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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.

2020 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR745 - RATTLESNAKE

HUNT AREAS: 70-72

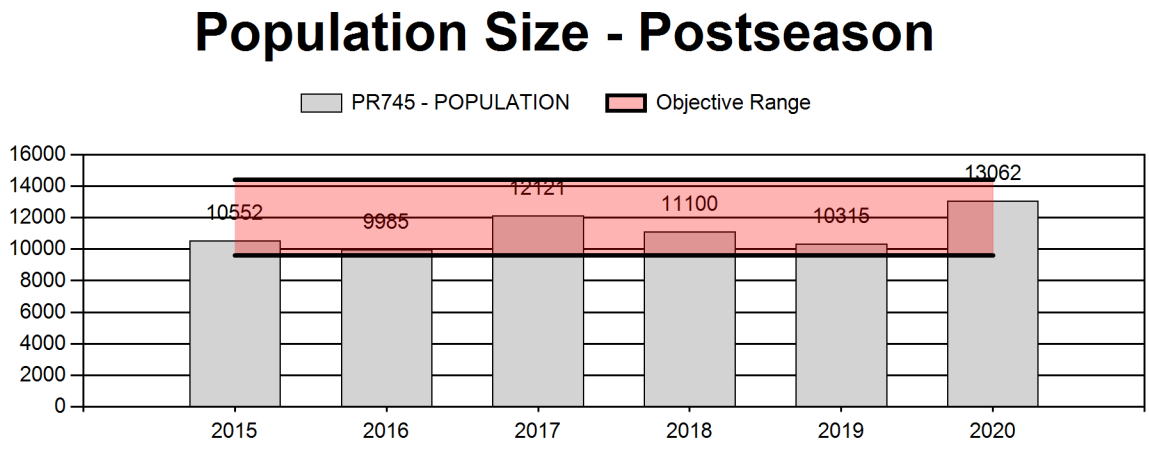
PREPARED BY: HEATHER O'BRIEN

	2015 - 2019 Average	2020	2021 Proposed
Population:	10,815	13,062	13,459
Harvest:	604	1,112	1,410
Hunters:	614	1,197	1,500
Hunter Success:	98%	93%	94 %
Active Licenses:	676	1,365	1,600
Active License Success:	89%	81%	88 %
Recreation Days:	1,716	4,277	4,600
Days Per Animal:	2.8	3.8	3.3
Males per 100 Females	52	69	
Juveniles per 100 Females	69	54	

Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	9%
Number of years population has been + or - objective in recent trend:	4
Model Date:	3/12/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	7.6%	8.8%
Males ≥ 1 year old:	15.6%	23.7%
Total:	7.8%	9.4%
Proposed change in post-season population:	-0.01%	0.03%



2021 HUNTING SEASONS
RATTLESNAKE PRONGHORN HERD (PR745)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
70	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	200	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	200	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

2020 Hunter Satisfaction: 86% Satisfied, 10% Neutral, 4% Dissatisfied

2021 Management Summary

1.) Hunting Season Evaluation: 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 should be conducted as soon as budgets allow to provide a new abundance estimate to realign the population model.

The severe winter of 2011 caused a drastic decline in this herd, which has since grown back toward 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 growing season resulted in poor range conditions, and herd growth continued to stall. Thus far, the winter of 2020-2021 has been mild, and overwinter survival is expected to improve compared to the previous two winters. Despite slowed population growth the last two years, good opportunity should remain for hunters in 2021, as the observed buck ratio remains high and the herd has remained near objective.

A three-year (2018-2020) analysis indicated the mean percent of harvest for males ≥ 1 year old was 15.4 percent, with a range from 11.6 to 15.6 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. Managers believe the estimated male harvest of 23.7 percent

for 2021 is reasonable based on classification survey results, harvest success and hunter satisfaction trends, and model credibility.

License issuance was liberalized throughout the herd unit for the 2020 hunting season, and managers propose maintaining the same doe hunting opportunity while increasing the buck hunting opportunity for hunters in 2021. Management goals are to continue reducing buck ratios based on the recreational management strategy, while holding the population near objective. Managers continue to receive feedback from agricultural landowners with a desire to increase harvest pressure on pronghorn. Thus license numbers will be increased slightly in Area 70, and hunters will be directed to those properties requesting continued harvest pressure.

2.) **Management Objective Review:** In 2020, managers updated the Rattlesnake Pronghorn Management Objective by changing to a recreational management strategy in all three hunt areas within the herd unit. There are no additional proposals to review or change management strategies for this herd unit in 2021.

3.) **Additional Herd Unit Information:** No new public access areas were added to the herd unit in 2021. The addition and expansion of access through the Walk-in Area program would facilitate pronghorn harvest and improve hunter distribution, particularly in Areas 70 & 71 which are dominated by private lands. Managers will continue to communicate with landowners to encourage additional participation in the area.

2015 - 2020 Preseason Classification Summary

for Pronghorn Herd PR745 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	10,913	160	243	403	19%	947	44%	796	37%	2,146	2,231	17	26	43	± 4	84	± 6	59
2016	10,400	178	281	459	21%	965	45%	711	33%	2,135	2,635	18	29	48	± 4	74	± 5	50
2017	12,541	202	324	526	21%	1,173	46%	824	33%	2,523	2,185	17	28	45	± 3	70	± 5	48
2018	12,003	236	452	688	26%	1,187	45%	785	30%	2,660	2,290	20	38	58	± 4	66	± 4	42
2019	11,536	172	490	662	31%	988	46%	511	24%	2,161	2,263	17	50	67	± 5	52	± 4	31
2020	14,285	103	325	428	31%	622	45%	336	24%	1,386	1,995	17	52	69	± 7	54	± 6	32

2020 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR746 - NORTH NATRONA

HUNT AREAS: 73

PREPARED BY: HEATHER O'BRIEN

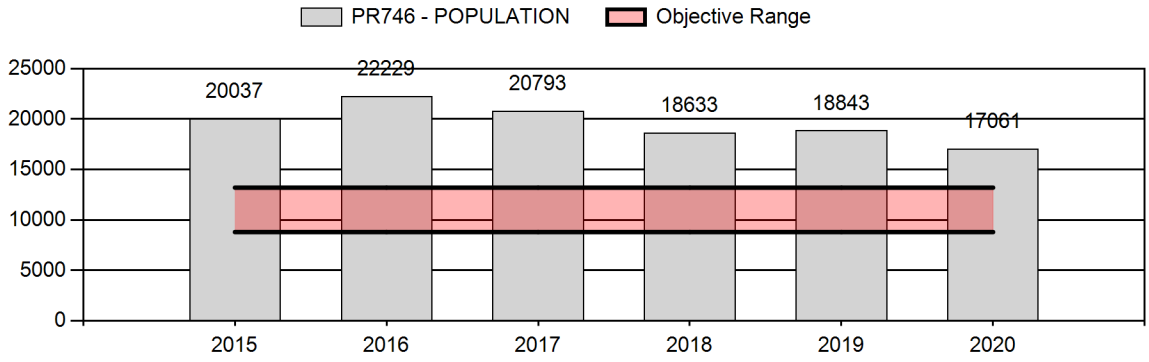
	2015 - 2019 Average	2020	2021 Proposed
Population:	20,107	17,061	16,042
Harvest:	1,565	2,011	1,525
Hunters:	1,650	2,160	1,600
Hunter Success:	95%	93%	95 %
Active Licenses:	1,703	2,261	1,650
Active License Success:	92%	89%	92 %
Recreation Days:	5,194	7,905	5,600
Days Per Animal:	3.3	3.9	3.7
Males per 100 Females	59	69	
Juveniles per 100 Females	78	54	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	55%
Number of years population has been + or - objective in recent trend:	8
Model Date:	02/19/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	8.9%	6.5%
Males ≥ 1 year old:	24.6%	21.8%
Total:	10.3%	8.6%
Proposed change in post-season population:	0.2%	-7.6%

Population Size - Postseason



2021 HUNTING SEASONS
NORTH NATRONA PRONGHORN HERD (PR746)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
73	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	1200	Any antelope
	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	500	Doe or fawn
	7	Aug. 15	Sep. 14	Sep. 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

2020 Hunter Satisfaction: 85% Satisfied, 6% Neutral, 9% Dissatisfied

2021 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, and population size has decreased incrementally each year. Still, this herd remains above objective and managers continue to prescribe liberal hunting seasons. Both trends and population estimates seem to be well-represented by the model for this herd. Five line-transect surveys provide independent abundance estimates which help align trends and improve population estimates. Another line-transect survey is scheduled for 2021.

Severe winters in both 2018-2019 and 2019-2020 resulted in higher mortality rates in the herd unit. 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 above the population objective. While hunting seasons should remain liberalized to continue management toward the objective, a decrease in overall license numbers was warranted to temper the pace of population reduction. The buck ratio for the herd remains high despite the designated recreational management strategy. Thus maintaining high buck harvest is justified proportionate to availability and opportunity, and to manage the buck ratio towards recreational levels.

A three-year (2018-2020) analysis indicated the mean percent of harvest for males ≥ 1 year old was 20.4 percent, with a range from 17.1 to 25.1 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 for the past four consecutive years. Managers believe the estimated male harvest of 21.8 percent for 2021 is reasonable based on classification survey trends, decreasing harvest success and hunter satisfaction, and model credibility.

The 2021 hunting season continues to assertively manage the North Natrona Pronghorn herd toward 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 and slowed production. Fifty Type 7 licenses will be available to control pronghorn densities on agricultural properties in the southeast portion of the herd unit. With a total of 1,750 licenses and a net reduction of 700 licenses, the population should still continue to decline toward objective while providing ample hunting opportunity.

2.) Management Objective Review: No review in 2021. The next management objective review is planned for 2024.

3.) 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 2020, managers and researchers collected horn measurements from 246 harvested bucks and tooth samples from 305 harvested does and bucks within the herd. Average horn size for the herd unit was 66 inches in 2020, and 74% of bucks sampled were aged in the field as 4+ years old. Average cementum annuli tooth age was 4.3 for bucks and 4.4 for does in 2020.

This statewide research project will continue to include the North Natrona Pronghorn Herd for the 2021 hunting season. Biologists and technicians will resume collection of horn measurement data from harvested bucks, as well as cementum annuli tooth ages from harvested pronghorn in the herd.

2015 - 2020 Preseason Classification Summary

for Pronghorn Herd PR746 - NORTH NATRONA

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	20,894	215	268	483	21%	936	42%	835	37%	2,254	2,729	23	29	52	± 4	89	± 7	59
2016	23,567	319	281	600	26%	905	39%	820	35%	2,325	2,409	35	31	66	± 5	91	± 7	54
2017	22,787	221	375	596	26%	953	41%	768	33%	2,317	3,371	23	39	63	± 5	81	± 6	50
2018	20,993	183	396	579	24%	1,080	45%	716	30%	2,375	2,947	17	37	54	± 4	66	± 5	43
2019	20,902	118	418	536	27%	887	45%	553	28%	1,976	3,068	13	47	60	± 5	62	± 5	39
2020	19,273	103	325	428	31%	622	45%	335	24%	1,385	2,017	17	52	69	± 7	54	± 6	32

2020 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR748 - NORTH CONVERSE

HUNT AREAS: 25-26

PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Population:	21,194	27,482	30,000
Harvest:	2,043	2,367	2,300
Hunters:	2,135	2,639	2,500
Hunter Success:	96%	90%	92 %
Active Licenses:	2,247	2,782	2,500
Active License Success:	91%	85%	92 %
Recreation Days:	6,038	8,343	8,000
Days Per Animal:	3.0	3.5	3.5
Males per 100 Females	59	68	
Juveniles per 100 Females	79	66	

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

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -1.8%

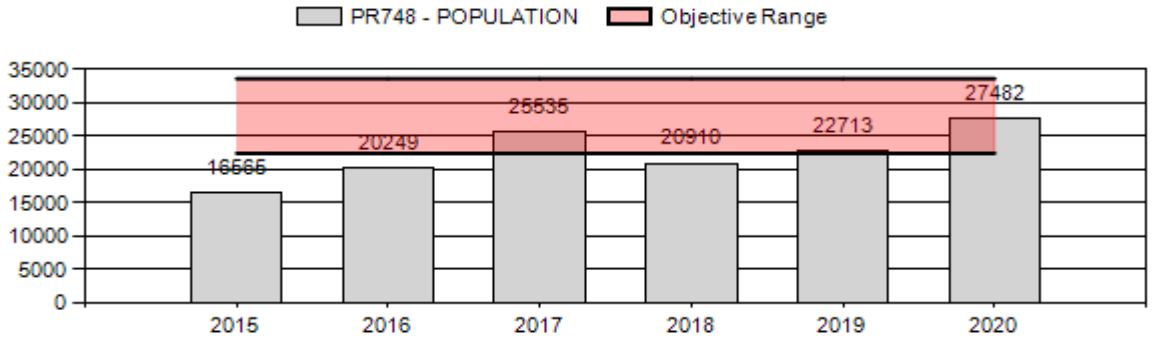
Number of years population has been + or - objective in recent trend: 10

Model Date: 02/11/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	4.5%	4.4%
Males ≥ 1 year old:	23.6%	20.6%
Total:	28.1%	26.6%
Proposed change in post-season population:	-10.3%	-7.3%

Population Size - Postseason



2021 HUNTING SEASONS

North Converse Pronghorn Herd Unit (PR748)

Hunt Area	Hunt Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
25	1	Aug. 15	Sep. 30	Oct. 1	Oct. 14	600	Any antelope
25	6	Aug. 15	Sep. 30	Oct. 1	Oct. 14	200	Doe or fawn
26	1	Aug. 15	Sep. 23	Sep. 24	Oct. 14	1300	Any antelope
26	6	Aug. 15	Sep. 23	Sep. 24	Oct. 14	500	Doe or fawn

2020 Hunter Satisfaction: 85.7% Satisfied, 9.1% Neutral, 5.2% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** Pronghorn numbers are within 2% of objective and showing an upward trend for the herd unit. The 2021 season structure was unchanged from the 2020 season. Drought conditions, poor fawn survival, and increasingly lower hunter success prompted managers to reduce the Type 1 licenses by 300 and Type 6 licenses by 250 in Hunt Area 25. 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. License issuance was maintained in Hunt Area 26 to limit population growth overall while reducing high buck ratios to within recreational management criterion. Significant declines have been detected in adjacent herds due to the severity of the winters the previous two years. Managers believe Hunt Area 25 has experienced similar declines, while Hunt Area 26 appears to have not been impacted to the same extent. Managers speculate Hunt Area 26 may have stabilized or shown a slight decline that the current model is not accurately representing, however that is not certain.

