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Acknowledgements

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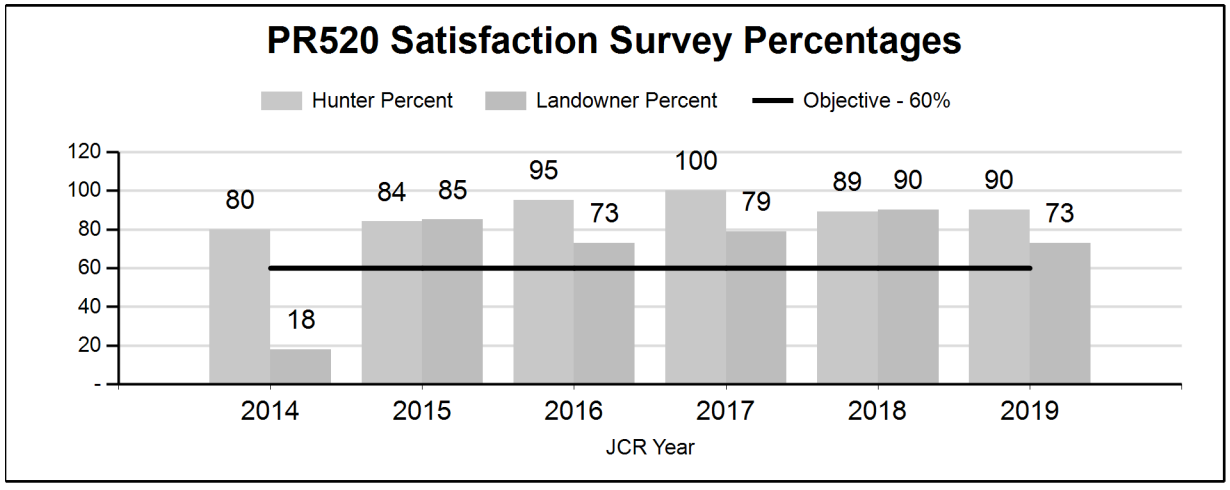
2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020
HERD: PR520 - CHALK BLUFFS
HUNT AREAS: 111
PREPARED BY: MARTIN HICKS

	2014 - 2018 Average	2019	2020 Proposed
Hunter Satisfaction Percent	89%	90%	60%
Landowner Satisfaction Percent	70%	73%	60%
Harvest:	116	171	160
Hunters:	118	172	170
Hunter Success:	98%	99%	94%
Active Licenses:	148	209	200
Active License Success:	78%	82%	80 %
Recreation Days:	447	590	590
Days Per Animal:	3.9	3.5	3.7
Males per 100 Females:	37	31	
Juveniles per 100 Females	67	62	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			22%
Number of years population has been + or - objective in recent trend:			0



2020 Hunting Seasons
Chalk Bluffs Pronghorn Herd Unit (PR520)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
111	1	Aug. 15	Sept. 19	Sept. 20	Oct. 14	150	Any antelope
111	1			Oct. 15	Dec. 31		Doe or fawn
111	6	Aug. 15	Sept. 19	Sept. 20	Dec. 31	100	Doe or fawn

2019 Hunter Satisfaction: 89% Satisfied, 6% Neutral, 5% Dissatisfied
2019 Landowner Satisfaction: 27% Above Desired Levels, 73% At Desired Levels

2020 Management Summary

1.) Hunting Season Evaluation: The 2020 season is designed to provide opportunity while maintaining a hunter and landowner satisfaction rate of 60%. The season will continue to run through December 31 for doe and fawn pronghorn to reduce damage situations from pronghorn that migrate from Colorado as the season progresses. Access continues to be an issue with this herd unit so managers are cognizant of monitoring the satisfaction level of hunters (which is well above desired objective levels) along with success and effort trends to determine license structure. Based on those factors is does not appear a change in season structure is warranted at this time. All license sold in 2019 and of those, 83% were active. The majority of those hunters were overwhelmingly satisfied with their hunt. Based on the limited access for this hunt area this does not seem plausible, however, for the past several years hunters satisfaction has remained high. It appears that the majority of hunters who are applying for this license have access secured prior to their hunt.

2.) Management Objective Review: The last time this herd unit's objective was reviewed was in 2018, so the next objective review will take place in 2023.

3.) Weather and Habitat: There were no major weather events that occurred during the 2019 biological year that could be directly contributed to any deviation from average survival rates for the Chalk Bluffs Pronghorn Herd Unit

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR521 - HAWK SPRINGS

HUNT AREAS: 34
PREPARED BY: MARTIN HICKS

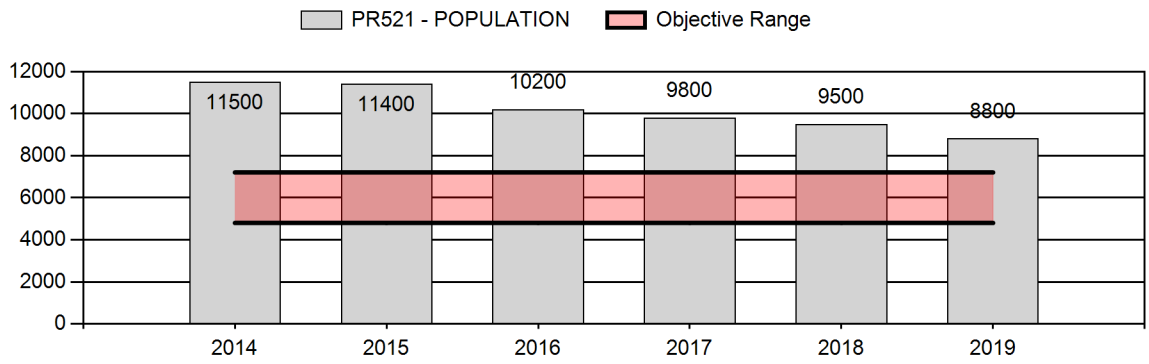
	2014 - 2018 Average	2019	2020 Proposed
Population:	10,480	8,800	8,900
Harvest:	1,144	967	770
Hunters:	1,376	1,384	1,065
Hunter Success:	83%	70%	72%
Active Licenses:	1,424	1,393	1,075
Active License Success:	80%	69%	72%
Recreation Days:	4,455	5,958	4,000
Days Per Animal:	3.9	6.2	5.2
Males per 100 Females	44	25	
Juveniles per 100 Females	50	35	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	47%
Number of years population has been + or - objective in recent trend:	10
Model Date:	01/22/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	7%	4%
Males ≥ 1 year old:	27%	28%
Total:	9%	7%
Proposed change in post-season population:	-8%	-2%

Population Size - Postseason



2020 Hunting Seasons
Hawk Springs Pronghorn Herd Unit (PR521)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
34	1	Aug. 15	Sept. 19	Sept. 20	Oct. 14	800	Any antelope
34	6	Aug. 15	Sept. 19	Sept. 20	Dec. 31	500	Doe or fawn

2019 Hunter Satisfaction: 76% Satisfied, 14% Neutral, 10% Dissatisfied

2020 Management Summary

1.)Hunting Season Evaluation: The 2020 season structure was a reduction in both Type 1 and Type 6 licenses to address a population that has experience poor fawn recruitment for four consecutive years. The proportion of males in the population significantly declined in 2019 as was expected given four years of poor fawn recruitment. However, even with a declining population there are still damage situations that need a lengthy doe/fawn season structure to address. The reduction of the number of male and female pronghorn licenses should offset poor juvenile recruitment thus slowing down the decreasing population trend.

2.) Management Objective Review: The last time this herd unit's objective was reviewed was in 2018, the next objective review will take place in 2023.

3.) Research: Managers of the Hawk Springs Herd Unit have expressed concern for this herd's recent poor performance. There is speculation that habitat quality has degraded significantly enough to a point that it is lacking the proper nutrient requirements for lactating does to sustain a fawn to weaning age. In particular the condition of lands enrolled into USDA's Conservation Reserve Program (CRP) are of concern as far as forage productivity and diversity. Within the next couple of years grants funding options will be explored to determine if it is feasible to investigate further the relationship between habitat use, parturition areas, survival and condition of CRP in southeast Wyoming.

4.) Weather and Habitat Data: There were no significant weather events that were identified as major contributors to poor fawn survival. Spring weather conditions in 2019 were cooler periods with above average precipitation that perhaps contributed to poor fawn survival. Pronghorn depend on non-native vegetation for much of their year-round nutrient requirements due to native rangelands converted to agricultural lands. Because of this habitat improvements projects have been limited to lands enrolled into the USDA's Conservation Reserve Program (CRP). Managers plan to investigate how CRP factors into the life history of pronghorn in southeast Wyoming.

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR521 - HAWK SPRINGS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2014	12,500	59	155	214	21%	498	48%	317	31%	1,029	1,151	12	31	43	± 6	64	± 7	45
2015	12,800	117	179	296	20%	729	49%	472	32%	1,497	1,849	16	25	41	± 4	65	± 6	46
2016	11,500	126	194	320	25%	696	54%	262	21%	1,278	1,243	18	28	46	± 5	38	± 4	26
2017	11,000	76	187	263	24%	603	54%	251	22%	1,117	1,409	13	31	44	± 5	42	± 5	29
2018	10,700	82	149	231	25%	490	52%	218	23%	939	1,227	17	30	47	± 6	44	± 6	30
2019	9,900	21	90	111	16%	446	63%	156	22%	713	1,306	5	20	25	± 4	35	± 5	28

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR522 - MEADOWDALE

HUNT AREAS: 11
PREPARED BY: MARTIN HICKS

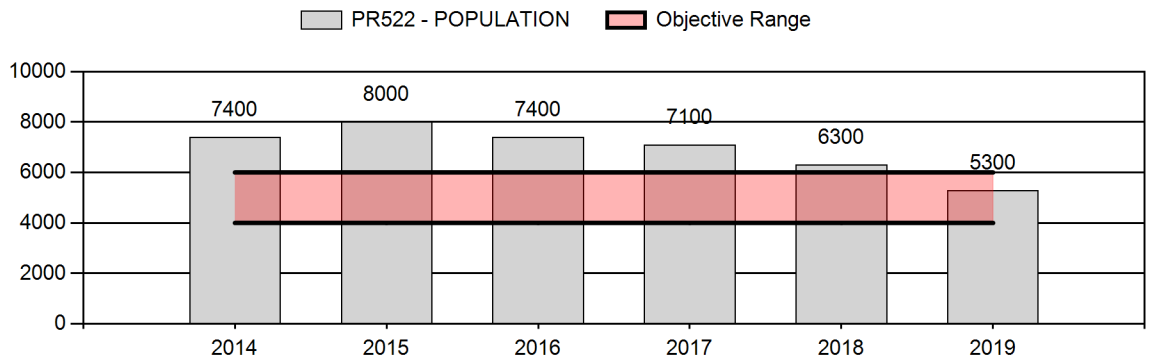
	2014 - 2018 Average	2019	2020 Proposed
Population:	7,240	5,300	5,000
Harvest:	554	737	570
Hunters:	600	855	705
Hunter Success:	92%	86%	81 %
Active Licenses:	658	902	755
Active License Success:	84%	82%	75 %
Recreation Days:	1,993	2,769	2,000
Days Per Animal:	3.6	3.8	3.5
Males per 100 Females	42	32	
Juveniles per 100 Females	53	38	

Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	6%
Number of years population has been + or - objective in recent trend:	10
Model Date:	01/22/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	10.2%	7.2%
Males ≥ 1 year old:	33%	33%
Total:	11%	9%
Proposed change in post-season population:	-9%	-10%

Population Size - Postseason



2020 Hunting Seasons
Meadowdale Pronghorn Herd Unit (PR522)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
11	1	Aug. 15	Sept. 30	Oct. 1	Oct. 31	450	Any antelope
11	6	Aug. 15	Sept. 30	Oct. 1	Oct. 31	300	Doe or fawn

2019 Hunter Satisfaction: 91% Satisfied, 6% Neutral, 3% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The 2020 season structure included a reduction in both Type 1 and Type 6 licenses to address a population that has experience poor fawn recruitment for four consecutive years. The proportion of males in the population has steadily declined in recent years, as was expected given four years of poor fawn recruitment. The reduction of the number of male and female pronghorn licenses should offset poor juvenile recruitment, resulting in a post-season population estimate of 5,000 pronghorn.

2.) Management Objective Review: The last time this herd unit's objective was reviewed was in 2018, so the next objective review will take place in 2023.

3.) Weather and Habitat Data: There were no significant weather events that were identified as a major contribution to above average adult and fawn mortality rates. Spring of 2019 resulted in longer periods of colder temperatures with above average precipitation that perhaps might have contributed to poor fawn survival.

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR522 - MEADOWDALE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2014	7,900	49	169	218	17%	637	50%	411	32%	1,266	1,327	8	27	34	± 4	65	± 6	48
2015	8,400	104	165	269	21%	590	46%	412	32%	1,271	1,441	18	28	46	± 5	70	± 7	48
2016	7,900	142	251	393	25%	786	51%	368	24%	1,547	1,330	18	32	50	± 5	47	± 4	31
2017	7,800	48	158	206	22%	508	54%	223	24%	937	1,468	9	31	41	± 5	44	± 5	31
2018	7,200	56	150	206	22%	546	58%	197	21%	949	1,463	10	27	38	± 5	36	± 5	26
2019	6,200	66	232	298	19%	944	59%	359	22%	1,601	1,373	7	25	32	± 3	38	± 3	29

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR523 - IRON MOUNTAIN

HUNT AREAS: 38
PREPARED BY: LEE KNOX

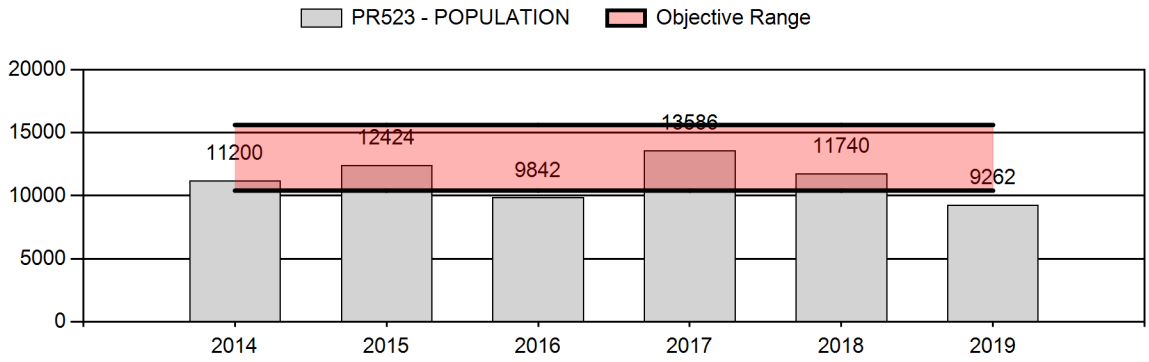
	2014 - 2018 Average	2019	2020 Proposed
Population:	11,758	9,262	8,601
Harvest:	1,523	1,063	800
Hunters:	1,769	1,418	950
Hunter Success:	86%	75%	84 %
Active Licenses:	1,825	1,444	1,000
Active License Success:	83%	74%	80 %
Recreation Days:	6,242	5,182	5,200
Days Per Animal:	4.1	4.9	6.5
Males per 100 Females	53	41	
Juveniles per 100 Females	66	57	

Population Objective (± 20%) :	13000 (10400 - 15600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-28.8%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/14/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	8%	204%
Males ≥ 1 year old:	27%	27%
Total:	6%	7%
Proposed change in post-season population:	5%	7%

Population Size - Postseason



2020 Hunting Seasons
Iron Mountain Pronghorn (PR523)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
38	1	Aug. 15	Oct. 4	Oct. 5	Oct. 31	1000	Any antelope
38	6	Aug. 15	Oct. 4	Nov. 1	Dec. 31	200	Doe or fawn

2019 Hunter Satisfaction: 92% Satisfied, 6% Neutral, 2% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The Iron Mountain pronghorn herd has been declining due to poor fawn recruitment. Fawn ratios overall have been in the high 50s and low 60s since 2016 (Appendix A). While this is not especially low, we are seeing a large variation in fawn ratios from east to west, with fawn ratios from the eastern portion of the herd unit often in the high 30s to low 40s. Many landowners are commenting they are seeing very few pronghorn in October. Compounding the issue, in November most of the pronghorn from the western portion of the herd unit migrate east and winter on agriculture fields, causing crop damage. We reduced the type 1 licenses by 250 and remove the extended season to reduce doe fawn harvest in 2020. The type 6 license will be reduced by 600 licenses. This allows us to reduce doe fawn harvest as much as possible while maintaining enough licenses for damage situations. The opening date will be moved from October 5th to Nov. 1st to better target the influx of migrating pronghorn in the eastern portion of the herd unit and address damage concerns.

2.) Management Objective Review: The current objective was set at 13,000 in 1997. The management objective was last reviewed in 2019.

3.) Habitat: No major landscape disturbances were observed in the herd unit in 2019. Precipitation in the hunt area was normal. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn fawns. Plant phonological shifts and delays were displayed in the spring due to cool daytime temperatures and freezing nighttime temperatures. Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures. High shrub mortality and cheatgrass invasion should be expected with mid to late summer wildfire events in the future.

Appendix A

Classification

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR523 - IRON MOUNTAIN

		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
2014	12,870	145	276	421	21%	861	43%	737	37%	2,019	2,094	17	32	49	± 4	86	± 6	57
2015	14,011	212	217	429	26%	676	41%	536	33%	1,641	3,021	31	32	63	± 6	79	± 7	49
2016	11,909	162	259	421	24%	862	49%	463	27%	1,746	1,586	19	30	49	± 4	54	± 5	36
2017	15,282	157	387	544	25%	1,019	46%	630	29%	2,193	2,080	15	38	53	± 4	62	± 5	40
2018	13,097	142	296	438	25%	859	49%	451	26%	1,748	1,526	17	34	51	± 5	53	± 5	35
2019	10,431	142	158	300	21%	726	50%	417	29%	1,443	1,609	20	22	41	± 4	57	± 5	41

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR524 - DWYER

HUNT AREAS: 103
PREPARED BY: MARTIN HICKS

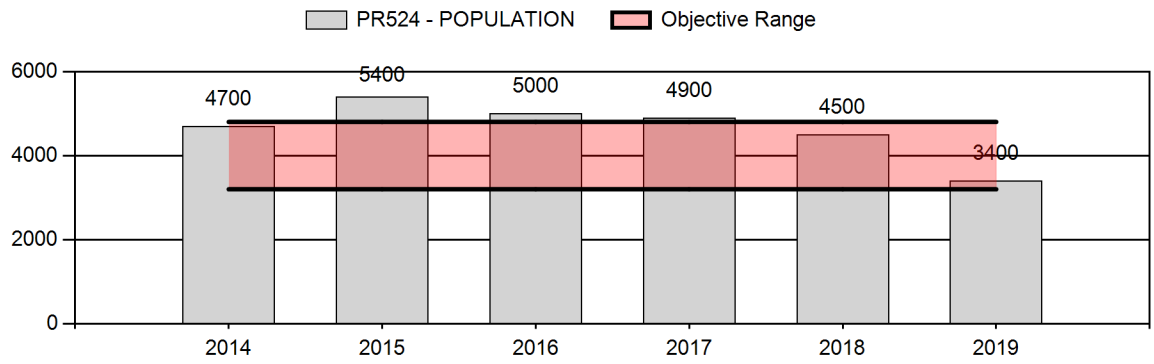
	2014 - 2018 Average	2019	2020 Proposed
Population:	4,900	3,400	3,400
Harvest:	666	673	520
Hunters:	728	828	635
Hunter Success:	91%	81%	82 %
Active Licenses:	794	865	665
Active License Success:	84%	78%	78 %
Recreation Days:	2,282	2,628	2,000
Days Per Animal:	3.4	3.9	3.8
Males per 100 Females	45	43	
Juveniles per 100 Females	46	24	

Population Objective (± 20%) :	4000 (3200 - 4800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-15%
Number of years population has been + or - objective in recent trend:	3
Model Date:	01/22/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	8.7%	7.1%
Males ≥ 1 year old:	47%	54%
Total:	16%	13%
Proposed change in post-season population:	-23%	-5%

Population Size - Postseason



2020 Hunting Seasons
Dwyer Pronghorn Herd Unit (PR524)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
103	1	Aug. 15	Oct. 4	Oct. 5	Oct. 31	450	Any antelope
103	6	Aug. 15	Oct. 4	Oct. 5	Dec. 31	350	Doe or fawn

2019 Hunter Satisfaction: 79% Satisfied, 9% Neutral, 12% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The 2020 season structure included a reduction in both Type 1 and Type 6 licenses to address a population that has experienced poor fawn recruitment for four consecutive years. The proportion of males in the population has not declined compared to adjacent herds but classification samples sizes typically are well below the adequate number needed to make accurate inferences. Even with a declining population there continues to be isolated areas of damage concerns, consequently a lengthy doe/fawn season will continue. The reduction of the number of male and female pronghorn licenses should offset poor juvenile recruitment, resulting in a post-season population estimate of 3,400 pronghorn.

2.) Management Objective Review: The last time this herd unit's objective was reviewed was in 2019. The next objective review will take place in 2024.

3.)Weather and Habitat Data: The only significant weather event that occurred during the biological year was a major hail storm that killed a documented 20+ pronghorn south of Glendo. Other than that, there were no additional events identified as a major contribution to below average survival rates. Spring of 2019 resulted in longer periods of colder temperatures with above average precipitation that might have contributed to poor fawn survival.

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR524 - DWYER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2014	5,400	68	167	235	21%	566	52%	295	27%	1,096	1,362	12	30	42	± 5	52	± 5	37
2015	5,900	88	137	225	24%	466	50%	234	25%	925	1,091	19	29	48	± 6	50	± 6	34
2016	5,800	60	104	164	23%	416	58%	135	19%	715	1,257	14	25	39	± 6	32	± 5	23
2017	5,700	123	187	310	29%	553	52%	209	19%	1,072	1,072	22	34	56	± 6	38	± 5	24
2018	5,300	42	156	198	20%	503	52%	269	28%	970	1,044	8	31	39	± 5	53	± 6	38
2019	4,100	46	102	148	26%	343	60%	84	15%	575	1,096	13	30	43	± 6	24	± 5	17

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR525 - MEDICINE BOW

HUNT AREAS: 30-32, 42, 46-48
PREPARED BY: LEE KNOX

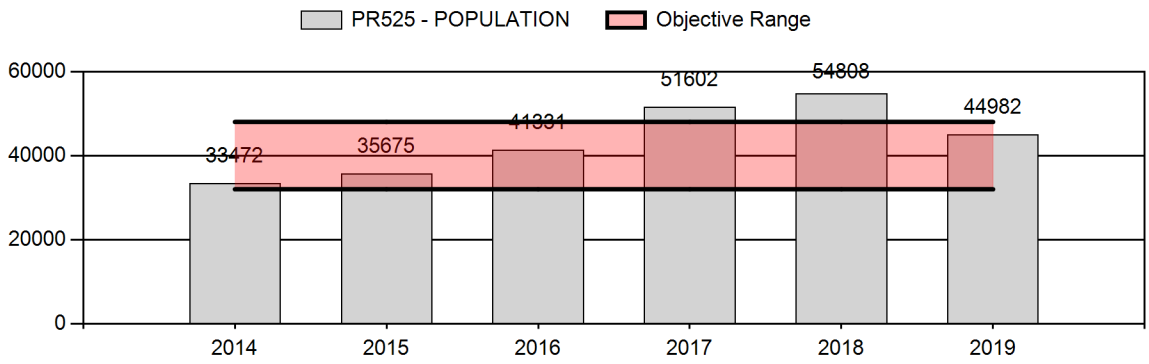
	2014 - 2018 Average	2019	2020 Proposed
Population:	43,378	44,982	50,715
Harvest:	2,635	3,830	3,800
Hunters:	2,819	4,153	4,150
Hunter Success:	93%	92%	92 %
Active Licenses:	3,135	4,571	4,570
Active License Success:	84%	84%	83 %
Recreation Days:	7,876	11,159	11,160
Days Per Animal:	3.0	2.9	2.9
Males per 100 Females	49	43	
Juveniles per 100 Females	71	66	

Population Objective (± 20%) :	40000 (32000 - 48000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	12%
Number of years population has been + or - objective in recent trend:	5
Model Date:	2/14/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	19%	19%
Total:	6%	6%
Proposed change in post-season population:	4%	4%

Population Size - Postseason



2020 Hunting Seasons
Medicine Bow Pronghorn Herd Unit (PR525)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
42	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	600	Any antelope
42	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	250	Doe or fawn
46	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	200	Any antelope
46	2	Aug. 15	Sep. 24	Oct. 5	Oct. 31	250	Any antelope
46	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	150	Doe or fawn
47	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	500	Any antelope
47	2	Aug. 15	Sep. 24	Oct. 5	Oct. 31	300	Any antelope
47	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	350	Doe or fawn
48	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	150	Any antelope
48	2	Aug. 15	Sep. 24	Oct. 5	Oct. 31	150	Any antelope
48	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	50	Doe or fawn
30	1	Aug. 15	Oct. 4	Oct. 5	Oct. 31	500	Any antelope
30	6	Aug. 15	Oct. 4	Oct. 5	Oct. 31	100	Doe or fawn
31	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	250	Any antelope
31	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	200	Doe or fawn
32	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	600	Any antelope
32	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	400	Doe or fawn
32	7	Aug. 15	Sep. 24	Sep. 25	Oct. 31	150	Doe or fawn valid on or within one (1) mile of irrigated land

2019 Hunter Satisfaction: 91% Satisfied, 6% Neutral, 3% Dissatisfied

2020 Management Summary:

1.) Hunting Season Evaluation: The current season setting structure was implemented in 2018 with the idea that the season length and quotas would remain consistent over a three period. This allows us to better evaluate if the season structure is managing the population towards objective. The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. Buck ratios are within management guidelines at 43:100 does (Appendix A) and the three year average of 51:100 does. We are seeing high winter mortality of all age classes of pronghorn on winter ranges near Hanna. From collared data we now know that most of the pronghorn in areas 42, 47, and 48 winters north and west of Hanna during severe winters. We are concerned we may see very low pronghorn densities this summer following two hard winters in a row. The current population is within 20% of the population objective, and being the third year of this season structure, the 2020 season will remain status quo.

2.) Management Objective review: The current objective was set at 40,000 in 2014. The management objective was last reviewed in 2019.

3.) Research: Proposed wind energy development in Shirley Basin covers about 60,966 acres of crucial winter range habitat. The Department is currently working with the Wyoming Cooperative Fish and Wildlife Research Unit to better understand the effects of wind energy on pronghorn (Appendix B). Collars were deployed on March 20, 2018 on 80 doe pronghorn. Captures will take place twice a year to maintain the sample size of 80 collared does. At the time of writing adult doe survival was 47% (95% CI 37%- 58%) in biological year 2019, however we are seeing multiple mortalities as winter progresses. We are also seeing a dozen or more collared does have crossed the Platte River and are wintering north of Sinclair in hunt area 62. Overall survival of the original 80 does is 42% with 38 remaining in the study. Several wind farms started building infrastructure such as roads during fall of 2019, and we expect to see more intensified development this spring and summer.

4.) Habitat: Although winter conditions started in late October, overall precipitation in Shirley Basin was normal for 2019. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn fawns at the onset of the fawning period. Plant phenological shifts and delays were displayed in the spring due to cool daytime temperatures and freezing nighttime temperatures. Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures. Winter weather arrived early on the plains, and triggered pronghorn migrations to lower elevations in early November.

Appendix A

Classification

2013 - 2019 Preseason Classification Summary

for Pronghorn Herd PR525 - MEDICINE BOW

		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
2013	29,495	301	614	915	17%	2,708	51%	1,698	32%	5,321	2,221	11	23	34	± 2	63	± 3	47
2014	35,942	514	617	1,131	20%	2,655	47%	1,882	33%	5,668	2,598	19	23	43	± 2	71	± 3	50
2015	38,028	424	529	953	19%	2,249	45%	1,747	35%	4,949	2,810	19	24	42	± 3	78	± 4	55
2016	43,874	614	806	1,420	22%	3,007	46%	2,046	32%	6,473	2,492	20	27	47	± 2	68	± 3	46
2017	54,726	516	996	1,512	24%	2,764	44%	1,962	31%	6,238	2,807	19	36	55	± 3	71	± 3	46
2018	58,808	537	1,186	1,723	25%	3,071	45%	2,073	30%	6,867	2,392	17	39	56	± 3	68	± 3	43
2019	49,195	335	791	1,126	21%	2,612	48%	1,730	32%	5,468	2,349	13	30	43	± 2	66	± 3	46

Appendix B

Shirley Basin Pronghorn Study

Report March 2020

Evaluating the Influences of Wind Energy on the Movement, Distribution, and Habitat Quality of Pronghorn

Adult CAPTURE, March 2020

PROJECT BACKGROUND

The Shirley Basin in south-central Wyoming provides crucial winter range for the Medicine Bow pronghorn herd. Numerous factors influence survival of pronghorn including predation, disease, harsh environmental conditions, and human development. One of the main objectives of this 6-year project is to understand the demographic consequences of wind development on pronghorn and to evaluate the effects of wind energy development on the movement of pronghorn that winter in the Shirley Basin. There is a substantial footprint of proposed wind energy development in the Shirley Basin, and it is not currently known, in any detail, how such development in crucial pronghorn habitat will influence this pronghorn herd. Since there are many proposed wind development projects throughout pronghorn winter range in Wyoming, this study will help evaluate effects and explore potential solutions to minimize habitat loss for wintering pronghorn. TB Flats and Ekola Flats are areas where wind energy development and crucial winter range for pronghorn overlap, and thus present an opportunity to learn about how pronghorn respond to wind development.

