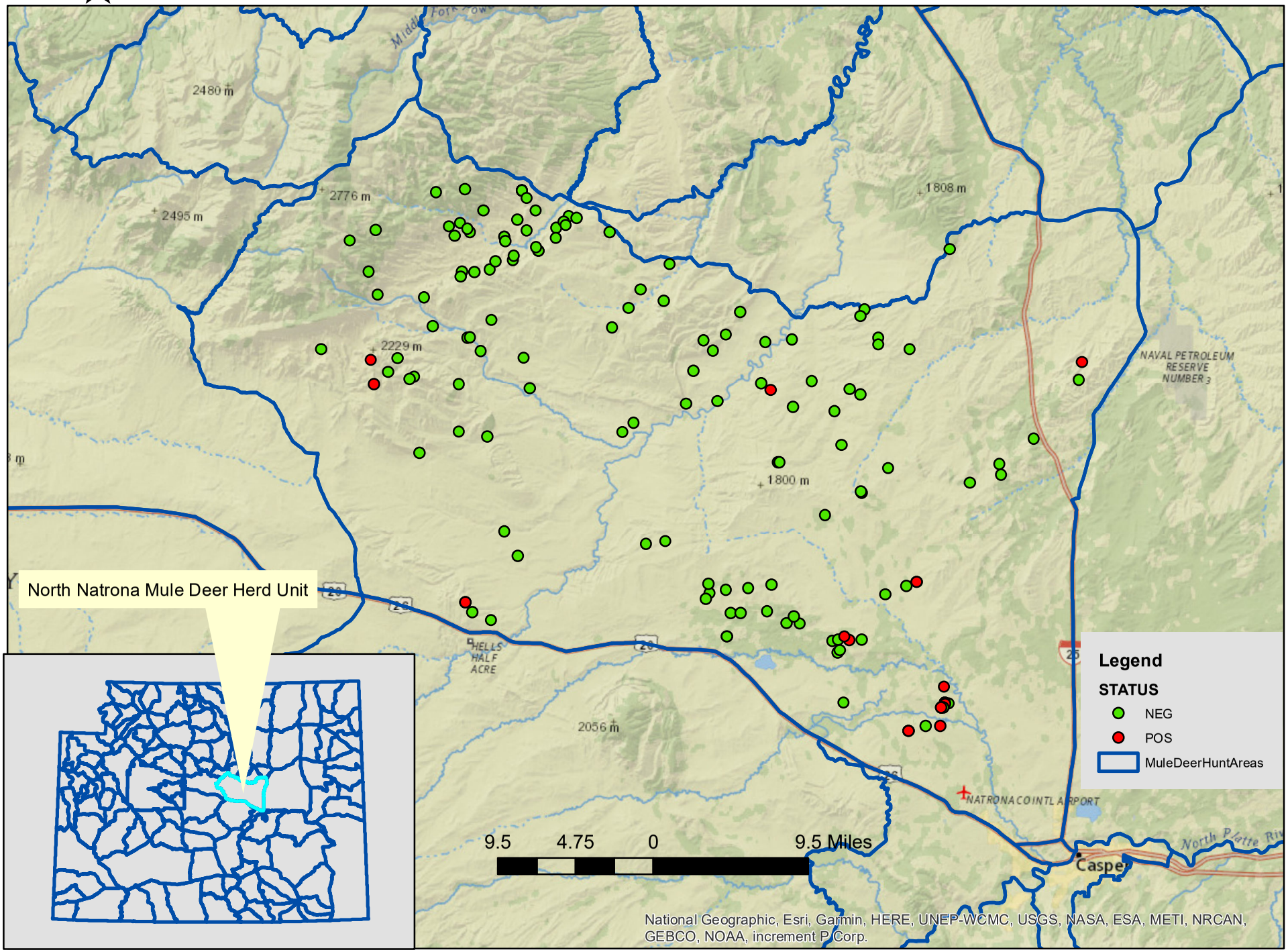
A total of 150 Type 1, antlered mule deer licenses are available for the 2022 season, which is a decrease of 50 licenses compared to 2021. Due to ongoing damage issues, 100 Type 7 licenses will again be available in 2022 and will be open on August 15 within the agricultural region in the southeastern part of the herd unit.

2) **Population Modeling:** The 2021 postseason population estimate for this herd was 2,006 mule deer using the Time-Specific and Constant Adult Survival spreadsheet model which will be the official estimate. In 2021, managers also began using PopR Integrated Population Models (IPM) to estimate population indices for mule deer and pronghorn. The 2021 postseason population estimate for this herd from the IPM was approximately 1,961 (CL=1,578-2,508) mule deer. Post season estimates from both models for 2021 were reported here to allow for comparison during this transitional year. The Department intends to replace the WGFD spreadsheet model with PopR IMP in bio-year 2022.

3) **Management Objective Review:** No herd review was scheduled in 2022.

4) **Chronic Wasting Disease Management:** The herd was not a priority for CWD surveillance in 2021. This herd was a priority for CWD surveillance in 2019 and 2020. The most current prevalence data was reported in the 2020 JCR. To date, no meaningful CWD management actions have occurred in this herd unit. However, data suggests management of high deer densities on irrigated landscapes may provide a focused and meaningful way to reduce CWD prevalence. Continued issuance of Type 7 licenses that focus harvest pressure on agricultural lands may similarly contribute to CWD management in the herd.