2) In 2020, horn length measurements (N=111) were collected from adult male pronghorn, with average horn length being 11.3 inches. A total of 14% of bucks were $\geq$ 13 inches. Managers can use these measurements to evaluate horn growth trends over time as this dataset grows.

3) This population has trended upward over the past eight years and should continue to slowly increase with the prescribed harvest. There are concerns recent drought conditions and lower fawn ratios in the past two years may 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.

4) Line transect surveys are not 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.

5) The 3-year average harvest for this herd unit is 22.6% of the model-based preseason population of >1 yr. old males. Type 1 license issuance was not increased to meet the goal of 25% harvest as the limited access, decreasing hunter success, and declining numbers in Hunt Area 25 do not warrant an increase.

Table 1.

2015 - 2020 Preseason Classification Summary

for Pronghorn Herd PR748 - NORTH CONVERSE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to	
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int
2015	18,382	196	251	447	21%	896	41%	820	38%	2,163	3,717	22	28	50	± 4	92	± 7
2016	21,902	197	216	413	24%	716	41%	609	35%	1,738	3,480	28	30	58	± 6	85	± 7
2017	27,642	154	329	483	30%	624	39%	510	32%	1,617	3,643	25	53	77	± 7	82	± 8
2018	23,662	189	336	525	23%	968	43%	748	33%	2,241	2,980	20	35	54	± 5	77	± 6
2019	25,619	147	448	595	27%	967	44%	619	28%	2,181	3,152	15	46	62	± 5	64	± 5
2020	30,086	144	348	492	29%	725	43%	477	28%	1,694	2,954	20	48	68	± 6	66	± 6

2020 - JCR Evaluation Form

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

HERD: PR750 - BLACK THUNDER

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

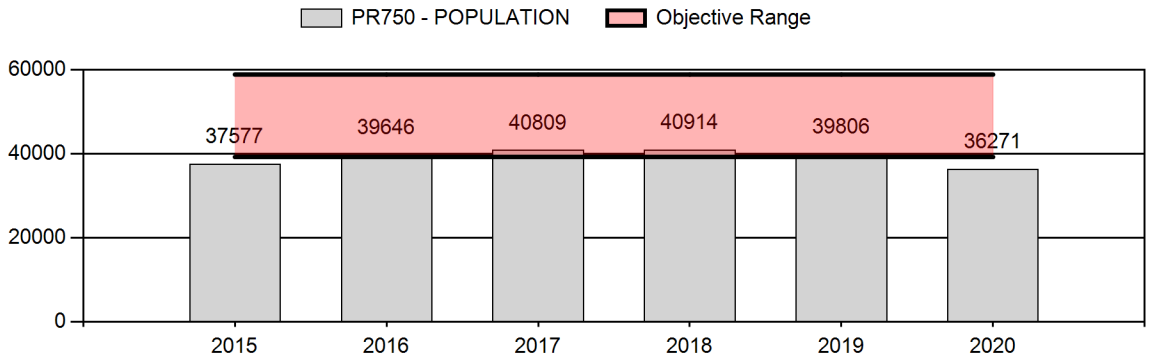
	2015 - 2019 Average	2020	2021 Proposed
Population:	39,750	36,271	38,422
Harvest:	4,097	3,632	2,584
Hunters:	4,540	4,067	3,125
Hunter Success:	90%	89%	83 %
Active Licenses:	4,962	4,406	3,350
Active License Success:	83%	82%	77 %
Recreation Days:	14,584	12,939	9,900
Days Per Animal:	3.6	3.6	3.8
Males per 100 Females	48	43	
Juveniles per 100 Females	72	61	

Population Objective (± 20%) :	49000 (39200 - 58800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-26.0%
Number of years population has been + or - objective in recent trend:	12
Model Date:	05/19/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	4.5%	2.4%
Males ≥ 1 year old:	35.6%	25.4%
Total:	9.9%	6.9%
Proposed change in post-season population:	+2.0%	+6.0%

Population Size - Postseason



2021 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	100	Any antelope
4	6	Aug. 15	Sep. 30	Oct. 1	Nov. 20	25	Doe or fawn
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	250	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	400	Any antelope
7	8	Aug. 15	Sep. 30	Oct. 1	Oct. 31	75	Doe or fawn valid in that portion of Area 7 east of Highway 116 and south of Mush Creek
8	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	250	Any antelope
9	1	Aug. 15	Sep. 30	Oct. 1	Oct. 31	375	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	100	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. 31	250	Any antelope
24	2	Aug. 15	Sep. 30	Oct. 1	Oct. 31	425	Any antelope valid on private land
24	6	Aug. 15	Sep. 30	Oct. 1	Oct. 31	50	Doe or fawn
24	7	Aug. 15	Sep. 30	Oct. 1	Oct. 31	125	Doe or fawn valid on private land

27	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	250	Any antelope
27	7	Aug. 15	Sep. 30	Oct. 1	Oct. 15	25	Doe or fawn valid on private land
29	1	Aug. 15	Sep. 30	Oct. 1	Oct. 15	125	Any antelope
29	2	Aug. 15	Sep. 30	Oct. 1	Oct. 31	400	Any antelope valid on private land
29	7	Aug. 15	Sep. 30	Oct. 1	Oct. 31	200	Doe or fawn valid on private land

2020 Hunter Satisfaction: 84.2% Satisfied 8.2% Neutral 7.6% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** This herd grew moderately through 2017, but appears to have declined substantially over the past three years despite model projections. The recent decline has been due to reduced recruitment stemming from lower fawn production and survival during the 2018-19 winter and subsequent spring, coupled with fairly severe drought in 2020. In addition, the 2018-19 winter resulted in significant mortality in adult pronghorn. Given the population decline, harvest was reduced 20% during the 2020 hunting season. The more conservative season resulted in hunter success and hunter effort remaining stable, although many hunters reported difficulty finding antelope. The 2019 end-of-bio-year Line Transect (LT) estimate for this herd was the lowest to date, and the spreadsheet model was unable to track the population through its confidence intervals. Given a continued decline in the population, hunting seasons were even more conservative in 2021. Overall, there was a reduction of 925 any-antelope licenses, and 575 licenses valid for doe or fawn. This included the elimination of two types of doe/fawn licenses (HA 6 Type 6 & HA7 Type 7). However, a new Type 8 license was made available for a portion of HA 7 to address a specific damage concern. Changes to the 2021 hunting season should allow this herd to grow slightly in 2022 and maintain the pre-season buck:doe ratio at about 45:100, with 25% of the preseason population of adult bucks projected to be taken (compared to the most recent three-year average of 38%). See Appendix 1 for 2015-2020 preseason classification summary.

2) **Concerns with this population:** The population estimate for this herd is thought to be fair given the model selection changed again this year. LT estimates for bio-years 2014, 2016, and 2019 trend in a manner congruent with field personnel, hunter, and landowner impressions. However, we can neither model through the seemingly high values for 2014 and 2016, nor the low 2019 estimate. It is suspected that the 2014 and 2016 estimates are very high, while the 2019's may be closer to reality. For some reason, changes to the single observer LT technique have resulted in substantially higher density estimates, which do not comport with field observations. With the change in model selection to a simpler model and reliance on only three of five LT estimates, post-season population estimates and trends reported on page 1 are now more in line with field observations and current model estimates. Finally, 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.

Appendix 1

2015 - 2020 Preseason Classification Summary

for Pronghorn Herd PR750 - BLACK THUNDER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	41,130	482	659	1,141	19%	2,558	43%	2,235	38%	5,934	3,717	19	26	45	± 2	87	± 4	60
2016	43,983	617	763	1,380	22%	2,770	44%	2,096	34%	6,246	3,046	22	28	50	± 3	76	± 3	51
2017	45,477	631	1,033	1,664	22%	3,343	44%	2,526	34%	7,533	3,069	19	31	50	± 2	76	± 3	50
2018	45,886	413	908	1,321	23%	2,766	49%	1,613	28%	5,700	1,957	15	33	48	± 2	58	± 3	39
2019	44,809	262	817	1,079	23%	2,191	47%	1,374	30%	4,644	2,238	12	37	49	± 3	63	± 3	42
2020	40,266	204	657	861	21%	2,025	49%	1,235	30%	4,121	2,781	10	32	43	± 3	61	± 3	43

2020 - JCR Evaluation Form

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

HERD: MD740 - CHEYENNE RIVER

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

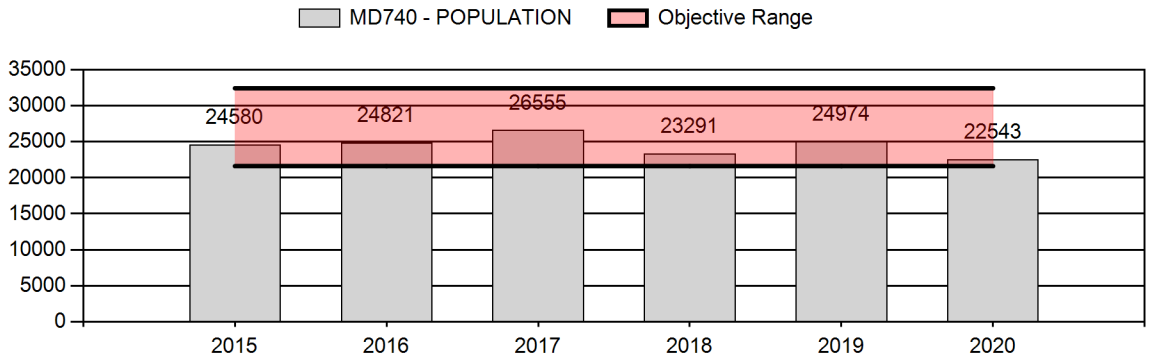
	2015 - 2019 Average	2020	2021 Proposed
Population:	24,844	22,543	23,575
Harvest:	1,260	1,275	1,250
Hunters:	2,048	2,440	2,350
Hunter Success:	62%	52%	53%
Active Licenses:	2,074	2,475	2,380
Active License Success:	61%	52%	53%
Recreation Days:	7,824	10,073	9,750
Days Per Animal:	6.2	7.9	7.8
Males per 100 Females	43	39	
Juveniles per 100 Females	66	41	

Population Objective (± 20%) :	27000 (21600 - 32400)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-16.5%
Number of years population has been + or - objective in recent trend:	12
Model Date:	03/01/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	0.7%	1.2%
Males ≥ 1 year old:	20.4%	21.0%
Total:	5.6%	5.5%
Proposed change in post-season population:	-8.5%	+4.8%

Population Size - Postseason



2021 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
9	7	Sep. 1	Sep. 30	Nov. 1	Nov. 30	75	Doe or fawn valid on private land east of U.S. Highway 85
10	1	Sep. 1	Sep. 30	Oct. 1	Oct. 21	150	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	100	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	100	Doe or fawn valid on private land

2021 Region B Nonresident Quota: 1,350 licenses

2020 Hunter Satisfaction: 66% Satisfied 17% Neutral 17% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** With excellent productivity and survival in 2014 and 2015, this herd experienced significant growth following a nadir 35% below objective in 2012. Since 2016, productivity and survival have generally declined. As a result, herd growth was curtailed, the population leveled off about 10% below objective, and then it dropped the last two years. During this timeframe, buck:doe ratios fell to more reasonable values as harvest of bucks remained fairly consistent while the population declined. In 2020, harvest and hunter satisfaction statistics suggest this population may have declined more than the 9% indicated by

the population model. Since population estimates for this herd are thought to be fair, and the trends produced by the model generally accurate, a conservative hunting season structure was again implemented in 2021. The changes made included reducing the Region B quota, while Type 6 & 7 license issuance was increased by 125 licenses. The reduction in the Region B quota is intended to reduce buck harvest as this population drops in order to maintain hunter success and limit the decline in buck:doe ratios. See Appendix 1 for 2015-2020 post-season classification summary. Additionally, access limitations further warrant this reduction as landowners significantly curtail private land access when this mule deer population declines. In contrast, the limited quota season for HA 10 was unchanged because the buck ratio there has been strong, and age and antler class of harvested buck pretty consistent (Appendix 2). The provisions for limited antlerless harvest are to address specific damage issues on private land in Hunt Areas (HAs) 9, 12, 13, 14 and 21. This proviso was extended to HAs 13 and 14 by changing the former HA 12 Type 6 to a HA 12, 13, 14 Type 7 license valid on private land.

2) **Chronic Wasting Disease Management:** Prior to 2018, approximately 1,750 mule deer from this herd unit (the vast majority of which were hunter-harvested) were tested for CWD, with 2.2% testing positive. In 2020, the herd was prioritized as a Tier 1 surveillance herd. Prevalence estimates and sample sizes for CWD sampling since 2018 are presented below (Table1). During 2020, we obtained 79% (158 samples) of the sampling goal of 200 adult buck mule deer. Tested deer represented 12.4% of the reported buck harvest. Sample distribution of mature males was fairly reasonable, and what could be expected given most of the deer are harvested on private land. Although, only 31% of the samples came from contiguous HAs 7, 8, 9, 11 & 21, which compose almost half of the herd unit. As has been the case historically, the majority of CWD positive animals came from the southern part of herd unit in HAs 13 & 14. To date, no CWD management actions have occurred in this herd unit.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%, n)	Yearling Males	Adult Females
2020	**13.9% (**unk**, n=158)**	8.6% (23)	0% (6)
2018 - 2020	**11.9% (7.4 – 16.5%, n=267)**	6.0% (33)	0% (14)

Table 1. CWD prevalence for hunter-harvested mule deer in the Cheyenne River Mule Deer Herd, 2018-2020.