In March 2018, the University of Wyoming and the Wyoming Game and Fish Department initiate a collaborative study to evaluate pronghorn response to wind energy in the Shirley Basin. We captured and collared 80 adult female pronghorn in the Shirley Basin and have

redeployed collars from mortalities twice a year, in December and March, to maintain our sample size of 80. Over the past two years we have noticed that a significant portion of our collard pronghorn migrate north to winter in Bates Hole and then migrate back to the Shirley Basin in the summer where they intermingle with the majority of our collared pronghorn. To further our understanding of this northerly migration, we spatially targeted those animals that winter in Bates Hole and collared 40 of these adult female pronghorn. Bates Hole is located on the north edge of the Shirley Basin and south of the Casper Mountains. By expanding the study area north to include Bates Hole, we can better understand the migration patterns in the Shirley Basin. This additional capture effort has increased our sample size from 80 to 120 collared animals within the Shirley Basin area and will further our ability to evaluate the effects of wind energy development on the seasonal movement of pronghorn in the Shirley Basin.

DATA COLLECTION

This year marked the third year of captures for this study, where we captured and collared 77 new adult female pronghorn. Captures took place on March 11th, 16th and 20th of 2020. All captures were conducted via helicopter net-gunning and animals were field processed by Native Range Capture Services. During captures we had one capture mortality and three animals died within two weeks of captures (one of these animals was caught in a fence and euthanized several days after it was captured), giving us a total of 4 capture-related mortalities. Doe pronghorn were fitted with Telonices RECON-4560-4 Globalstar Sattelite GPS collars. The collars were programmed to collect a GPS location every 2 hours and transmit 1 location via satellite daily. The battery capacity of these collars is approximately 3.5 years. The collars emit a very high frequency (VHF) signal, which will allow ground technicians to locate collars to retrieve the stored data.

During field processing, biological samples were taken. We collected blood samples (~20 ml) for DNA testing and to provide the Wyoming Game and Fish Veterinary Lab with samples to screen for disease. We also collected fecal samples (~15 to 20 pellets) for nutrition analyses.

CAPTURE LOCATIONS

Of the 77 pronghorn captured and collared in March 2020, 37 of the collars were redeployed from mortalities in the Shirley Basin proper in an effort to maintain our sample size of 80 collared adult female pronghorn. An additional 40 collars were deployed on the northern edge of the Shirley Basin in an area known as Bates Hole with the goal to further our understanding of the migration patterns of the Medicine Bow herd.

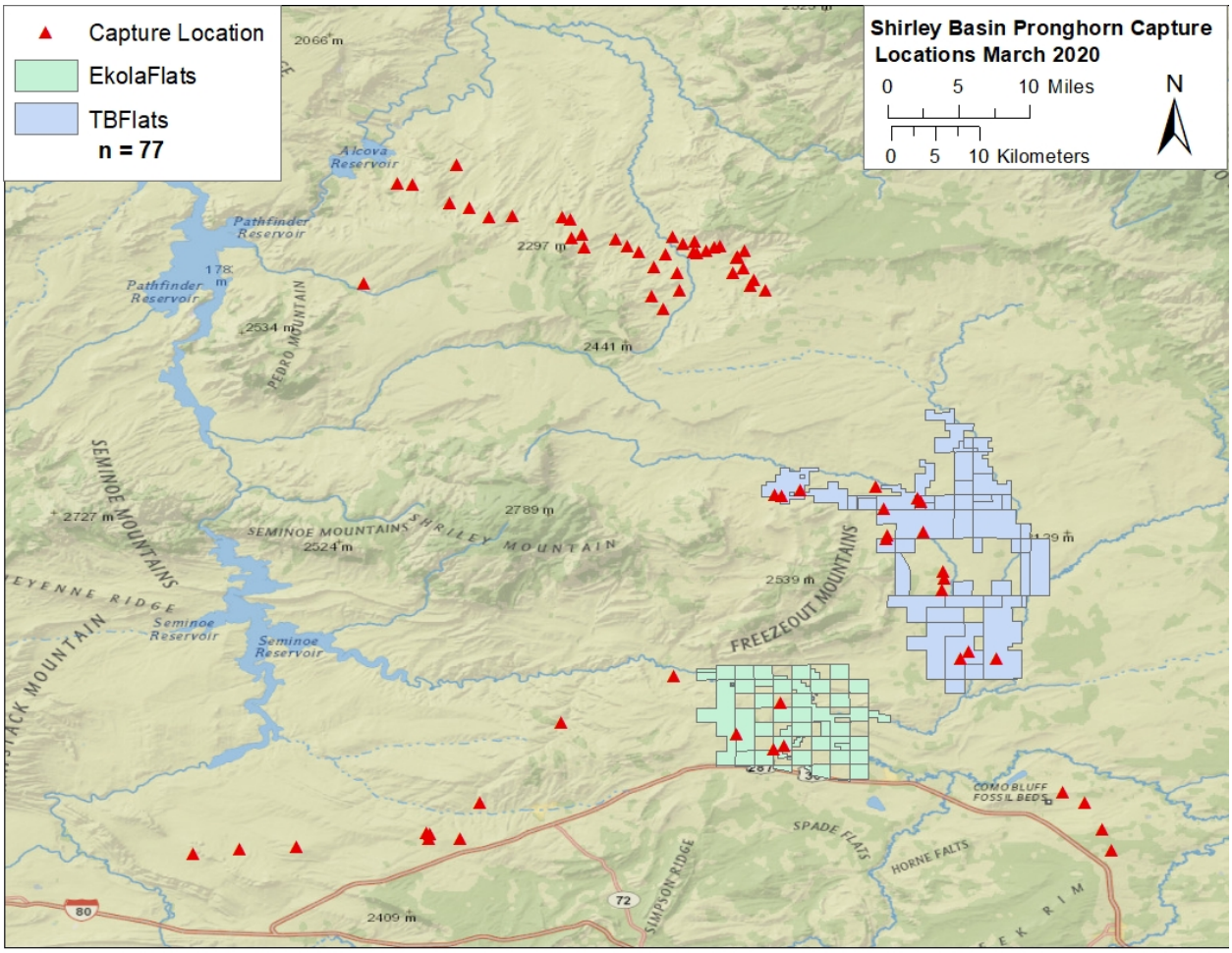


Figure 1. Capture locations of all (n = 77) pronghorn does in the larger Shirley Basin study area.

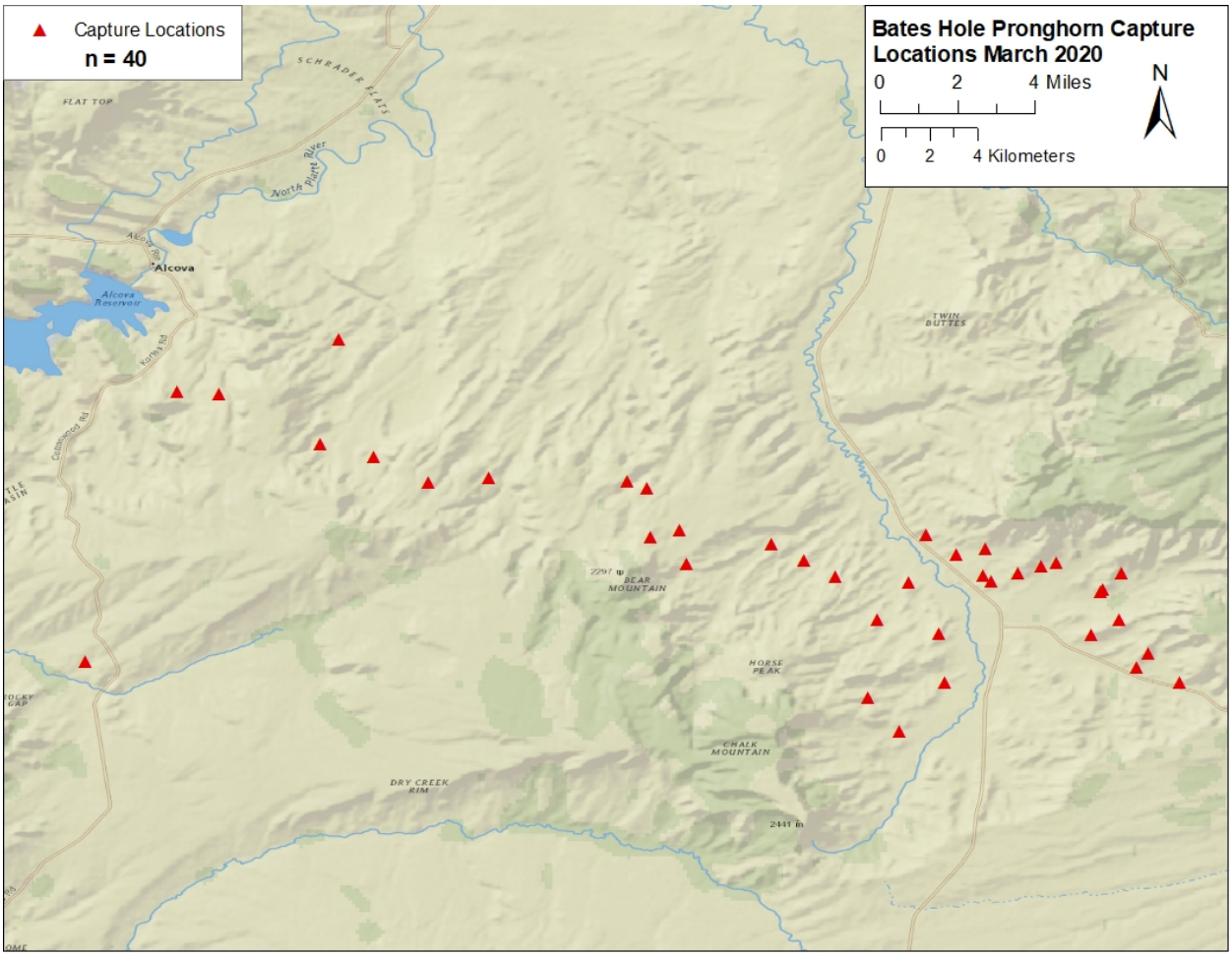


Figure 2. Capture locations of 40 new pronghorn does in Bates Hole.

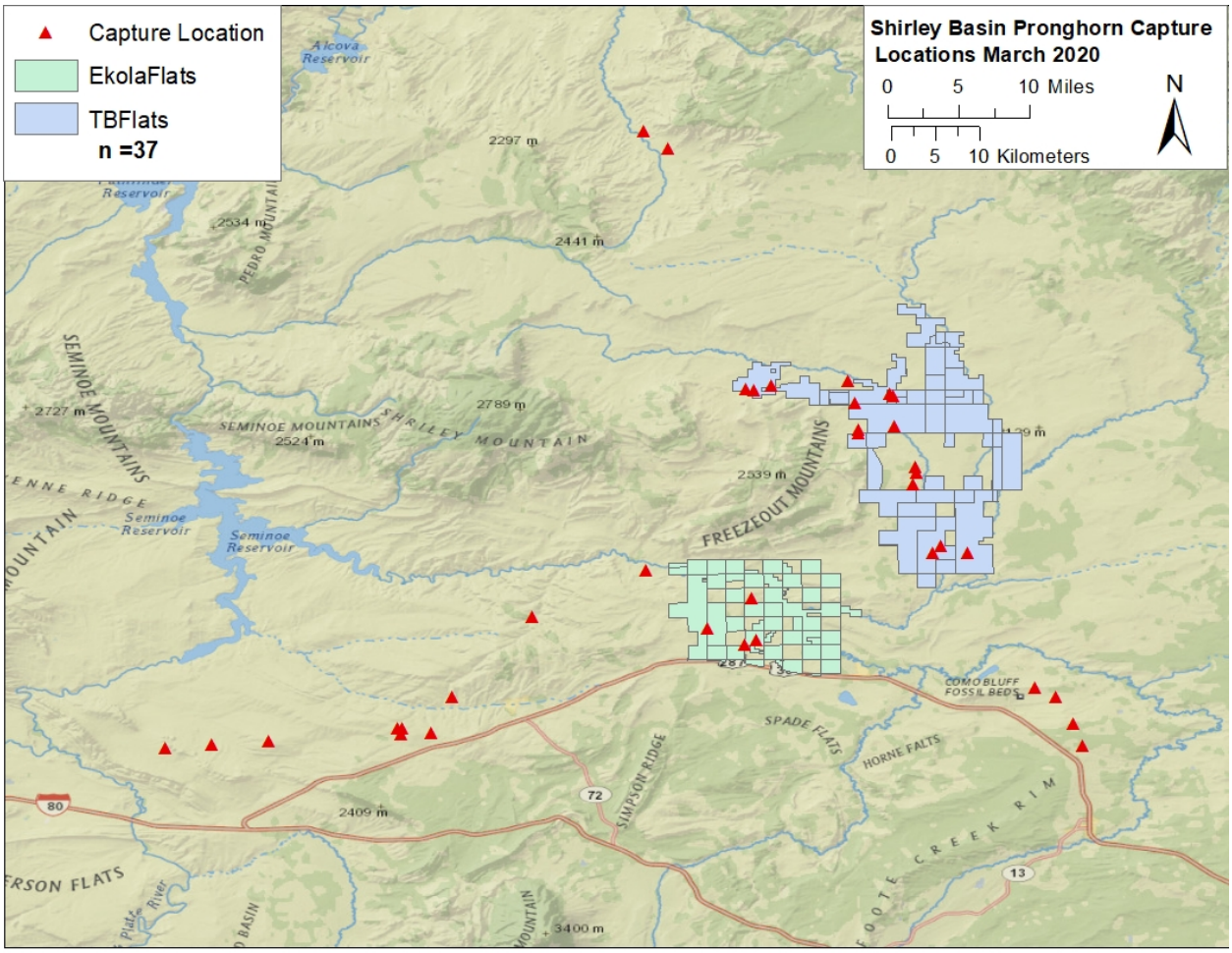


Figure 3. Capture locations of 37 redeployed collars on pronghorn does in the Shirley Basin proper.

COLLABORATORS

Research partners for this project include Lee Knox, Embere Hall, Teal Cufaude, Heather O'Brian, and Justin Binfet of the Wyoming Game and Fish Department. We want to sincerely thank all collaborators for their help and funding to make this project possible: Wyoming Game and Fish Department, Pacificorp, Invenergy, and The Nature Conservancy in Wyoming.

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2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR526 - COOPER LAKE

HUNT AREAS: 43
PREPARED BY: LEE KNOX

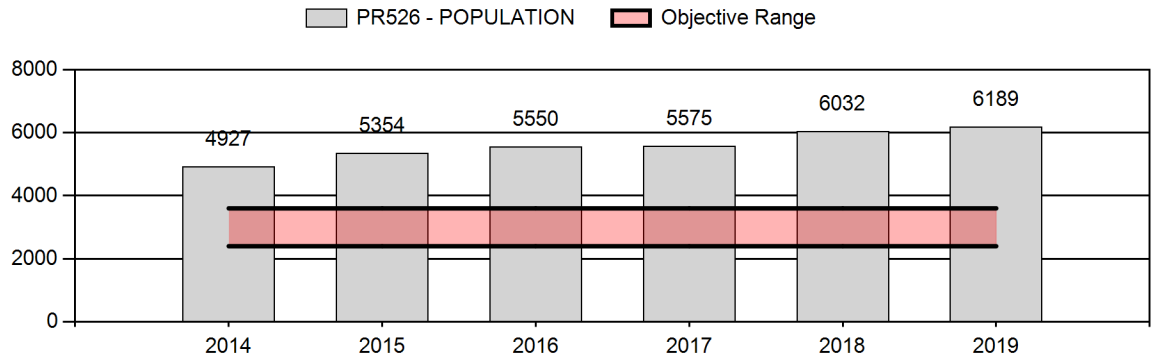
	2014 - 2018 Average	2019	2020 Proposed
Population:	5,488	6,189	6,500
Harvest:	747	862	860
Hunters:	853	1,090	1,000
Hunter Success:	88%	79%	86 %
Active Licenses:	917	1,186	1,200
Active License Success:	81%	73%	72 %
Recreation Days:	2,585	3,419	3,400
Days Per Animal:	3.5	4.0	4.0
Males per 100 Females	63	40	
Juveniles per 100 Females	89	70	

Population Objective (± 20%) :	3000 (2400 - 3600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	106%
Number of years population has been + or - objective in recent trend:	21
Model Date:	2/12/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	20%	20%
Males ≥ 1 year old:	20%	20%
Total:	18%	18%
Proposed change in post-season population:	4%	4%

Population Size - Postseason



2020 Hunting Seasons
Cooper Lake (PR526)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
43	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	600	Any antelope
43	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	700	Doe or fawn

2019 Hunter Satisfaction: 86% Satisfied, 8.7% Neutral, 5.2% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: Cooper Lake is predominantly a private land herd with minimal public access. This herd is over objective by more than two fold however hunter access and crowding are the limiting factors. The majority of harvest comes from the Laramie River and Diamond Lake Hunter Management Areas. The current season structure was implemented in 2018 with the idea in mind that the season length and quotas would remain consistent over a three period. This allows us to better evaluate if the season structure is managing the population towards objective. Season length and license allocation are as liberal as access will allow. The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. Buck ratios have remained well within management guidelines with buck ratios in 2019 at 40:100, and the 3 year average at 55:100 does.

2.) Management Objective Review: The current objective was set at 3,000 in 1986. The management objective was last reviewed in 2018.

3.) Population Abundance Estimate: We conducted a line transect survey in May of 2019. The survey was conducted using Laird Flying Services in a Husky fixed wing. Total survey cost was $1,750.00 for 6 hours of flying. We flew 492 miles on 32 transects with a mean flight height of 321 ft and detected 405 clusters with 796 pronghorn. Total occupied habitat used in the analysis was 445 square miles. Pronghorn density was estimated at 28.62 per square mile (95% CI 22.81 – 35.90/sq.mi). The population estimate was 12,738 pronghorn with a 95% confidence interval of 10,154 – 15,978 pronghorn (Appendix B). It is hard to correlate this estimate to the current population estimate from the spreadsheet model of 6,200 pronghorn, however the survey is statistically valid and of good quality.

4.) Habitat: Precipitation in the hunt area was normal for 2019. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn fawns at the onset of the fawning period. Plant phenological shifts and delays were displayed in the spring due to cool daytime temperatures and freezing nighttime temperatures.

Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures.

Appendix A

Classification

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR526 - COOPER LAKE

		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
2014	5,558	101	96	197	25%	300	38%	303	38%	800	1,538	34	32	66	± 9	101	± 13	61
2015	6,052	68	92	160	20%	325	41%	307	39%	792	2,352	21	28	49	± 7	94	± 12	63
2016	6,367	109	139	248	27%	345	38%	324	35%	917	2,878	32	40	72	± 9	94	± 11	55
2017	6,500	135	243	378	27%	564	41%	437	32%	1,379	2,904	24	43	67	± 7	77	± 7	46
2018	6,998	52	88	140	23%	246	41%	211	35%	597	1,984	21	36	57	± 9	86	± 13	55
2019	7,137	34	100	134	19%	336	48%	236	33%	706	1,959	10	30	40	± 6	70	± 9	50

Appendix B

Line Transect Summary

2018 PR526 - COOPER LAKE Pronghorn Line-Transect Summary

Survey Dates:	5/31/2019 - 5/31/2019
Survey Cost:	$ 1,750.00
Flight Service:	LAIRD FLYING SERVICE
Aircraft:	HUSKY
Observers:	Kelly Todd and Becca Lutz

Weather Conditions:

Temperature (Degrees Fahrenheit):	70
Cloud Cover (%):	50
Wind Speed (MPH):	0 - 20

Transect Limits:	-106.194932 to -10F.588132
Transect Direction:	North/South
Transect Interval (Minutes of Longitude):	3
Transect Length: (Mi.):	492
Transect Altitude (AGL):	321 ft.
Occupied Habitat (mi^2):	445
Density Estimate (Animals/mi^2 with Confidence Intervals):	28.62 (22.81 - 35.90)
Population Estimate (with Confidence Intervals):	12,738 (10,154 - 15,978)

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR527 - CENTENNIAL

HUNT AREAS: 37, 44-45
PREPARED BY: LEE KNOX

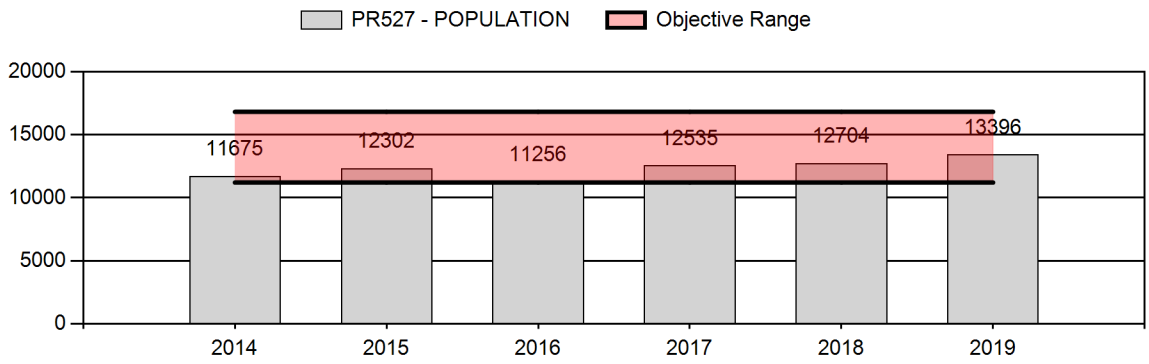
	2014 - 2018 Average	2019	2020 Proposed
Population:	12,094	13,396	13,396
Harvest:	1,013	1,017	988
Hunters:	1,081	1,085	1,085
Hunter Success:	94%	94%	91 %
Active Licenses:	1,214	1,187	1,200
Active License Success:	83%	86%	82 %
Recreation Days:	3,807	3,269	3,200
Days Per Animal:	3.8	3.2	3.2
Males per 100 Females	46	46	
Juveniles per 100 Females	63	56	

Population Objective (± 20%) :	14000 (11200 - 16800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-4.3%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/10/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	6%	5.5%
Males ≥ 1 year old:	21%	23%
Total:	7%	7%
Proposed change in post-season population:	-1%	0%

Population Size - Postseason



2020 HUNTING SEASONS

Centennial Pronghorn Herd (PR527)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
37	1	Aug. 15	Sep. 19	Sep. 20	Oct. 14	150	Any antelope
37	6	Aug. 15	Sep. 19	Sep. 20	Oct. 14	25	Doe or fawn
44	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	300	Any antelope
44	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	150	Doe or fawn
45	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	400	Any antelope
45	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	350	Doe or fawn

2020 Hunter Satisfaction: 94.3% Satisfied, 3.3% Neutral, 2.4% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The current season setting structure was implemented in 2018 with the idea that the season length and quotas would remain consistent over a three period. This allows us to better evaluate if the season structure is managing the population towards objective. The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. Buck ratios have remained within management guidelines at 48:100 does and the 3 year average of 44:100 does. The population is within 20% of the population objective, and being the third year of this season structure the 2020 season will remain status quo.

2.) Management Objective review: The current objective was set at 14,000 in 1997. The management objective was last reviewed in 2018.

3.) Population Abundance Estimate: We conducted a line transect survey in May of 2019. The survey was conducted using Laird Flying Services in a Husky fixed wing. Total survey cost was $2,500.00 for 10 hours of flying. We flew 560 miles on 51 transects with a mean flight height of 318 ft and detected 396 clusters with 999 pronghorn. Total occupied habitat used in the analysis was 1,100 square miles. Pronghorn density was estimated at 36 (95% CI 30-51/sq.mi). The population estimate was 39, 303 pronghorn with a 95% confidence interval of 30,450 – 50,730 pronghorn (Appendix B). It is hard to correlate this to the current population estimate from the spreadsheet model of 13,700 pronghorn, however the survey is statistically valid and of good quality.

4.) Habitat: Precipitation in the hunt area was normal for 2019. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn fawns at the onset of the fawning period. Plant phenologicall shifts and delays were displayed in the spring due to cool daytime temperatures and freezing nighttime temperatures.

Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures.

Appendix A

Classification

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR527 - CENTENNIAL

		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
2014	12,762	249	321	570	22%	1,149	44%	907	35%	2,626	2,149	22	28	50	± 4	79	± 5	53
2015	13,414	199	277	476	19%	1,181	48%	802	33%	2,459	2,207	17	23	40	± 3	68	± 5	48
2016	12,388	182	353	535	25%	1,000	48%	565	27%	2,100	1,724	18	35	54	± 4	56	± 4	37
2017	13,681	107	284	391	21%	972	52%	508	27%	1,871	2,039	11	29	40	± 4	52	± 4	37
2018	13,800	124	260	384	23%	823	50%	439	27%	1,646	1,532	15	32	47	± 4	53	± 5	36
2019	14,782	132	328	460	23%	1,006	50%	562	28%	2,028	1,609	13	33	46	± 4	56	± 4	38

Appendix B

Line Transect Summary

2018 PR527 - CENTENNIAL Pronghorn Line-Transect Summary

Survey Dates:	5/27/2019 - 5/30/2019
Survey Cost:	$ 2,500.00
Flight Service:	LAIRD FLYING SERVICE
Aircraft:	HUSKY
Observers:	Lee Knox Bill Brinegar

Weather Conditions:

Temperature (Degrees Fahrenheit):	70
Cloud Cover (%):	0
Wind Speed (MPH):	0 - 0

Transect Limits:	0 to 0
Transect Direction:	North/South
Transect Interval (Minutes of Longitude):	5
Transect Length: (Mi.):	560
Transect Altitude (AGL):	318 ft.