2019-2020 Hunter-Kill CWD Tested Mule Deer North Natrona Herd Unit

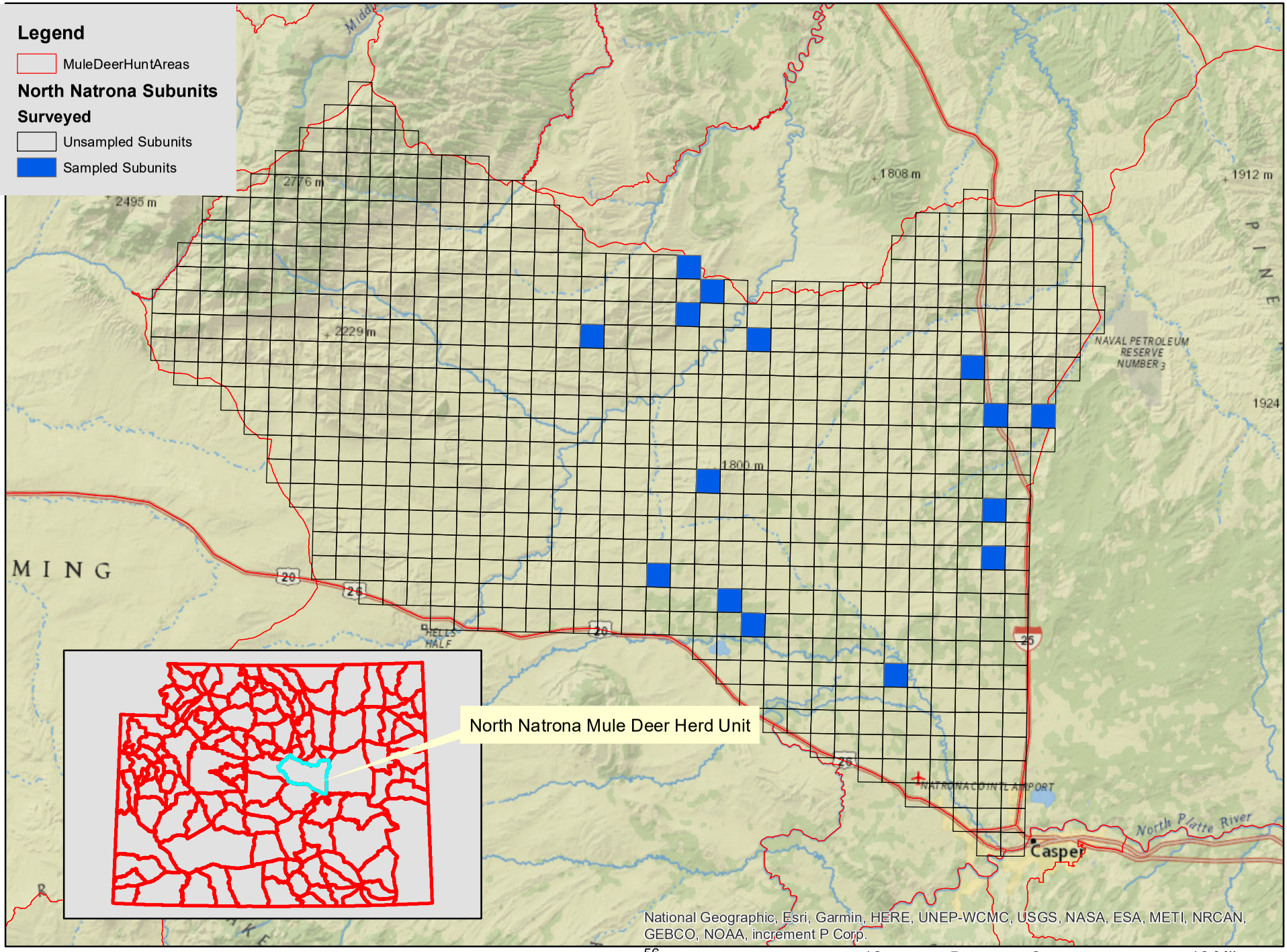


2021 MD759 Stratified Random Sampling

- 4 hours of helicopter survey time on December 3 and 9, 2021
- A total of 207 deer were detected
- Only 15/24 (11 high, 4 low density) sample units were sampled due to extreme wind conditions, likely would have met the sample goal of 300-500 deer if all 24 units were sampled
- Rhat Max of Point Est: 1.31
- Rhat Max of Upper CI: 1.91
- Proportion <1.1: 0.64
- Post season population estimate 1,961 (1,578-2,210)

Sample unit	Density
213	Low
261	Low
337	Low
525	Low
206	High
101	High
132	High
170	High
335	High
422	High
465	High
541	High
572	High
598	High
631	High

2021 North Natrona Herd Unit Stratified Random Sampling



2021 - JCR Evaluation Form

SPECIES: White tailed Deer
PERIOD: 6/1/2021 - 5/31/2022

HERD: WD706 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

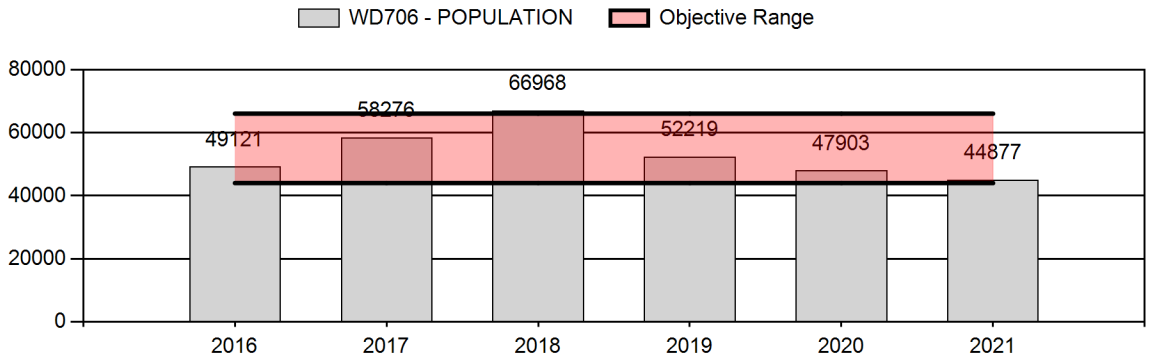
	2016 - 2020 Average	2021	2022 Proposed
Population:	54,897	44,877	26,903
Harvest:	6,388	4,578	3,885
Hunters:	9,828	8,681	7,400
Hunter Success:	65%	53%	52 %
Active Licenses:	10,404	9,068	7,800
Active License Success:	61%	50%	50 %
Recreation Days:	38,458	35,831	30,800
Days Per Animal:	6.0	7.8	7.9
Males per 100 Females	35	26	
Juveniles per 100 Females	66	53	