Appendix 1

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD740 - CHEYENNE RIVER

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	24,580	268	193	76	15	43	595	20%	1,373	46%	1,009	34%	2,977	1,672	20	24	43	± 3	73	± 4	51
2016	24,821	298	297	90	8	0	693	23%	1,371	46%	916	31%	2,980	1,506	22	29	51	± 3	67	± 3	44
2017	26,555	264	413	109	12	0	798	21%	1,777	48%	1,143	31%	3,718	1,371	15	30	45	± 2	64	± 3	44
2018	23,291	132	399	114	8	0	653	20%	1,669	51%	970	29%	3,292	1,133	8	31	39	± 2	58	± 3	42
2019	24,974	110	172	75	6	5	368	18%	991	47%	731	35%	2,090	1,400	11	26	37	± 3	74	± 4	54
2020	22,543	121	219	92	9	0	441	22%	1,127	55%	465	23%	2,033	1,416	11	28	39	± 3	41	± 3	30

Appendix 2

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

2020 - JCR Evaluation Form

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

HERD: MD751 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

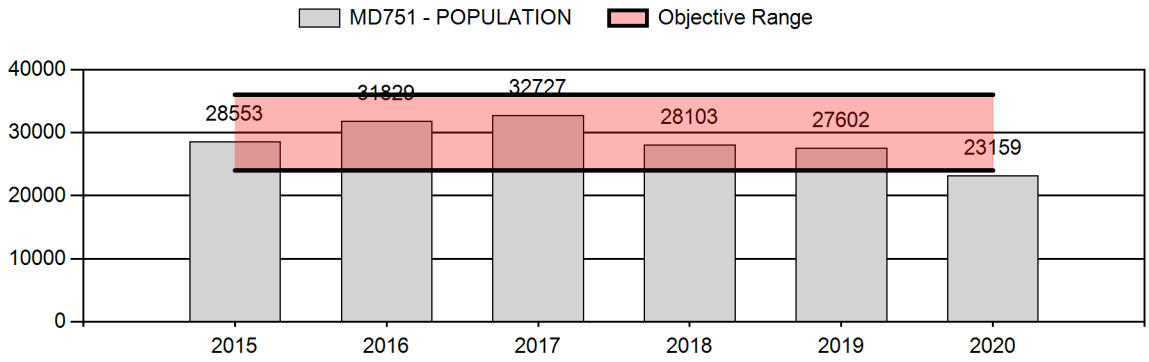
	2015 - 2019 Average	2020	2021 Proposed
Population:	29,763	23,159	22,538
Harvest:	2,442	1,945	1,846
Hunters:	5,356	5,277	4,995
Hunter Success:	46%	37%	37 %
Active Licenses:	5,553	5,446	5,155
Active License Success:	44%	36%	36 %
Recreation Days:	15,784	16,851	16,000
Days Per Animal:	6.5	8.7	8.7
Males per 100 Females	29	24	
Juveniles per 100 Females	71	48	

Population Objective (± 20%) :	30000 (24000 - 36000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-22.8%
Number of years population has been + or - objective in recent trend:	3
Model Date:	02/22/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	3.9%	4.1%
Males ≥ 1 year old:	33.0%	35.9%
Total:	8.5%	8.3%
Proposed change in post-season population:	-16.0%	-2.7%

Population Size - Postseason



2021 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. 30	3,000	Doe or fawn valid on private land
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 30		Antlered deer off private land; any deer on private land
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 30		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	300	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	200	Doe or fawn
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land

2021 Region A nonresident quota: 3,750 licenses

2020 Hunter Satisfaction: 77% Satisfied 13% Neutral 10% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** This herd has shown cyclic population fluctuations since at least the 1960's. Following a population low in 2012, the herd rebounded in large part due to excellent productivity and survival in 2014 and 2015. The population peaked in 2016 about 6% above objective. At the same time, post-season buck:doe ratios climbed well above historic values. Since 2016 recruitment has declined. In addition, over-winter mortality of all age classes was amplified in bio-year 2018, and drought in combination with other factors, resulted in very low fawn numbers in 2020. Because hunting seasons remained fairly consistent as the population dropped, post-season buck:doe ratios have returned to long-term values around 23

bucks per 100 does. See Appendix 1 for 2015-2020 post-season classification summary.

Population estimates for this herd are thought to be fair, and shifts produced by the model are congruent with changes in pre-season trend counts. As a result, more conservative hunting seasons have been implemented since 2020. The 2021 changes entailed a reduction in non-resident, Region A General licenses by 250 tags, and total doe/fawn license availability diminished by 500. Continued issuance of Type 7 licenses at this level will enable antlerless harvest amounting to about 325 antlerless mule deer in addition to the approximately 100 taken on General licenses. The majority of antlerless mule deer harvest occurs in Hunt Area 1. Because Type 7 licenses are undersubscribed, valid only on private land, and are primarily used (about two-thirds of them) to harvest white-tailed deer, managers are reluctant to reduce their issuance further as harvest of sympatric, antlerless whitetails is needed to manage that population. Considering the distributional shifts by deer over the past year, Type 7 license issuance will buffer total sales, yet give those landowners with increased deer densities the opportunity control numbers, while landowners with low deer numbers can simply prohibit access and harvest.

2) **Management Objective Review:** Management objectives for this herd were reviewed in 2020 and discussed again internally in 2021. Both reviews resulted in the decision not to make changes. The Department will continue to manage for 30,000 mule deer post-season in the Black Hills using a recreational management strategy. The population objective set in 2015 represented a 50% increase over the former objective, which was in place for over 30 years. Because area managers and most landowners were very comfortable with mule deer numbers in 2016 and 2017 when this population was estimated to be at objective, and many would like to see an increase in mule deer numbers now that the population has dropped below objective, it is reasonable not to make a change. This mule deer population is very productive compared to most, and can increase substantially when conditions are favorable. As such, maintaining recreational hunting is justified. This allows area managers to provide ample hunting opportunity and attract more non-resident hunters who play a key role in managing the sympatric population of white-tailed deer. Finally, we believe habitat conditions are not a limiting factor in managing this herd towards, or maintaining it at the current objective.

3) **Chronic Wasting Disease (CWD):** Prior to the 2018 hunting season, just under 1,100 mule deer from the Black Hills had been tested for CWD. The vast majority of those were hunter-harvested, of which 0.2% were found to have the disease. A total of 142 mule deer have been tested for CWD since 2018, as the herd is currently prioritized as a Tier 2 surveillance herd. Of those deer tested, 7.7% were CWD-positive, all adult bucks. To date, no CWD management actions have occurred in this herd unit.

Appendix 1

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD751 - BLACK HILLS

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	28,553	158	90	16	0	9	273	14%	939	48%	746	38%	1,958	1,812	17	12	29	± 2	79	± 5	62
2016	31,829	182	183	32	0	0	397	17%	1,113	49%	762	34%	2,272	1,467	16	19	36	± 3	68	± 4	50
2017	32,727	146	216	57	2	0	421	16%	1,343	50%	917	34%	2,681	1,429	11	20	31	± 2	68	± 4	52
2018	28,103	71	109	15	2	0	197	12%	884	53%	582	35%	1,663	1,297	8	14	22	± 2	66	± 4	54
2019	27,602	67	98	21	1	0	187	12%	822	51%	597	37%	1,606	1,508	8	15	23	± 2	73	± 5	59
2020	23,159	65	99	38	7	0	209	14%	884	58%	425	28%	1,518	1,462	7	16	24	± 2	48	± 4	39

2020 - JCR Evaluation Form

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

HERD: MD755 - NORTH CONVERSE

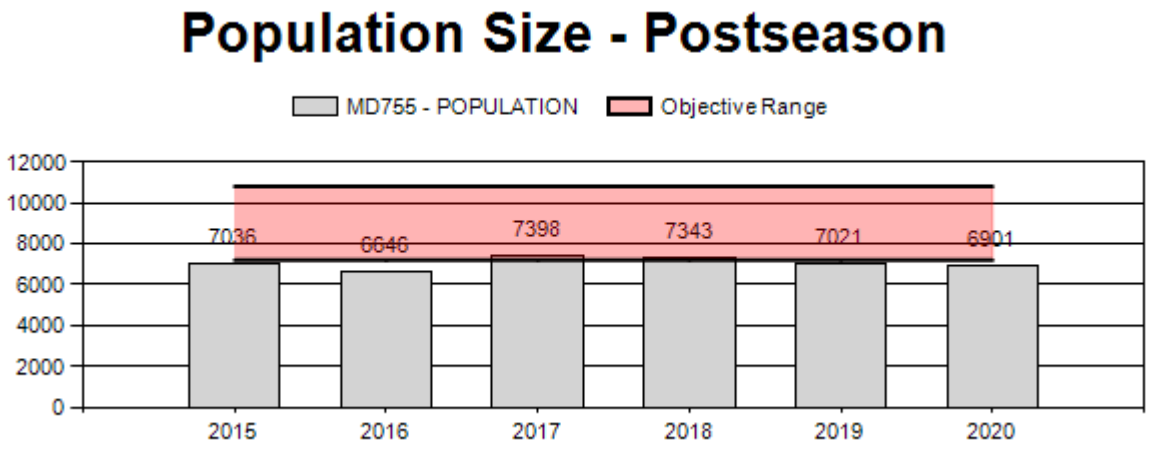
HUNT AREAS: 22
PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Population:	7,089	6,901	7,248
Harvest:	250	274	275
Hunters:	306	418	400
Hunter Success:	82%	66%	69%
Active Licenses:	306	418	400
Active License Success:	82%	66%	69 %
Recreation Days:	1,103	1,676	1,400
Days Per Animal:	4.4	6.1	5.1
Males per 100 Females	46	46	
Juveniles per 100 Females	73	53	

Population Objective (± 20%) :	9000 (7200 - 10800)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-23.3%
Number of years population has been + or - objective in recent trend:	12
Model Date:	02/12/2021

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:	15.5%	15.4%
Total:	15.5%	15.4%
Proposed change in post-season population:	-4.9%	-3.9%



2021 HUNTING SEASONS
North Converse Mule Deer Herd Unit (MD755)

Hunt Area	Hunt Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
22	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	500	Antlered mule deer or any white-tailed deer

2020 Hunter Satisfaction: 65% Satisfied, 13% Neutral, 22% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** The 2021 season structure was conservative in an effort to promote population growth and maintain buck ratios within special management parameters. License numbers were kept unchanged from the 2020 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.

2) **Chronic Wasting Disease Management:** There were no CWD management actions taken in the North Converse herd unit in 2020. To date, we do not have any meaningful CWD prevalence data for this herd.

3) 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. The fawn ratio observed in 2019 was significantly lower than average from the prior five year period. This was likely a result of a very cool, wet spring during peak parturition period. This low fawn ratio continued into 2020 instead with drought conditions prevailing through the parturition period and throughout the summer.

4) 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.

5) In 2020, 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.

6) Buck ratios are consistently high in this herd. They have averaged 50 bucks:100 does over the past five years.

7) The increasing population trend simulated by the current model is not accurately reflected

in the graph on page 1. As the model has evolved, it has not remained congruent with past model simulations.

Table 1.

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD755 - NORTH CONVERSE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	7,036	65	54	35	10	0	164	18%	393	43%	351	39%	908	1,858	17	25	42	± 5	89	± 8	63
2016	6,646	37	42	24	2	14	119	18%	324	49%	217	33%	660	1,224	11	25	37	± 5	67	± 7	49
2017	7,398	41	98	42	7	0	188	22%	383	44%	295	34%	866	1,588	11	38	49	± 5	77	± 7	52
2018	7,343	36	75	16	0	0	127	31%	159	39%	123	30%	409	1,825	23	57	80	± 12	77	± 12	43
2019	7,021	51	93	41	1	0	186	20%	460	51%	262	29%	908	1,644	11	29	40	± 4	57	± 5	41
2020	6,901	25	82	41	2	0	150	23%	326	50%	173	27%	649	1,240	8	38	46	± 6	53	± 6	36

2020 - JCR Evaluation Form

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

HERD: MD756 - SOUTH CONVERSE

HUNT AREAS: 65 | PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Population:	5,674	5,243	5,218
Harvest:	261	301	270
Hunters:	708	867	750
Hunter Success:	37%	35%	36 %
Active Licenses:	708	867	750
Active License Success:	37%	35%	36 %
Recreation Days:	2,610	3,647	3,000
Days Per Animal:	10	12.1	11.1
Males per 100 Females	42	38	
Juveniles per 100 Females	62	43	

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

Management Strategy: Private Land

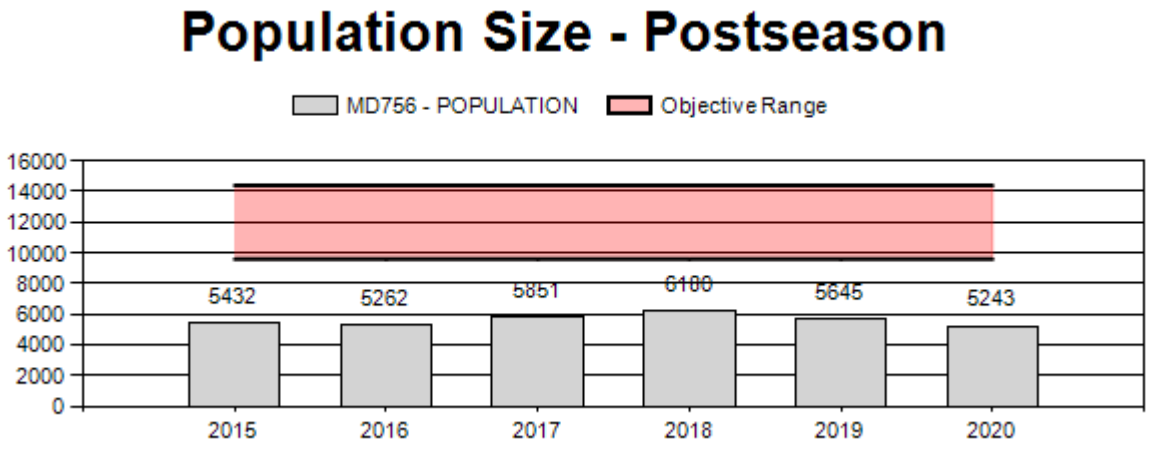
Percent population is above (+) or below (-) objective: -56.3%

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

Model Date: 02/16/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	0.2%	0%
Males ≥ 1 year old:	19.5%	20.9%
Total:	19.7%	20.9%
Proposed change in post-season population:	-4.9%	-5.5%



2021 HUNTING SEASONS

South Converse Deer Herd Unit (MD756)

Hunt Area	License Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
65	GEN	Sep. 1	Sep. 30	Oct. 15	Oct. 31		Antlered mule deer three (3) points or more on either antler or any white-tailed deer

2021 Region J nonresident quota: 900 licenses

2020 Hunter Satisfaction: 52% Satisfied, 25% neutral, 23% Dissatisfied

2021 Management Summary

1) Hunting Season Evaluation: The 2021 season structure was kept unchanged from the 2020 season. The season continued to go until Oct. 31 with a 3-point or better antler point restriction to increase harvest of mature mule deer bucks. This was put in place to maintain buck numbers on accessible public lands while also increasing opportunity throughout the hunt area, especially on private lands where buck ratios remain high and more opportunity could be provided. The 2021 season will be the fourth year of the extended 17-day season and antler point restriction. 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 recently started to show a downward trend.