Occupied Habitat (mi^2):	1,100
Density Estimate (Animals/mi^2 with Confidence Intervals):	35.73 (27.682 - 46.118)
Population Estimate (with Confidence Intervals):	39,303 (30,450 - 50,730)

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR528 - ELK MOUNTAIN

HUNT AREAS: 50
PREPARED BY: TEAL CUFAUDE

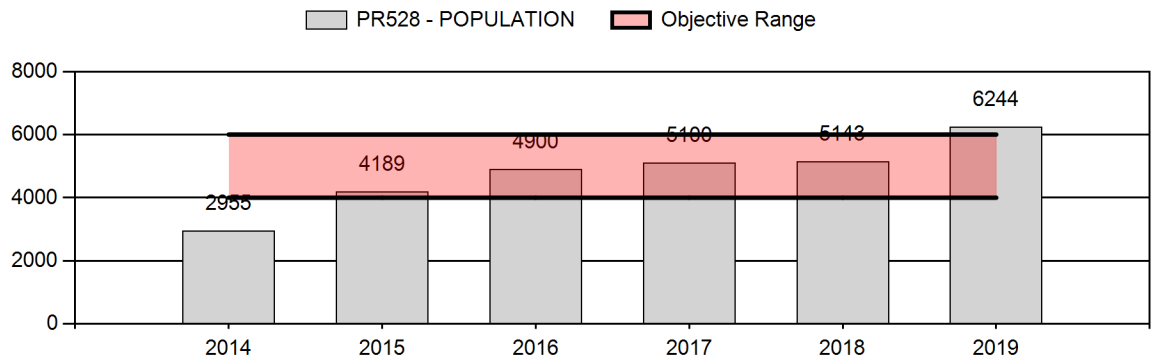
	2014 - 2018 Average	2019	2020 Proposed
Population:	4,457	6,244	6,300
Harvest:	333	420	415
Hunters:	344	459	450
Hunter Success:	97%	92%	92%
Active Licenses:	382	492	490
Active License Success:	87%	85%	85 %
Recreation Days:	1,114	1,290	1,300
Days Per Animal:	3.3	3.1	3.1
Males per 100 Females	42	48	
Juveniles per 100 Females	56	50	

Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	25%
Number of years population has been + or - objective in recent trend:	5
Model Date:	2/15/2020

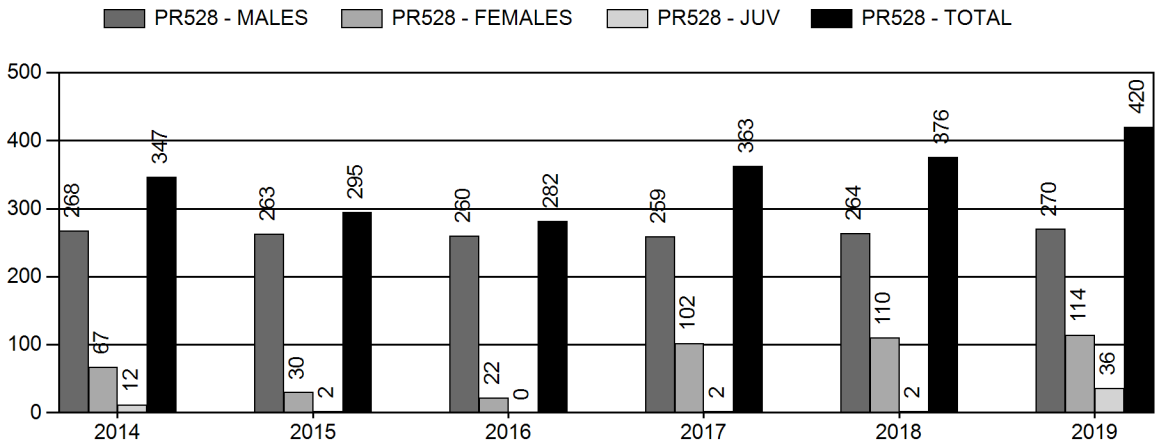
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	3.6%	3.4%
Males ≥ 1 year old:	20.9%	20.5%
Total:	-9%	-8.4%
Proposed change in post-season population:	-1.5%	1.5%

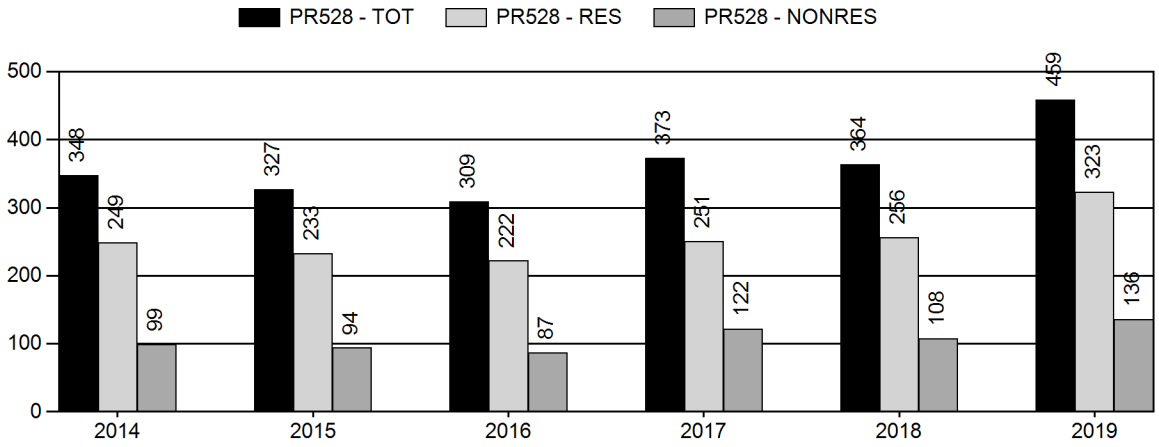
Population Size - Postseason



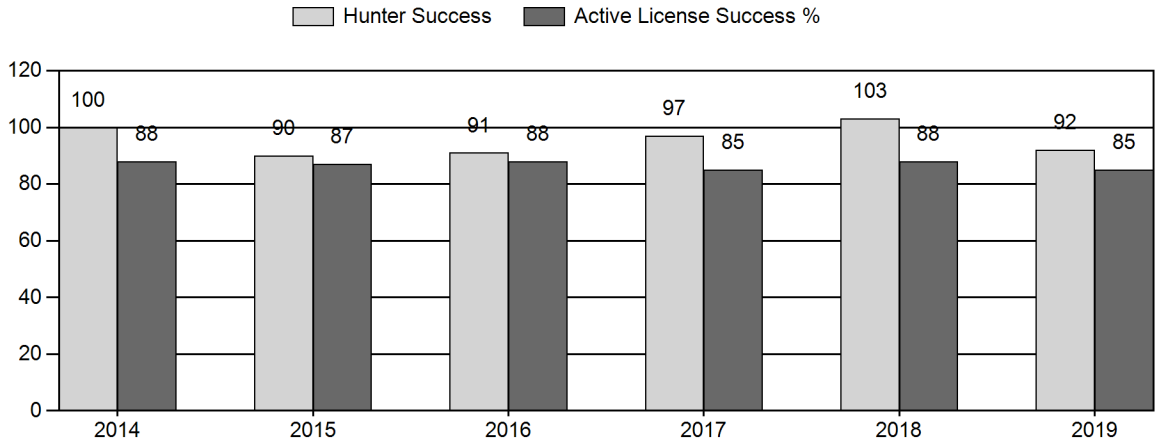
Harvest



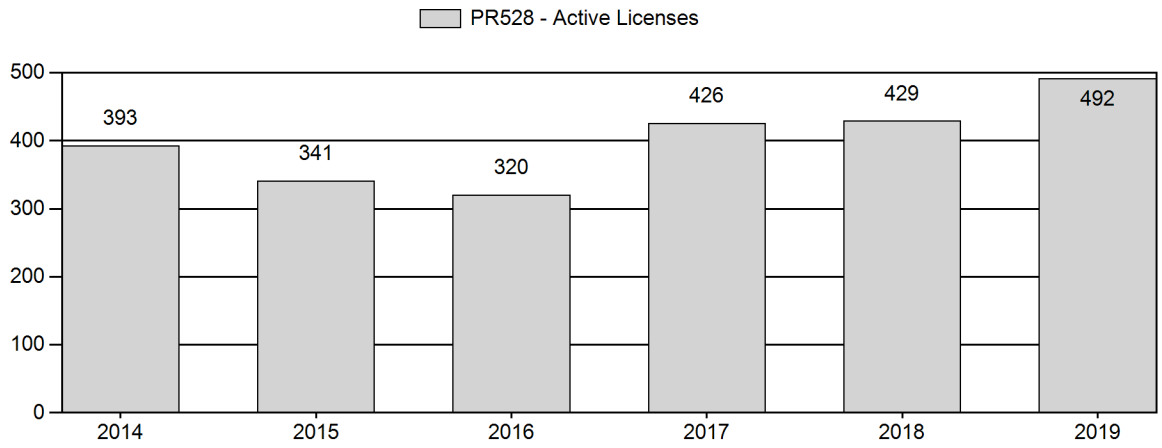
Number of Hunters



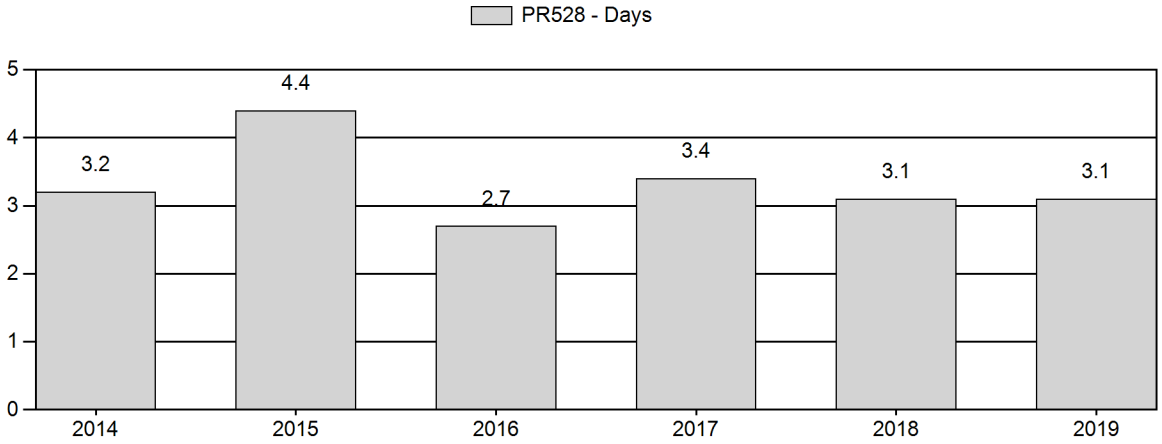
Harvest Success



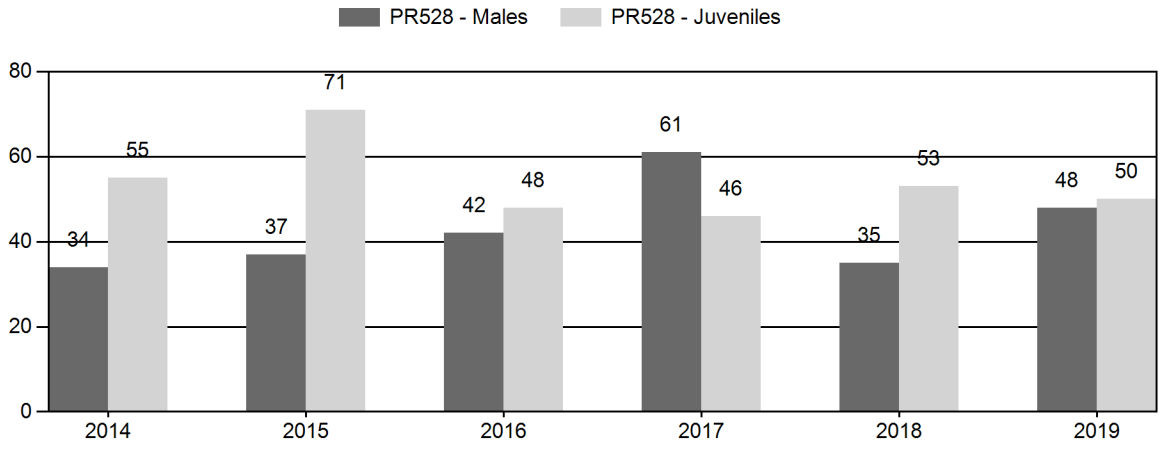
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2020 Hunting Seasons
Elk Mountain Pronghorn (PR528)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
50	1	Aug. 15	Aug. 31	Sep. 16	Oct. 31	300	Any antelope
50	6	Aug. 15	Aug. 31	Sep. 16	Oct. 31	200	Doe or fawn
50	0			Sep. 1	Sep. 15	50	Any antelope, muzzle-loading firearms only

2019 Hunter Satisfaction: 84.2% Satisfied, 10.8% Neutral, 5% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The spreadsheet model's population estimates match trends in harvest and preseason classifications, however end of biological year estimates are less than the corresponding year Line Transect (LT) survey density estimates conducted in 2007, 2010, 2012, and 2018. In 2019 preseason buck/doe ratios (48/100) remained within the recreational management limits (Appendix A). In 2020, the Type 1 license quota remained the same as 2019. Type 6 license quota remained the same as 2019 to allow for increased doe/fawn harvest in the herd unit. The popular muzzleloader only, Type 0 license, continued to be offered in 2020. This level of harvest should allow for stabilizing to slightly increasing pronghorn numbers in this herd unit.

2.) Weather/Habitat: There were greater than average snow accumulations, especially at the higher elevation associated with this hunt area. Due to cold spring temperatures and late snow events, snow persisted in the area well into the spring. The cold temperatures and weather events may have had some negative impacts on fawn survival in the early spring. BLM rain gauge data indicate that precipitation levels were between 100%-123% for the 2019 biological year. Higher than average growing season precipitation resulted in excellent grass and forb production in 2019 likely allowing pronghorn in this area to go into winter in good body condition.

3.) Line Transect Survey: A LT survey was conducted to estimate pronghorn abundance at the end of biological year 2018. The LT survey was completed on 25 May 2019, using a Husky fixed-wing airplane (Laird Flying Services) with a single observer. Transects were flown in a latitudinal direction at 1.5 minute intervals, over occupied habitat throughout the herd unit. The survey took approximately 6 hours to fly 33 transects that covered 687 miles of transect line length. A total of 269 pronghorn clusters and 671 individuals were detected during the survey. Total occupied habitat used in the analysis was 586 square miles. DISTANCE selected the Negative Exponential model, based on the minimum Akaike Information Criterion value for the models tested, to fit the detection curve for the LT survey data. Pronghorn density was estimated at 22 per square mile (95% confidence interval=16-29 pronghorn per square mile). The end of biological year population estimate was 13,107 pronghorn (95% confidence interval= 9,847-17,445 pronghorn), with a 14.5% coefficient of variation. The results for the probability of detection were considered acceptable.

Appendix A

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR528 - ELK MOUNTAIN

		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
2014	3,337	64	111	175	18%	511	53%	280	29%	966	1,021	13	22	34	± 4	55	± 6	41
2015	4,502	118	108	226	18%	612	48%	437	34%	1,275	1,153	19	18	37	± 4	71	± 6	52
2016	5,200	80	83	163	22%	391	53%	189	25%	743	1,459	20	21	42	± 6	48	± 7	34
2017	5,500	157	152	309	30%	503	48%	230	22%	1,042	1,426	31	30	61	± 7	46	± 5	28
2018	5,557	74	111	185	19%	523	53%	276	28%	984	1,209	14	21	35	± 5	53	± 6	39
2019	6,706	95	197	292	24%	610	50%	308	25%	1,210	1,214	16	32	48	± 5	50	± 5	34

2019 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2019 - 5/31/2020

HERD: PR529 - BIG CREEK

HUNT AREAS: 51
PREPARED BY: TEAL CUFAUDE

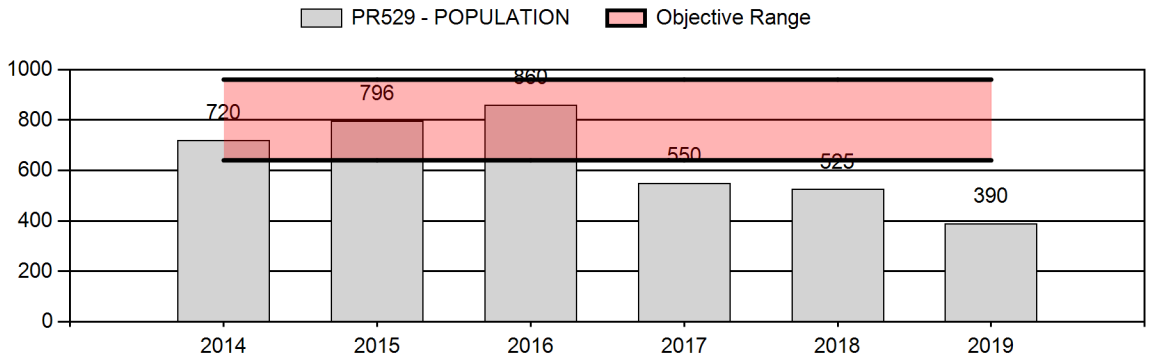
	2014 - 2018 Average	2019	2020 Proposed
Population:	690	390	175
Harvest:	113	182	180
Hunters:	112	186	185
Hunter Success:	101%	98%	97%
Active Licenses:	131	213	215
Active License Success:	86%	85%	84%
Recreation Days:	374	747	700
Days Per Animal:	3.3	4.1	3.9
Males per 100 Females	59	69	
Juveniles per 100 Females	52	56	

Population Objective (± 20%) :	800 (640 - 960)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-51.2%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/15/2020

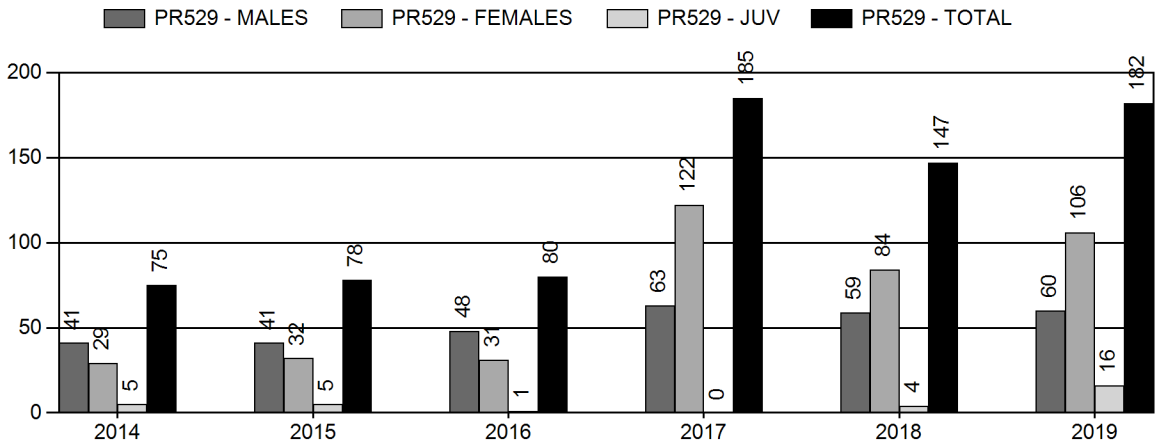
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	45%	68%
Males ≥ 1 year old:	35%	70%
Total:	-34%	-54%
Proposed change in post-season population:	-32%	-55%

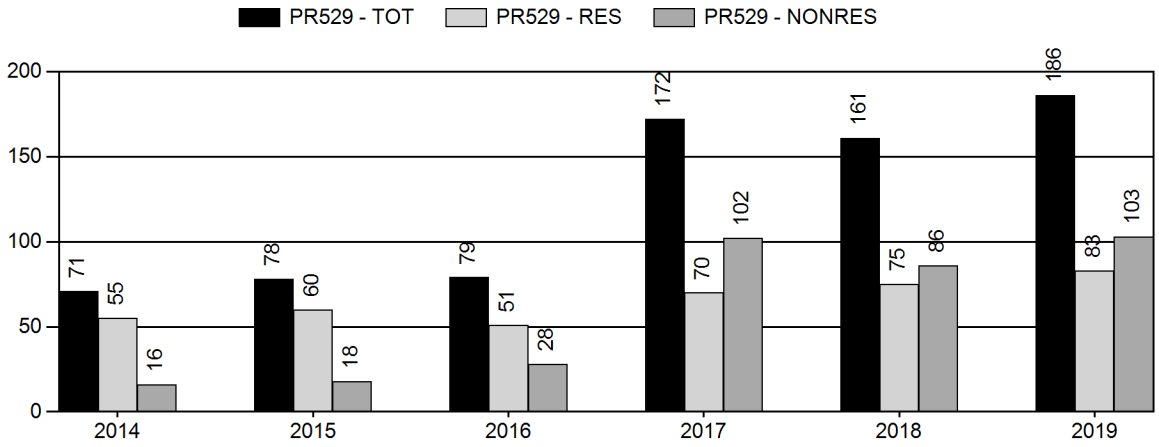
Population Size - Postseason



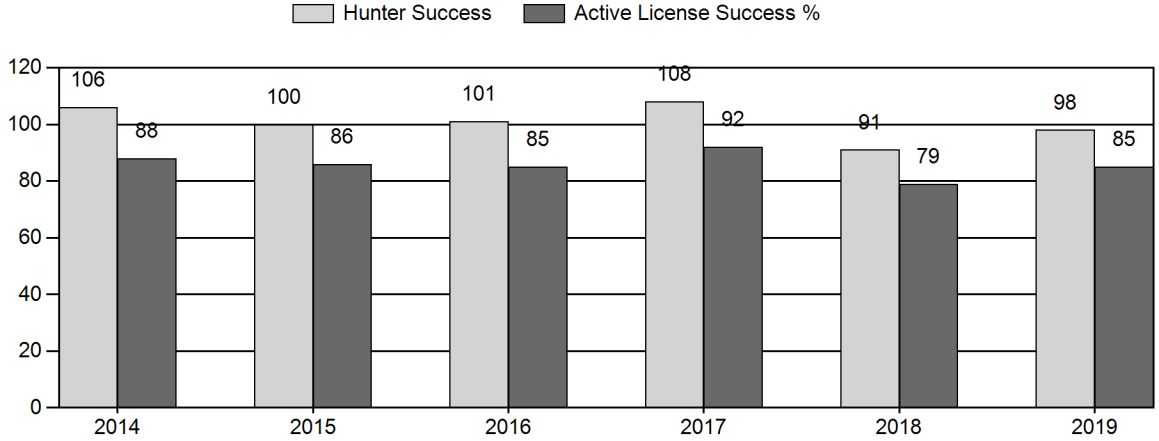
Harvest



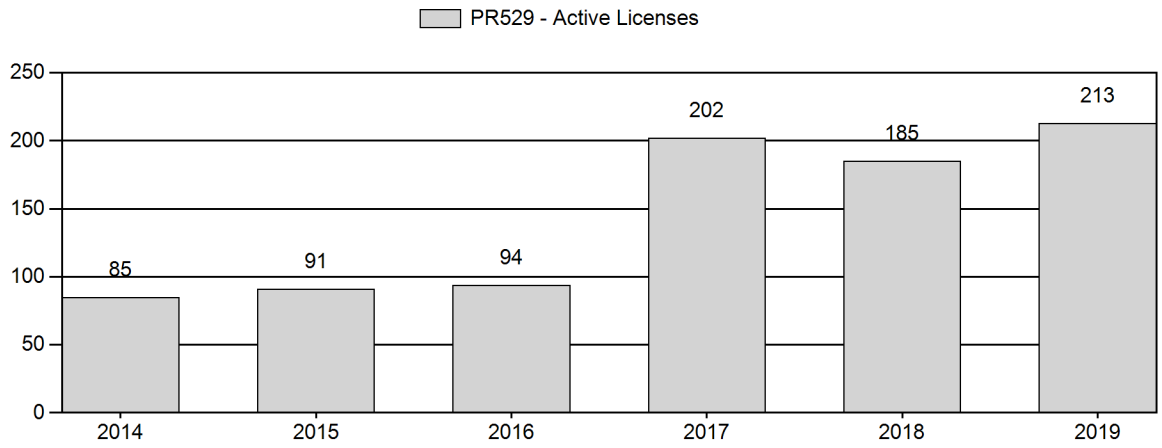
Number of Hunters



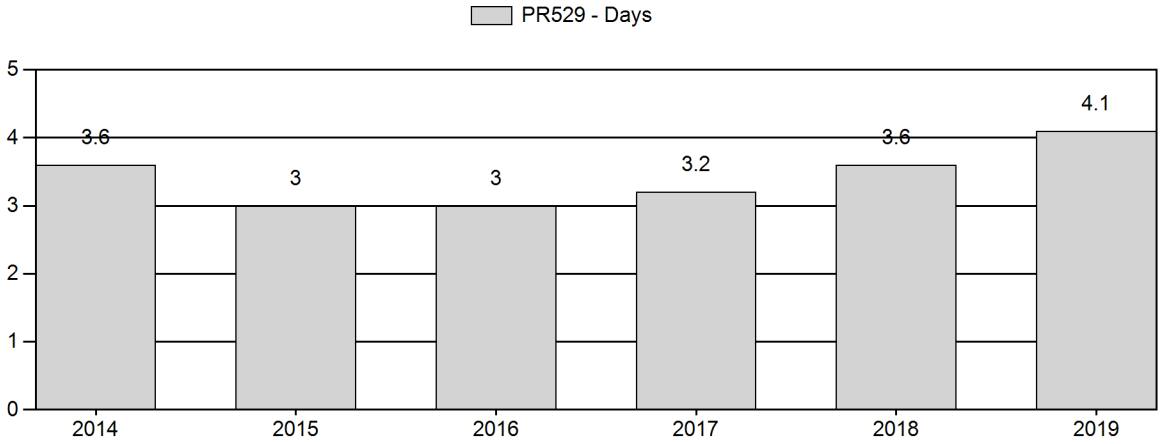
Harvest Success



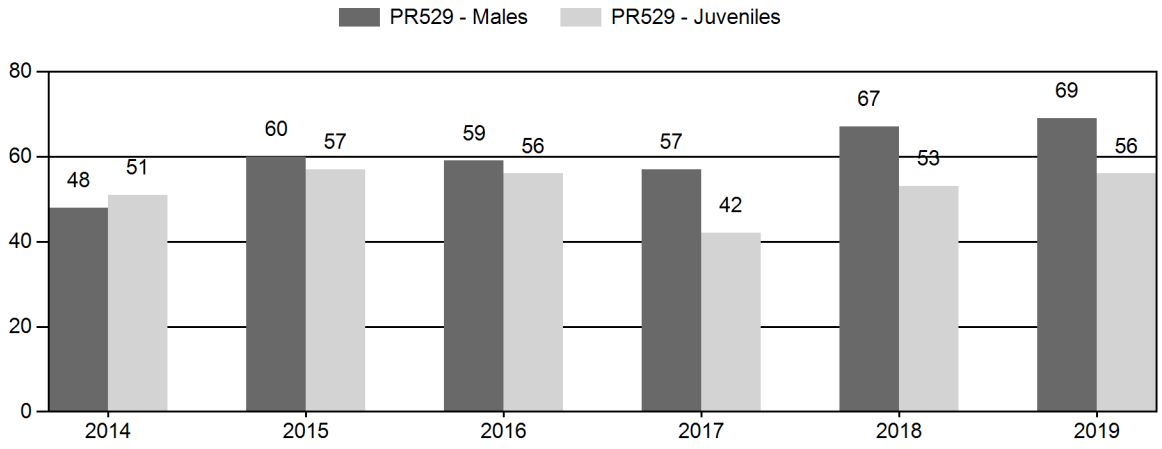
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2020 Hunting Seasons
Big Creek Pronghorn (PR529)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
51	1	Aug. 15	Sep.15	Sep.16	Nov.14	100	Any antelope
	6			Aug. 15	Sep. 15	150	Doe or fawn valid on private land
		Aug. 15	Sep. 15	Sep. 16	Nov. 14		Doe or fawn valid in the entire area

2019 Hunter Satisfaction: 86.1% Satisfied, 12.7% Neutral, 1.3% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The 2019 population estimate of 390 pronghorn, likely underestimates the true number of pronghorn in this herd unit. The spreadsheet model for this herd affords managers little opportunity to obtain an accurate post hunt population estimate and indicated any level of harvest would crash this population. The model for this herd is biologically indefensible. One challenge when modeling this herd is that it is an interstate population. In future years, incorporating adjacent Colorado herd composition data could improve the model. The preseason classification sample in 2019 continued to exceed the classification objective. The fawn/doe ratio (56/100) exceeded the five-year average and buck/doe ratios remained above recreational management objective limits (Appendix A). Opportunity for additional buck harvest was evident so Type 1 licenses were increased by 25 in 2020. The Type 6 license quota was increased by 100 licenses in 2017. This increase was prescribed to reduce pronghorn numbers towards a more appropriate level in consideration of damage to alfalfa fields in the western part of the herd unit. It was anticipated that these damage concerns would continue in 2020, and as such the Type 6 licenses quota remained the same.

2.) Weather/Habitat: There were greater than average snow accumulations, especially at the higher elevation associated with this hunt area. Snow depths were relatively deep near the Wyoming/Colorado state line and, due to cold spring temperatures and late snow events, snow persisted in the area well into the spring. The cold temperatures and weather events may have had some negative impacts on pronghorn fawns in the early spring. BLM rain gauge data indicate that the Prospect Mountain area received 110% of average precipitation for the 2019 biological year. Additionally, PRISM data for the Platte Valley shows that annual and growing season precipitation values are well above the 30 year averages resulting in excellent grass and forb production throughout the hunt area.

3.) Line Transect Survey: A Line Transect (LT) survey was conducted to estimate pronghorn abundance at the end of biological year 2018. The LT survey was completed on 26 May 2019, using a Husky fixed-wing airplane (Laird Flying Services) with a single observer. Transects were flown in a latitudinal direction at 1 minute intervals, over occupied habitat throughout the herd unit. The survey took approximately 4 hours to fly 23 transects that covered 332 miles of transect line length. A total of 145 pronghorn clusters and 390 individuals were detected during the survey. Total

occupied habitat used in the analysis was 206 square miles. DISTANCE selected the Hazard-Rate model, based on the minimum Akaike Information Criterion value for the models tested, to fit the detection curve for the LT survey data. Pronghorn density was estimated at 13 per square mile (95% confidence interval= 9-18 pronghorn per square mile). The end of biological year population estimate was 2,704 pronghorn (95% confidence interval=1,946-3,757 pronghorn), with a 16.6% coefficient of variation. The results for the probability of detection were considered acceptable. The density estimate derived from this analysis should be considered accurate. The spreadsheet model was not able to track the estimate.