Population Objective (± 20%) :	55000 (44000 - 66000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-18.4%
Number of years population has been + or - objective in recent trend:	3
Model Date:	02/18/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	6.2%	9.6%
Males ≥ 1 year old:	32.0%	41%
Proposed change in post-season population:	-9%	-40%

Population Size - Postseason



2022 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. 20		Antlered deer off private land; any deer on private land
1, 2, 3	7	Sep. 1	Sep. 30	Nov. 1	Nov. 20	2,000	Doe or fawn valid on private land
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
4	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land except the lands of the State of Wyoming's Ranch A property shall be closed
4	7	Sep. 1	Sep. 30	Nov. 1	Nov. 20	175	Doe or fawn valid on private land
5	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land
5	6	Sep. 1	Sep. 30	Nov. 1	Nov. 20	50	Doe or fawn
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land

2022 Region A nonresident quota: 2,750 licenses

2021 Hunter Satisfaction: 55% Satisfied 22% Neutral 23% Dissatisfied

2021 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, peaking about 10% - 15% above objective in 2017. The population then began to decline with increased harvest and reduced recruitment (Appendix 1). The 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, during which some ranches lost more than 50% of their resident white-tailed deer. With the declining population, hunting seasons became more conservative each year beginning in 2020, and notably more so in 2022. However, even with changes to hunting seasons, hunter success dropped from 67% in 2017 to 52% the past two years. Similarly, hunter satisfaction fell from about 80% in 2017 & 2018 to around 70% in 2019 & 2020, and then to 55% in 2021. Changes in 2022 entailed a 27% reduction in non-resident, Region A General

licenses and closing the season on November 20 in all Hunt Areas. These changes were necessary to mitigate a projected decline in buck numbers. Type 7 license issuance was also cut by 1,275 to reduce antlerless harvest. Type 7 licenses are valid only on private land, and are primarily (about two-thirds of them) used to harvest white-tailed deer. Issuance of Type 7 licenses continued to allow landowners who so desire, the opportunity control deer numbers. The population is projected to continue to decline to a point well below objective in 2022 even with more conservative hunting season in place.

2) **Population Modeling:** Population estimates for this herd continue to rely on the Department's spreadsheet system, and are tenuous at best. This is because the herd boundary borders two states and therefore does not represent a closed population; sightability of bucks during classifications can vary widely; and average survival rates estimated by the model are not realistic. It also appears, for some reason, that modeled population estimates lag a year behind what is happening on the ground. However, pre-season population estimates are about 80% correlated with pre-season trend counts, and the trends produced by the model seem realistic.

3) **Chronic Wasting Disease (CWD):** Prior to the 2021 hunting season, just over 2,300 white-tailed deer from the Black Hills 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 have 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 2019 and 2021 are presented below (Table1). During 2021, we obtained 217 samples from adult, buck white-tailed deer, which represented 7.5% of the reported buck harvest. The 2021 samples were well distributed throughout the herd unit. Interestingly, the lowest prevalence rates were again found in HA's 2 & 4. In these Hunt Areas, the majority of tested deer have been harvested on National Forest, where there is very high hunting pressure almost exclusively focused on bucks, which results lower buck:doe ratios and mostly younger age classes of buck deer. 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	**7.4%** (4.3% - 11.2%, n=270)	0% (17)	8.6% (105)

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

2021 - JCR Evaluation Form

SPECIES: White tailed Deer

PERIOD: 6/1/2021 - 5/31/2022

HERD: WD707 - CENTRAL

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

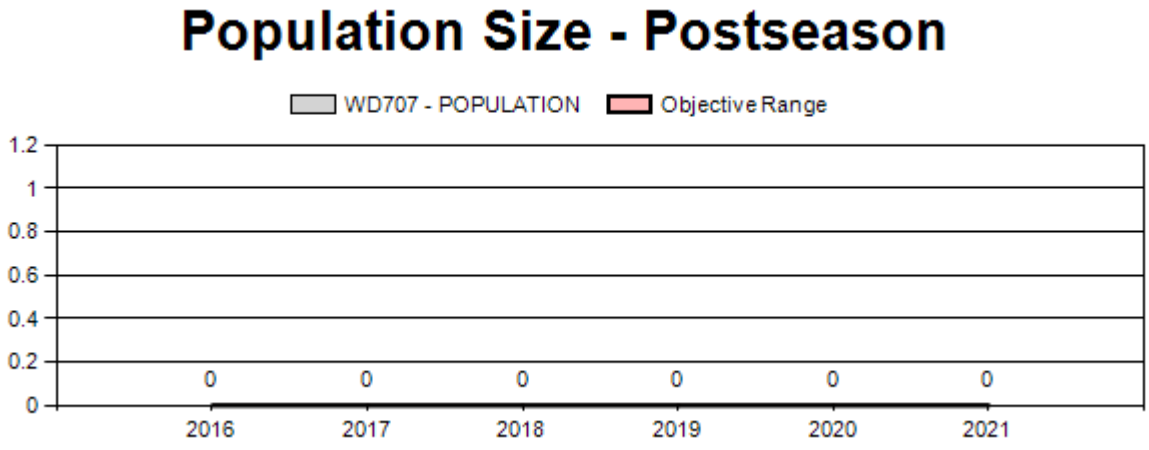
PREPARED BY: MATT HUIZENGA

	2016 - 2020 Average	2021	2022 Proposed
Population:	0	N/A	N/A
Harvest:	1,274	1,330	800
Hunters:	2,496	2,873	1,500
Hunter Success:	51%	46%	53 %
Active Licenses:	2,846	3,352	1,750
Active License Success:	45%	40%	46 %
Recreation Days:	10,169	12,896	7,000
Days Per Animal:	8.0	9.7	8.8
Males per 100 Females	38	36	
Juveniles per 100 Females	69	58	

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%



2022 HUNTING SEASONS
Central White-Tailed Deer Herd Unit (WD707)

Hunt Area	License Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
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	75	Any white-tailed deer
65	3	Sep. 1	Sep. 30	Oct. 15	Nov. 30	300	Any white-tailed deer, also valid in that portion of Area 66 in Converse County
65	8	Sep. 1	Sep. 30	Oct. 15	Nov. 30	500	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	50	Any white-tailed deer
66,88,89	8			Aug. 15	Oct. 14	50	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.