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. This hunt area has been sampled fairly consistently over the years. Sample sizes have varied by year, however CWD prevalence has averaged 38% (n=141) over the past 6 years in adult male mule deer. The 2020 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.

3) After the heavy snow storms of the previous winter, the spring and summer of 2020 brought drought conditions to the area which persisted through the 2020/2021 winter.

4) Classification flight time was limited to <5 hours of survey time. However, when coupled with ground classifications, a smaller than objective, but reasonable sample size (n=704) was achieved. Managers are therefore confident in observed ratios.

5) Fawn ratios showed a marked decrease in 2019 and 2020, which will likely lead to continued population stagnation or decline.

6) This herd unit is slated for a sightability survey/abundance estimate within the next few years to anchor the population model.

7) After the lowest harvest reported in Hunt Area 65 since 1991 in 2019, mule deer harvest in 2020 was back up to similar harvest as prior years.

8) In 2020, we collected antler spread measurements (n=24) from adult male mule deer harvested in the South Converse Herd Unit. Class II bucks represented 58% of all bucks sampled, Class I bucks represented 33%, and Class III bucks represented the other 8%.

Table 1.

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD756 - SOUTH CONVERSE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to	
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int
2015	5,432	81	68	29	7	0	185	19%	458	48%	308	32%	951	1,164	18	23	40	± 4	67	± 6
2016	5,262	137	176	70	20	0	403	20%	1,030	51%	568	28%	2,001	900	13	26	39	± 2	55	± 3
2017	5,851	70	103	38	3	0	214	22%	453	46%	319	32%	986	1,315	15	32	47	± 5	70	± 6
2018	6,180	41	79	23	8	0	151	22%	299	44%	237	34%	687	1,571	14	37	51	± 6	79	± 8
2019	5,645	78	133	31	0	0	242	21%	608	52%	321	27%	1,171	1,281	13	27	40	± 3	53	± 4
2020	5,243	52	70	25	2	0	149	21%	388	55%	167	24%	704	1,030	13	25	38	± 4	43	± 5

2020 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD757 - BATES HOLE/HAT SIX

HUNT AREAS: 66-67

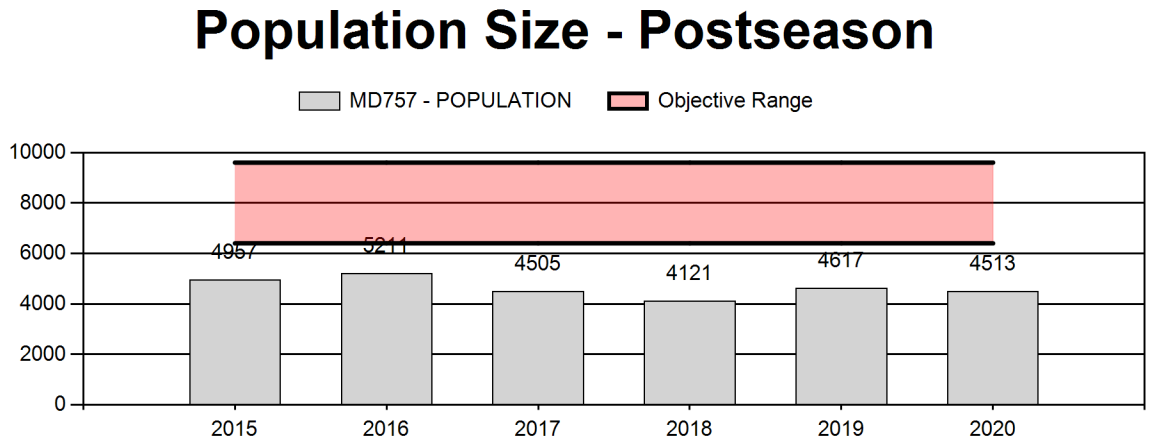
PREPARED BY: HEATHER O'BRIEN

	2015 - 2019 Average	2020	2021 Proposed
Population:	4,682	4,513	4,404
Harvest:	337	215	200
Hunters:	891	858	800
Hunter Success:	38%	25%	25%
Active Licenses:	891	858	800
Active License Success:	38%	25%	25%
Recreation Days:	3,377	3,082	2,500
Days Per Animal:	10.0	14.3	12.5
Males per 100 Females	32	32	
Juveniles per 100 Females	66	67	

Population Objective (± 20%) :	8000 (6400 - 9600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-43.6%
Number of years population has been + or - objective in recent trend:	20
Model Date:	02/25/2021

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:	22%	24%
Total:	8.8%	8.9%
Proposed change in post-season population:	-2.2%	-2.4%



2021 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

2021 Region D Nonresident Quota: 400

2020 Hunter Satisfaction: 43% Satisfied, 27% Neutral, 30% Dissatisfied

2021 Management Summary:

1.) Hunting Season Evaluation: The model for this herd depicts a population that has been consistently under objective with a fairly stable population trend. It is unlikely this trend line is accurate, as managers recall years when there were far more mule deer in the herd than are accounted for by the model. After being at very low levels through 2012, this population grew through 2017 but has since declined. Harvest data are difficult for the model to interpret, with antler-point restrictions (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. Annual survival estimates derived from GPS-collar data will be added from a study initiated in March 2021. These independent estimates will contribute additional discrete data points which should improve model performance.

Postseason classifications have yielded mediocre fawn ratios in the 60s per 100 does for the last six years. Classification surveys showed a slight increase in yearling bucks, and a slightly improved proportion of mature (class II & III) bucks in 2019 and 2020 (Table 1). 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 3-year cycle. The APR was thus maintained for the 2020 season. Severe drought conditions persisted during the 2020 growing season and throughout the fall, and hunters were able to access much of the herd unit. Still, harvest success remained low (25%) for the second year compared to the five-year average of 38 percent. The influence of drought

on deer distribution, constraints of the APR, and low total deer numbers likely all contributed to low harvest success in 2020.

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

Table 1. Antler classification analysis for **Area 66** within the Bates Hole/Hat Six Mule Deer Herd Unit, 2008 – 2020.

For the 2021 hunting season, managers prescribed a 7-day general license season, which is typical for the herd. The APR remained as a limitation for harvested mule deer, 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.) Management Objective Review: There was no review scheduled for 2021.

3.) Chronic Wasting Disease Management: Bates Hole – Hat Six is a Tier 2 surveillance herd that was prioritized for Chronic Wasting Disease (CWD) sampling as a component of ongoing research in 2020. Prevalence estimates and sample sizes are presented in Table 2. For this

surveillance period, a total of 143 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.

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Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*	
	Adult Males (CI = 95%)	Yearling Males
2020	**25% (n=61)**	0% (5)
2018-2020	**27% (15-35%, n=143)**	21% (24)

Table 2. CWD prevalence for hunter-harvested male mule deer in the Bates Hole – Hat Six Mule Deer Herd, 2018 - 2020.

4.) Additional Surveys: As part of the Mule Deer Initiative in this herd unit, managers analyzed regional PRISM precipitation from 2015-2020. See Appendix A for a summary of weather data as it pertains to the Bates Hole / Hat Six Mule Deer Herd Unit. Managers also 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 2020 reporting period.

In 2019 a multi-year research project was initiated in the 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. Thus far a number of mountain lions have been captured and fitted with GPS collars, and collection of spatial and predation data has begun. Mule deer capture and collaring efforts are scheduled for March 2021. Deer GPS collars will provide spatial data, CWD prevalence data, as well as adult and fawn survival data to be incorporated into the population model.

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD757 - BATES HOLE/HAT SIX

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	4,957	164	97	29	13	0	303	15%	1,039	50%	719	35%	2,061	1,208	16	13	29	± 2	69	± 3	54
2016	5,211	132	198	31	4	0	365	20%	886	48%	585	32%	1,836	1,236	15	26	41	± 3	66	± 4	47
2017	4,505	54	108	23	4	0	189	16%	611	52%	365	31%	1,165	1,216	9	22	31	± 3	60	± 4	46
2018	4,121	32	59	7	0	0	98	13%	384	52%	252	34%	734	1,161	8	17	26	± 3	66	± 6	52
2019	4,617	55	89	10	4	0	158	15%	536	51%	356	34%	1,050	1,058	10	19	29	± 3	66	± 5	51
2020	4,513	43	41	6	0	0	90	16%	278	50%	187	34%	555	1,070	15	17	32	± 5	67	± 8	51

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

Precipitation

From October 2019 through September 2020 (Water Year 2020), precipitation in the Bates Hole / Hat Six Mule Deer Herd Unit was almost 3 inches lower than the 30-year average for the same water year timeframe (Figure 1). The growing season (April-June) precipitation in 2020 (3.1 inches) was also about 3 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 2020, typically the driest months during the summer, the Bates Hole / Hat Six Mule Deer Herd Unit received only 0.6 inches of precipitation which is about one third of the 30-year average for July and August. The herd unit received 1.4 inches of precipitation during September and October 2020, which is a little over half of the 30-year average of 2.6 inches. Precipitation received during this timeframe is beneficial to help jumpstart plant growth the following growing season. Overall, this herd unit received much lower precipitation in 2020 than 30-year averages across all seasons analyzed. While habitat conditions in upper Bates Hole are faring better, lower Bates Hole is showing the effects of such a poor water year. The 2021 water year precipitation thus far (October 2020 – April 2021) is 6.7 inches. 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 2021 water year may also be poor which will further exacerbate the effects of the low precipitation from 2020.

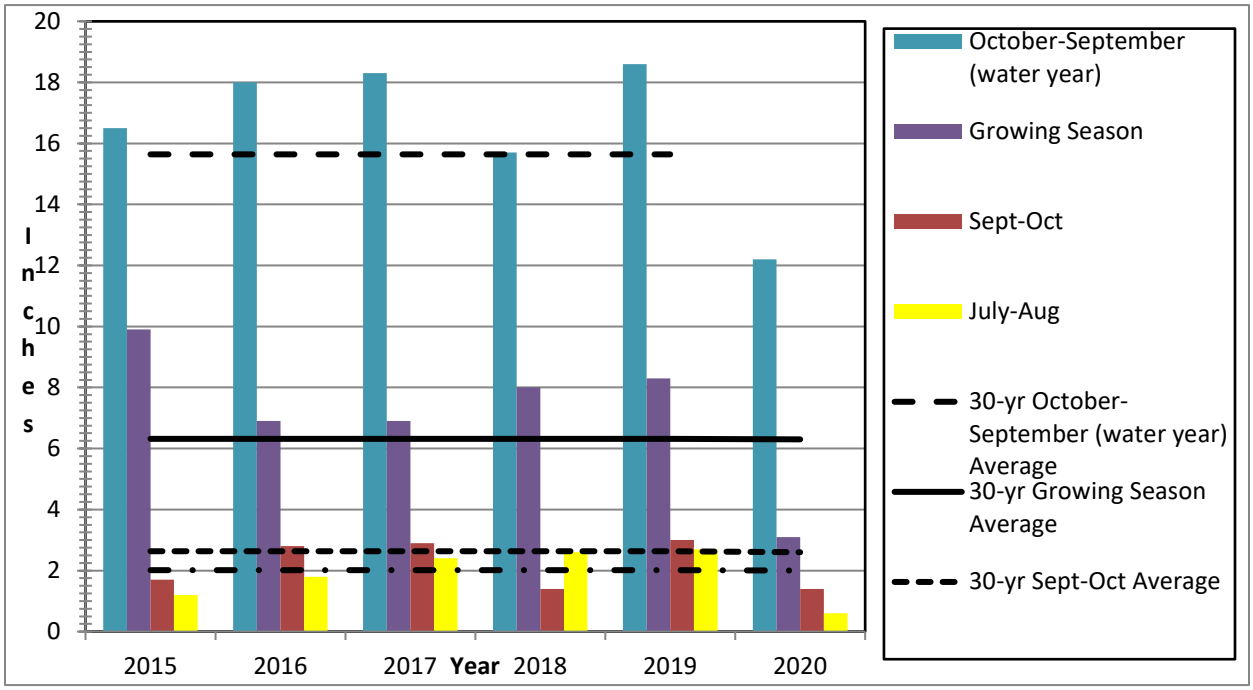


Figure 1. Seasonal precipitation received compared to 30-year averages within the Bates Hole / Hat Six Mule Deer Herd Unit.