Appendix A

2014 - 2019 Preseason Classification Summary

for Pronghorn Herd PR529 - BIG CREEK

		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
2014	802	42	87	129	24%	271	50%	137	26%	537	501	15	32	48	± 5	51	± 5	34
2015	882	58	91	149	28%	248	46%	141	26%	538	561	23	37	60	± 6	57	± 6	36
2016	950	61	123	184	27%	311	46%	175	26%	670	657	20	40	59	± 5	56	± 5	35
2017	750	48	114	162	29%	285	50%	120	21%	567	435	17	40	57	± 5	42	± 4	27
2018	687	45	186	231	31%	344	45%	182	24%	757	546	13	54	67	± 3	53	± 3	32
2019	590	52	144	196	31%	283	44%	159	25%	638	448	18	51	69	± 3	56	± 3	33

2019 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2019 - 5/31/2020
HERD: BS516 - DOUGLAS CREEK
HUNT AREAS: 18
PREPARED BY: LEE KNOX

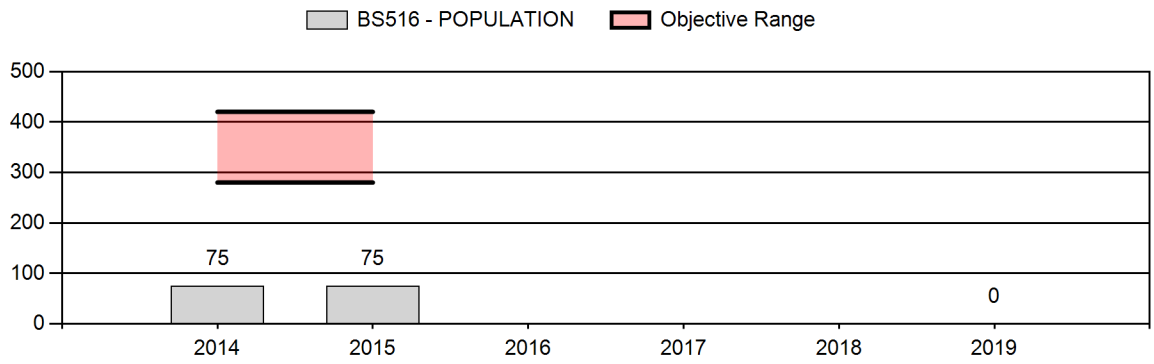
	2014 - 2018 Average	2019	2020 Proposed
Population:		N/A	N/A
Harvest:	0	0	2
Hunters:	0	0	2
Hunter Success:	0%	0%	100 %
Active Licenses:	0	0	2
Active License Success:	0%	0%	100 %
Recreation Days:	1	0	14
Days Per Animal:	0	0	7
Males per 100 Females	37	0	
Juveniles per 100 Females	45	0	

Population Objective (± 20%) :	75 (60 - 90)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/23/2020

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%

Population Size - Postseason



2020 Hunting Seasons
Douglas Creek Bighorn Sheep Herd Unit (BS 516)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
18, 21	1	Aug. 15	Aug. 31	Sep. 1	Oct. 31	2	Any ram (1 resident, 1 nonresident)
18,21	1			Nov.1	Nov. 30		Any ram, valid only in Hunt Area 18

Current Management Objective:

1) **5-year running average of ≥ 75% hunter success**- 100%
2) **5-year running average age of harvested rams between 6 and 8 years of age**- 2012- 2017 Average Age: 7 years old
3) **Documented occurrence of adult rams in the population**~ > 25 rams observed

2020 Management Summary

1.) Hunting Season Evaluation: The 2020 season will be open for one resident and one nonresident. The season is open every other year to maintain the opportunity to harvest a six year or older age class ram, which is specified by the special management guidelines. A ram has not been harvested in Area 18 since 2014. Rams are not always available on public land in October which may be limiting harvest. Rams are often seen on public lands during the rut and extending the season through November will provide better opportunity in Area 18.

2.) Management Objective Review: The objective was last reviewed in 2016 and was changed from a population objective of 350 sheep to a limited opportunity objective.

3.) Research: The Douglas Creek herd was part of a statewide bighorn sheep disease sampling project. In 2019 seven ewes were captured, collared, and tested for bacterial pathogens (Appendix B). The collars will collect a location every two hours for two years. This type of fine scale data will be beneficial in future management of this herd. To date we have not had any mortalities of collared ewes.

4.) Habitat: Higher than average snow accumulations during the 2018-2019 winter paired with cold spring temperatures in 2019 in southeast and southcentral Wyoming resulted in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. Cold temperatures and storms into late May could have impacted early lambing season with potential for associated lamb mortalities. The “late spring” created phenological delays for plants, especially at higher elevations and may have limited early spring forage. Growing season precipitation was higher than average in the both the Douglas Creek and Encampment River herd units in 2019 resulting in excellent grass and forb production and shrub leader growth.

No major disturbances were documented in the areas associated with the Douglas Creek or Encampment River herds in 2019. The large-scale fires occurring in the Snowy and Sierra Madres Ranges over the past ten years have not affected either herd area. The lack of natural disturbances within these bighorn sheep ranges has resulted in shrub communities trending to older and decadent age classes and conifer encroachment. Cheatgrass continues to be an issue on the southeast facing slopes at lower elevations within both of these herd units. The WGFD in conjunction with the USFS, BLM, and Carbon County Weed and Pest continue to conduct large-scale aerial cheatgrass treatments.

Appendix A

Classification

2014 - 2019 Postseason Classification Summary

for Bighorn Sheep Herd BS516 - DOUGLAS CREEK

		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
2014	75	3	1	4	10%	22	55%	14	35%	40	0	14	5	18	± 9	64	± 19	54
2015	75	0	3	3	14%	10	48%	8	38%	21	0	0	30	30	± 21	80	± 41	62
2016	0	4	3	7	30%	11	48%	5	22%	23	0	36	27	64	± 33	45	± 26	28
2017	0	1	7	8	15%	32	58%	15	27%	55	68	3	22	25	± 0	47	± 0	38
2018	0	1	18	19	30%	37	58%	8	12%	64	0	3	49	51	± 0	22	± 0	14
2019	0	0	0	0	0%	46	73%	17	27%	63	0	0	0	0	± 0	37	± 0	37

Appendix B

Results From 2019 Disease Surveillance

2019 BHS Surveillance

WSVL Number	Animal ID	Date Sampled	Herd	Tonsil Culture/PCR Final	Nasal Culture/PCR Final
19-00907	19-095	1/21/2019	Douglas Creek	Lkt+ Mannheimia spp	NSP
19-00907	19-096	1/21/2019	Douglas Creek	NSP	NSP
19-00907	19-097	1/21/2019	Douglas Creek	Lkt+ Mannheimia spp	NSP
19-00907	19-098	1/21/2019	Douglas Creek	NSP	NSP
19-00907	19-099	1/21/2019	Douglas Creek	Lkt+ Mannheimia spp	LKT+ Mannheimia spp
19-00907	19-100	1/21/2019	Douglas Creek	Lkt+ Mannheimia spp	Lkt+ M. haemo/M. glucosida
19-00907	19-101	1/21/2019	Douglas Creek	Lkt+ M. haemo/M. glucosida	NSP

NSI = no significant isolation

NSP = No significant pathogens

2019 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2019 - 5/31/2020

HERD: BS517 - LARAMIE PEAK

HUNT AREAS: 19

PREPARED BY: MARTIN HICKS

	2014 - 2018 Average	2019	2020 Proposed
Population:		N/A	N/A
Harvest:	7	8	8
Hunters:	8	8	8
Hunter Success:	88%	100%	100 %
Active Licenses:	8	8	8
Active License Success:	88%	100%	100 %
Recreation Days:	81	68	65
Days Per Animal:	11.6	8.5	8.1

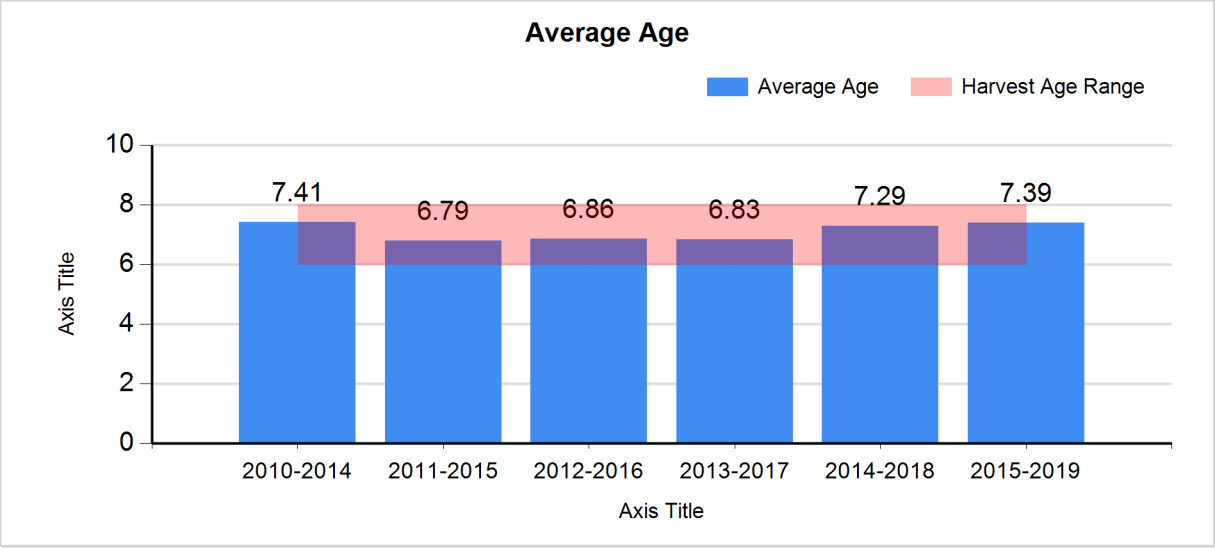
Limited Opportunity Objective:

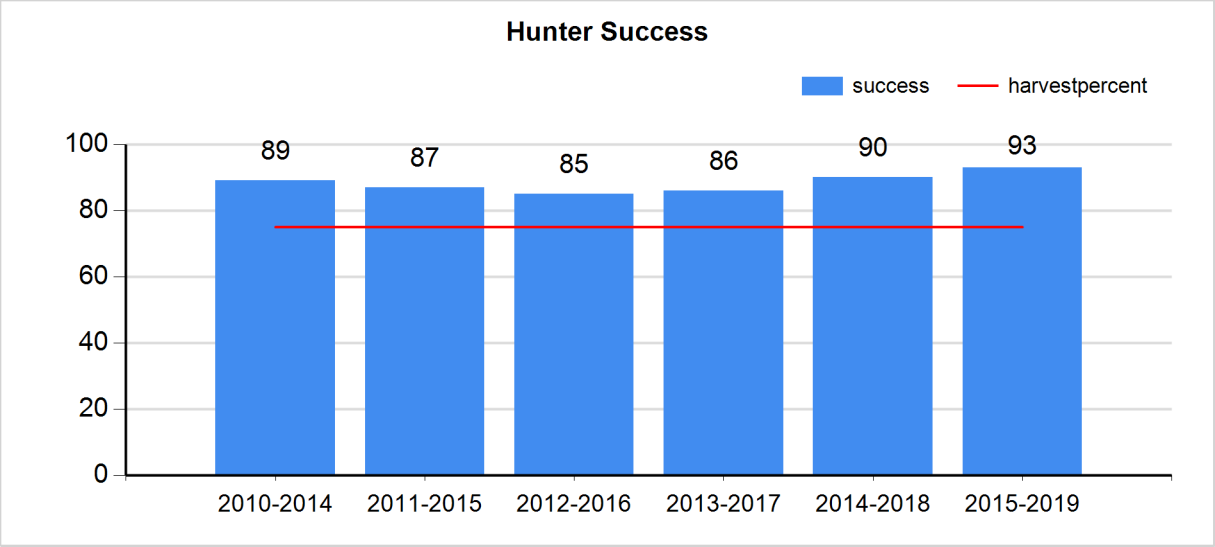
5-year average of > 75% hunter success

5-year average harvest age of 6-8 years

Secondary Objective:

Management Strategy: Special




Hunter Success
success
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80
60
40
20
0
89
87
85
86
90
93
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019

2020 Hunting Seasons
Laramie Peak Bighorn Sheep Herd Unit (BS517)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
19	1	Aug. 15	Aug. 30	Sept. 1	Oct. 31	8	Any ram

Current Management Objective:

1) **5-year running average of >75% hunter success**-92%
2) **5-year running average age of harvested rams between 6 and 8 years of age**-7.5
3) **Documented occurrence of adult rams in the population**-30

2020 Management Summary

1) Hunting Season Evaluation: The 2020 season will provide 8 hunters the opportunity to harvest a mature ram, with a high likelihood of success. There are a number of older age rams in the population to maintain the management objective. However, access to the wild sheep remains difficult due to large tracts of private land within occupied sheep habitat that is not open for hunting opportunities. Hunter crowding is an issue if more than 8 licenses are prescribed and harvest statistics have suffered when there were more than 8 bighorn sheep hunters in the field.

2.) Management Objective Review: The herd objective was reviewed in 2019 and no changes were proposed to the current management regime.

3.) On Going Research: During the winter of 2019 sixteen bighorn sheep ewes were captured as part of the state-wide disease surveillance efforts focusing on bacterial pathogens that may lead to all age die offs. Results indicated that overall sheep were in relatively decent health, however certain bacteria pathogens were present (Appendix A). There were 15 female wild sheep fitted with GPS radio collars that collected three locations per day. Movement patterns were documented during lambing, nursery and winter periods to determine habitat selection (Appendix B).

4) Weather and Habitat: There were no major weather events that could be associated with extraordinary mortality rates. However, within Sybille Canyon there was one collared bighorn sheep ewe and 5 other ewes, one lamb and one ram (5 years old), that either did test positive for the pneumonia pathogen *Mannheimia haemolytica* or were suspected to have the bacteria present but tissues were untestable (Appendix C), which is a concern to managers and we will continue to monitor the herd throughout the winter. There were 1,400 acres of occupied habitat that was treated for cheatgrass as a result of the 2018 Britania fire. An additional 5,300 acres are scheduled to be treated in fall of 2020.

2014 - 2019 Postseason Classification by Hunt Area

for Bighorn Sheep Herd BS517 - LARAMIE PEAK - Hunt Area 19

			Males				Females		Juveniles				Males/100 Females			Young/100	
Year	Area	% Herd	# Ylg	# Adult	Total Male	% Male	#	% Fem	#	% Juv	Total	Class Obj	Ylg	Adult	Males	Female	Adult
2014	19	0%	8	25	33	41%	31	38%	17	21%	81	0	26	81	106	55	27
2015	19	0%	2	21	23	28%	42	51%	17	21%	82	0	5	50	55	40	26
2016	19	0%	10	30	40	27%	67	45%	41	28%	148	0	15	45	60	61	38
2017	19	0%	5	30	35	29%	59	49%	26	22%	120	0	8	51	59	44	28
2018	19	0%	9	28	37	37%	45	45%	18	18%	100	0	20	62	82	40	22
2019	19	0%	7	30	37	27%	72	53%	26	19%	135	0	10	42	51	36	24

Appendix A

2019 BHS Herd Health Surveillance Report

Wyoming Game & Fish Department
Wildlife Health Laboratory

Laramie Peak Herd

The Laramie Peak BHS herd was last sampled in March 2017, with six animals captured in the Iron Mountain vicinity. In January of this year, capture crews and Veterinary Services personnel captured and sampled sixteen adult ewes from the Laramie Peak herd from Hays Canyon, Laramie Peak, and Sybille Canyon.

Nasal and tonsil swabs were analyzed for the presence of respiratory pathogens by culture and PCR. *Mycoplasma ovipneumoniae* was detected by PCR in the nasal swabs of three animals, and cultured from one. Leukotoxin positive *Mannheimia* species, including *Mannheimia haemolytica,* were identified, as well as *Pasteurella multocida*. Hemolytic *Bibersteina trehalosi* was observed on culture plates grown from the tonsil swabs of two animals, and confirmed by biochemical analysis and MALDI-TOF identification; however, PCR did not detect a leukotoxin gene in any samples or isolates. This is an unusual finding, but not unique. The full respiratory pathogen report is included on the following page.

Fecal samples were submitted to the Wyoming State Vet Lab for parasite analysis. Parasite oocysts were detected at low levels in 13 out of 16 animals, with no significant findings. Additionally, all animals in the Laramie Peak herd had lungworm larvae present, with 2 out of 16 sheep having levels considered high burdens (>1,000 larvae per gram feces considered high lungworm burden).

Trace mineral analysis was performed on blood samples. When compared to trace mineral levels in domestic sheep, the Laramie Peak herd is generally deficient in phosphorus, manganese and zinc. Zinc deficiency can contribute to acute disease conditions in domestic sheep, and possibly in bighorn sheep as well. A complete trace mineral report is available upon request.

2019 BHS Herd Health Surveillance Report

Animal ID	Date Sampled	Location	Herd	Tonsil culture/PCR final	Nasal culture/PCR final
19-066	1/22/2019	Hays Canyon	Laramie Peak	Lkt+ M. haemolytica, P. multocida	P. multocida
19-067	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	NSP	P. multocida
19-068	1/22/2019	Hays Canyon	Laramie Peak	NSP	P. multocida
19-069	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	NSP	P. multocida
19-070	1/22/2019	Hays Canyon	Laramie Peak	NSP	P. multocida
19-071	1/22/2019	Hays Canyon	Laramie Peak	Lkt+ Mannheimia sp	NSP
19-072	1/22/2019	Laramie Peak	Laramie Peak	Lkt+ Mannheimia sp	Lkt+ Mannheimia sp
19-073	1/23/2019	Laramie Peak	Laramie Peak	hemo B. trehalosi (no leukotoxin)	NSP
19-074	1/22/2019	Hays Canyon	Laramie Peak	NSP	NSP
19-075	1/22/2019	Hays Canyon	Laramie Peak	P. multocida, hemo B. trehalosi (no leukotoxin)	P. multocida
19-076	1/22/2019	Hays Canyon	Laramie Peak	P. multocida	NSP
19-077	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	NSP	NSP

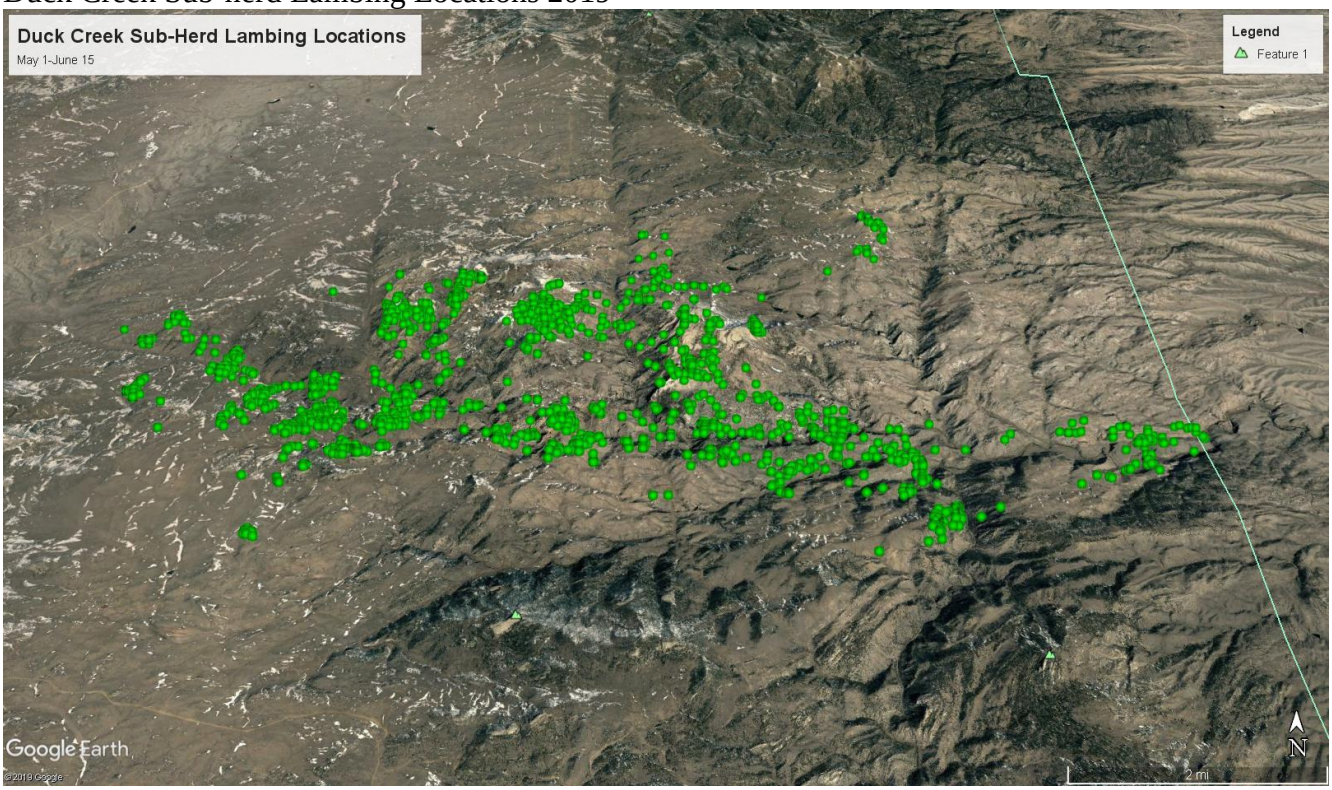
NSP = No significant pathogens NA = No samples received

Animal ID	Date Sampled	Location	Herd	Tonsil culture/PCR final	Nasal culture/PCR final
19-078	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	Lkt+ M. haemolytica, P. multocida	Lkt+ Mannheimia haemolytica
19-079	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	Lkt+ M. haemolytica	P. multocida, M. ovi
19-080	1/21/2019	Johnson Creek/Sybille Canyon	Laramie Peak	Lkt+ M. haemolytica, P. multocida	P. multocida, M. ovi
19-081	1/22/2019	Hays Canyon	Laramie Peak	NSP	P. multocida, Lkt+ Mannheimia sp, M. ovi

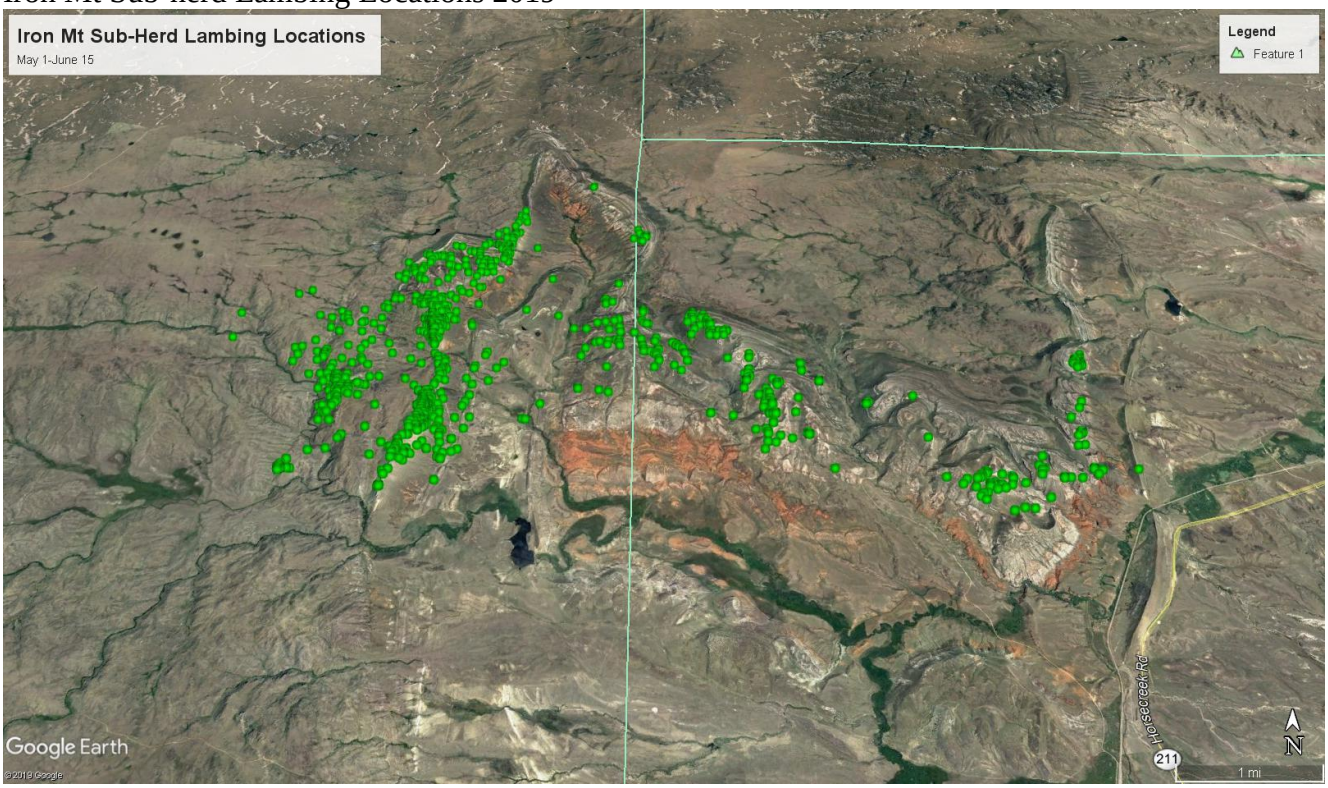
NSP = No significant pathogens NA = No samples received

Appendix B. Laramie Peak Bighorn Sheep Herd Unit GPS locations 2019/2020.