2021 Hunter Satisfaction: 55% Satisfied, 21% Neutral, 24% Dissatisfied

2022 Management Summary

1) Hunting Season Evaluation: The 2022 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. However 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. Observed buck ratios of 36 bucks:100 does (n=293) were well over minimum objective ratios(≥20 bucks:100 does postseason). The majority of white-tailed deer classifications come from Hunt Area 65. Hunt Area 10 Type 3 and Type 8 licenses were each reduced by 10. Combined Hunt Areas 11, 12, 13, & 14 Type 3 licenses were reduced by 100 and Type 8 licenses were reduced by 200. Hunt Area 22 Type 3 and Type 8 licenses were each reduced by 50. Hunt Area 65 Type 3 licenses were reduced by 100 and Type 8 licenses were reduced by 250. Combined Hunt Areas 66, 88, & 89 Type 3 and Type 8 licenses were each reduced by 100. All limited quota white-tailed deer licenses for the Central White-tailed Deer Herd Unit sold out in 2021 except for Hunt Area 65 Type 8 licenses.

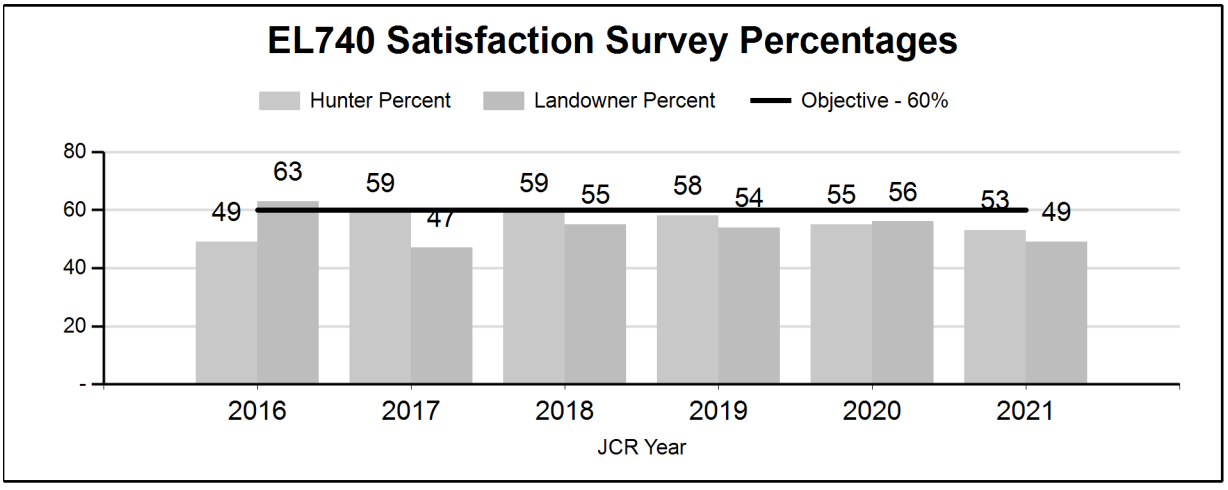
2) Chronic Wasting Disease Management: CWD sample sizes within the Central White-Tailed Deer Herd Unit were not sufficient to report an accurate prevalence. Increased sampling effort will be put forth in Hunt Area 65 in conjunction with intensive Mule Deer and Elk surveillance in 2022. Managers are working 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.

2021 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2021 - 5/31/2022
HERD: EL740 - BLACK HILLS
HUNT AREAS: 1, 116-117
PREPARED BY: JOE SANDRINI

	2016 - 2020 Average	2021	2022 Proposed
Hunter Satisfaction Percent	56%	53%	55%
Landowner Satisfaction Percent	55%	49%	55%
Harvest:	644	839	935
Hunters:	1,834	2,166	2,200
Hunter Success:	35%	39%	42%
Active Licenses:	1,908	2,262	2,300
Active License Success:	34%	37%	41%
Recreation Days:	17,424	21,815	24,300
Days Per Animal:	27.1	26.0	26.0
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:			-9%
Number of years population has been + or - objective in recent trend:			9



2022 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
116	7			Aug. 15	Jan 31	300	Cow or calf valid off national forest
117	1	Sep. 1	Sep. 30	Oct. 15	Nov. 30	400	Any elk
117	1			Dec. 1	Jan. 31		Antlerless elk
117	2	Sep. 1	Sep. 30	Oct. 15	Jan. 31	200	Antlered elk five (5) points or less on either antler or antlerless elk
117	4	Sep. 1	Sep. 30	Oct. 15	Jan. 31	150	Antlerless elk
117	6	Sep. 1	Sep. 30	Oct. 15	Jan. 31	250	Cow or calf
117	7			Aug. 15	Jan. 31	500	Cow or calf valid off national forest; also valid on national grassland

2021 Hunter Satisfaction 53 % Satisfied 25 % Neutral 22 % Dissatisfied

2020 Landowner Satisfaction JCR [1] 17% Below 50% At [2] 33% Above

2020 Landowner Satisfaction Surveyed [3] 39% Satisfied 19% Neutral 42% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** The harvest strategy for this the Black Hills elk herd continues to be to harvest as many elk as possible given limited hunter access to private. Changes to the 2022 hunting season entailed an increase of 150 Type 6 licenses in Area 117, along with the conversion of 50 Area 117 Type 4 licenses to Type 2 with the Type 2 limitation being changed to "antlered elk five (5) points or less on either antler or antlerless elk." These changes were made to help ensure license issuance meets or exceeds demand for cow/calf licenses in HA 117, and increase harvest of younger aged bulls. No changes were made to issuance of HA 116 Type

[1] When asked if elk numbers are below, at, or above desired level.
[2] JCR program calculated wrong. 42 out 84 landowners reported elk number "at desired level"
[3] These figures are from landowner survey asking specifically about satisfaction in the same manner as the hunter harvest survey.