2020 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD758 - RATTLESNAKE

HUNT AREAS: 88-89

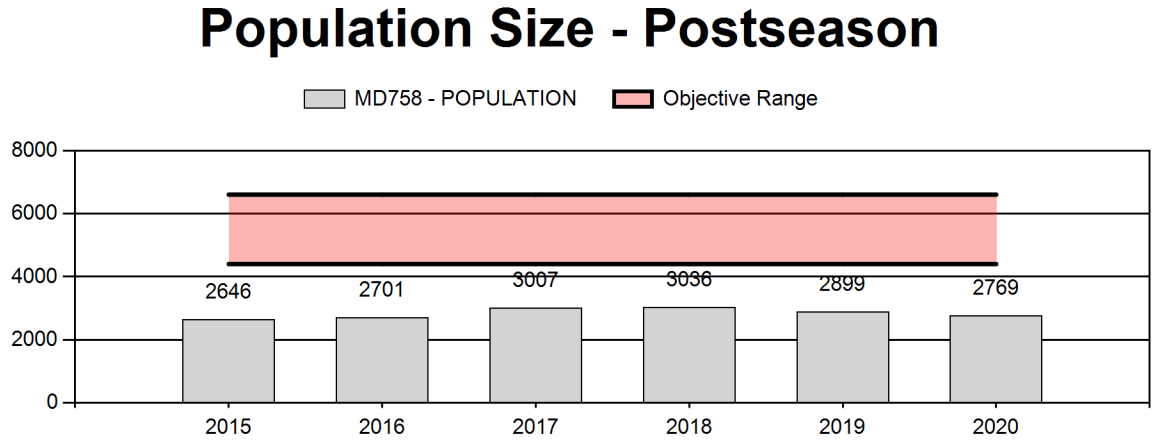
PREPARED BY: HEATHER O'BRIEN

	2015 - 2019 Average	2020	2021 Proposed
Population:	2,858	2,769	2,834
Harvest:	205	274	225
Hunters:	379	527	420
Hunter Success:	54%	52%	54 %
Active Licenses:	379	527	420
Active License Success:	54%	52%	54 %
Recreation Days:	1,335	1,914	1,575
Days Per Animal:	6.5	7.0	7
Males per 100 Females	46	40	
Juveniles per 100 Females	71	56	

Population Objective (± 20%) :	5500 (4400 - 6600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-49.7%
Number of years population has been + or - objective in recent trend:	15
Model Date:	02/25/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	0.8%	0.8%
Males ≥ 1 year old:	36.6%	32.9%
Total:	8.9%	7.3%
Proposed change in post-season population:	-6.9%	2.3%



2021 HUNTING SEASONS
RATTLESNAKE MULE DEER HERD (MD758)

Hunt Area	Type	Archery Dates		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	125	Antlered mule deer or any white-tailed deer

2020 Hunter Satisfaction: 60% Satisfied, 22% Neutral, 18% Dissatisfied

2021 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. Population size appears to have gradually declined from 2018-present, as fawn production and overwinter survival have decreased. The trends depicted by the model are reasonable, and an independent abundance estimate was added to the 2019 bio-year that helps align the model for more accurate population estimates.

Postseason classification data were collected from the ground and using a stratified random-sample survey design via helicopter 2020. The resulting sample size (N=485) was significantly smaller compared to previous years with more extensive flight budget and aerial coverage. Despite this, managers believe the resulting demographic data reasonably represent the population, as the survey was well-distributed across the herd, and resulting data are comparable to those seen in adjacent herds for 2020. Despite good observed buck ratios in Area 89, harvest success on Type 1 licenses dropped below 70% in 2020. General license success in Area 88 was 45%, which is comparable to the 5-year average. The proportion of mature age class (class II & class III) bucks increased slightly during postseason classification surveys (Table 1). However, overall population size seems to be declining after harsh winter conditions in 2019-2020 followed by severe drought. Stagnant harvest success combined with two years of poor fawn production lead managers to prescribe a more conservative season in 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	1,220	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

Table 1. Antler classification data for Area 89 within the Rattlesnake Mule Deer Herd unit, 2008-2020.

The 2021 season continues to provide quality hunting opportunity while reducing harvest pressure to offset slower population growth. 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 125 Type 1 licenses were available for antlered deer, which is a decrease of 50 licenses compared to 2020.

2.) Management Objective Review: No review in 2020.

3.) Chronic Wasting Disease Management: Rattlesnake Mule Deer is a Tier 2 surveillance herd that was prioritized for CWD sampling in 2019 and 2020. Prevalence estimates and sample sizes are presented in Table 2. For this surveillance period, a total of 105 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%)
2020	**18.5% (n=54)**
2018-2020	**14.3% (7.1-22.5%, n=105)**

Table 2. CWD prevalence for hunter-harvested adult male mule deer in the Rattlesnake Mule Deer Herd, 2018 - 2020.

4.) Additional Surveys: Tooth samples and antler measurements were also collected from 48 harvested male mule deer in 2020. The average cementum annuli tooth age of those sampled was 4.5 years, and the average antler spread for the herd unit was 18.6 inches. Those deer harvested in Area 89 (N=28) had a slightly higher average tooth age of 5.05 years and a larger average antler spread of 19.7 inches (Table 3).

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

Table 3. Hunter-submitted tooth age and antler measurement data from Area 89 deer, 2009-2019.

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD758 - RATTLESNAKE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	2,646	96	97	41	3	0	237	22%	491	45%	371	34%	1,099	1,209	20	29	48	± 4	76	± 5	51
2016	2,701	58	96	30	3	0	187	19%	487	49%	314	32%	988	1,288	12	26	38	± 3	64	± 5	47
2017	3,007	50	89	95	5	0	239	22%	442	41%	392	37%	1,073	1,132	11	43	54	± 4	89	± 6	58
2018	3,036	79	109	27	2	0	217	24%	407	45%	286	31%	910	1,270	19	34	53	± 5	70	± 6	46
2019	2,899	34	65	21	1	0	121	19%	345	53%	184	28%	650	1,410	10	25	35	± 4	53	± 5	39
2020	2,769	24	45	25	4	0	98	20%	248	51%	139	29%	485	881	10	30	40	± 5	56	± 7	40

2020 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD759 - NORTH NATRONA

HUNT AREAS: 34

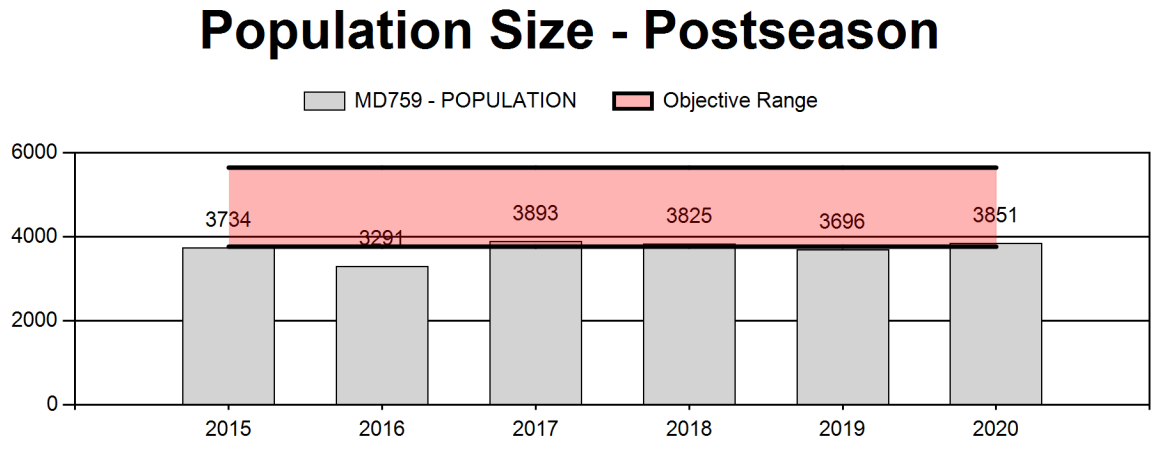
PREPARED BY: HEATHER O'BRIEN

	2015 - 2019 Average	2020	2021 Proposed
Population:	3,688	3,851	4,105
Harvest:	188	232	165
Hunters:	235	308	220
Hunter Success:	80%	75%	75 %
Active Licenses:	241	336	230
Active License Success:	78%	69%	72 %
Recreation Days:	1,120	1,353	975
Days Per Animal:	6.0	5.8	5.9
Males per 100 Females	45	34	
Juveniles per 100 Females	75	34	

Population Objective (± 20%) :	4700 (3760 - 5640)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-18.1%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/27/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	2.5%	2.7%
Males ≥ 1 year old:	16.3%	11.6%
Total:	5.6%	3.8%
Proposed change in post-season population:	-12.3%	6.6%



2021 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	200	Antlered mule deer or any white-tailed deer
	7	Sep. 1	Sep. 30	Oct. 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

2020 Hunter Satisfaction: 50% Satisfied, 17% Neutral, 3 3% Dissatisfied

2021 Management Summary:

1.) Hunting Season Evaluation: The model for this herd depicts a relatively stable population until the harsh winter of 2011. After a brief dip in numbers, the herd recovered and increased gradually until 2017. Moderate fawn production/survival from 2017-present resulted in a slowly declining herd, which is currently just below the population objective. The current model has no independent survival data or abundance estimates; thus it relies on consistent classification and harvest data alone. The model may not accurately predict population trends, as field managers believe the herd has declined in recent years. Thus the resulting population estimate from the model may be high. An independent abundance estimate would help to align trends for this herd and improve population estimates.

Postseason classification data were collected from the ground and via helicopter in 2020, but overall survey effort was reduced due to budget constraints. The resulting sample size (N=622) was lower compared to typical survey years with more thorough aerial coverage. Observed buck and fawn ratios were below 5-year averages, but are plausible given the harsh winter conditions of 2019-2020 and severe drought during the growing season. A lower proportion of Class I bucks were observed compared to the previous 3 years, which correlates to years of lower fawn production/survival in 2018-2019 (Table 1). Fawn production/survival seems to have decreased over the past three years, which has slowed population growth. Harvest success on Type 1 licenses has declined in the same time period and was only 66% in 2020, which is a 10-year low. Slower population growth, decreased harvest success, and

declining hunter satisfaction lead managers to prescribe a more conservative harvest for the fall of 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

Table 1. Antler classification data for the North Natrona Mule Deer Herd Unit, 2002-2020.

The 2021 season continues to provide hunting opportunity but reduces harvest pressure to compensate for slower population growth. A total of 200 Type 1, antlered mule deer licenses are available for the 2021 season, which is a decrease of 100 licenses compared to 2020. Due to ongoing damage issues, 100 Type 7 licenses will be available again in 2021, valid in the agricultural region of the herd unit east of the Bucknum Road (Natrona County Road 125) and south of the BNSF railroad.

2.) Management Objective Review: No review in 2020.

3.) Chronic Wasting Disease Management: North Natrona is a Tier 2 surveillance herd that was prioritized for CWD sampling in 2019 and 2020. Prevalence estimates and sample sizes

are presented in Table 2. For this surveillance period, a total of 157 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 of mature males was reasonable, although few samples were collected from the eastern parts of the herd unit. This area contains predominantly private land with limited hunting access. Despite marginal sample distribution the majority of positive mule deer were harvested in the southeastern part of the herd unit, where higher densities of deer congregate on irrigated agricultural lands. To date, no meaningful CWD management actions have occurred in this herd unit. However, data such as these suggest 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.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*
	Adult Males (CI = 95%)
2020	**7% (n=75)**
2018-2020	**6% (2.5-10.6%, n=157)**

Table 2. CWD prevalence for hunter-harvested adult male mule deer in the North Natrona Mule Deer Herd, 2018 - 2020.

4.) Additional Surveys: Tooth samples were collected from 72 harvested mule deer in 2020 (Table 3). The average cementum annuli tooth age of those sampled was 5.1 years (5-year average = 4.8), and the average antler spread was 18.2 inches (5-year average = 20.2 inches). It is difficult to definitively explain why harvested bucks had a higher average age but a smaller average antler spread compared to 5-year averages. A larger sample size in 2020 may have provided more representative data for the herd compared to previous years, increased license issuance may have increased harvest pressure on smaller bucks, or habitat conditions and changes in nutrition may have contributed to differences in antler growth between years.

	2010	2013	2014	2015	2016	2017	2018	2019	2020
Average Age	4.44	5.4	5.27	5.27	4.85	4.6	4.7	4.8	5.1
Median Age	4.5	5.5	4.5	4.5	5.5	4.5	4.5	4.5	4.5
Average Antler Spread	21.2	21.2	20	20.9	21.5	20.7	19.9	18.1	18.2
Sample Size (N) =	68	52	44	32	40	51	49	53	72

Table 3. Lab tooth age and antler spread data from Hunt Area 34 harvested deer, 2010-2020.

2015 - 2020 Postseason Classification Summary

for Mule Deer Herd MD759 - NORTH NATRONA

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	3,734	78	93	22	1	0	194	18%	452	42%	419	39%	1,065	1,236	17	26	43	± 4	93	± 7	65
2016	3,291	68	105	36	3	0	212	18%	571	47%	425	35%	1,208	1,336	12	25	37	± 3	74	± 5	54
2017	3,893	57	124	34	2	0	217	23%	402	44%	305	33%	924	1,113	14	40	54	± 5	76	± 6	49
2018	3,825	56	116	17	2	0	191	26%	360	48%	194	26%	745	1,223	16	38	53	± 5	54	± 6	35
2019	3,696	11	27	3	0	0	41	18%	114	49%	79	34%	234	1,134	10	26	36	± 8	69	± 13	51
2020	3,851	21	81	24	1	0	127	20%	370	59%	125	20%	622	1,096	6	29	34	± 4	34	± 4	25

2020 - JCR Evaluation Form

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

HERD: WD706 - BLACK HILLS

HUNT AREAS: 1-6
PREPARED BY: JOE SANDRINI

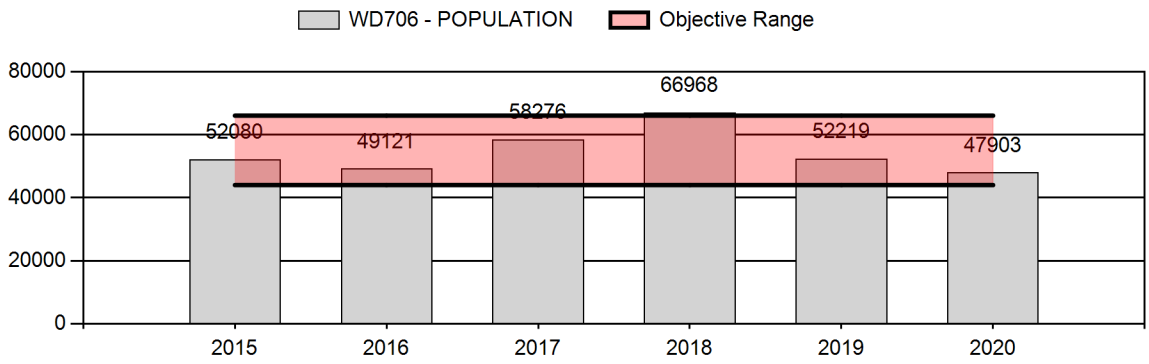
	2015 - 2019 Average	2020	2021 Proposed
Population:	55,733	47,903	55,628
Harvest:	6,422	5,829	5,578
Hunters:	9,587	9,677	9,220
Hunter Success:	67%	60%	60 %
Active Licenses:	10,197	10,091	9,615
Active License Success:	63%	58%	58 %
Recreation Days:	37,148	40,779	39,000
Days Per Animal:	5.8	7.0	7.0
Males per 100 Females	34	34	
Juveniles per 100 Females	72	55	