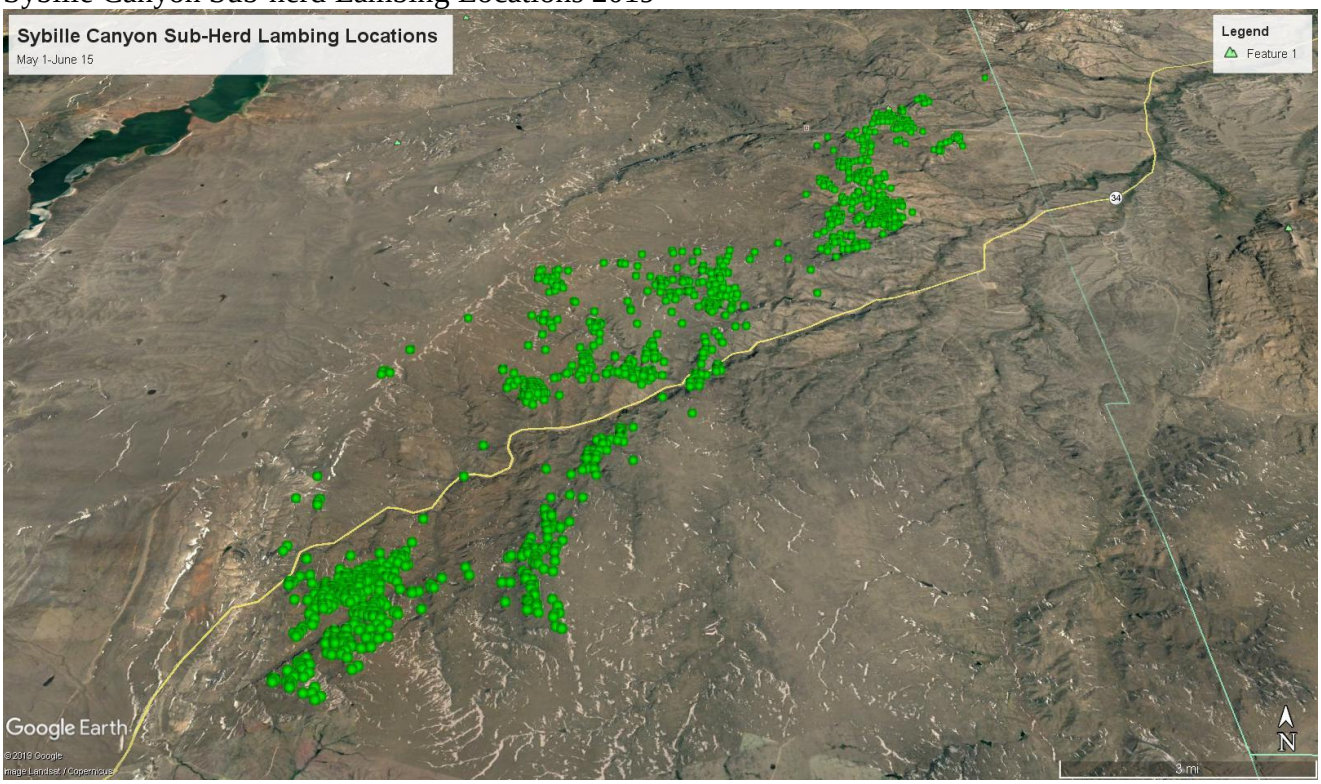
Duck Creek Sub-herd Lambing Locations 2019



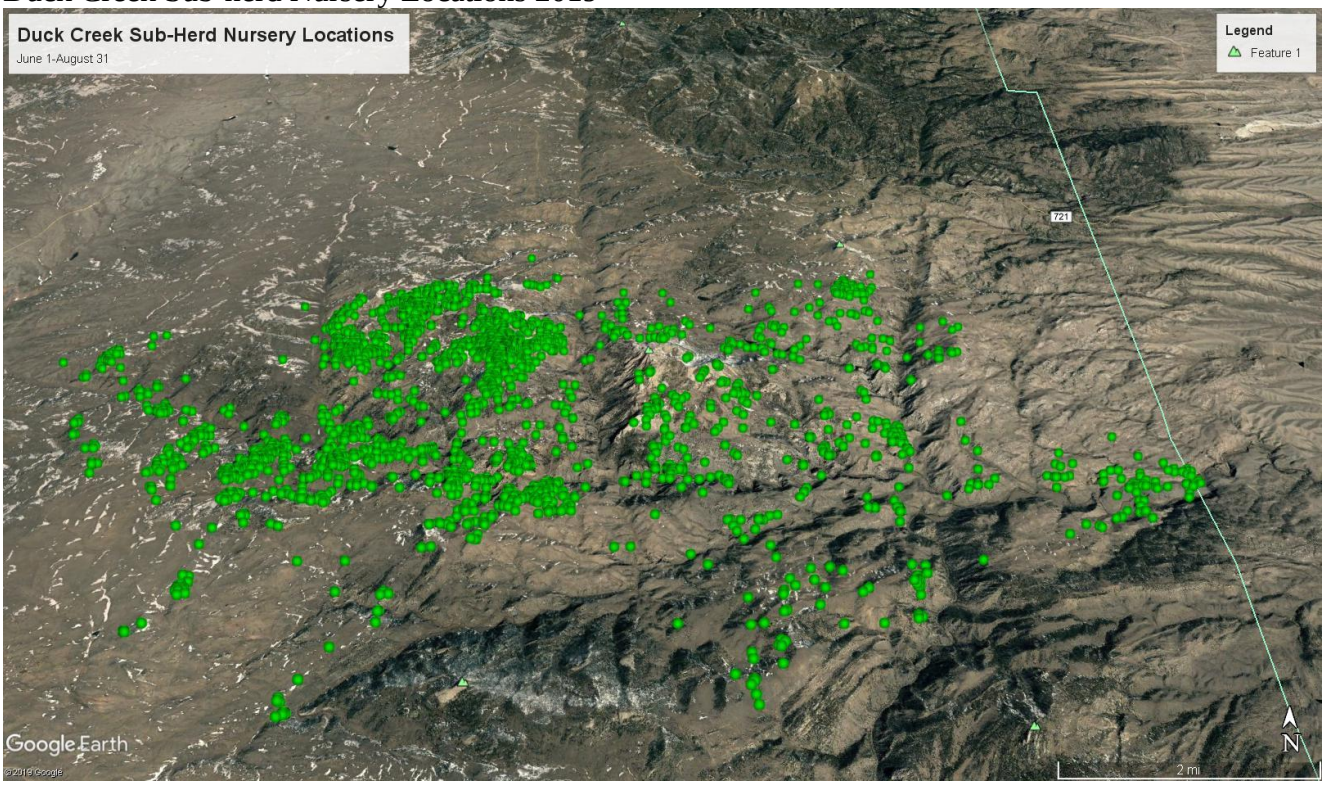
Iron Mt Sub-herd Lambing Locations 2019



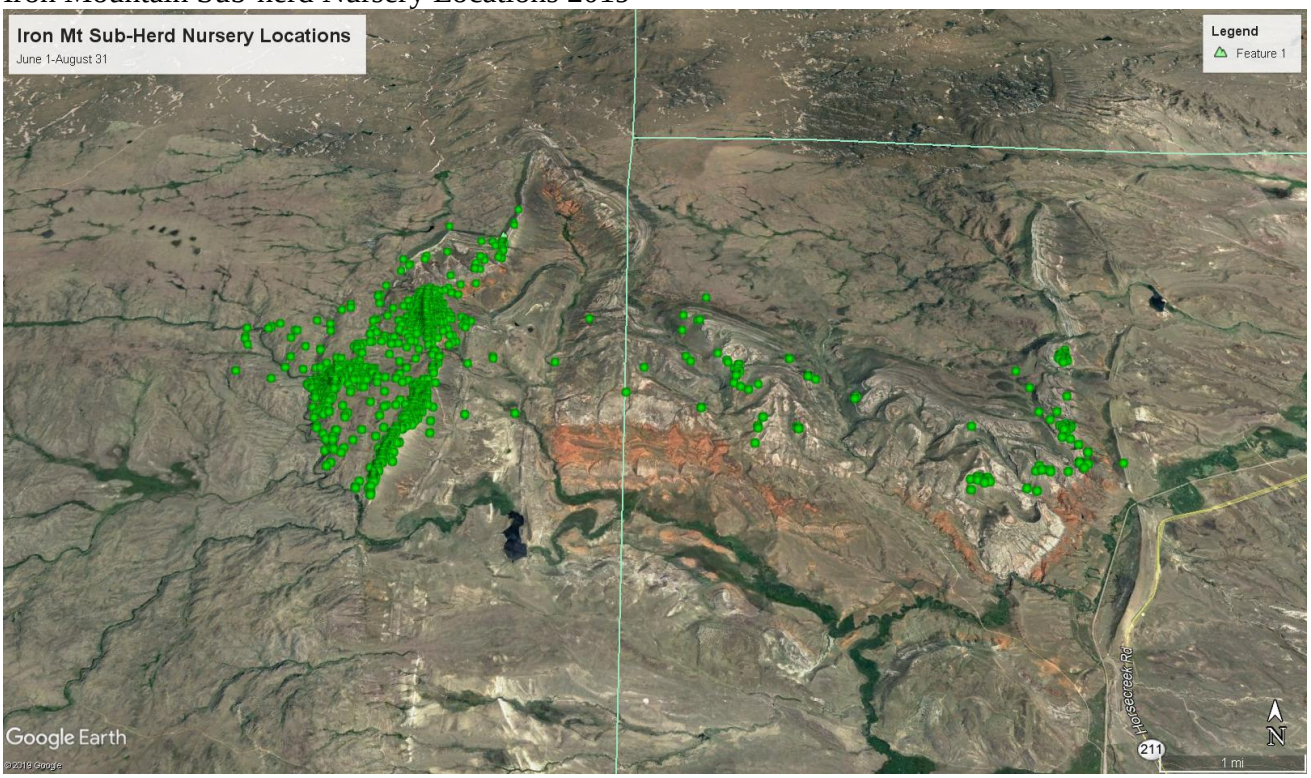
Sybille Canyon Sub-herd Lambing Locations 2019



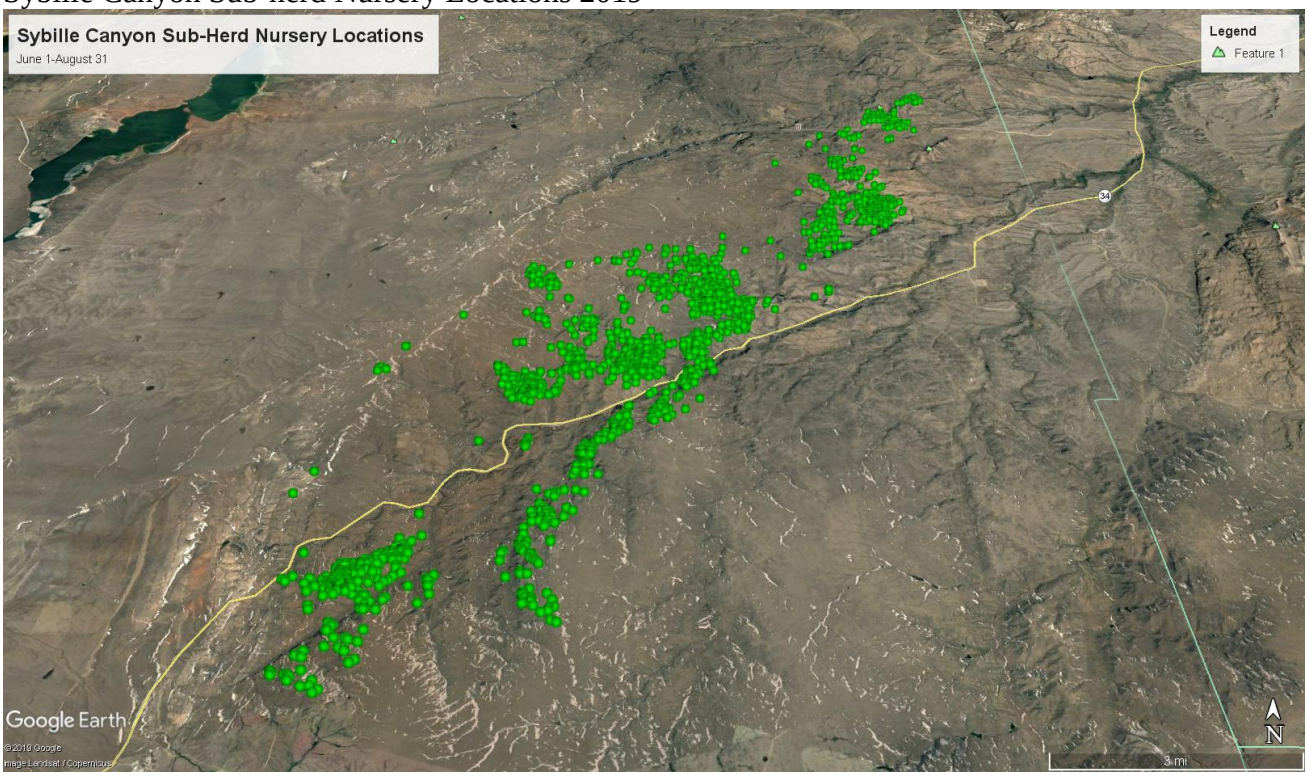
Duck Creek Sub-herd Nursery Locations 2019



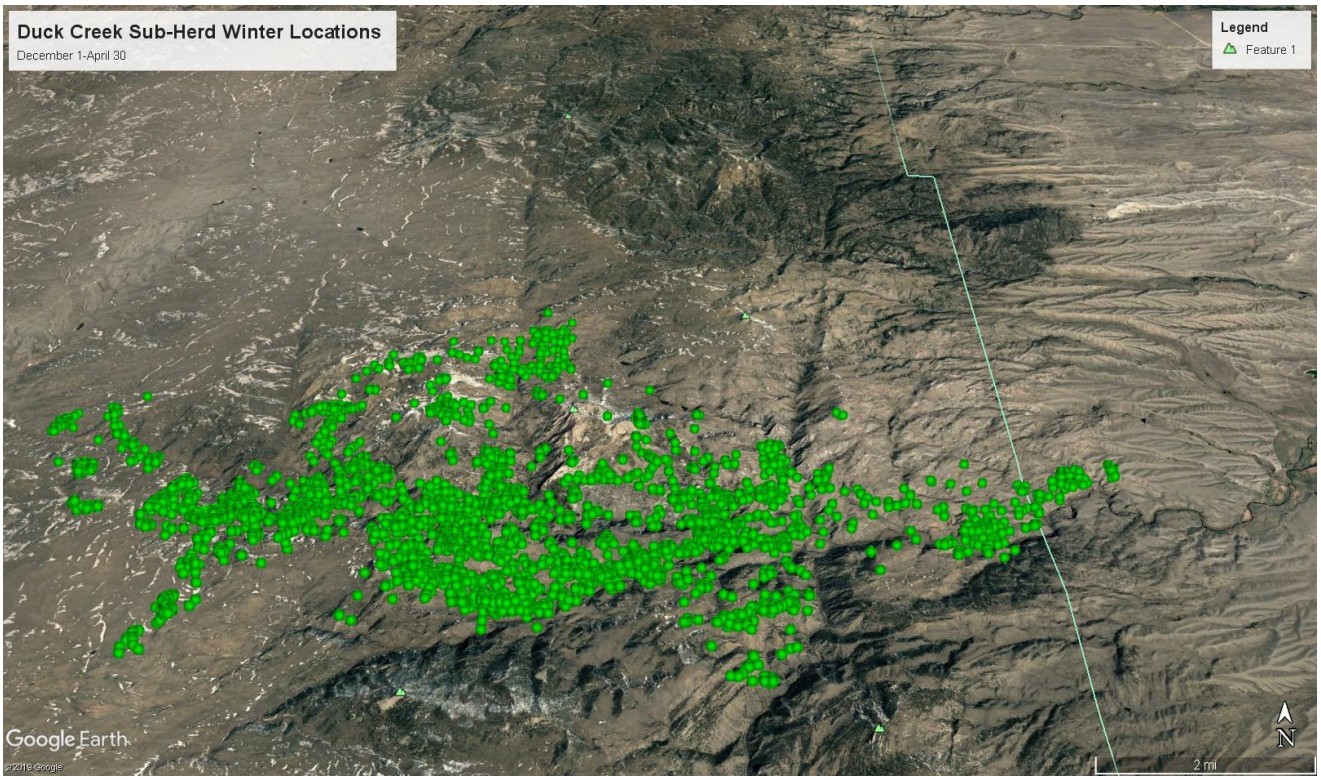
Iron Mountain Sub-herd Nursery Locations 2019



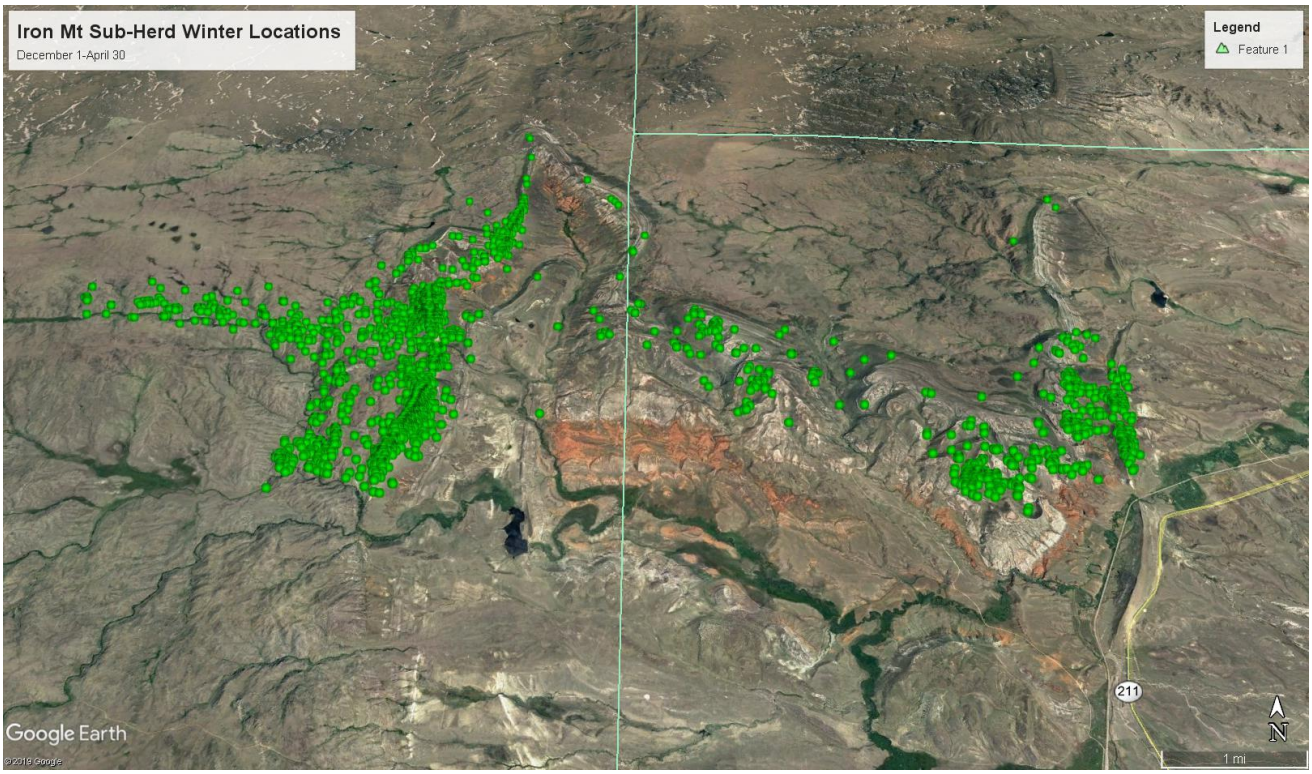
Sybille Canyon Sub-herd Nursery Locations 2019



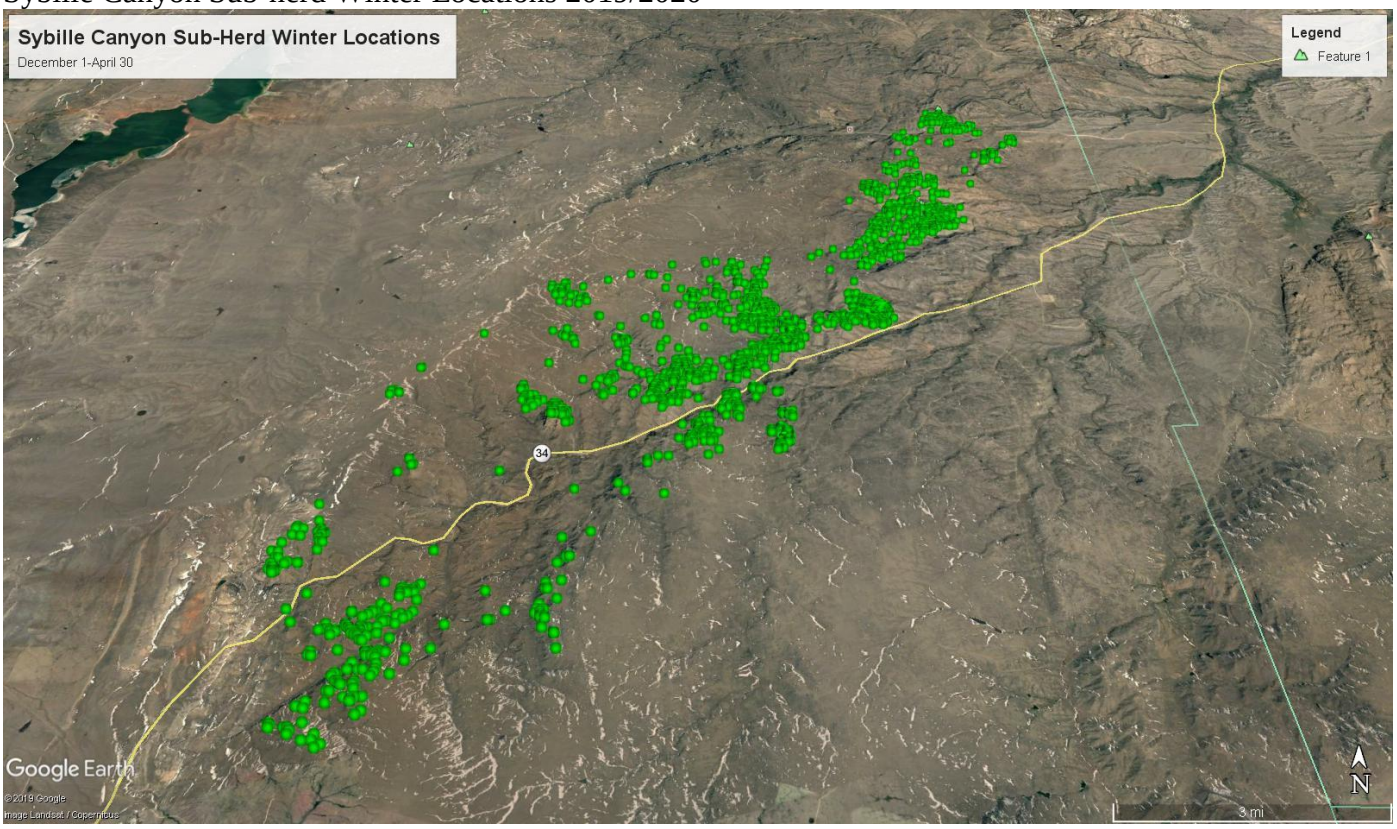
Duck Creek Sub-herd Winter Locations 2019/20



Iron Mountain Sub-herd Winter Locations 2019/2020

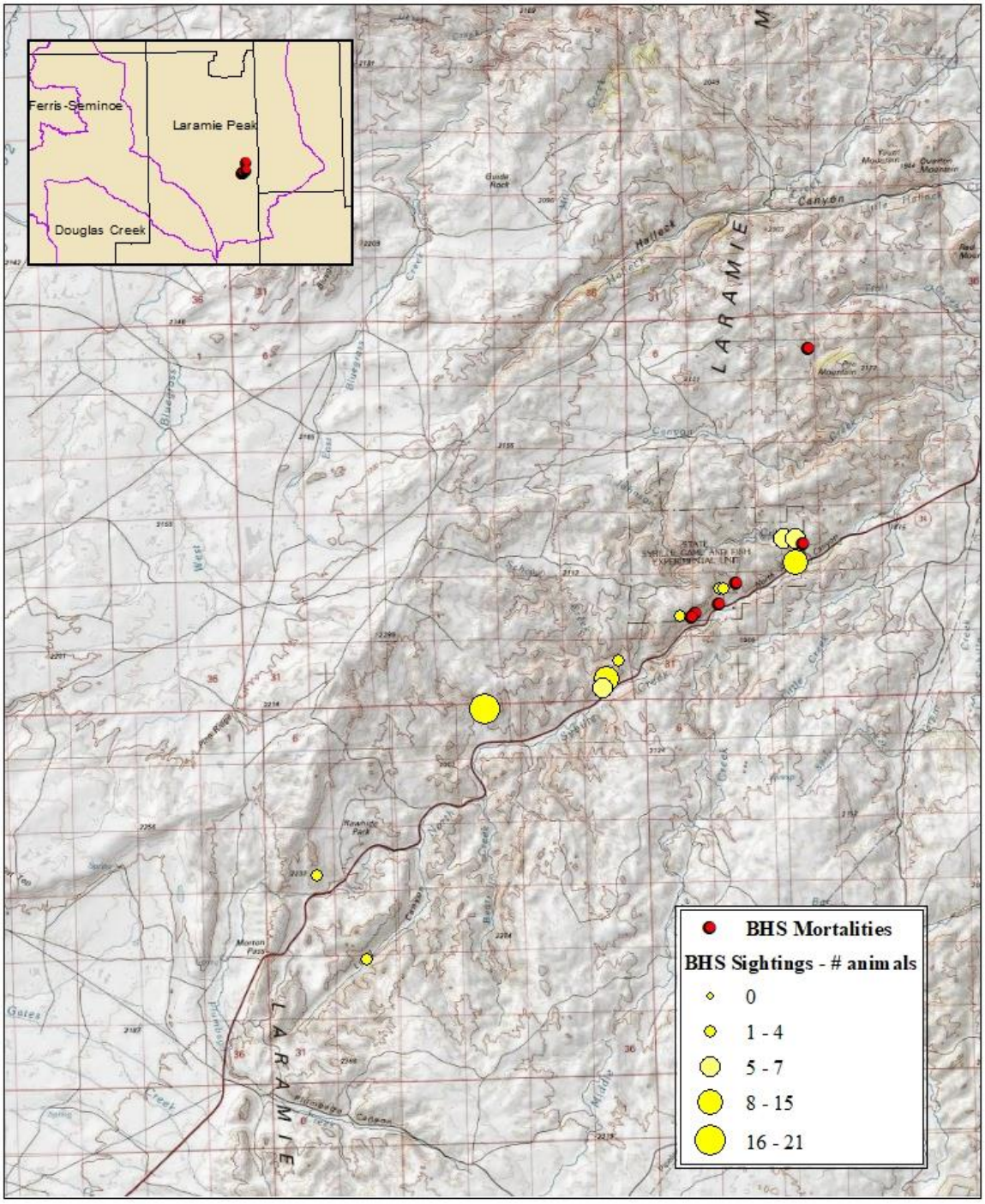


Sybille Canyon Sub-herd Winter Locations 2019/2020



Appendix C

Laramie Peak Herd - Bighorn Sheep (BHS) Mortalities and Sightings
Feb-March 2020



2019 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2019 - 5/31/2020

HERD: BS519 - ENCAMPMENT RIVER

HUNT AREAS: 21

PREPARED BY: TEAL CUFAUDE

	2014 - 2018 Average	2019	2020 Proposed
Population:		N/A	N/A
Harvest:	4	0	0
Hunters:	4	0	0
Hunter Success:	100%	0%	0 %
Active Licenses:	4	0	0
Active License Success:	100%	0%	0 %
Recreation Days:	7	0	0
Days Per Animal:	7	0	0

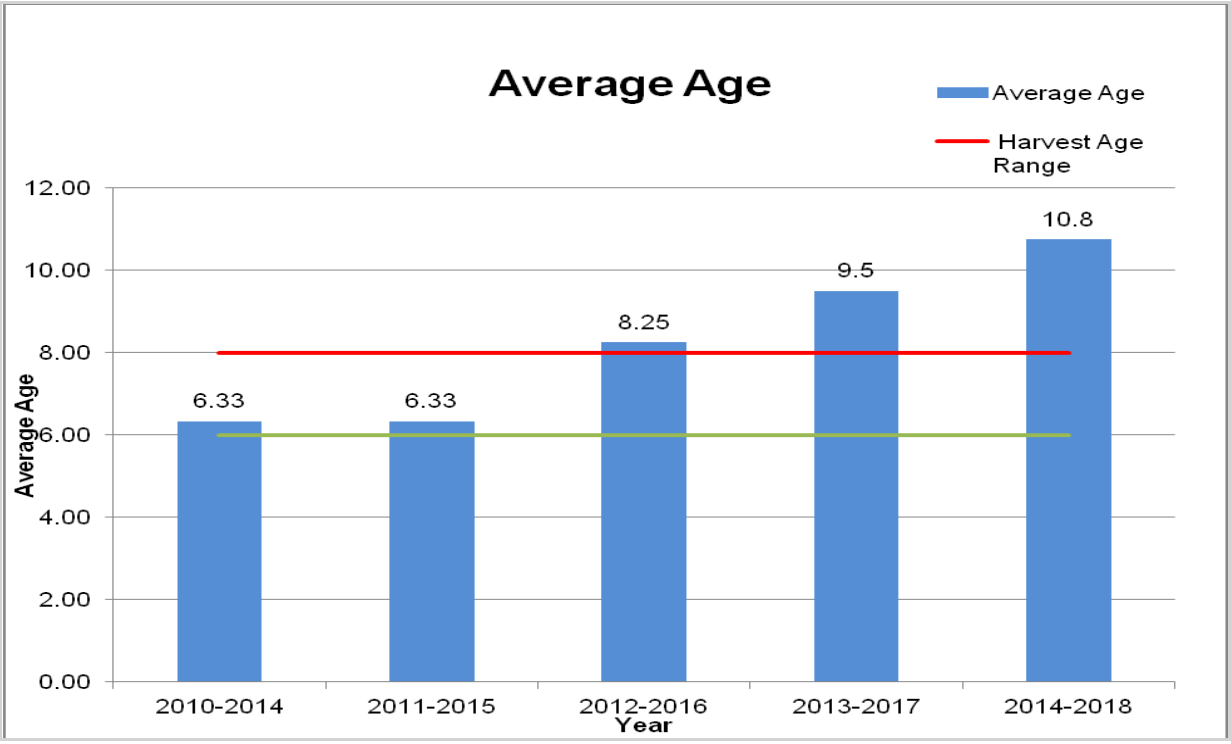
Limited Opportunity Objective:

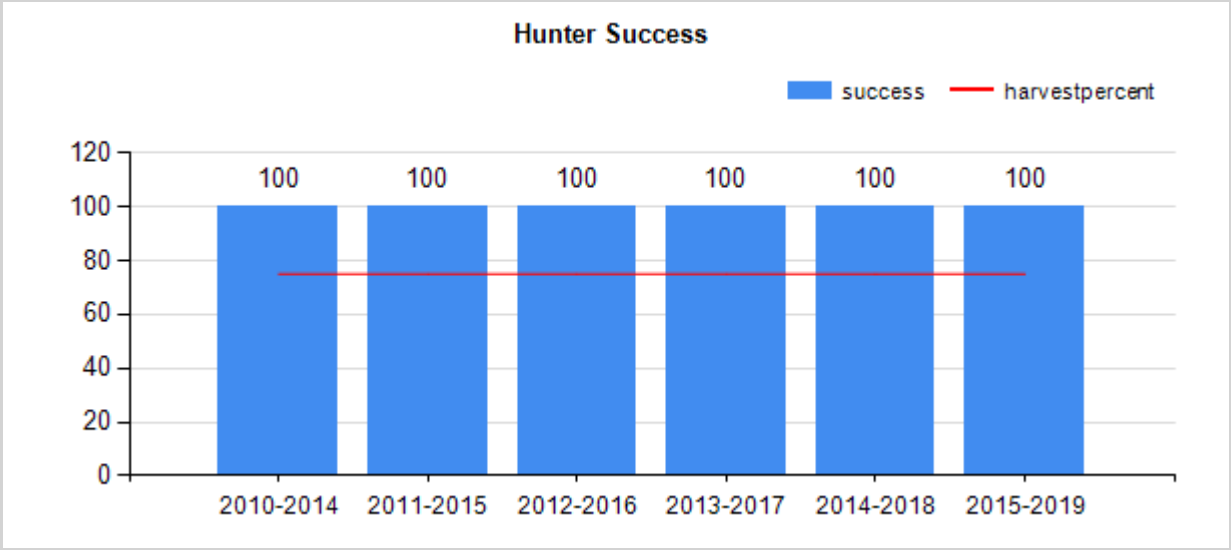
5-year average of > 75% hunter success

5-year average harvest age of 6-8 years

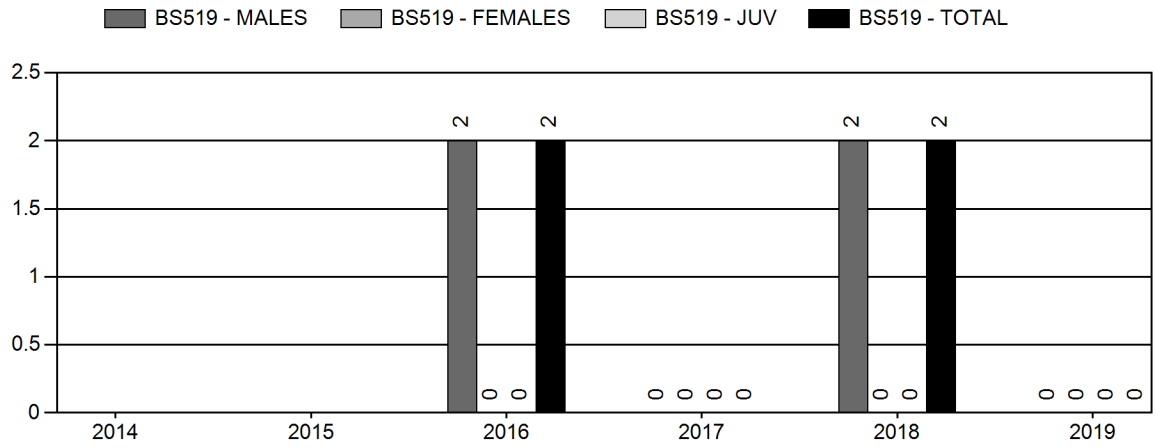
Secondary Objective:

Management Strategy: Special

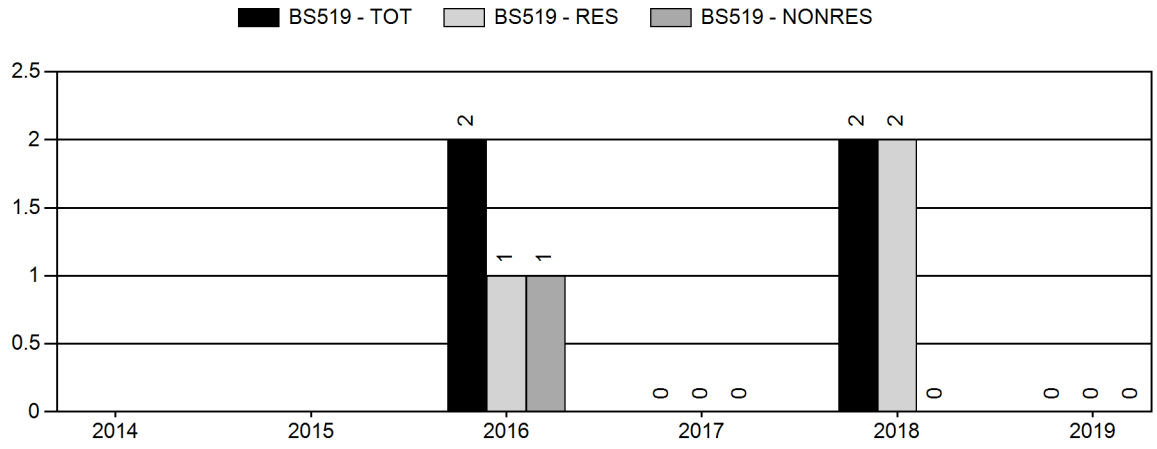



Hunter Success
success
harvestpercent
120
100
80
60
40
20
0
100
100
100
100
100
100
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018
2015-2019

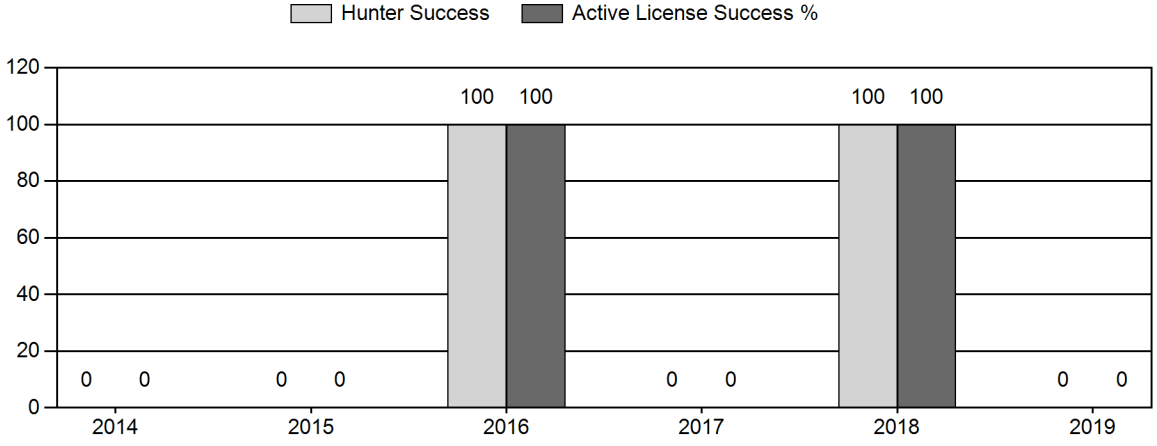
Harvest



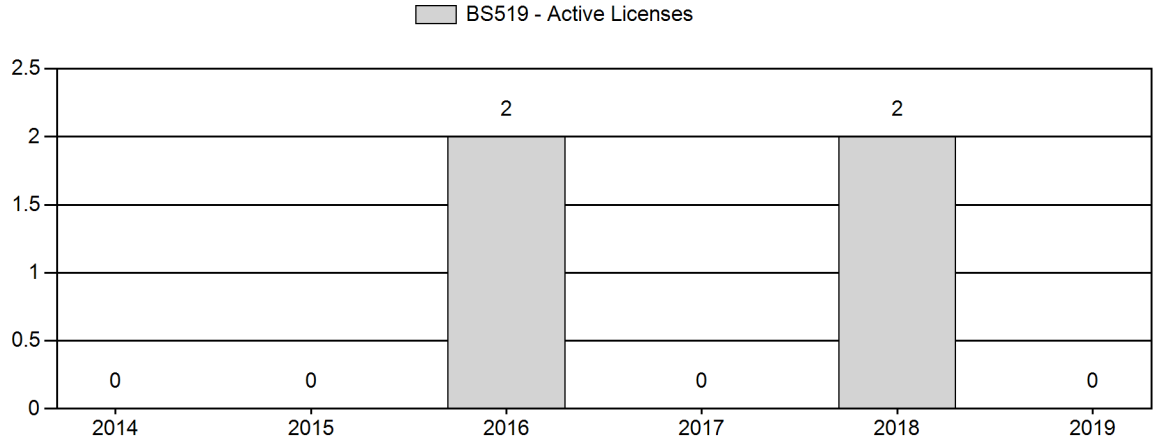
Number of Hunters



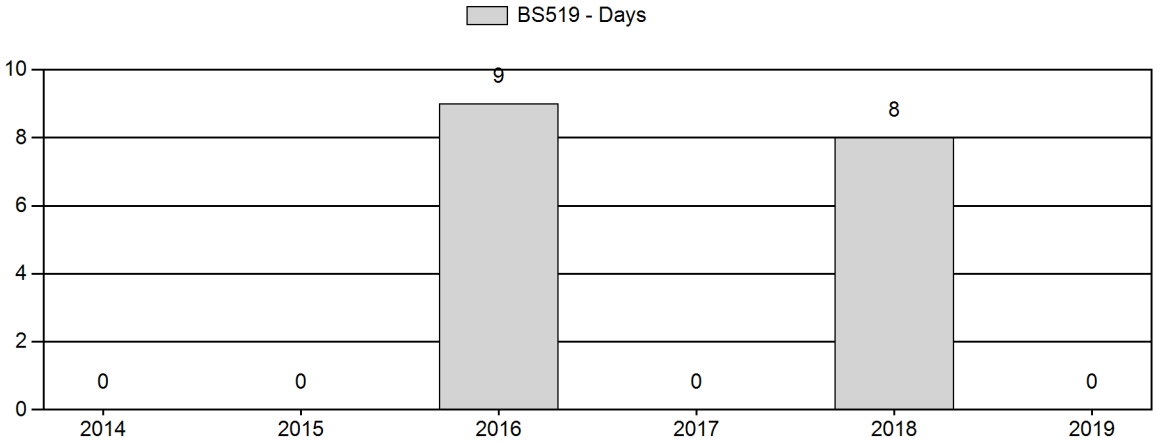
Harvest Success



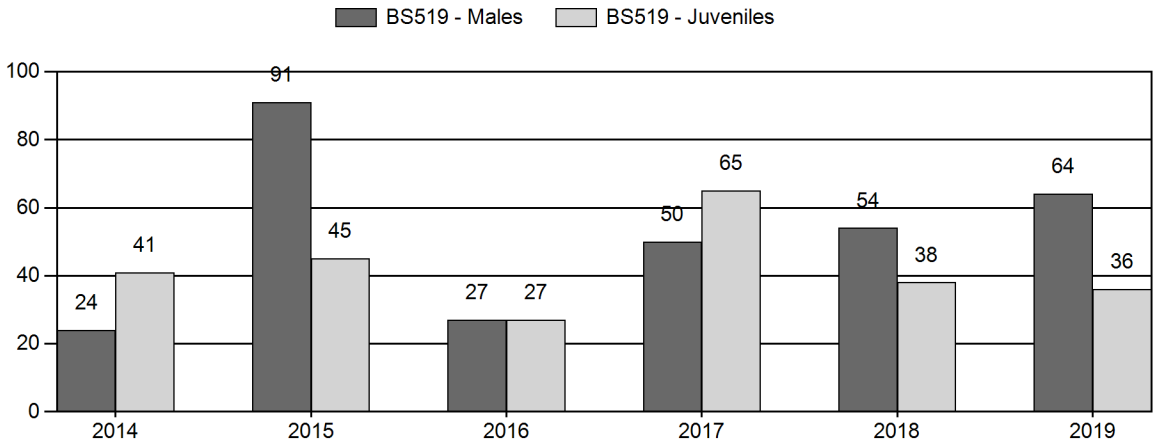
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2020 Hunting Seasons
Encampment River Bighorn Sheep (BS519)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
18, 21	1	Aug. 15	Aug.31	Sep.1	Oct. 31	2	Any ram (1 resident, 1 nonresident)
18,21	1			Nov. 1	Nov. 30		Any ram, valid only in Hunt Area 18

Current Management Objective: Bighorn Sheep Limited Opportunity

1) 5-year running average of >75% hunter success
   - Currently Met: 2015-2019 Hunter Success- 100%
2) 5-year running average age of harvested rams between 6 and 8 years of age, and
   - Currently Met: 2015-2019 Harvest Mean Age- 10.75 years of age
3) Documented occurrence of adult rams in the population.
   - Currently Met: >10 adult rams observed in 2019

2020 Management Summary

1.) Hunting Season Evaluation: The hunting season was open in 2020 for this herd unit in combination with Douglas Creek bighorn sheep herd unit (BS516). For the 2020 hunting season, two licenses, valid for any ram, were issued for one non-resident and one resident and 100% harvest success was anticipated. Harvest opportunities in this herd unit have been offered every other year for the past decade in conjunction with BS516. Historically licensed hunters will harvest rams in the Encampment River herd because rams in the Douglas Creek herd are typically not available on public land during the hunting season. In 2020, license holders were permitted to hunt in Hunt Area 18 from November 1st-30th. The 2019 postseason classification sample (n=22) was obtained from a single observation in October 2019 (Appendix A). The postseason classification results were 7 adult rams, 0 yearling rams, 11 ewes, and 4 lambs. Due to the variable nature of data collection in this herd unit, it is difficult to interpret the data annually. Rams were observed throughout the year in the herd unit, including an observation of 10 adult rams in May 2019.

2.) Weather/Habitat: Higher than average snow accumulations during the 2018-2019 winter paired with cold spring temperatures in 2019 in southeast and south central Wyoming resulted in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. Cold temperatures and storms into late May could have impacted early lambing season with potential for associated lamb mortalities. The “late spring” created phenological delays for plants, especially at higher elevations and may have limited early spring forage. Growing season precipitation was higher than average in the both the Douglas Creek and Encampment River herd units in 2019 resulting in excellent grass and forb production and shrub leader growth.

No major disturbances were documented in the areas associated with the Douglas Creek or Encampment River herds in 2019. The large-scale fires occurring in the Snowy and Sierra Madres Ranges over the past ten years have not affected either herd area. The lack of natural disturbances within these bighorn sheep ranges has produced shrub communities that are trending to older and decadent age classes and conifer encroachment, which may limit access to quality habitat.

Cheatgrass continues to be an issue on the southeast facing slopes at lower elevations within both herd units. The WGFD in conjunction with the USFS, BLM, and Carbon County Weed and Pest continue to conduct large-scale aerial cheatgrass treatments.

3.) Research: Since 2018, WGFD has conducted three helicopter/net-gun capture and collar efforts in this herd unit. Data gathered through these efforts will provide WGFD with a credible estimate of the number of bighorn sheep in the herd unit. Location data will also be used for habitat selection analyses (Appendix B).

4.) Disease: Disease surveillance efforts are ongoing within the herd in conjunction with a statewide disease assessment effort (Appendix C).

Appendix A

2014 - 2019 Postseason Classification Summary

for Bighorn Sheep Herd BS519 - ENCAMPMENT RIVER

		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
2014	0	1	3	4	14%	17	61%	7	25%	28	0	6	18	24	± 0	41	± 0	33
2015	0	2	8	10	38%	11	42%	5	19%	26	47	18	73	91	± 0	45	± 0	24
2016	0	1	3	4	17%	15	65%	4	17%	23	0	7	20	27	± 0	27	± 0	21
2017	0	2	8	10	23%	20	47%	13	30%	43	0	10	40	50	± 0	65	± 0	43
2018	0	0	7	7	28%	13	52%	5	20%	25	0	0	54	54	± 0	38	± 0	25
2019	0	0	7	7	32%	11	50%	4	18%	22	0	0	64	64	± 0	36	± 0	22

Appendix B-Encampment River Bighorn Sheep Research

Over the last three winters (2017-18, 2018-19, and 2019-20) three helicopter/net-gun capture and collar efforts have occurred in the Encampment River bighorn sheep herd unit. The original purpose of this work was to provide a credible estimate of the number of bighorn sheep that utilize winter range in this herd unit. Additionally a full array of disease samples were collected from captured bighorn sheep as part of a statewide disease surveillance effort. Since the original capture effort, the objectives for this work have evolved. Fine-scale movement data collected from the GPS collars will help managers to both more fully understand the movements of this herd, and to delineate the habitats these bighorn sheep select. Managers will use these data to determine high-use ranges and movement routes and to better quantify the habitat attributes that might limit the expansion of this herd. This work may also provide insights on habitat components that are important to the resilience and expansion of other small, isolated bighorn sheep herds across the state. Below is a summary of the three capture and collar efforts:

- February 2018- Five bighorn sheep ewes were collared and disease sampled.
- January 2019- Eight bighorn sheep ewes were captured and disease sampled. Three of the five previously collared (2017-18) bighorn sheep ewes were recaptured and non-functioning collars were replaced. A total of six new GPS collars were deployed.
- February 2020- Two ewes with 2017-18 collars were recaptured and collars were replaced. A total of ten ewes were collared and disease sampled.
- A total of 12 working GPS collars were on Encampment River bighorn sheep ewes as of February 2020.
- With the six collars deployed in January 2019, over 2,200 data points have been collected. From these data, it appears the bighorn sheep are using an approximately 12.75 square mile area in shrub dominated slopes within the Encampment River drainage, avoiding dense conifer stands. Coarse, qualitative habitat analyses show that bighorn sheep movement seems to be constrained by habitat type and Highway 70, despite the availability of considerable suitable habitat to the northwest and southeast of their current area of use.
- We have conducted mortality site investigations for three collared ewes. One bighorn sheep died from blunt trauma (likely associated with capture) and two bighorn sheep were cached by mountain lions and cause of death was likely predation. One of the predated bighorn sheep had a hoof deformity and a sinus tumor, which could have made it more vulnerable to predation.
- The sinus tumor detected in one of the collared bighorn sheep is the first confirmed sinus tumor in this herd.

Wednesday, July 31, 2019

2019 BHS Herd Health Surveillance Report

Wyoming Game & Fish Department
Wildlife Health Laboratory

Encampment, State Line and Douglas Creek Herd Health

In January of this year, eighteen bighorn sheep were captured from the Encampment, State Line and Douglas Creek herds. All were ewes between 2-6 years of age, with two recaptures from 2018. One animal arrived on site with a high body temperature and was not sampled. Blood, fecal samples, and nasal and tonsil swabs were taken from seventeen animals for testing. The Encampment herd was minimally sampled in 2018, however this is the first extensive herd health surveillance report on these three herds in several years.

Nasal and tonsil swabs were analyzed for the presence of respiratory pathogens by culture and PCR. Leukotoxin-positive *Mannheimia* organisms were detected in twelve out of seventeen tonsil swabs, including *Mannheimia haemolytica* from two animals, one confirmed by leukotoxin gene sequencing. *Pasteurella multocida* was detected in the tonsil swabs of three animals, and in nasal swabs from two additional animals. The Wildlife Health Lab did not detect *Mycoplasma ovipneumoniae* by either culture or PCR in any animals from these herds. No evidence of *Bibersteinia trehalosi* was found by culture or PCR in contrast to 2018, when *B. trehalosi* was cultured from the tonsil swabs of four animals, including the two recaptured this year. The full respiratory pathogen report is included on the following page.

Fecal samples were submitted to the Wyoming State Vet Lab for analysis of parasite load. Lungworm larvae (*Protostrongylus* species) were detected in sixteen of seventeen sheep, with six sheep having levels considered high burdens (>1,000 larvae per gram feces considered high burden). Low levels of pathogenic *Eimeria* species (*E. ovinoidalis* and *E. crandallis*) were detected in five sheep from the Douglas Creek and Encampment herds; at the levels observed, this is not considered a significant finding, though the presence of these pathogenic species within the herd could have an impact on the health of lambs in these herds.

Trace mineral analysis showed low levels of phosphorus, zinc and manganese when compared to reference levels for domestic sheep. Surveillance of other herds this year showed similar deficiencies of the same minerals, with some additionally low in copper.

2019 BHS Herd Health Surveillance Report

Animal ID	Date Sampled	Location	Tonsil culture/PCR final	Nasal culture/PCR final
19-082	1/20/2019	Encampment	NA	NA
19-083	1/20/2019	Encampment	Lkt+ Mannheimia spp	NSP
19-084	1/20/2019	Encampment	M.haemo/M.glucosida	P. multocida
19-085	1/20/2019	Encampment	NSP	NSP
19-086	1/20/2019	Encampment	Lkt+ Mannheimia spp, P. multocida	P. multocida
19-087	1/20/2019	Encampment	NSP	NSP
19-088	1/20/2019	Encampment	NSP	P. multocida
19-089	1/20/2019	State line	Lkt+ Mannheimia spp	NSP
19-090	1/20/2019	State line	Lkt+ Mannheimia spp, P. multocida	NSP
19-091	1/20/2019	State line	Lkt+ Mannheimia spp, P. multocida	NSP
19-092	1/21/2019	Encampment	Lkt+ Mannheimia spp	NSP
19-095	1/21/2019	Granite Creek	Lkt+ Mannheimia spp	NSP
19-096	1/21/2019	Granite Creek	NSP	NSP
19-097	1/21/2019	Granite Creek	Lkt+ Mannheimia spp	NSP

NSP = No significant pathogens NA = No samples received

Animal ID	Date Sampled	Location	Tonsil culture/PCR final	Nasal culture/PCR final
19-098	1/21/2019	Granite Creek	NSP	NSP
19-099	1/21/2019	Granite Creek	Lkt+ Mannheimia spp	LKT+ Mannheimia spp
19-100	1/21/2019	Granite Creek	Lkt+ Mannheimia spp	Lkt+ M. haemo/M. glucosida
19-101	1/21/2019	Granite Creek	Lkt+ M. haemo/M. glucosida	NSP

NSP = No significant pathogens NA = No samples received

2019 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2019 - 5/31/2020

HERD: EL531 - IRON MOUNTAIN

HUNT AREAS: 6
PREPARED BY: LEE KNOX

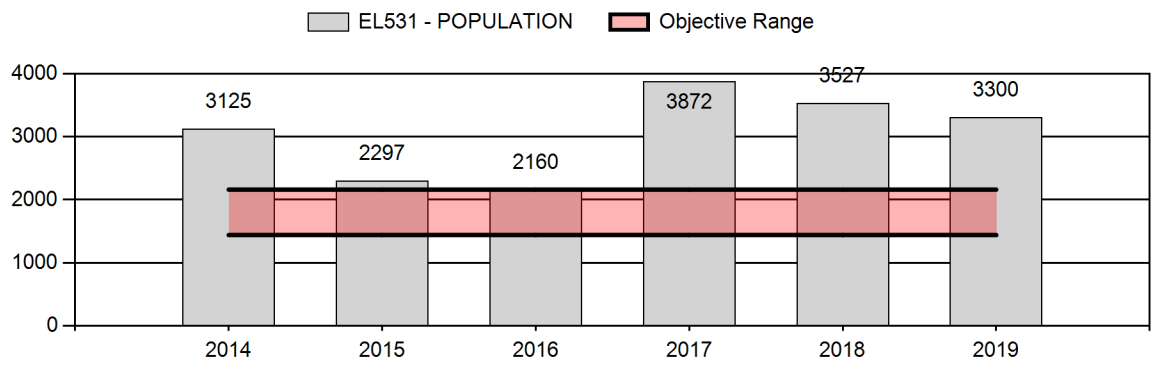
	2014 - 2018 Average	2019	2020 Proposed
Population:	2,996	3,300	3,300
Harvest:	643	489	650
Hunters:	1,476	1,216	1,400
Hunter Success:	44%	40%	46 %
Active Licenses:	1,523	1,195	1,500
Active License Success:	42%	41%	43 %
Recreation Days:	9,901	7,403	1,500
Days Per Animal:	15.4	15.1	2.3
Males per 100 Females	28	72	
Juveniles per 100 Females	50	49	

Population Objective (± 20%) :	1800 (1440 - 2160)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	83%
Number of years population has been + or - objective in recent trend:	20
Model Date:	3/4/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	15%	15%
Males ≥ 1 year old:	30%	30%
Total:	17%	17%
Proposed change in post-season population:	5%	5%

Population Size - Postseason



2020 Hunting Seasons
Iron Mountain Elk (EL531)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
6	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 31		Any elk valid off national forest
6	Gen			Nov. 1	Nov. 30		Antlerless elk valid off national forest
6	1	Sep. 1	Sep. 30	Oct. 15	Oct. 31	75	Any elk
6	1			Nov. 1	Jan. 31		Antlerless elk
6	4	Sep. 1	Sep. 30	Nov. 1	Jan. 31	50	Antlerless elk
6	6	Sep. 1	Sep. 30	Aug. 15	Jan. 31	1100	Cow or calf valid off national forest

219 Hunter Satisfaction: 61% Satisfied, 22% Neutral, 16% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The Iron Mountain Elk Herd remains well above the population objective of 1,800 elk. The 2020 season is status quo. The current season structure is designed to maximize cow elk harvest. We maintain 1,100 type 6 licenses, even though they do not sell out, to ensure there are always licenses available.

2.) Management Objective review: The management objective for Iron Mountain is a post season population objective of 1800 elk. This objective was set in 1997 and last reviewed in 2017.

3.) **CWD management:** The 5 year CWD prevalence in the Iron Mountain Elk Herd is 13.5% with a sample size of 251.

4.) **Hunter Access:** With limited accessible public lands, elk harvest is dependent on private land access. To facilitate an increases in cow elk harvest, area managers meet with 18 key landowners one on one to discuss elk harvest and hunter access in hunt area 6.

5.) Habitat and Weather: No major landscape disturbances were observed in the herd unit in 2019. Precipitation in the hunt area was normal for 2019. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn calves at the onset of the calving period. Plant phenological shifts and delays were displayed in the Spring due to cool daytime temperatures and freezing nighttime temperatures. Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures.

More than 6” of wet, heavy snow fell in the last week of May at elevations greater than 7,500’. Heavy snowfall occurred in portions of the Iron Mountain herd unit in mid-October and several subsequent storms resulted in changes in herd distribution. These storm events made access increasingly difficult for hunting in the latter portions of the hunting season.

In the Pole Mountain portion of hunt area 6, travel management restrictions have been put in place along several riparian areas on USFS lands. In addition to the closures, reclamation efforts were completed to rehabilitate riparian and upland areas where degradation has occurred, mostly caused by off-road vehicle use and subsequent erosion. These closures should result in providing greater security cover for elk in summer months.

The Pilot Hill land acquisition process (5,472 acres) continues to move forward and may result in the establishment of a WHMA on approximately half of the acres in 2020. Some suitable elk habitat is found midslope in mixed mountain shrub communities and at higher elevations in aspen / mixed conifer habitats. Management of recreational access will largely determine the habitat effectiveness of the area for elk and other wildlife.

The USFS and Wy State Forestry Division have been working cooperatively to complete conifer and aspen mastication and prescribed fire treatments on USFS, OSLI, and intermixed private lands on Pole Mountain. Aspen regeneration in treatment areas has been mixed. Some browsing of young aspen has been high, likely by elk, mule deer, and livestock. Disturbance caused by recreationists during much of the growing season likely results in decreased use in places.

Habitat conditions in the herd unit are impacted by increasing elk numbers, lack of managed disturbance in shrub dominated rangelands, and increases in cheatgrass composition in preferred habitats. Elk use of irrigated hay meadows continues to create damage problems throughout the herd unit. Risk of wildfires with high fire severity is increasing with increasing composition of cheatgrass in the understory. High shrub mortality and cheatgrass invasion should be expected with mid to late summer wildfire events in the future.