1 licenses (late season bull tag) even though success was 61% on these tags in 2021. 2020 was the first year this license type was issued, and success was only 8%. It is likely the 2021 reported success on HA 116 Type 1 tags was an anomaly because hunter success on all license types in HA 116 has averaged just 21% over the past five years.

To facilitate harvest, a Hunt Management Coordinator has been hired each of the last five years to assist hunters with access to private land. It is estimated this program has increased elk harvest on average 50 head per year in HA 117. The 2022 hunting season is expected to result in a total harvest of about 850 adult elk (935 total including calves) from the herd unit. Based upon an estimated preseason herd composition of 47:100:40 (calf:cow:bull) and a recruitment rate of 44 yearling elk per 100 cows, the anticipated 2022 harvest would remove the annual, yearling recruitment (number of adult elk coming into the population in 2023) from a preseason herd of about 3,600 head (all age and sex classes combined).

2) **Management Notes:** The Department does not estimate the population size of this herd due to its interstate nature and the difficulty of accurately classifying elk in this part of Wyoming. Instead, it is managed for landowner and hunter satisfaction. Since 2016, a pre-paid return mail survey has been sent to about 160 Black Hills landowners. Subtracting for undelivered surveys, the response rate in 2022 was 55%, representing the first increase in response rate since the survey's inception. Landowner "satisfaction" measures as captured in the JCR program are subjective perceptions of relative elk numbers. Therefore, they neither represent actual satisfaction, nor can they be rightly juxtaposed to measures of hunter satisfaction. Because of this, both types of landowner "satisfaction" (perception of relative elk numbers and actual statement of satisfaction) are listed above. When questioned about changes to license issuance, 37% of the 2022 respondents stated a desire to increase license issuance, 12% to decrease it, and 51% wish it to remain unchanged. This herd has a secondary management objective that seeks a three-year, average annual bull harvest comprised of 20% aged ≤ 2 years old; 60% aged 3 to 5 years old; and 20% aged 6 years or older *(± 5% in all categories).* Not enough tooth age data have been collected since 2019 to garner an estimate of the percentage of bulls taken from each age class. However, the population appears to have an overabundance of bulls based upon field observations. This is to be expected given the historic, annual harvest rate of cows exceeding that of bulls.

3) **Population Modeling:** Because this is neither a closed population, nor is it feasible to conduct adequate composition surveys, we do not model this herd. However, in 2016 and 2020, WGFD partially funded South Dakota Game Fish & Parks (SDGF&P) helicopter-based, late winter elk sightability survey. WGFD's funding was used to pay SDGF&P to survey a significant portion of occupied habitat south of Interstate Highway 90 within HA's 1 & 117. In 2016, 31 subunits were surveyed and a total of 923 elk observed; yielding an estimate of 1,091 elk within the survey area (95% C.I. 988 - 1,521). In 2020, 42 subunits were flown and 1,519 elk found. This effort yielded an estimate of 1,687 elk (95% C.I. 1,584 - 2,118). Directly comparing the 31 subunits flown in both 2016 and 2020 revealed a 36% increase in the number of elk detected in that portion of the herd unit. In the future, consideration should be given to managing for a wintering population number based upon this survey technique.

4) **Chronic Wasting Disease (CWD):** To date, about 220 elk from the Black Hills have been tested for CWD. The vast majority of these elk were harvested by hunters in HA 117. Two

hunter-harvested elk have tested positive for the disease, one in 2018 and one in 2020, both from HA 117. The only other CWD-positive elk found in the Black Hills have been two targeted surveillance elk, one from HA 117 in 2008, and one from HA 1 in 2020.

2021 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2021 - 5/31/2022

HERD: EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

HUNT AREAS: 7, 19

PREPARED BY: MATT HUIZENGA

	2016 - 2020 Average	2021	2022 Proposed
Population:	13,597	12,347	10,507
Harvest:	2,314	1,940	2,500
Hunters:	4,801	5,004	5,000
Hunter Success:	48%	39%	50%
Active Licenses:	4,873	5,068	5,300
Active License Success:	47%	38%	47 %
Recreation Days:	35,434	39,532	37,500
Days Per Animal:	15.3	20.4	15
Males per 100 Females	39	0	
Juveniles per 100 Females	39	0	

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

Management Strategy: Special

Percent population is above (+) or below (-) objective: 147%

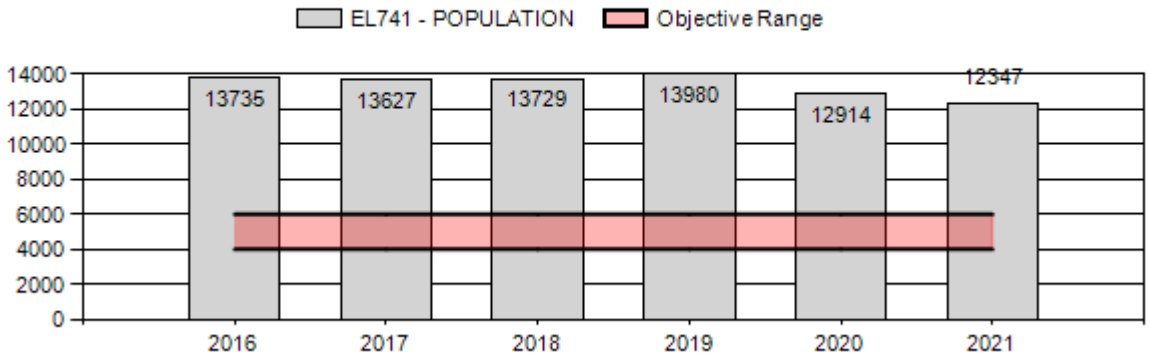
Number of years population has been + or - objective in recent trend: 21

Model Date: 02/22/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	18.6%	19.3%
Males ≥ 1 year old:	28.3%	23.7%
Proposed change in post-season population:	-18.8%	-14.9%

Population Size - Postseason



2022 HUNTING SEASONS

Laramie Peak/Muddy Mountain Elk Herd Unit (EL741)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
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; valid in all of Platte 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; valid in all of Platte 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

2021 Hunter Satisfaction: 60% Satisfied, 19% Neutral, 21% Dissatisfied

2022 Management Summary

1) Hunting Season Evaluation: The 2022 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 2022 season, the existing season structure was unchanged in Hunt Area 7 due to concerns of public land saturation. However to address public and landowner comments, the Hunt Area 7 Type 2 license limitation was changed from 4 points or less to 5 points or less on either antler to allow for more flexibility for harvesting younger bulls.