Population Objective (± 20%) :	55000 (44000 - 66000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-12.9%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/22/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	8.3%	8.2%
Males ≥ 1 year old:	35.6%	33.9%
Total:	13.0%	10.9%
Proposed change in post-season population:	-0.6%	+16.7%

Population Size - Postseason



2021 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	Gen	Sep. 1	Sep. 30	Nov. 21	Nov. 30		Antlered white-tailed deer off private land; any white-tailed deer on private land
1, 2, 3	7	Sep. 1	Sep. 30	Nov. 1	Nov. 30	3,000	Doe or fawn valid on private land
2	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 30		Antlered deer off private land; any deer on private land
3	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 30		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	300	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	200	Doe or fawn
6	Gen	Sep. 1	Sep. 30	Nov. 1	Nov. 20		Antlered deer off private land; any deer on private land

2021 Region A nonresident quota: 3,750 licenses

2020 Hunter Satisfaction: 69% Satisfied 19% Neutral 13% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** This herd has shown cyclic population fluctuations since at least the 1960's due to changes in weather and harvest, along with periodic epizootic hemorrhagic disease (EHD) outbreaks. Following a population low after the 2010-11 winter, this herd grew consistently until peaking about 15% above objective in 2017. Preseason buck:doe ratios showed a similar trend, peaking in 2018. Following the 2018-19 winter, which was moderately

severe and resulted in increased mortality, the population dropped below objective and the buck:doe ratio declined. Consequently, hunter success dropped and effort increased. This past year, there were changes in distribution with drought, but the overall population seemed to level off. With a more restrictive hunting season in place, hunter success was similar to 2019, while effort increased. Population estimates for this herd are thought to be tenuous, but annual shifts produced by the model are congruent with pre-season trend counts. Because the population appears to be declining and fawn:doe ratios have been low the past two years, a more conservative hunting season structure was implemented. See Appendix 1 for 2015-2020 pre-season classification data. Changes in 2021 entailed a further reduction in non-resident, Region A General licenses by 250 tags to mitigate a projected decline in buck numbers, along with a reduction of 500 Type 7 tags. Continued issuance of Type 7 licenses at this level enables harvest of somewhere in the neighborhood of 2,000 antlerless whitetail deer in addition to the approximately 350 taken on General licenses. Because Type 7 licenses are undersubscribed, valid only on private land, and are primarily (about two-thirds of them) used to harvest white-tailed deer, managers are reluctant to reduce issuance further because antlerless harvest is needed to manage this herd. Considering the distributional shifts by deer over the past year, Type 7 license issuance will buffer total sales, yet give those landowners with increased deer densities the opportunity control numbers, while landowners with low deer numbers can simply prohibit access and harvest.

2) **Management Objective Review:** Management objectives for this herd were reviewed in 2020 and discussed again internally in 2021. Both reviews resulted in the decision not to make changes. The Department will continue to manage for 55,000 white-tailed deer post-season in the Black Hills using a recreational management strategy. The population objective, set in 2015, represented a 38% increase over the former objective, which was in place for over 30 years. The current objective will remain the same for the following reasons:

    a. Area managers and most landowners were comfortable with white-tailed deer numbers when this population was estimated to be at objective.

    b. Many landowners felt there were too many deer in 2017 when it was above objective.

    c. Some landowners and especially hunters would now like to see an increase in deer numbers following the recent population decline.

    Because this white-tailed deer population is very productive and can increase substantially when conditions are favorable, maintaining recreational hunting is justified. This allows area managers to provide ample hunting opportunity and attract more non-resident hunters who play a key role in helping to regulate this population, especially on private lands. Finally, we believe habitat conditions are not a limiting factor in managing this herd towards, or maintaining it at, the current objective.

3) **Chronic Wasting Disease (CWD):** Prior to the 2018 hunting season, just over 2,200 white-tailed deer from the Black Hills had been tested for CWD. The vast majority of those were hunter-harvested deer, of which 0.2% were found to have the disease. A total of 159 white-tailed deer have been tested for CWD since 2018, as the herd is currently prioritized as a Tier 2 surveillance herd. Of the deer tested the past three years, 6.9% tested positive for CWD. To

date, no CWD management actions have occurred in this herd unit.

Appendix 1

2015 - 2020 Preseason Classification Summary

for White tailed Deer Herd WD706 - BLACK HILLS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	58,681	157	212	369	14%	1,276	47%	1,079	40%	2,724	2,132	12	17	29	± 0	85	± 0	66
2016	56,571	169	224	393	16%	1,216	50%	825	34%	2,434	1,464	14	18	32	± 0	68	± 0	51
2017	65,541	144	321	465	17%	1,331	49%	947	35%	2,743	1,605	11	24	35	± 0	71	± 0	53
2018	74,769	246	429	675	19%	1,721	47%	1,228	34%	3,624	1,641	14	25	39	± 0	71	± 0	51
2019	58,425	50	122	172	14%	643	53%	398	33%	1,213	1,221	8	19	27	± 0	62	± 0	49
2020	53,763	137	286	423	18%	1,239	53%	680	29%	2,342	0	11	23	34	± 0	55	± 0	41

2020 - JCR Evaluation Form

SPECIES: White tailed Deer

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

HERD: WD707 - CENTRAL

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

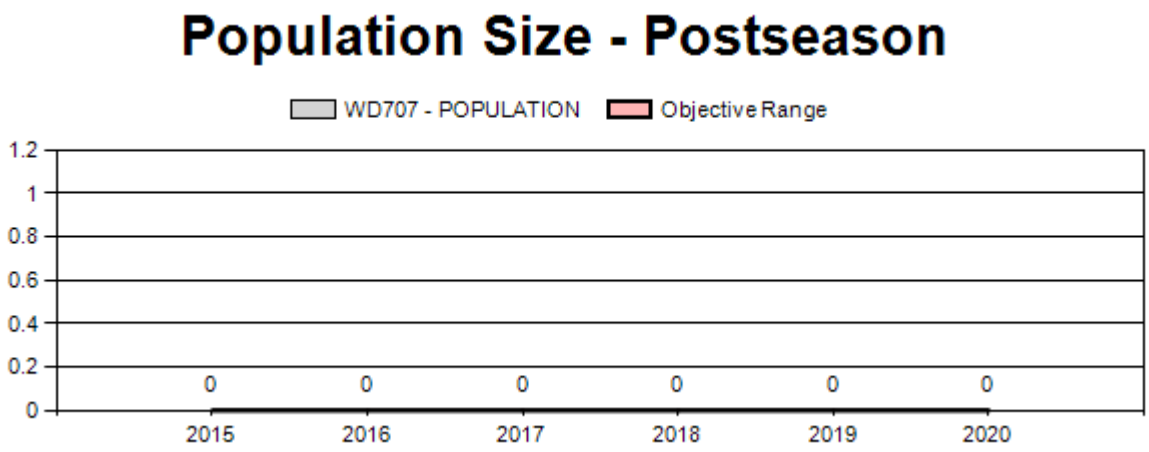
PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Population:	0	N/A	N/A
Harvest:	1,081	1,702	1,900
Hunters:	2,231	2,975	3,200
Hunter Success:	48%	57%	59 %
Active Licenses:	2,536	3,423	3,500
Active License Success:	43%	50%	54 %
Recreation Days:	9,042	12,706	14,000
Days Per Animal:	8.4	7.5	7.4
Males per 100 Females	37	54	
Juveniles per 100 Females	74	51	

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%
Total:	0%	0%
Proposed change in post-season population:	0%	0%



2021 HUNTING SEASONS
Central White-Tailed Deer Herd Unit (WD707)

Hunt Area	Hunt Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
10	3	Sep. 1	Sep. 30	Oct. 1	Nov. 30	35	Any white-tailed deer
10	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	35	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	300	Any white-tailed deer
11,12, 13,14	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	400	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	150	Any white-tailed deer
22	8	Sep. 1	Sep. 30	Oct. 1	Nov. 30	200	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	400	Any white-tailed deer, also valid in that portion of Area 66 in Converse County
65	8	Sep. 1	Sep. 30	Oct. 15	Dec. 31	750	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	150	Any white-tailed deer
66,88, 89	8			Aug. 15	Oct. 14	150	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.

2020 Hunter Satisfaction: 64% Satisfied, 20% Neutral, 16% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation:** The 2021 season structure was liberal to allow for high hunter opportunity within the recreational management strategy. White-tailed deer numbers have

grown from a low in 2013. White-tailed deer harvest has increased each year since 2014. Buck ratios of 42 bucks:100 does (n=1,557) were well over minimum objective (≥20 bucks:100 does postseason). The majority of white-tailed deer classifications come from Hunt Area 65. An additional 50 Type 3 licenses and 100 Type 8 licenses were issued in Hunt Area 22, an additional 25 Type 3 licenses were issue in Hunt Area 34, and an additional 250 Type 8 licenses were issued in Hunt Area 65 to address high populations and private land damage concerns. Hunt Area 65 was also added to Section 4 (b) of the Chapter 2 Regulation allowing unlimited doe/fawn licenses after the initial drawing.

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 data is not collected on this herd unit.

4) Managers saw a number of cases of EHD in some areas, but did not see an extensive die-off in 2020.

5) All limited quota white-tailed deer licenses for the Central White-tailed Deer Herd Unit sold out in 2020.

Table 1.

2015 - 2020 Postseason Classification Summary

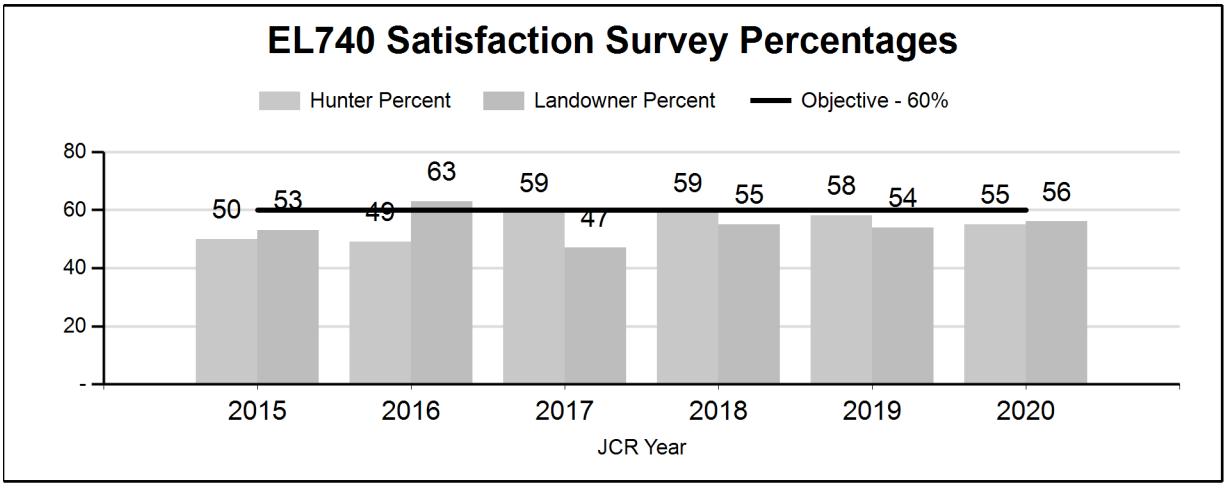
for White tailed Deer Herd WD707 - CENTRAL

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	0	48	59	107	20%	223	42%	196	37%	526	0	22	26	48	± 0	88	± 0	59
2016	0	78	127	205	16%	635	50%	436	34%	1,276	0	12	20	32	± 0	69	± 0	52
2017	0	69	114	183	21%	404	45%	301	34%	888	0	17	28	45	± 0	75	± 0	51
2018	0	90	161	251	19%	601	46%	456	35%	1,308	0	15	27	42	± 0	76	± 0	54
2019	0	41	65	106	13%	420	51%	299	36%	825	0	10	15	25	± 0	71	± 0	57
2020	0	84	244	328	21%	772	49%	466	30%	1,566	0	11	32	42	± 0	60	± 0	42

2020 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2020 - 5/31/2021
HERD: EL740 - BLACK HILLS
HUNT AREAS: 1, 116-117
PREPARED BY: JOE SANDRINI

	2015 - 2019 Average	2020	2021 Proposed
Hunter Satisfaction Percent	55%	55%	60%
Landowner Satisfaction Percent	55%	56%	60%
Harvest:	617	701	857
Hunters:	1,799	1,968	2,325
Hunter Success:	34%	36%	37%
Active Licenses:	1,881	2,034	2,400
Active License Success:	33%	34%	36%
Recreation Days:	17,483	19,538	24,000
Days Per Animal:	28.3	27.9	28.0
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:			-4%
Number of years population has been + or - objective in recent trend:			3



2021 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	150	Spike or antlerless elk
117	4	Sep. 1	Sep. 30	Oct. 15	Jan. 31	200	Antlerless elk
117	6	Sep. 1	Sep. 30	Oct. 15	Jan. 31	100	Cow or calf
117	7			Aug. 15	Jan. 31	500	Cow or calf valid off national forest; also valid on national grassland

2020 Hunter Satisfaction: 55 % Satisfied 22 % Neutral 23 % Dissatisfied

2020 Landowner Satisfaction JCR[1]: 20% Below 56 % At 24% Above

2020 Landowner Satisfaction Surveyed[2]: 44% Satisfied 22% Neutral 34% Dissatisfied

[1] When asked if elk numbers are below, at, or above desired level.
[2] These figures are from landowner survey asking specifically about satisfaction in the same manner as the hunter harvest survey.