Appendix A

Classification

2014 - 2019 Postseason Classification Summary

for Elk Herd EL531 - IRON MOUNTAIN

		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
2014	3,125	44	67	111	13%	499	59%	238	28%	848	671	9	13	22	± 3	48	± 4	39
2015	2,297	152	142	294	23%	616	49%	355	28%	1,265	743	25	23	48	± 3	58	± 3	39
2016	2,160	123	50	173	15%	657	55%	357	30%	1,187	631	19	8	26	± 2	54	± 3	43
2017	3,872	155	150	305	14%	1,269	58%	629	29%	2,203	614	12	12	24	± 1	50	± 2	40
2018	3,527	116	106	222	14%	919	59%	409	26%	1,550	636	13	12	24	± 2	45	± 3	36
2019	3,300	52	92	144	33%	200	45%	98	22%	442	689	26	46	72	± 9	49	± 7	28

2019 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2019 - 5/31/2020

HERD: EL533 - SNOWY RANGE

HUNT AREAS: 8-12, 110, 114, 125 | PREPARED BY: TEAL CUFAUDE

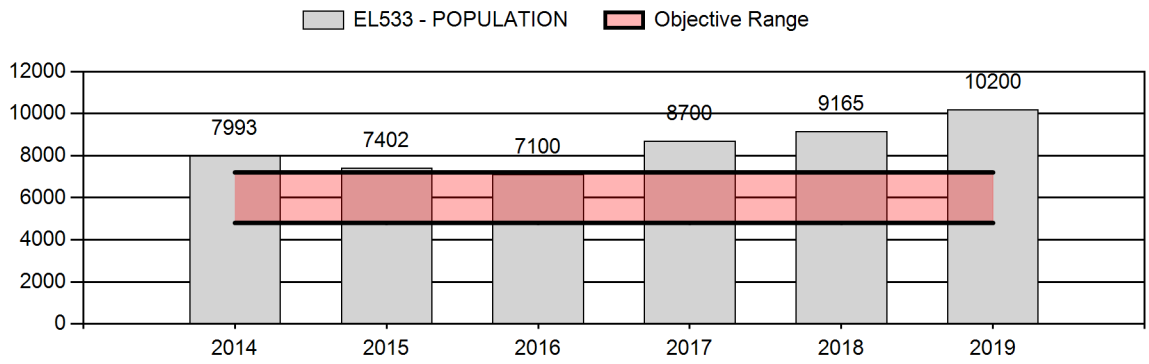
	2014 - 2018 Average	2019	2020 Proposed
Population:	8,072	10,200	9,700
Harvest:	1,998	1,946	2,130
Hunters:	5,919	5,339	5,500
Hunter Success:	34%	36%	39 %
Active Licenses:	6,214	5,749	5,800
Active License Success:	32%	34%	37 %
Recreation Days:	47,929	39,706	42,000
Days Per Animal:	24.0	20.4	19.7
Males per 100 Females	27	29	
Juveniles per 100 Females	46	35	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	70%
Number of years population has been + or - objective in recent trend:	5
Model Date:	3/6/2020

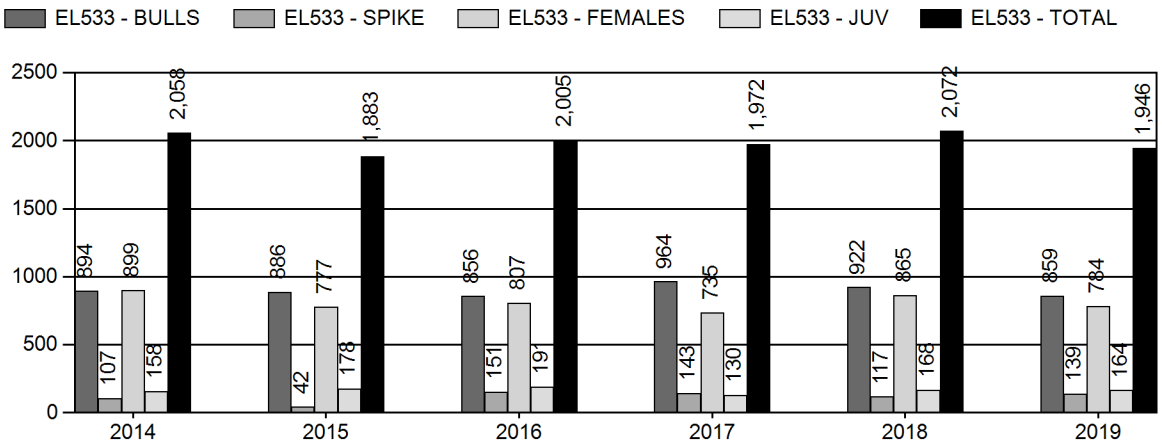
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	12%	15%
Males ≥ 1 year old:	39%	44%
Total:	-17%	-19%
Proposed change in post-season population:	-5%	-4%

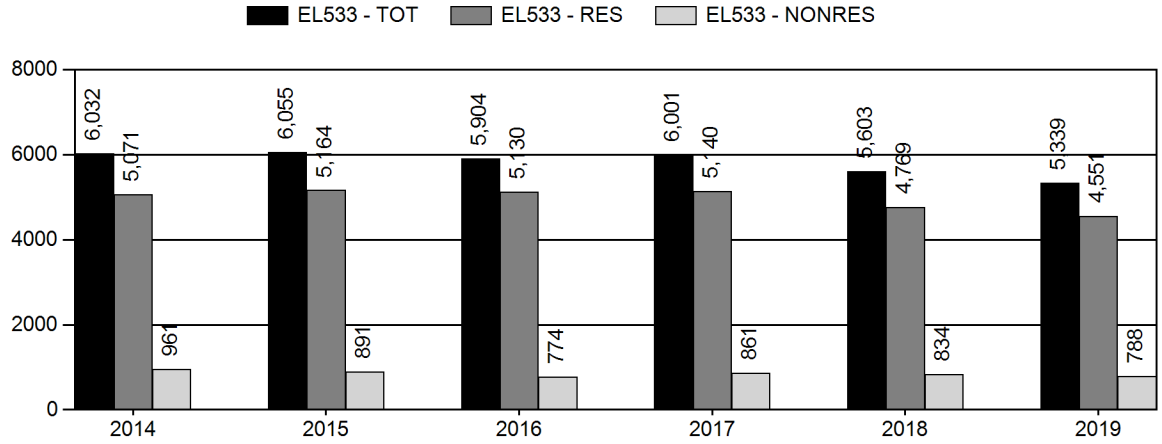
Population Size - Postseason



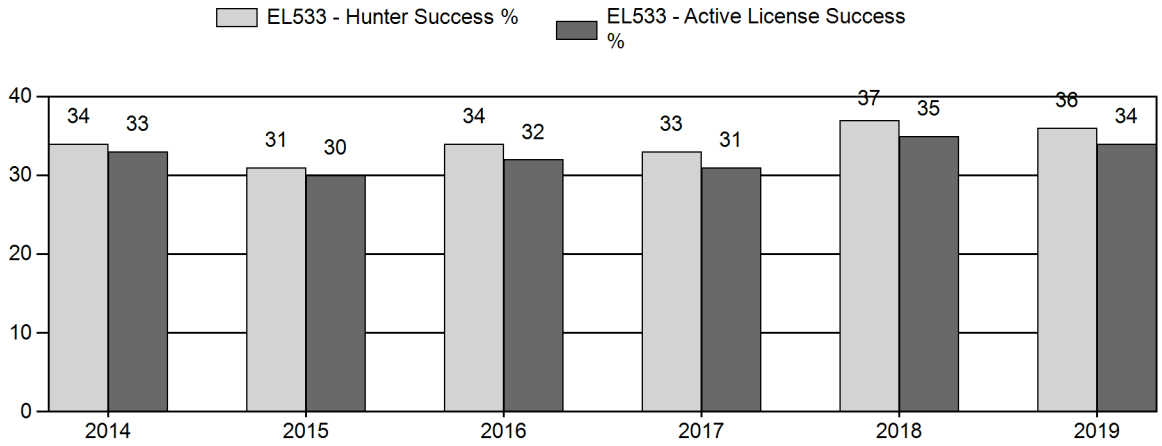
Harvest



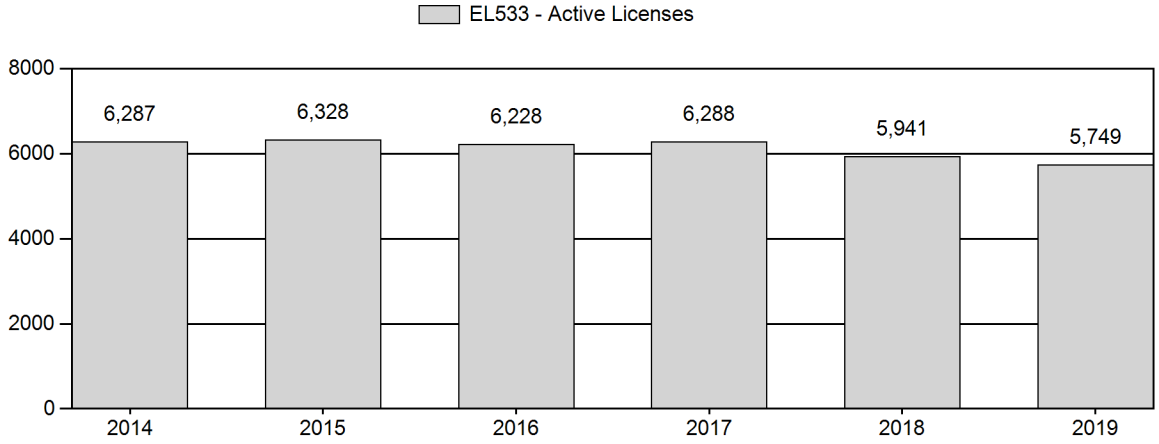
Number of Hunters



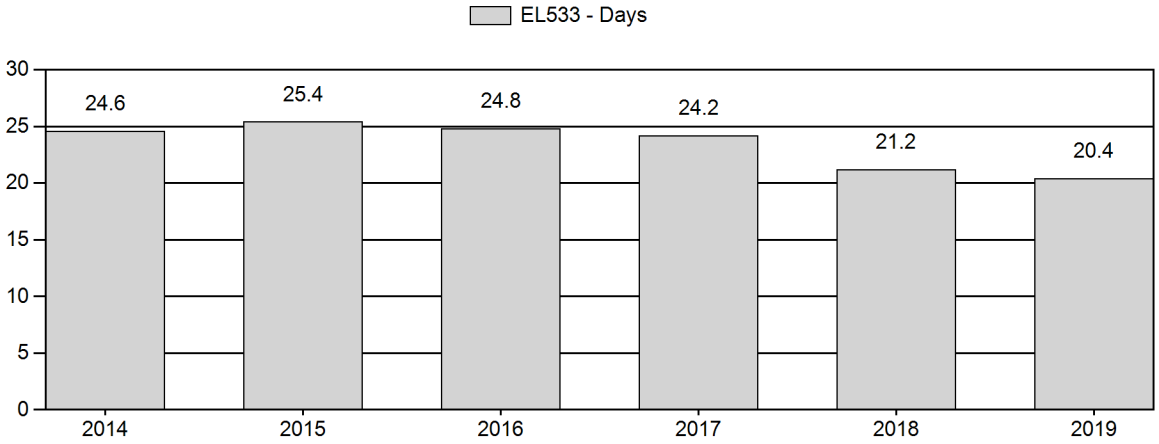
Harvest Success



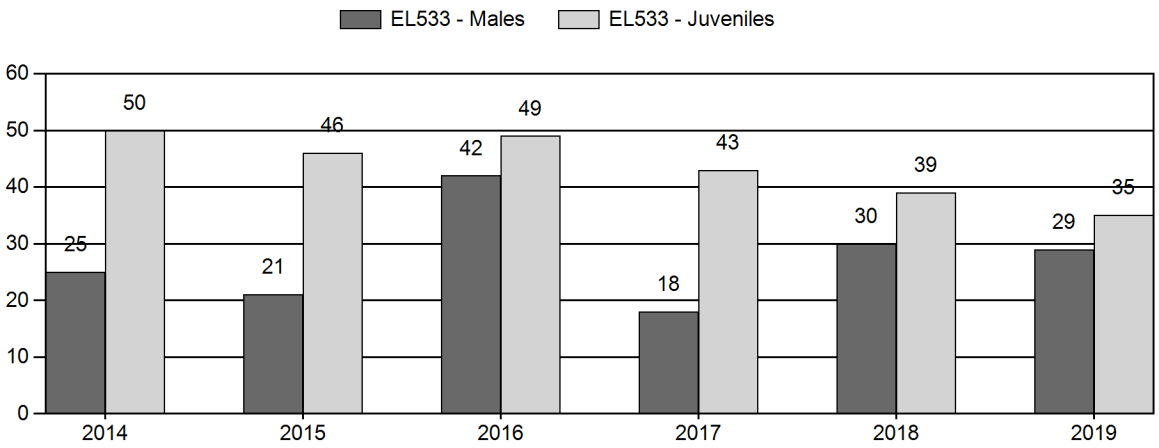
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2020 Hunting Seasons
Snowy Range Elk Herd Unit (EL533)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
8	1	Sep. 1	Sep. 30	Oct. 1	Jan. 31	150	Any elk
8	6			Aug. 15	Jan. 31	200	Cow or calf
9	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 31		Any elk
9	6	Sep. 1	Sep. 30	Oct. 1	Dec. 31	150	Cow or calf
9,10	7	Sep.1	Sep.30				Cow or calf valid in entire area
9, 10	7			Aug. 15	Jan. 31	250	Cow or calf valid off national forest
10	Gen	Sep.1	Sep. 30	Oct. 15	Oct. 31		Any elk
10	6	Sep.1	Sep. 30	Oct. 1	Dec. 31	100	Cow or calf
11	1	Sep. 15	Sep. 30	Oct. 1	Nov.30	150	Any elk
11	4	Sep. 15	Sep. 30	Oct. 1	Nov.30	300	Antlerless elk
11	6	Sep. 15	Sep. 30				Cow or calf valid in the entire area
11	6			Aug. 15	Jan. 31	50	Cow or calf valid off national forest; the Wyoming Game and Fish Commission's Wick Wildlife Habitat Management Area shall be closed
11	9			Sep. 1	Sep. 30	50	Any elk, archery only
12	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 31		Any elk
12	6	Sep. 1	Sep. 30	Oct. 1	Nov. 14	200	Cow or calf
12	6			Nov. 15	Jan. 31		Cow or calf valid west of Wyoming Highway 130
12, 13, 15, 110	7	Sep.1	Sep. 30				Cow or calf valid in the entire area
12, 13, 15, 110	7			Aug. 15	Jan. 31	225	Cow or calf valid on private land
110	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 31		Any elk
110	6	Sep. 1	Sep. 30	Oct. 1	Nov. 14	200	Cow or calf
114	1	Sep. 1	Sep. 30	Oct. 1	Dec. 31	50	Any elk
114	6			Aug. 15	Jan. 31	200	Cow or calf
125	1	Sep. 1	Sep. 30	Oct. 1	Dec. 31	250	Any elk
125	1			Jan. 1	Jan. 31		Antlerless elk
125	6	Sep. 1	Sep. 30	Oct. 1	Jan. 31	300	Cow or calf

2019 Hunter Satisfaction: 64.5% Satisfied, 21.9% Neutral, 13.6% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: In 2019, 4,297 elk were classified during the postseason aerial classification survey (Appendix A). The classification effort produced ratios of 29 bulls and 35 calves per 100 cows in this herd unit. Calf production decreased slightly from 39 calves: 100 cows in 2018. The bull ratio was 3% less than the 2018 ratio and 6% greater than the average for the last five years. The 2019 harvest survey indicated 5,339 hunters harvested 1,946 elk. The total harvest success rate of 36% was a 1% decrease from 2018. Branch-antlered bulls accounted for 86% of the male harvest in 2019 and 44% of the overall harvest. Days per harvest (20.4) decreased in 2019 and harvest success rates were considered acceptable. The hunting seasons in the Snowy Range herd unit continue to provide recreational elk hunting opportunities while reducing the overall elk population towards the objective. Hunt Areas 8, 114, and 125 will continue to have limited quota hunting seasons in 2020. Hunt Area 11 will also remain a limited quota hunting season in 2020. It contains a substantial amount of accessible public land, including the Wick Wildlife Habitat Management Area and USFS lands. Hunt Area 11 continues to provide opportunity for hunters to experience a quality elk hunt on public land. Hunt Areas 9, 10, 12, and 110 will continue to be general license hunting seasons in 2020. Limited quota, reduced-price cow or calf licenses will be available in each of these hunt areas. The August through January Type 7 seasons continued to be offered and quotas were increased to mitigate damage on private land. The Hunt Area 110 Type 6 license quota was increased as an additional effort to increase antlerless harvest.

2.) Weather/Habitat: Precipitation from October 2018 through September 2019 was above average. Higher than average snow accumulations during the 2018-19 winter paired with cold spring temperatures in 2019 in southeast and south central Wyoming resulted in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. Although growing season (April through June) precipitation was above average for both lower (April-June) and higher (May-July) elevations the persistent cold temperatures into June effectively reduced the length of the growing season. The 2019-20 winter began early with significant snow hitting the higher elevations in mid-October and accumulated in higher elevations consistently throughout the winter. Although snow accumulated at lower elevations, high winds and occasional warm spells cleared some areas making browse available in the central part of the herd unit. Snow depths continue to persist near the WY/CO state line. Snow accumulations and drifting may affect wintering elk in the northern part of the herd unit as well. SNOTEL sites on the west side of the Snowy Range currently report 132-170% of average snowfall. West slope Sierra Madre SNOTEL sites report 79-93% of average snowpack.

3.) Disease: Chronic wasting disease (CWD) was first observed in the Snowy Range herd unit in 2004. The five-year (2015-19) CWD prevalence in the herd unit was 1.8% (508 sampled, 9 CWD positive).

2014 - 2019 Postseason Classification Summary

for Elk Herd EL533 - SNOWY RANGE

		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
2014	7,993	259	148	407	14%	1,609	57%	800	28%	2,816	640	16	9	25	± 1	50	± 2	40
2015	7,402	206	190	396	13%	1,885	60%	876	28%	3,157	693	11	10	21	± 1	46	± 2	38
2016	7,100	242	470	712	22%	1,697	52%	837	26%	3,246	657	14	28	42	± 2	49	± 2	35
2017	8,700	182	146	328	11%	1,778	62%	768	27%	2,874	707	10	8	18	± 1	43	± 2	36
2018	9,165	187	278	465	18%	1,574	59%	608	23%	2,647	585	12	18	30	± 2	39	± 2	30
2019	10,200	434	326	760	18%	2,618	61%	919	21%	4,297	547	17	12	29	± 1	35	± 1	27

2019 - JCR Evaluation Form

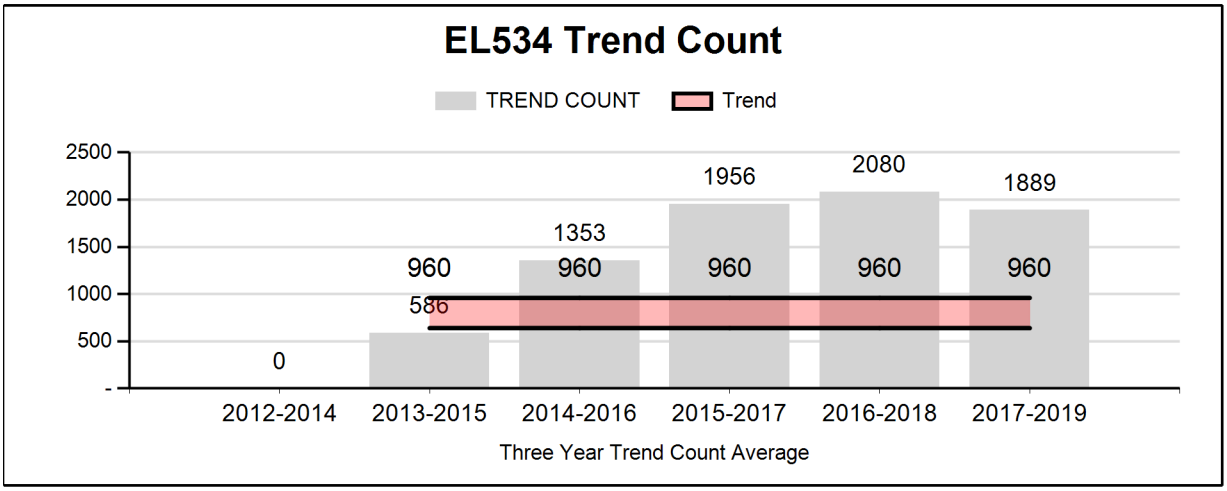
SPECIES: Elk
PERIOD: 6/1/2019 - 5/31/2020
HERD: EL534 - SHIRLEY MOUNTAIN
HUNT AREAS: 16
PREPARED BY: TEAL CUFAUDE

	2014 - 2018 Average	2019	2020 Proposed
Trend Count:	2,000	1,727	1,600
Harvest:	355	375	370
Hunters:	653	702	703
Hunter Success:	54%	53%	53 %
Active Licenses:	679	715	725
Active License Success	52%	52%	51 %
Recreation Days:	5,240	4,761	5,000
Days Per Animal:	14.8	12.7	13.5
Males per 100 Females:	40	27	
Juveniles per 100 Females	44	30	

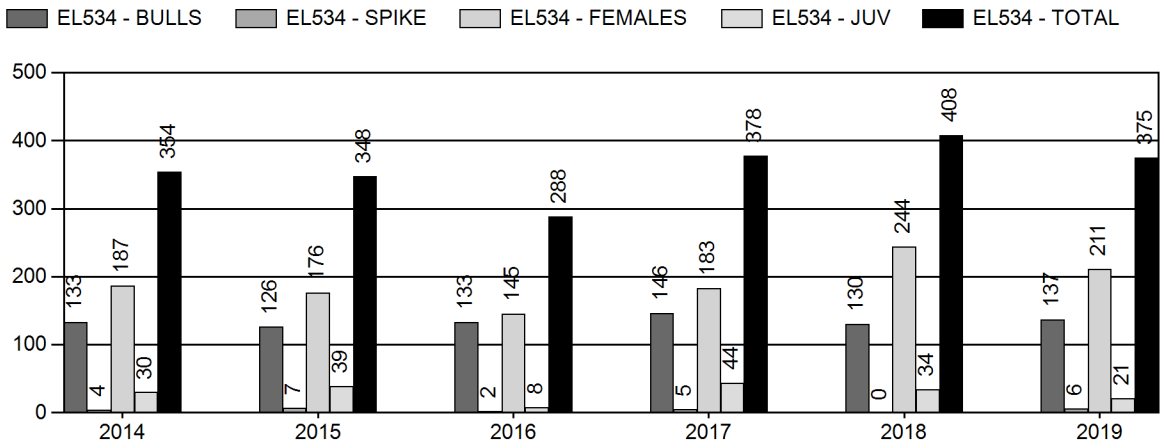
Trend Based Objective (± 20%)	800 (640 - 960)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	116%
Number of years population has been + or - objective in recent trend:	5

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

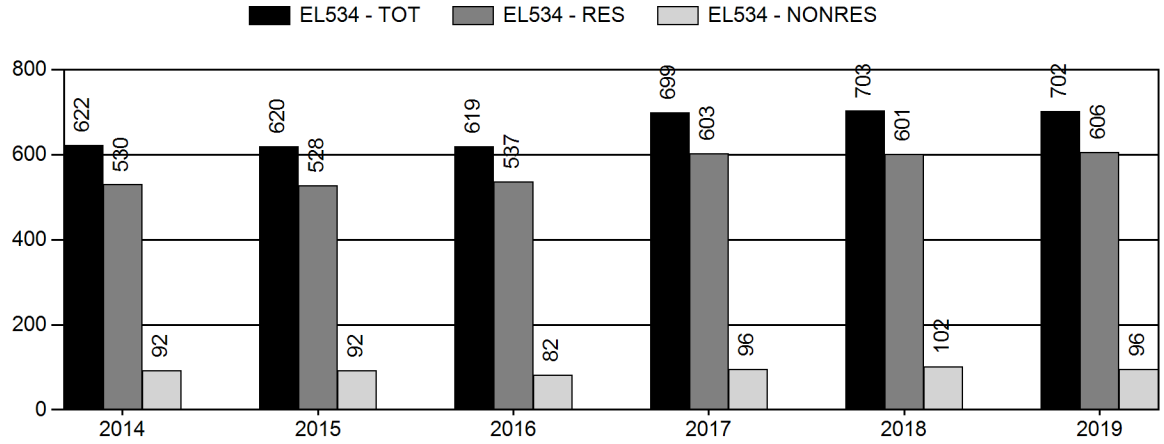
	JCR Year	Proposed
Females ≥ 1 year old:	N/A%	N/A%
Males ≥ 1 year old:	N/A%	N/A%
Juveniles (< 1 year old):	N/A%	N/A%



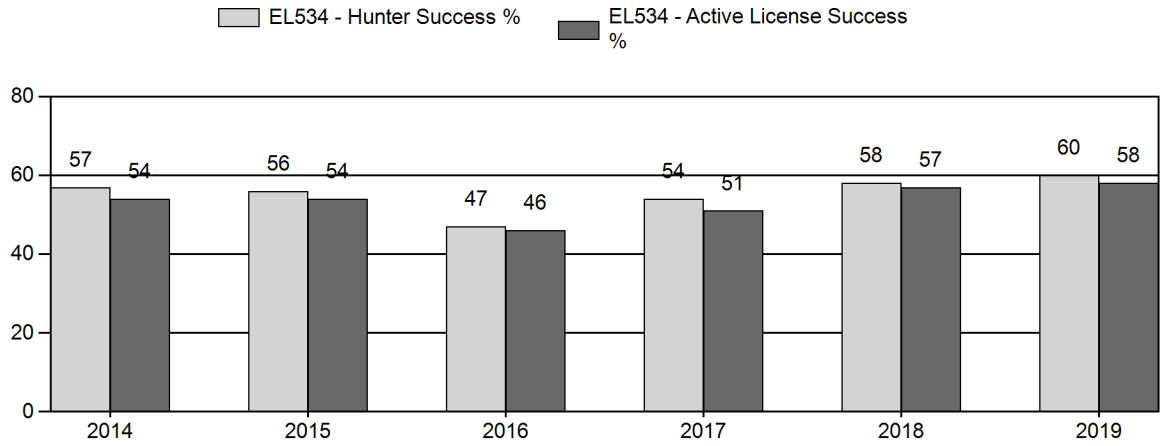
Harvest



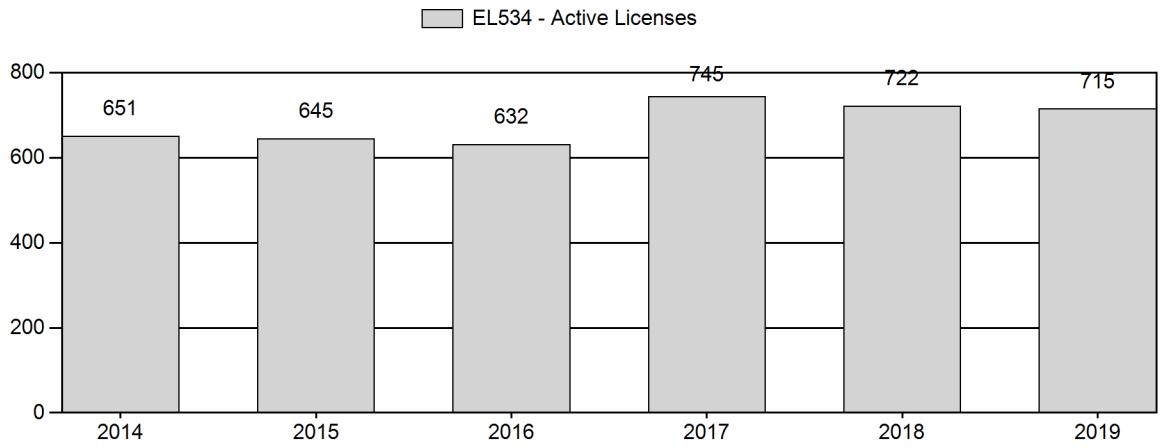
Number of Hunters



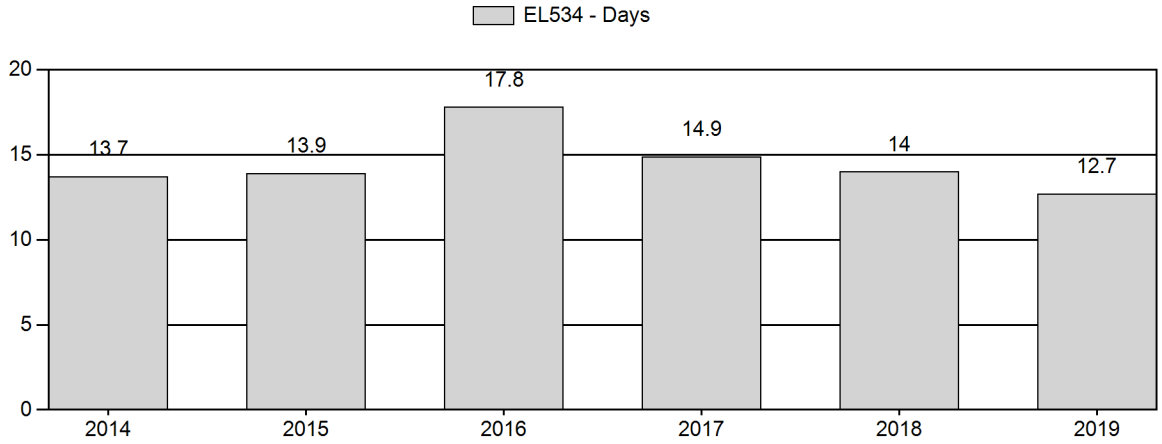
Harvest Success



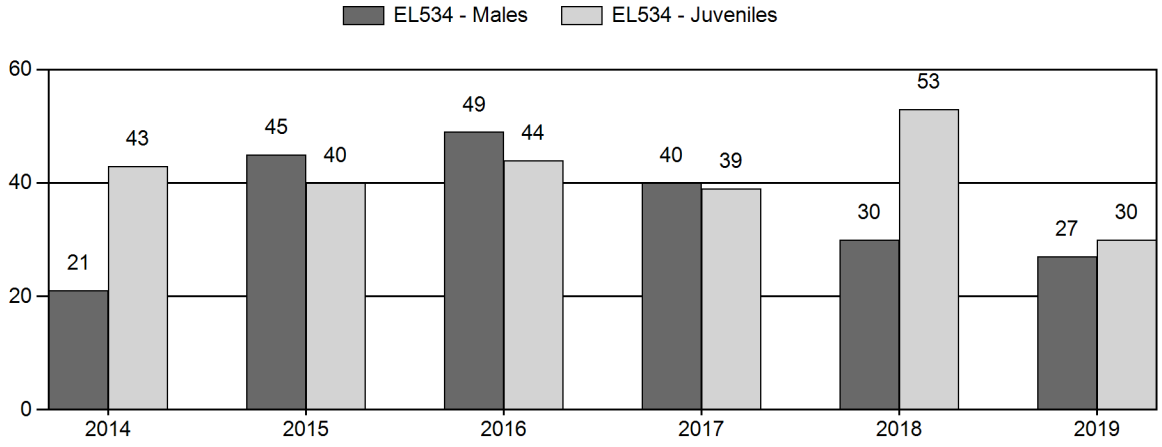
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2020 Hunting Seasons
Shirley Mountain Elk Herd Unit (EL534)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
16	1	Sep. 1	Sep. 30	Oct. 1	Oct. 31	150	Any elk
16	1			Dec. 1	Jan. 31		Antlerless elk
16	2	Sep. 1	Sep. 30	Nov. 1	Nov. 30	50	Any elk
16	2			Dec. 1	Jan. 31		Antlerless elk
16	4			Sep. 1	Sep. 30	300	Antlerless elk valid on the Hanna Draw Hunter Management Area (HMA permission slip required)
16	4	Sep. 1	Sep. 30	Oct. 1	Jan. 31		Antlerless elk valid in the entire area
16	6			Aug. 15	Sep. 30	300	Cow or calf valid on private land; also valid on or within one-half (½) mile of irrigated land, and on the Hanna Draw Hunter Management Area (HMA permission slip required)
16	6	Sep. 1	Sep. 30	Oct. 1	Jan. 31		Cow or calf valid in the entire area

2019 Hunter Satisfaction: 81% Satisfied, 13.2% Neutral, 5.7% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: Postseason sex and age classifications were conducted in conjunction with a mid-winter trend survey (Appendix A). The results of this survey were 27 bulls and 30 calves per 100 cows, from a sample of 1,727 elk. The mid-winter trend count to estimate the wintering population of elk in the herd unit was conducted in January 2020 (Appendix B). The 2019 harvest survey indicated 702 hunters harvested 375 elk in 2019, with an overall success rate of 53.4%. The proportion of branch-antlered bulls in the antlered elk harvest was 95.8%. The 2020 hunting season recommendations were prescribed with the objectives of maintaining bull ratios within the special management parameters and reducing elk numbers. Access in the Beer Mug Hunter Management Area (HMA) was anticipated to be the same as 2019. Access in the Hanna Draw HMA continued in 2020 with August, September, and November periods for Type 4 and Type 6 licensed hunters. The Type 6, August 15-September 30, "within one-half (½) mile of irrigated land" limitation was retained for the 2020 hunting season to address several elk damage situations.