Hunt Area 19 Type 1 and 2 (Any elk) licenses have been at the same allocation (300 combined) since 2007. Since 2017 harvest success on the Type 2 license has been above 60%, with the highest being in 2017 (83%) and the most recent being in 2021 (63%). The Type 1 license has been between 51% (2017) and 62% (2021). Due to hunter saturation on public lands, an increase in "any elk" licenses is discouraged on a large scale. However, a slight increase on Type 2 licenses is warranted as hunters spread themselves out temporally more during November compared to the October Type 1 season. Currently a closure of all elk license types takes place from October 15-31 in Hunt Area 19. During this time some elk move from an area that provides little access onto adjacent public lands. When the season opens again on November 1 success usually increases. Managers believe shutting down all license types from November 21 to November 30 will reduce pressure and allow elk to move back onto areas the public can access similar to the earlier break in seasons. Allowing both any elk license types to open again from December 1-14 for bull harvest would allow for more opportunity and could yield higher success on all license types.

A fairly mild winter provided good access throughout the hunting seasons. After an above average harvest in 2020, the 2021 harvest markedly decreased. This was likely due to an early snowstorm restricting access and causing earlier elk movements to lower elevations in October as well as above average temperatures and winds later in the season.

No flight time was allocated to the Laramie Peak/Muddy Mountain herd unit in 2021, however managers were able to classify a few groups of elk in conjunction with deer classifications. Most classifications were done by ground (n=1,263). The TSJ,CA Spreadsheet model was used to estimate the post-hunt population in 2021.The last abundance estimate was completed in February 2019 with a sightability survey of the Laramie Peak/Muddy Mountain herd unit. The sightability survey 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.

In 2021, managers collected antler class data (n=109) from hunter-harvested bull elk. Class II (>=6 points, heavy 5x5) bulls made up 40% 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 been collected since 2008 during postseason classification surveys. Class II bulls are showing a downward trend while Class I bulls are showing an increase.

2) Chronic Wasting Disease Management: There were no CWD management actions taken in the Laramie Peak/Muddy Mountain herd unit in 2021. The Laramie Peak/Muddy Mountain herd unit was targeted for intensive surveillance in 2018 and will be targeted again in 2022. From 2019-2021, a total of 299 elk were tested, with 15 being positive for CWD for a prevalence of 5.0%.

2021 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2021 - 5/31/2022

HERD: EL742 - RATTLESNAKE

HUNT AREAS: 23

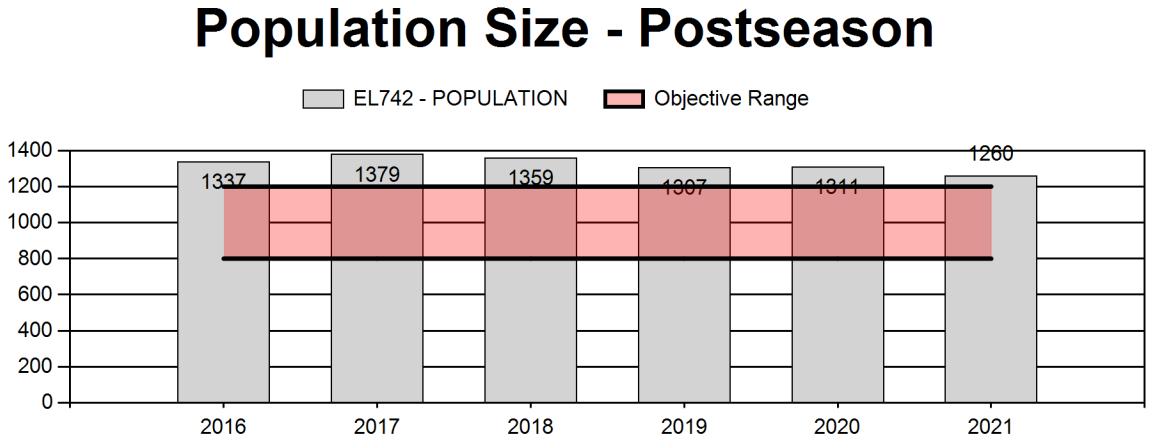
PREPARED BY: BRANDON WERNER

	2016 - 2020 Average	2021	2022 Proposed
Population:	1,339	1,260	1,108
Harvest:	168	196	198
Hunters:	410	384	395
Hunter Success:	41%	51%	50%
Active Licenses:	443	440	450
Active License Success:	38%	45%	44%
Recreation Days:	4,023	3,690	3,850
Days Per Animal:	23.9	18.8	19.4
Males per 100 Females	34	11	
Juveniles per 100 Females	30	56	

Population Objective (± 20%) :	1000 (800 - 1200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	26%
Number of years population has been + or - objective in recent trend:	30
Model Date:	02/25/2022

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

	JCR Year	Proposed
Females ≥ 1 year old:	11.6%	9.7%
Males ≥ 1 year old:	25.4%	25.5%
Proposed change in post-season population:	4.9%	-12%



2022 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
	6	Sep. 1	Sep. 30	Oct. 1	Oct. 31	200	Cow or calf
				Nov. 15	Dec. 15		Cow or calf

2021 Hunter Satisfaction: 64% Satisfied, 16% Neutral, 20% Dissatisfied

2022 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 season large cow and calf groups more consistently moved from this property with no access and onto adjacent public lands. Success on Type 4, 6, and 7 licenses increased considerably. Hunter satisfaction jumped rather dramatically from the 2020 season.