2021 Management Summary

1) **Hunting Season Evaluation:** One change was made to the hunting season structure with the creation of a Type 6 license valid for cow or calf in Hunt Area (HA) 117. In addition, license issuance in HA 117 was increased by 50 Type 1, 100 Type 2, and 100 Type 7 licenses. These changes were made for three reasons:

    a. There is a desire to increase issuance of Type 1 licenses, which had high harvest success in 2020 (67%) in order to increase bull hunting opportunity and harvest. However, this area already has the highest hunter effort values in the state for elk licenses with over 60% success, with hunters taking on average 23 days to harvest an elk over the last 10 years, and 22 days in 2021. The long season in this area contributes to high success and will continue to do so. Additionally, because the majority of the hunt area is private land and we are close to, if not at access saturation, it is anticipated success will decline substantially along with hunter satisfaction if Type 1 license issuance is markedly increased.

    b. Type 2 license numbers were increased threefold to augment harvest of spike elk in an effort to maintain bull quality, but reduce the bull:cow ratio while increasing harvest of antlerless elk.

    c. The increase in HA 117 Type 7 license issuance along with the creation of the Type 6 is intended to meet first choice license demand for cow/calf licenses. Last year, 62 nonresidents and 87 residents did not draw an HA 117 cow/calf license as their first choice. Further, having more cow/calf licenses available will permit and encourage nonresident hunters, whose harvest success is higher than residents, to hunt antlerless elk given the structure of our license draw. Finally, the Type 6 tags will create some public land hunting opportunity on cow/calf licenses.

    The overall harvest strategy for this herd is aimed at removing as many elk as possible given very restricted private land access.

    It is estimated the changes implemented will result in up to 860 total elk taken (320 bulls, 40 spikes, 395 cows, & 105 calves) if harvest success is similar to 2020. 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 (from tooth age data), taking 755 adult elk would remove the annual yearling recruitment from a preseason herd of about 3,650 head (all age and sex classes).

2) **Management Notes:** Because the Department does not estimate the population size of this herd due to its interstate nature, the herd is managed for landowner and hunter satisfaction. In addition, this herd has a secondary management objective that seeks an 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). Very little tooth age data were collected in 2019, and just a bit more in 2020. Based upon the available data, the average harvest percentages of these age classes over the past three-years has been 23%, 61%, and 16%, respectively. See Appendix 1.

    Since 2016, each January a pre-paid return mail survey has been sent to about 160 Black Hills landowners. Subtracting for undelivered surveys, the response rate has declined steadily from

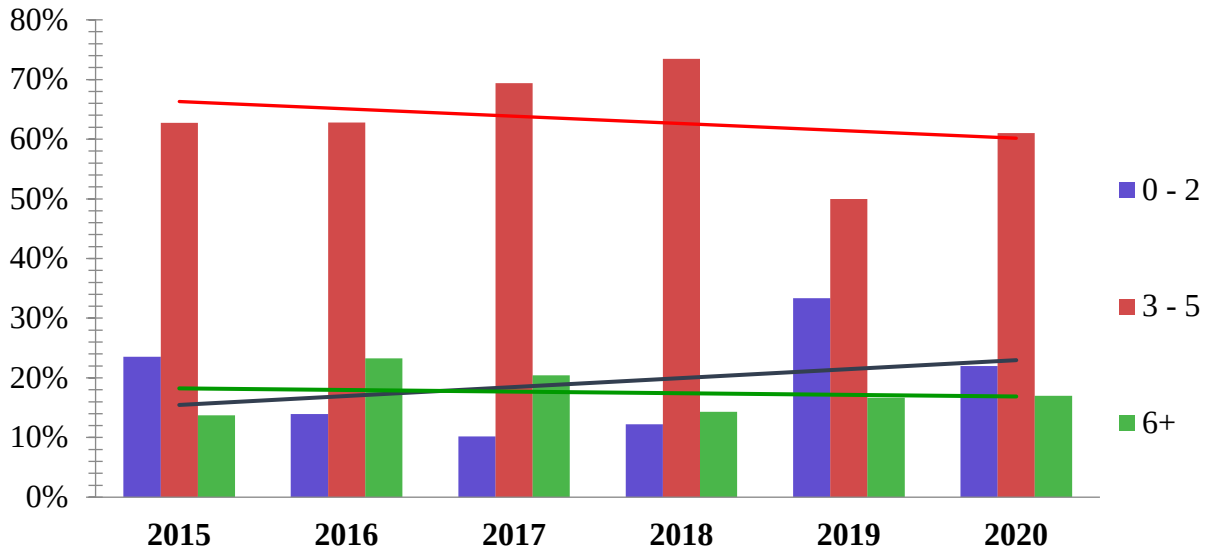
53% in 2016 to 46% this year. Landowner satisfaction as captured in the JCR program and the reasons for satisfaction are not strictly tied to perceptions of elk numbers. Therefore, they cannot be directly compared to hunter satisfaction measures, because quantifying criterion for each group are different. Consequently, using reports of "at," "above," and "below" desired levels as satisfaction measures is entirely inappropriate. These statements are not measures of satisfaction per se, and while they may be associated to some degree with satisfaction, they are simply subjective indications of perceived elk numbers relative to personal desire. Because of this, both types of "landowner satisfaction" measures are provided above.

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 for 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 a sightability 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 a sightability 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 estimated number of elk present 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.

3) **Chronic Wasting Disease (CWD):** To date, about 200 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.

Appendix 1

Average Ages of Harvest Bulls (2015 – 2020)



2020 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

HUNT AREAS: 7, 19

PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Population:	13,958	12,914	11,026
Harvest:	2,340	2,537	2,650
Hunters:	4,797	4,884	5,000
Hunter Success:	49%	52%	53 %
Active Licenses:	4,897	4,900	5,100
Active License Success:	48%	52%	52 %
Recreation Days:	34,976	36,350	38,500
Days Per Animal:	14.9	14.3	14.5
Males per 100 Females	39	23	
Juveniles per 100 Females	38	45	

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

Management Strategy: Special

Percent population is above (+) or below (-) objective: 158%

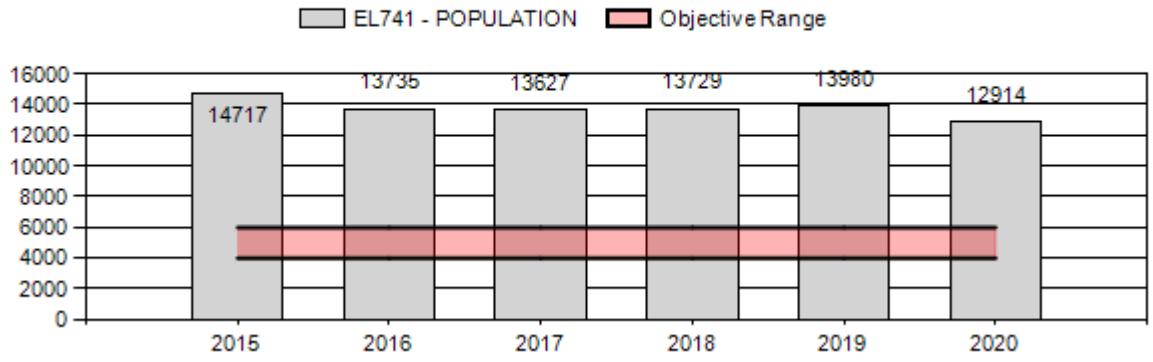
Number of years population has been + or - objective in recent trend: 20

Model Date: 02/16/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	15.7%	18.6%
Males ≥ 1 year old:	20.9%	28.3%
Total:	36.6%	46.9%
Proposed change in post-season population:	-18.4%	-18.8%

Population Size - Postseason



2021 HUNTING SEASONS
Laramie Peak/Muddy Mountain Elk Herd Unit (EL741)

Hunt Area	Type	Special Archery Dates		Regular 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 four (4) 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			Nov. 21	Jan. 31		Antlerless elk
19	2	Sep. 1	Sep. 30	Nov. 1	Nov. 20	150	Any elk
19	2			Nov. 21	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

2020 Hunter Satisfaction: 62% Satisfied, 18% Neutral, 20% Dissatisfied

2021 Management Summary

1) **Hunting Season Evaluation**: The 2021 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 2021 season, the existing season structure was unchanged due to concerns of public land saturation, however to address high bull ratios and allow more opportunity for bull harvest, 350 Type 2 licenses were added for antlered elk, 4 points or less, valid in Converse County only beginning after the regular Type 1 season. These licenses were added to address landowner and sportsmen concerns with high bull ratios in Converse County (see Appendix A for more information).

2) **Chronic Wasting Disease Management:** There were no CWD management actions taken in the Laramie Peak/Muddy Mountain herd unit in 2020. The Laramie Peak/Muddy Mountain herd unit was targeted for intensive surveillance in 2018 and will be targeted again in 2022. This herd unit has had

good sample sizes (avg. of 114) for the past seven years. From 2018-2020, a total of 418 elk were tested, with 23 being positive for CWD for a prevalence of 5.5%.

3) 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.

4) A fairly mild winter provided good access throughout the hunting seasons. After two years of reduced harvest, total harvest in 2020 increased back to average or above average numbers.

5) No flight time was allocated to the Laramie Peak/Muddy Mountain herd unit in 2020, however managers were able to classify a few groups in conjunction with deer classifications. Most classifications were done by ground (n=1,933).

6) In 2020, managers collected antler class data (n=178) from hunter-harvested bull elk. Class II (>=6 points, heavy 5x5) bulls made up 83% of the sample.

7) 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.

8) 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.

Appendix A:

Elk Hunt Area 7 – Type 2 License Proposal for 2021

- Herd unit population estimate is ~12,900 elk, which is more than double the objective of 5,000
- Continued high success rates on Type 1 licenses (was 65% in 2020, averaged 61% over past 10 years)
- Increasing bull numbers in this herd with very high bull ratios documented during intensive survey in 2019
  - Classified 9,359 elk from helicopter and observed 51 bulls per 100 cows
  - Special management strategy goal of 30-40 bulls:100 cows
  - During this survey WGFD personnel classified 2,483 bulls, the vast majority of which were yearling or small raghorn (1,798) bulls compared to 6-point or larger bulls (685)
  - Percentage of 6-point or larger bulls has declined since 2008 (first year of classifying bulls based on antler size)
- WGFD has received repeated landowner and hunter complaints about declining bull quality in HA7 over past decade
  - Bull antler size decreasing – now more bulls than ever, broken tines, less very large bulls (WGFD agrees)
  - Tooth age data indicates average age of harvested bulls has increased over past decade yet antler size declining
  - Could too many bulls be responsible for declining trophy quality? – WGFD suspects, but unknown
- WGFD can and should provide more opportunity for bull elk harvest, so why not just increase Type 1 licenses?
  - Public land saturation – overcrowding and reduced hunter success on public land – don't want to make worse
  - There is a stark difference in bull distribution in Area 7, with far more bulls being available in the northern portion of HA7 later in the season – therefore proposal to increase bull harvest in Converse County only
  - Increasing Type 1 licenses would likely exert more pressure on older age classes / large antlered bulls
  - Vast majority of bulls on private land late in season – limited access with hunters unwilling to pay access fees
  - Could reduce access for cow elk with more Type 1 licenses if landowners charge access fees or hunters hold out
  - Proposal to extend Type 1 bull season in Converse County was opposed by hunters and landowners last year
- Why a Type 2 "raghorn" season?
  - Will increase overall elk harvest
  - Increase harvest on younger-aged bulls and lower bull ratio without increasing harvest on older-aged bulls
  - Converse County landowners request and strongly support and agreed to provide access
  - Potential increased access for small bulls later in the season on several landowners
    - Some landowners don't have cows available at that time, but regularly have bachelor groups of bulls
  - Landowners/outfitters not willing to give up high-dollar trophy bull hunts to harvest smaller bulls for free or reduced price during Type 1 season
  - UNKNOWN – harvesting more small bulls may improve older bull antler size (has diminished over past decade)
- Why a 4-point or less?
  - Alleviates perception that WGFD is just trying to help landowners/outfitters sell more trophy bull hunts
  - Relatively few yearling bulls found in these bachelor groups, so landowners prefer this to "spike-only" licenses
    - Spreads harvest to more than just one age-class as compared to "spike-only" licenses
- Why not a 5-point or less?
  - 4-point bulls are easier to distinguish by hunters than 5-point bulls with "whale tail" fifth tine curving back
  - Will minimize the number of large 6-point bulls with broken antlers being harvested
- Potential issues/concerns
  - Regulation complexity could lead to confusion with "4 points or less" limitation
  - Statewide implications / precedent – concern over complicating regulations across the state
  - Represents "cultural shift" and lends appearance of specialized trophy management
  - Hunters may shoot larger bulls with broken points – a point is defined in regulation
  - Weather always has the potential to limit late season access and success
  - Non-residents can't apply this year unless they modify an existing application
  - Could decrease cow harvest in some areas due to increased pressure or landowners not allowing cow hunters if charging for "raghorn" bull hunters
  - If landowners do not allow as much access as expected then season will be discontinued

Table 1.

2015 - 2020 Postseason Classification Summary

for Elk Herd EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	14,717	404	485	889	18%	2,882	59%	1,116	23%	4,887	504	14	17	31	± 1	39	± 1	30
2016	13,735	383	581	964	21%	2,803	61%	806	18%	4,573	495	14	21	34	± 1	29	± 1	21
2017	13,627	211	339	550	19%	1,645	57%	674	23%	2,869	499	13	21	33	± 2	41	± 2	31
2018	13,729	853	1,630	2,483	27%	4,855	52%	2,021	22%	9,359	602	18	34	51	± 1	42	± 1	28
2019	13,980	120	188	308	16%	1,125	60%	454	24%	1,887	888	11	17	27	± 2	40	± 3	32
2020	12,914	132	130	262	14%	1,153	60%	518	27%	1,933	898	11	11	23	± 2	45	± 3	37

Figure 1.

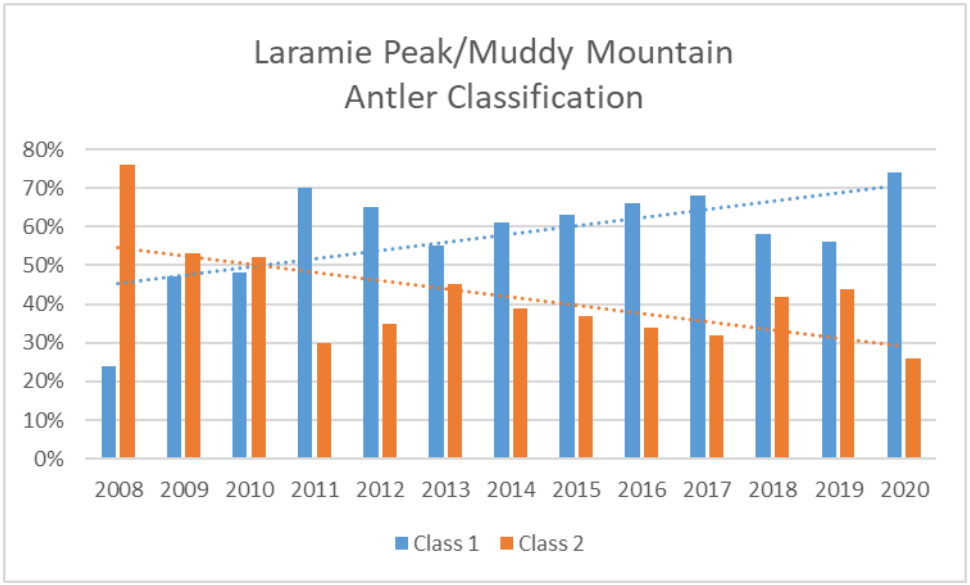


Figure 2.

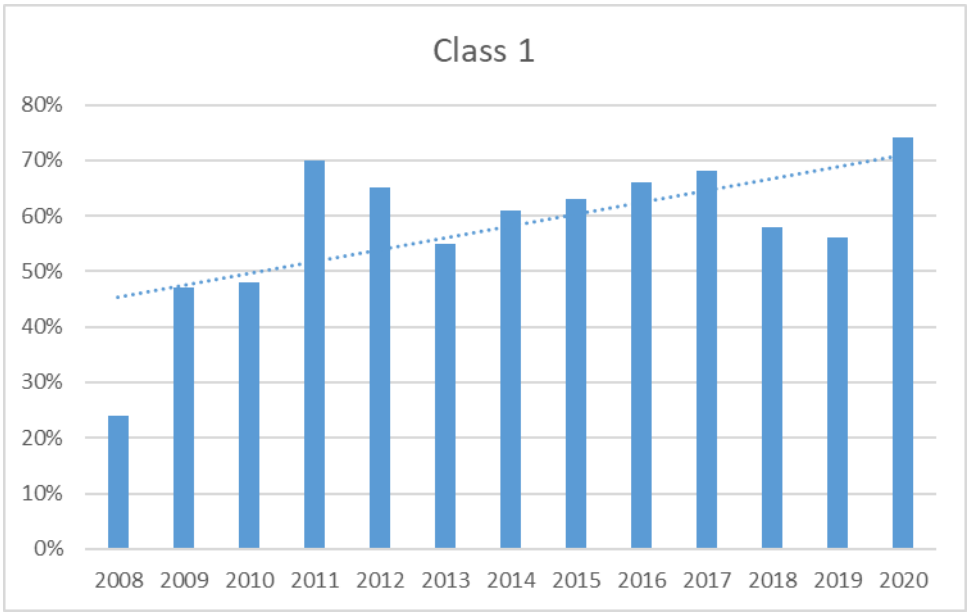
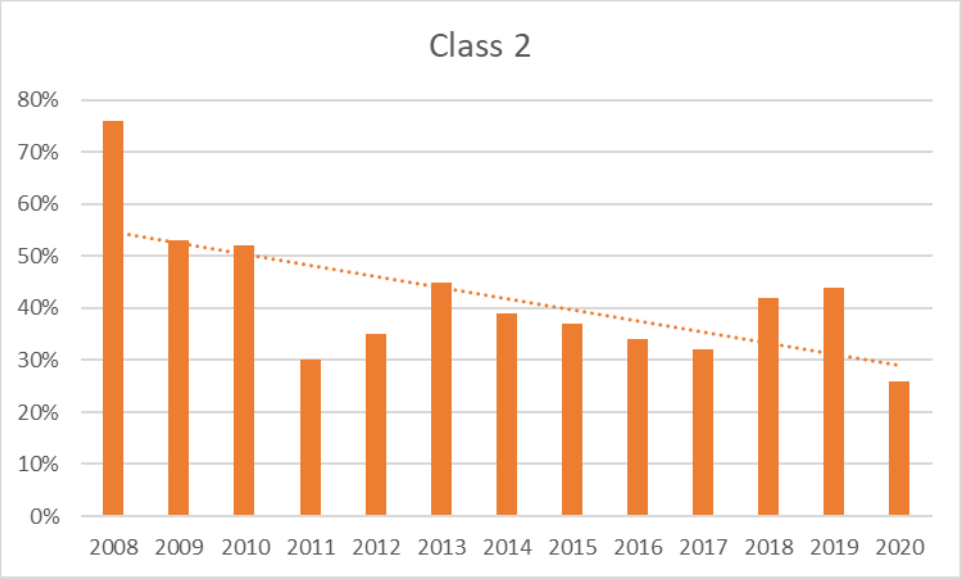


Figure 3.


Class 2
80%
70%
60%
50%
40%
30%
20%
10%
0%
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

2020 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL742 - RATTLESNAKE

HUNT AREAS: 23

PREPARED BY: HEATHER O'BRIEN

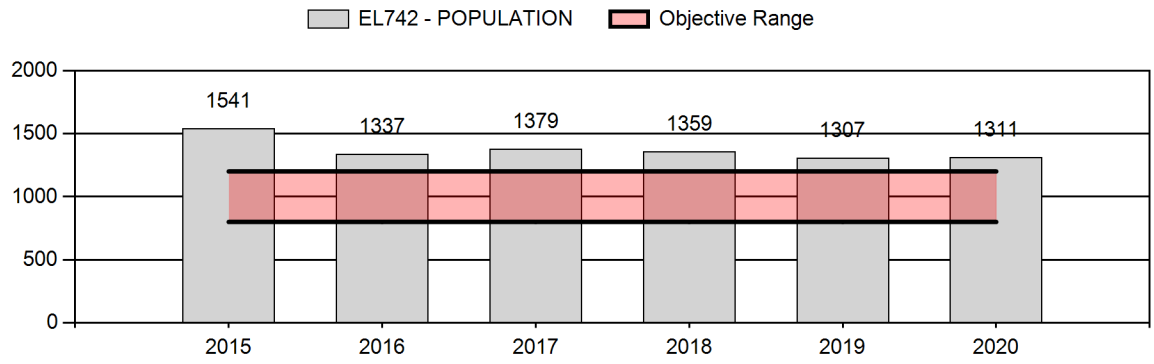
	2015 - 2019 Average	2020	2021 Proposed
Population:	1,385	1,311	1,198
Harvest:	183	121	171
Hunters:	402	432	440
Hunter Success:	46%	28%	39 %
Active Licenses:	430	477	475
Active License Success:	43%	25%	36 %
Recreation Days:	3,584	5,257	5,200
Days Per Animal:	19.6	43.4	30.4
Males per 100 Females	38	31	
Juveniles per 100 Females	31	28	

Population Objective (± 20%) :	1000 (800 - 1200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	31%
Number of years population has been + or - objective in recent trend:	29
Model Date:	02/22/2021

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

	JCR Year	Proposed
Females ≥ 1 year old:	6.2%	9.9%
Males ≥ 1 year old:	19.2%	25.3%
Total:	8.4%	12.3%
Proposed change in post-season population:	0.2%	-8.6%

Population Size - Postseason



2021 HUNTING SEASONS
RATTLESNAKE ELK HERD (EL742)

Hunt Area	Type	Archery Dates		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	125	Antlerless elk
				Nov. 15	Dec. 15		Antlerless elk
	6	Sep. 1	Sep. 30	Oct. 1	Oct. 31	200	Cow or calf
				Nov. 15	Dec. 15		Cow or calf
	7	Sep. 1	Sep. 30	Nov. 15	Dec. 15	50	Cow or calf

2020 Hunter Satisfaction: 50% Satisfied, 18% Neutral, 32% Dissatisfied

2021 Management Summary:

1.) Hunting Season Evaluation: 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. Classification data collected during the same survey provided a bull ratio that is likely the most accurate in the history of the herd. For 2020, a stratified random sample survey of herd subunits was used to classify elk with the goal of decreasing bias, improving efficiency, and ultimately enhancing data quality and model accuracy.

The 2021 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 60th percentile. However, harvest on females is consistently poor due to large numbers of cows and calves taking refuge on one property that allows no hunting access. Habitat conditions were extremely dry with little snowfall during the 2020 hunting season, and harvest success rates on all license types were below average. Movement of elk off private lands that allow no hunting is often a function of winter weather in this herd. Without any substantial winter

weather events, many elk remained on private lands and inaccessible to harvest during 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 harvest success on females, this herd will likely continue to grow and disperse into adjacent areas. Field managers will continue working with landowners in the herd with the goal of improving access and increasing harvest on females.

2.) **Management Objective Review:** No review in 2021.

3.) **Additional Surveys:** A sightability 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.

2015 - 2020 Postseason Classification Summary

for Elk Herd EL742 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2015	1,541	10	86	96	57%	48	29%	23	14%	167	390	21	179	200	± 43	48	± 15	16
2016	1,337	53	77	130	18%	478	66%	114	16%	722	395	11	16	27	± 2	24	± 2	19
2017	1,379	23	71	94	19%	295	58%	116	23%	505	375	8	24	32	± 4	39	± 4	30
2018	1,359	131	107	238	18%	776	60%	274	21%	1,288	441	17	14	31	± 1	35	± 1	27
2019	1,307	66	216	282	27%	603	58%	155	15%	1,040	428	11	36	47	± 2	26	± 1	18
2020	1,311	27	59	86	20%	275	63%	76	17%	437	481	10	21	31	± 4	28	± 4	21

2020 - JCR Evaluation Form

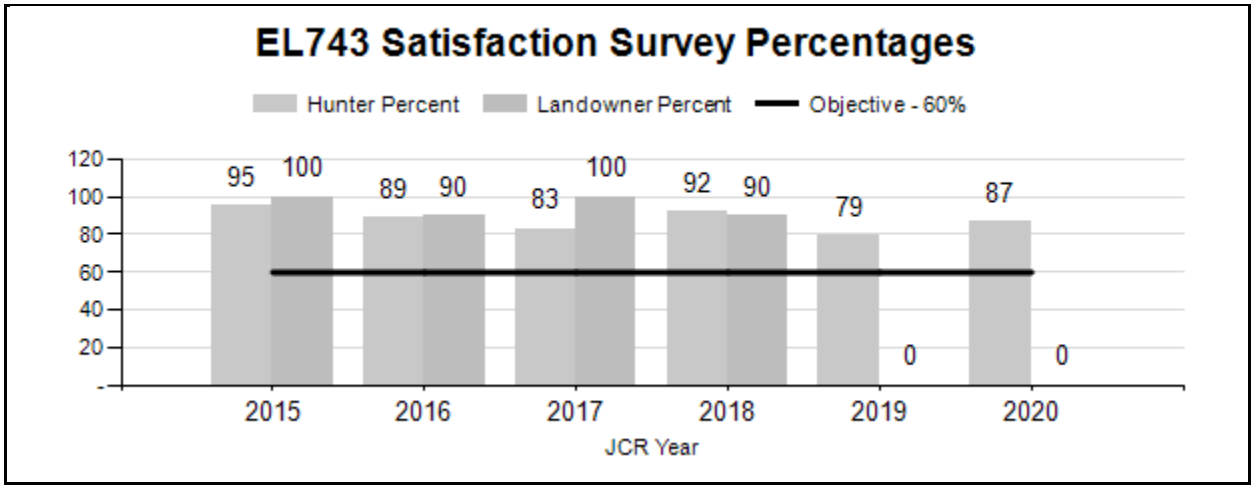
SPECIES: Elk
PERIOD: 6/1/2020 - 5/31/2021

HERD: EL743 - PINE RIDGE

HUNT AREAS: 122
PREPARED BY: MATT HUIZENGA

	2015 - 2019 Average	2020	2021 Proposed
Hunter Satisfaction Percent	87%	87%	90%
Landowner Satisfaction Percent	73%	0%	0%
Harvest:	116	168	200
Hunters:	135	198	225
Hunter Success:	86%	85%	89 %
Active Licenses:	144	209	250
Active License Success:	81%	80%	80%
Recreation Days:	506	723	850
Days Per Animal:	4.4	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:	2



2021 HUNTING SEASONS
Pine Ridge Elk Herd Unit (EL743)

Hunt Area	License Type	Special Archery Dates		Regular Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
122	1	Sep. 1	Sep. 30	Oct. 1	Nov. 30	125	Any elk
122	1			Dec. 1	Dec. 31		Antlerless elk
122	6	Sep. 1	Sep. 30	Oct. 1	Dec. 31	200	Cow or calf

2020 Hunter Satisfaction: 87% Satisfied, 13% Neutral, 0% Dissatisfied

2020 Landowner Satisfaction: 0% Below desired levels, 0% At or about at desired levels, 100% Above desired levels

2021 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 2021 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. A total of 25 Type 1 licenses and 25 Type 6 licenses were added to increase harvest potential to limit herd growth and provide additional hunter opportunity. As a result of the lack of public access, Type 6 licenses generally do not sell out for this area. However, landowners have expressed a desire in recent years for higher female harvest and increased youth participation with some indication there will be more access and opportunity.

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

3) A winter trend count was attempted in 2020 with very limited flight time in conjunction with deer surveys. 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, only finding 49 elk in 2015, 271 elk in 2016, 88 elk in 2018, and 383 elk in 2020.

4) 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. Harvest alone is likely insufficient to curtail population growth, and managers believe elk may be emigrating from this herd.

5) 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 in the hunt area 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. Only seven landowners attended the meeting with one calling in to discuss proposed seasons and other management issues. In addition, five more landowners were contacted by field personnel. No landowners expressed any major concerns and all generally liked how things are going, but were in agreement that elk numbers were higher than desired. The 0% landowner satisfaction shown in the above table therefore does not necessarily accurately represent actual satisfaction with the hunting seasons and hunt quality, but satisfaction with elk numbers with the framework provided.

6) The secondary objective for this herd unit is a bull harvest distribution consisting of 60% mature, branch-antlered bulls. Seventy-one percent of reported bulls harvested in 2020 were branch-antlered bulls.

7) Hunter success in this area over the past five years is quite high, averaging 86% harvest success with an average of 4.4 days to harvest. While managers always prefer to better manage this population through increased harvest, license issuance is almost entirely dependent upon how many hunters landowners are willing to take.