   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. During the later part of the 2021 season, many elk moved out of Area 23 and into adjacent Area 128. As a result, managers allowed late season Type 4 license holders to enter Area 128 from November 15-December 15 in the 2022 season to try to increase cow harvest. With the addition enabling hunters to enter Area 128 during the late season, managers removed the Type 7 and added those licenses to the Type 4.

2) **Population Modeling:** The model for this herd does not appear to depict trends or estimate population size accurately. 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 2022 season was the time-specific juvenile, constant adult, male survival coefficient. This model resulted in the best confidence interval.

3) **Management Objective Review:** This herd unit was slated for an objective review in 2022. 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 2027; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

4) **Additional Surveys:** A sightablility survey was conducted for this herd unit in January 2020 and the resulting abundance estimate was incorporated into the spreadsheet model. No new abundance or trend count surveys have been conducted this year.

2021 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2021 - 5/31/2022

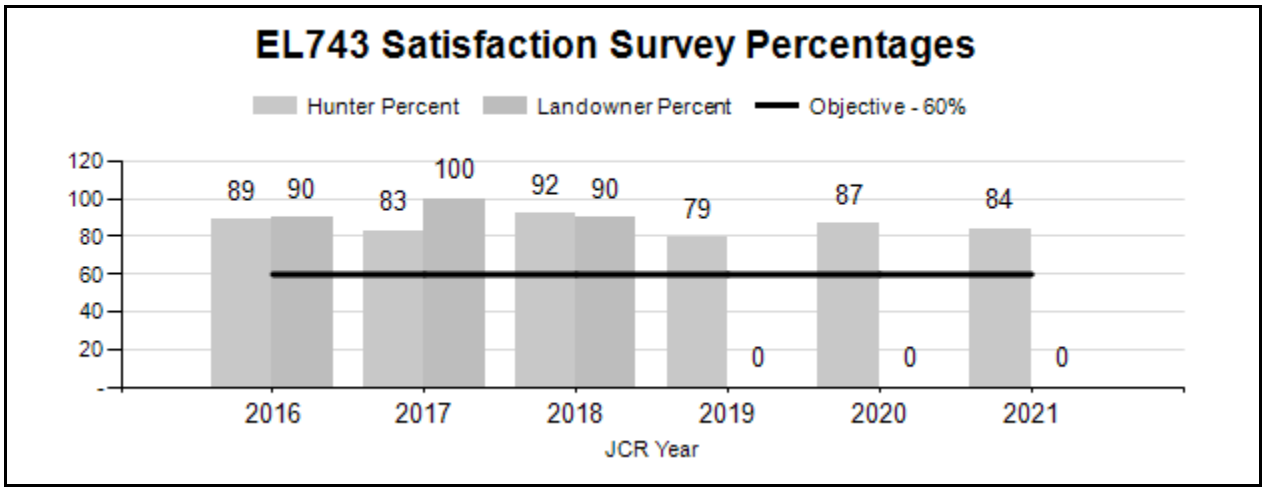
HERD: EL743 - PINE RIDGE

HUNT AREAS: 122

PREPARED BY: MATT HUIZENGA

	2016 - 2020 Average	2021	2022 Proposed
Hunter Satisfaction Percent	86%	84%	90%
Landowner Satisfaction Percent	58%	0%	60%
Harvest:	127	166	300
Hunters:	148	240	350
Hunter Success:	86%	69%	86 %
Active Licenses:	158	254	375
Active License Success:	80%	65%	80 %
Recreation Days:	552	711	1,250
Days Per Animal:	4.3	4.3	4.2
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:	3



2022 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. 15	Nov. 30	125	Any elk
122	1			Dec. 1	Dec. 31		Antlerless elk
122	6	Sep. 1	Sep. 30	Oct. 1	Dec. 31	300	Cow or calf

2021 Hunter Satisfaction: 84% Satisfied, 7% Neutral, 9% Dissatisfied

2021 Landowner Satisfaction: 0% Below desired levels, 0% At or about at desired levels, 100% Above desired levels

2022 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 2022 season structure was set to try 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. To increase harvest potential to limit herd growth and provide additional hunter opportunity, 100 Type 6 licenses were added. 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 already crowded conditions at the limited public access points. Managers changed the Type 1 opening date back to Oct. 15 to address those concerns.

There is no population model for this herd. Populations are estimated based off aerial winter trend counts and landowner input. Population estimates since 2013 have stayed steady between 800-1000 elk in this herd. Landowner input indicates those numbers are likely lower than the current population size. 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. No aerial counts were conducted in 2021.

Hunter success in this area over the past five years is quite high, averaging 86% harvest success with an average of 4.3 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.

2) Management Objective Review: This herd unit was slated for an objective review in 2022. 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 2027; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

Landowner and hunter satisfaction is the primary objective in this herd. Hunter satisfaction was well over the 60% minimum objective. Landowner satisfaction was not as easily measured. Letters were sent to 24 landowners who typically have elk on their property notifying them of an information gathering meeting while providing Department employee contact information for those unable to attend. Fourteen landowners attended the meeting. All generally liked how things are going, but were in agreement that elk numbers were higher than desired. Overcrowding issues on public lands were also discussed with the earlier Type 1 opening date. The 0% landowner satisfaction shown in the above table therefore does not necessarily accurately represent actual satisfaction with the hunting season framework and hunt quality, but rather dissatisfaction with elk numbers.

The secondary objective for this herd unit is a bull harvest distribution consisting of 60% mature, branch-antlered bulls. One-hundred percent of reported bulls harvested in 2021 were branch-antlered bulls.

3) Chronic Wasting Disease Management: This herd has not been included yet in CWD surveillance efforts.

Table 1.

Landowner Satisfaction Survey Results

	At or about at desired levels	**Above desired levels**	**Below desired levels**
Landowner Surveys Returned	0	10	0

2021 - JCR Evaluation Form

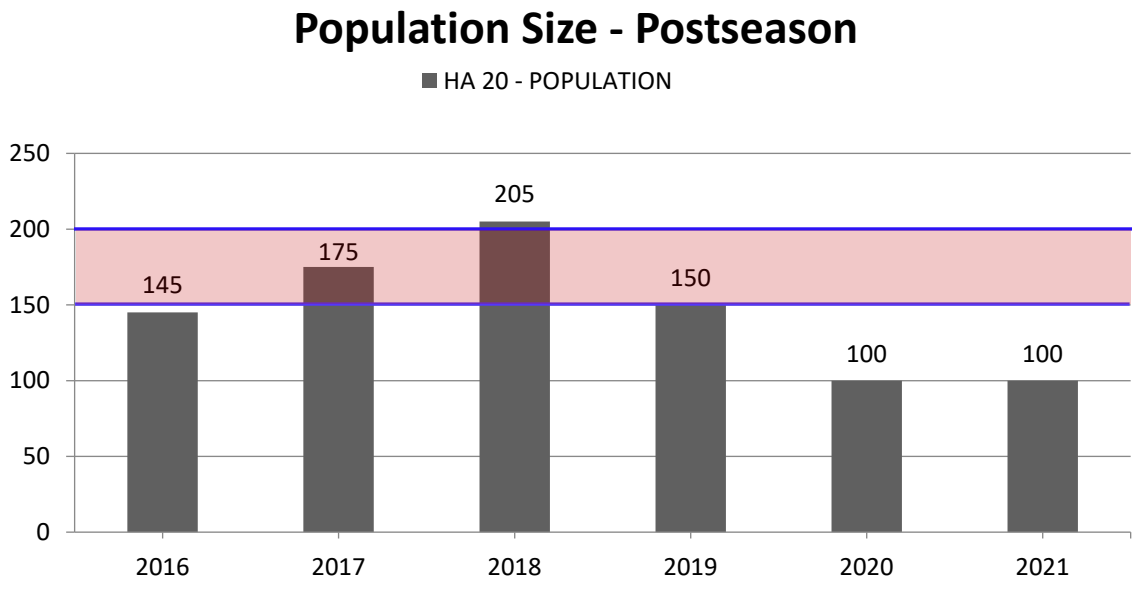
PERIOD: 6/1/2021 - 5/31/2022

HERD: Non-Herd Unit

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

	2016 - 2020 Average	2021	2022 Proposed
Population:	165	100	100
Harvest:	2.6	3	1
Hunters:	2.6	3	1
Hunter Success:	100%	100%	100%
Active Licenses:	2.6	3	1
Active License Success:	100%	100%	100%
Recreation Days:	7.8	5	5
Days Per Animal:	3	5.0	5.0
Males per 100 Females	92	105	
Juveniles per 100 Females	39	19	

Population Objective (± 20%):	150-200
Management Strategy:	Joint Management with
Percent population is above (+) or below (-) objective:	South Dakota
Number of years population has been + or - objective in recent trend:	2
Model Date:	No Model (Population est. from ground observations)



2022 HUNTING SEASONS

BIGHORN SHEEP HUNT AREA 20 (KOUBA CANYON)

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	1	Any ram (1 resident)

2021 Hunter Satisfaction: *Bighorn Sheep (BHS) Hunters Not Surveyed*

2022 Management Summary

1) **Hunting Season Evaluation:** As part of a sightability study, in February of 2021 there were 21 ewes and 17 rams with active radio collars in this herd. In addition, there were at least three active collars on ewes collared as part of a previous project. 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. The remainder of the bighorn sheep mortalities (both sexes) were attributed to a train collision, lion predation, or suspected disease (Epizootic Hemorrhagic Disease or Blue Tongue Virus). Bighorn sheep observations this winter indicated a large proportion of radio-collared sheep in the herd and virtually no lambs. Poor lamb survival in 2020 and lower numbers of observed sheep that year suggested this herd was poised to decline in 2021. Based upon field observations and survival of radio collared bighorns, there has likely been a decline augmented by above average annual mortality since 2018. A sightability flight flown in mid-February detected 75 total sheep, including 22 of the 23 collared sheep known to be in the survey area. However, these data were insufficient to reliably estimate the population due to the small number of sheep groups detected. Based upon field observations of bighorn sheep in 2020 and 2021, we estimate that there are roughly 100 sheep in this herd. Due to the apparently declining population and lower numbers of mature rams, two fewer licenses were issued in 2022. The season was also shortened 31 days, closing on November 31. The 2022 hunting season should provide success for one resident hunter. In addition, three rams will likely be harvested from this herd in South Dakota. The timeline for SDGF&P setting their hunting season did not allow adjustments to the South Dakota license quota prior to sightability data being collected. If the combined interstate harvest of four rams is met in 2022, it is possible harvest could exceed the management objective of harvesting no more than 10% of the rams, or 50% of the class IV rams. However, we just do not have enough solid data to know for sure. At any rate, the ram harvest should not impact the reproductive potential of the herd, but changes to ram harvest may be needed again in 2023.

2) **Management Objective:** In 2012, joint management criteria for this herd were agreed upon with South Dakota Game Fish and Parks (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 known number of Class IV rams, and annual harvest should not exceed 10% of the total rams based upon available data. This management framework is reviewed annually with SDGF&P.

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

   i A ground-based 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. In addition, securing access across private lands for data collection in Wyoming has become impossible without a paid access agreement.

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

   In 2019, a project was begun to develop a helicopter-based sightability model for this herd. The study is being conducted in tandem with SDGF&P and seeks to capture and VHF radio-collar up to 40 bighorn sheep; disease test captured BHS; conduct helicopter and ground based surveys for BHS; and develop a sightability model based upon topographic and vegetative features to compensate for BHS available for observation but not detected. With just 23 active radio collars confirmed in the study area in mid-February 2022, a sightability flight was conducted. However, very few groups of sheep were sighted and an estimate could not be produced. It is hoped more sheep can be radio collared over the next year and another set of flights conducted, perhaps with an adjusted protocol to improve detection. The other option would be to better refine the ground based technique with more radio collared animals available for detection.