2.) Management Objective Review: The management objective was reviewed in 2020 and changed from a mid-winter trend count of 800 (±20%) elk to a mid-winter trend count of 1,200 (±20%) elk (Appendix C pending). The special management strategy was maintained. Under special management, bull ratios are allowed to exceed 30 bulls: 100 cows and the proportion of branch-antlered bulls is expected to exceed 66% of the antlered elk harvest.

3.) Weather/Habitat: Overall precipitation from October 2018 through September 2019 was above average across the herd unit. Higher than average snow accumulations during the 2018-19 winter paired with cold spring temperatures in 2019 in southeast and south-central Wyoming resulted in persistent snowpack at high elevations. Although growing season (April through June) precipitation was above average for both lower (April-June) and higher (May-July) elevations the persistent cold temperatures into June effectively reduced the length of the growing season. The limited number of habitat transects established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. Most shrub-steppe habitat in this herd unit is decadent and in need of treatments to improve the nutritional value of sagebrush and other plants.

4.) Disease: Chronic wasting disease (CWD) was first observed in the Shirley Mountain herd unit in 2006. The five-year (2015-19) CWD prevalence in the herd unit was 7.7% (52 sampled, 4 CWD positive). Due to small sample size, however, CWD prevalence may not be represented accurately.

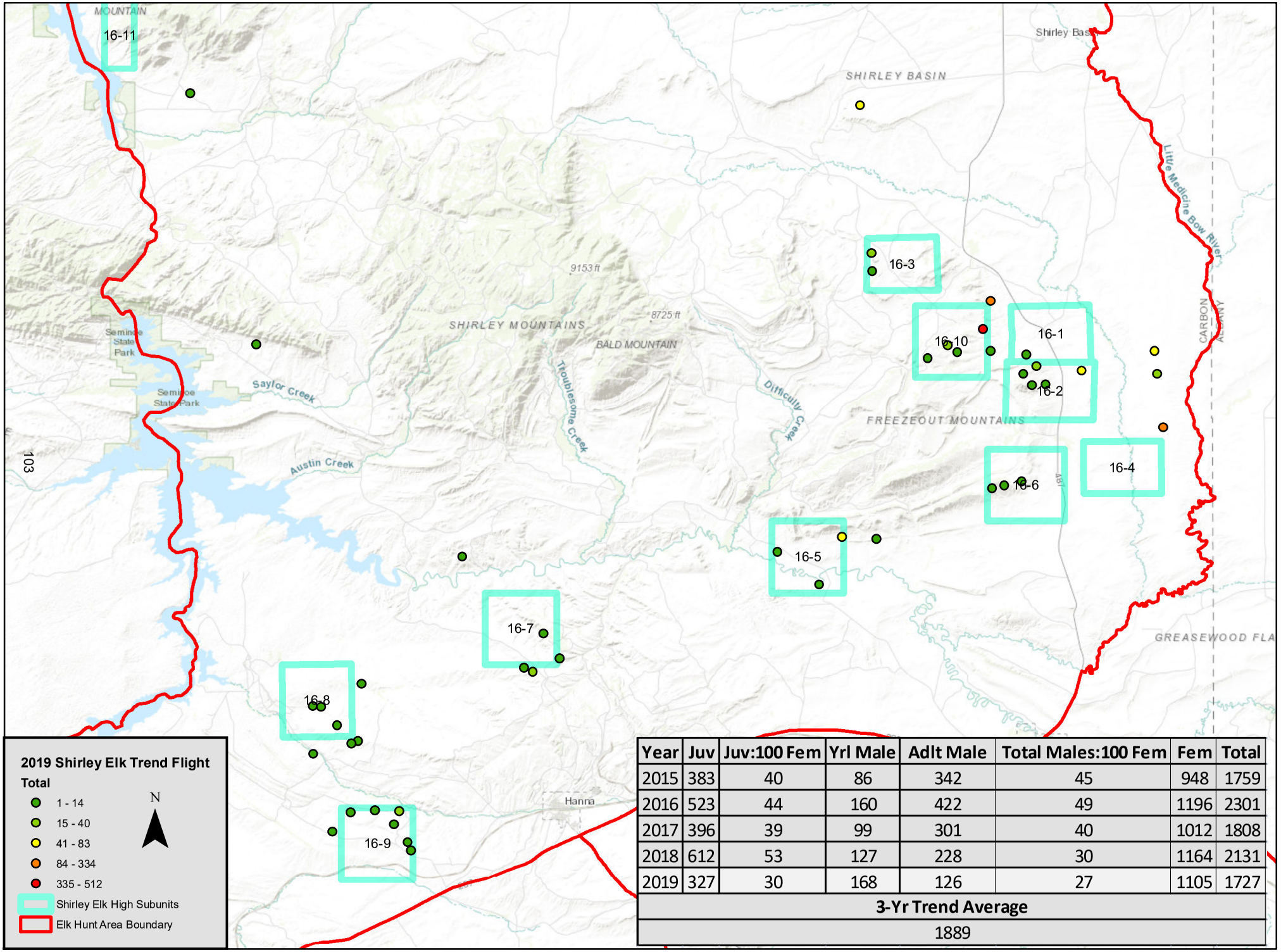
2014 - 2019 Postseason Classification Summary

for Elk Herd EL534 - SHIRLEY MOUNTAIN

		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
2014	767	14	47	61	13%	294	61%	127	26%	482	395	5	16	21	± 2	43	± 4	36
2015	0	86	342	428	24%	948	54%	383	22%	1,759	596	9	36	45	± 0	40	± 0	28
2016	0	160	422	582	25%	1,196	52%	523	23%	2,301	634	13	35	49	± 0	44	± 0	29
2017	0	99	301	400	22%	1,012	56%	396	22%	1,808	581	10	30	40	± 0	39	± 0	28
2018	0	127	228	355	17%	1,164	55%	612	29%	2,131	463	11	20	30	± 0	53	± 0	40
2019	0	168	126	294	17%	1,106	64%	327	19%	1,727	0	15	11	27	± 0	30	± 0	23

Appendix B

2019 Shirley Mountain Elk Flight (Jan 10)



Year	Juv	Juv:100 Fem	Yrl Male	Adlt Male	Total Males:100 Fem	Fem	Total
2015	383	40	86	342	45	948	1759
2016	523	44	160	422	49	1196	2301
2017	396	39	99	301	40	1012	1808
2018	612	53	127	228	30	1164	2131
2019	327	30	168	126	27	1105	1727
3-Yr Trend Average							
1889							

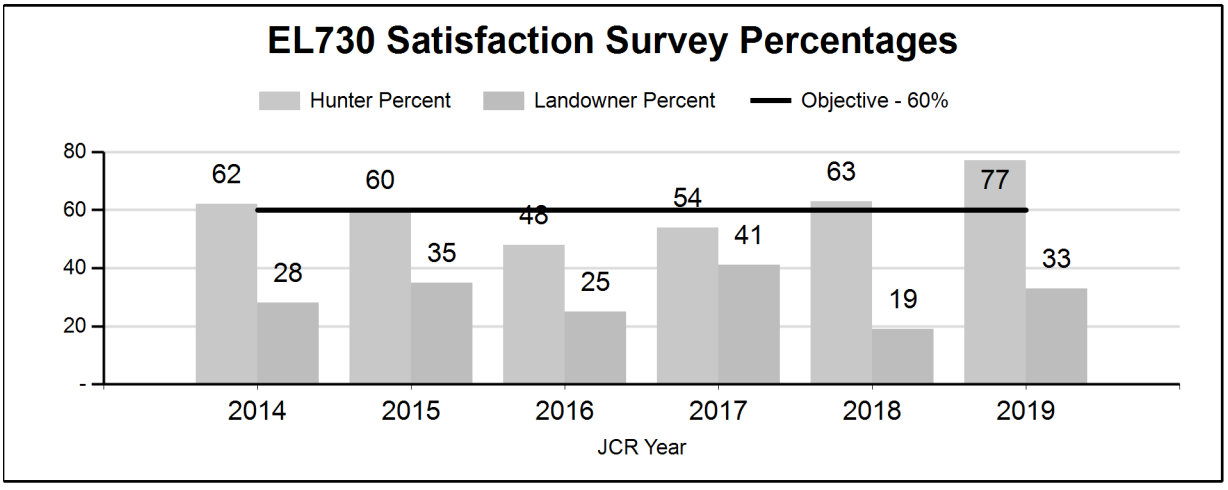
2019 - JCR Evaluation Form

SPECIES: Elk
HERD: EL730 - RAWHIDE
HUNT AREAS: 3

PERIOD: 6/1/2019 - 5/31/2020
PREPARED BY: MARTIN HICKS

	2014 - 2018 Average	2019	2020 Proposed
Hunter Satisfaction Percent	58%	77%	60%
Landowner Satisfaction Percent	30%	33%	60%
Harvest:	111	150	160
Hunters:	340	349	330
Hunter Success:	33%	43%	48 %
Active Licenses:	354	328	350
Active License Success:	31%	46%	46 %
Recreation Days:	2,381	2,468	2,540
Days Per Animal:	21.5	16.5	15.9
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

Satisfaction Based Objective	60%
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-5%
Number of years population has been + or - objective in recent trend:	6



2020 Hunting Seasons
Rawhide Elk Herd Unit (EL730)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
3	Gen	Sept. 1	Sept. 14	Sept. 15	Oct. 14		Any elk
3	Gen			Oct. 15	Jan. 31		Any elk valid south of U.S. Hwy 26
3	6	Sept. 1	Sept. 30	Aug. 15	Nov. 30	200	Cow or calf
3	6			Dec. 1	Jan. 31		Cow or calf valid south of U.S. Hwy 26

2019 Hunter Satisfaction: 77% Satisfied, 14% Neutral, 9% Dissatisfied
2019 Landowner Satisfaction: 16% Above, 22% At, 51% Below Desired Levels

2020 Management Summary

1.) Hunting Season Evaluation: The 2020 season is designed to maximize harvest on a landscape that is dominated by private land to try and keep a growing elk herd at check. However, there are landowner concerns with not enough elk north of U.S. Highway 26 so that will remain a conservative season to try and improve satisfaction levels for that segment of landowners.

2.) Management Objective Review: The Rawhide Elk Herd Unit's landowner and sportsmen satisfaction objective was last reviewed in 2017 and will go up for review again in 2022.

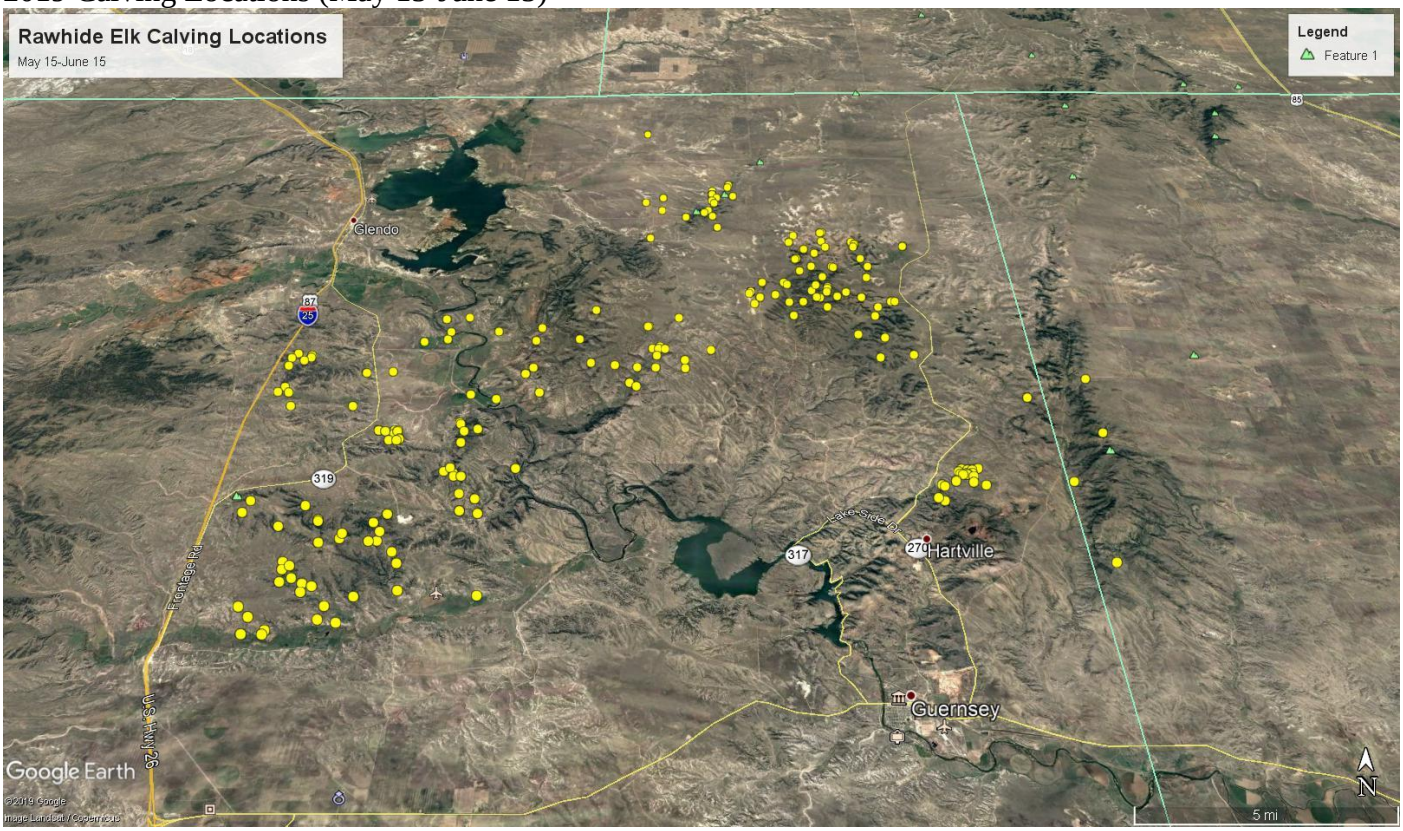
3.) On Going Research: During the 2017/18 winter, 29 female elk were captured and fitted with radio collars as part of a study conducted with the Wyoming State Military Department (Camp Guernsey) to look at habitat selection, identify seasonal ranges, document calving area and map movement patterns (See appending Appendix A).

4.) Weather and Habitat: Annual precipitation was normal in the Rawhide herd unit in 2019. There were delays in plant phenology exhibited in rangeland and perennial/annual cropland environments due to cold, wet weather and several freeze events that occurred in late May. Native rangeland habitats largely remain in late seral stages due to a lack of managed disturbance on the landscape. Due to the close proximity of perennial and annual crops to security cover provided by steep canyons and intermittent timber patches, elk are likely to shift their diets and utilize these forage resources in this intensive agricultural environment. Cheatgrass remains a large threat in native rangeland plant communities and also in cropland environments. Conservation Reserve Program (CRP) enrolled lands continue their downward spiral and provide very little in the form of hiding, calving, and thermal cover and equally poor forage production and forage quality for much of the year. Many acres of CRP are expiring in southeast Wyoming in 2020. With proposed per acre USDA soil rental rates, it is highly likely we will see a mass exit from the program and farmers returning to annual crop production or livestock grazing. Over the last 35 years of the CRP programs' existence, we've seen multi-species stands convert to single specie grass stands (e.g. smooth brome) in the majority of CRP tracts. Efforts to work with

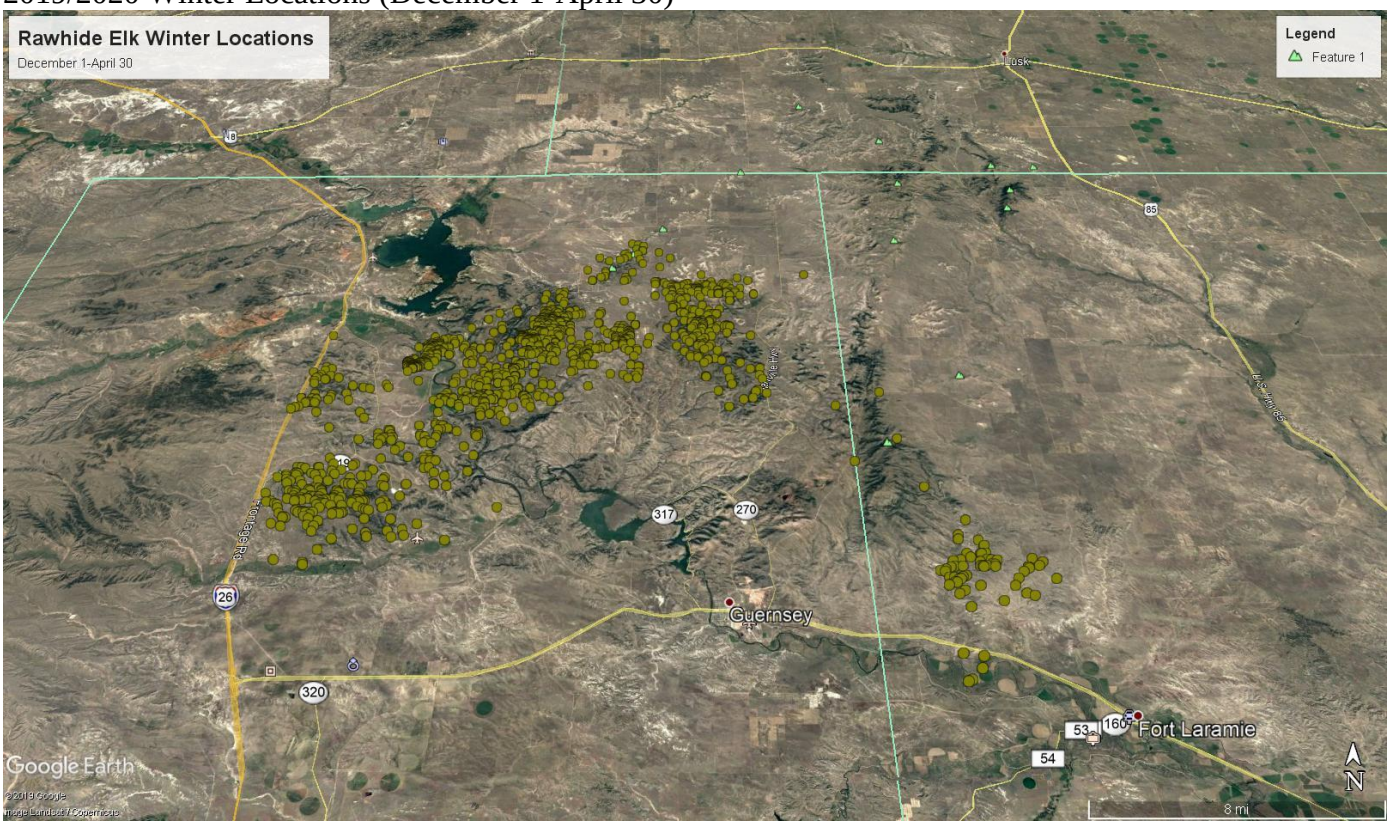
USDA and farmers to enhance CRP for the benefit of wildlife through stand vegetation renovation are ongoing.

Appendix A- Rawhide Elk Herd Unit GPS Collar Data, 2019-2020

2019 Calving Locations (May 15-June 15)



2019/2020 Winter Locations (December 1-April 30)



2019 - JCR Evaluation Form

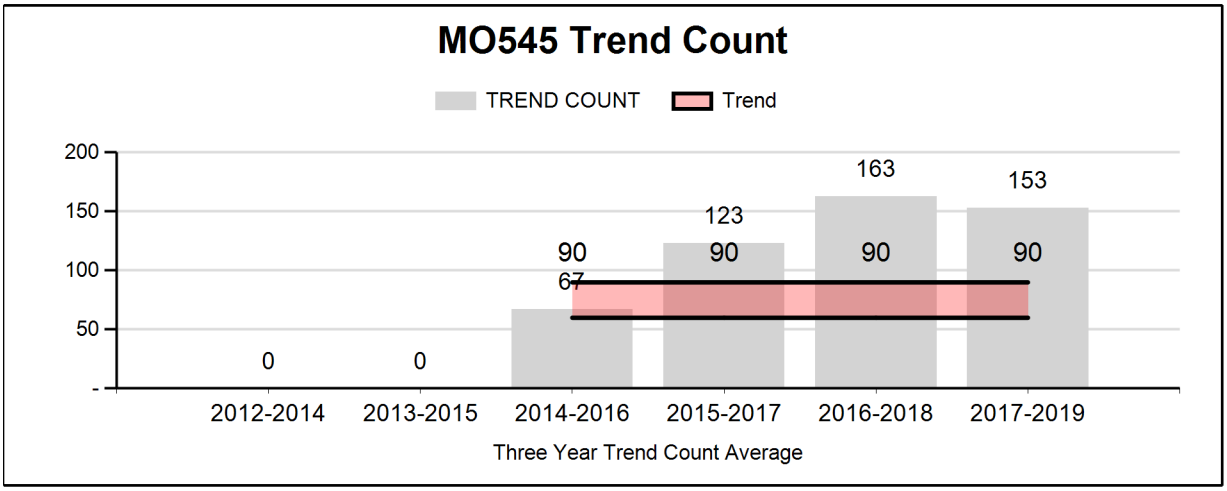
SPECIES: Moose
PERIOD: 6/1/2019 - 5/31/2020
HERD: MO545 - SNOWY RANGE
HUNT AREAS: 38, 41
PREPARED BY: TEAL CUFAUDE

	2014 - 2018 Average	2019	2020 Proposed
Trend Count:	163	169	150
Harvest:	41	41	41
Hunters:	45	45	46
Hunter Success:	91%	91%	89%
Active Licenses:	45	45	45
Active License Success	91%	91%	91%
Recreation Days:	346	411	400
Days Per Animal:	8.4	10.0	9.8
Males per 100 Females:	105	86	
Juveniles per 100 Females	46	45	

Trend Based Objective (± 20%)	75 (60 - 90)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	125%
Number of years population has been + or - objective in recent trend:	3

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

	JCR Year	Proposed
Females ≥ 1 year old:	NA%	N/A%
Males ≥ 1 year old:	NA%	N/A%
Juveniles (< 1 year old):	NA%	N/A%



2020 Hunting Seasons
Snowy Range Moose (MO545)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
38,41	1	Sep. 1	Sep. 30	Oct.1	Nov. 14	20	Any moose, except cow moose with calf at side
	4	Sep. 1	Sep. 30	Oct.1	Nov. 14	20	Antlerless moose, except cow moose with calf at side

Secondary Management Objectives:

1) 3-yr. average of ≥ 4 years of age median for harvested bulls.
   - Currently Met: 2017-2019 Median Age for Harvested Bulls- 5.2 years of age
2) 3-yr. average of ≥ 40% of bulls in harvest = ≥ 5 years of age.
   - Currently Met: 2017-2019 Percentage of Bulls ≥ 5 years of age- 65%
3) Maintain sustainable communities of willow species preferred by moose
   - Currently Met: Reference Habitat Section

2020 Management Summary

1.) Hunting Season Evaluation: A moose abundance survey was completed in the Snowy Range herd unit in March 2015, resulting in an abundance estimate of 266 ± 56 (90% CI) moose. Since biological year 2016, mid-winter trend counts have been conducted to monitor moose in this herd unit. Appendix A illustrates the age and sex ratios observed during these trend counts. Based on the results from these counts, 201 moose, 169 moose, 120 moose, and 169 moose respectively, the initial objective of 75 was likely too low to meaningfully correlate with current moose numbers. The three-year trend count average from 2017-19 was 153 moose. The map in Appendix B details the flight path and moose observations during the 2019 trend count survey. The Snowy Range herd unit has a reputation for producing trophy quality bulls. As shown in the Appendix C, the 2019 bull harvest continued to be within WGFD's parameters for "prime-age bulls." From 2009-19, 537 total hunters (416 resident, 121 nonresident) have harvested 489 moose in this herd unit. During this time period, 237 antlerless moose (213 cows, 24 juveniles) have been harvested. Only two antlerless moose (cows) have been harvested on Type 1 licenses since 2009. In 2020, Type 1 and Type 4 license numbers remained at 20 licenses each. This license allocation is expected to maintain the population at objective and age of harvested bulls within the secondary management objective ranges.

2.) Habitat: Higher than average snow accumulations during the 2018-2019 winter paired with cold spring temperatures in 2019 in southeast and south central Wyoming resulted in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. The "late spring" created phenological delays for plants, especially at higher elevations. This likely caused moose to continue browsing on shrubs and willows longer into the spring. Spring grasses and forbs were likely only accessible in the early spring at lower elevations. Growing season precipitation was higher than average in the herd unit in 2019 resulting in excellent grass and forb production and shrub leader growth. Due to snow accumulations and decent growing season precipitation, fire activity was very low in 2019 and there were no new large-scale fires within the herd unit.

Three years of habitat data have been collected in the Snowy Range moose herd unit, through a collaborative research project by University of Wyoming graduate student, Alex May. Between 2015 and 2016, willow browse monitoring using the Kiegley Live Dead Index (LDI) was conducted on 57 transects. Data showed a decrease in browse pressure, when compared to data collected in earlier studies. These results suggest planeleaf willow growth is less inhibited by browsing than in previous years. Laramie terrestrial habitat biologists intend to establish willow monitoring transects in 2020 to continue to track willow utilization within the Snowy Range. Heavy snowfall occurred throughout the herd unit in mid-October and several subsequent storms resulted in earlier movements to winter ranges. Appendix D describes recent disturbances and habitat projects occurring in the herd unit. The 2018 Annual Strategic Habitat Plan details habitat management projects within this herd unit
(https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

3.) Research: A moose research project was initiated by the Wyoming Cooperative Fish and Wildlife Research Unit and the WGFD in the Snowy Range herd unit during the spring of 2017. The objectives for this research were to assess survival and cause-specific mortality of adult female moose and evaluate patterns of habitat use of female moose as a function of habitat conditions, with specific (Appendix E).

4.) Disease: In 2019, 12 moose were sampled and tested for Chronic Wasting Disease (CWD). No sampled moose from this herd unit tested positive for CWD. Moose, especially throughout the southern extent of their range, are susceptible to a variety of diseases and parasites. Presence of carotid artery worms (Elaeophora schneideri) has been increasingly documented in most herd units in Wyoming. In 2019, carotid artery worms were found in three hunter harvested Snowy Range moose. Carotid artery worms were detected in two cow moose that were part of the Snowy Range moose research.

Appendix A

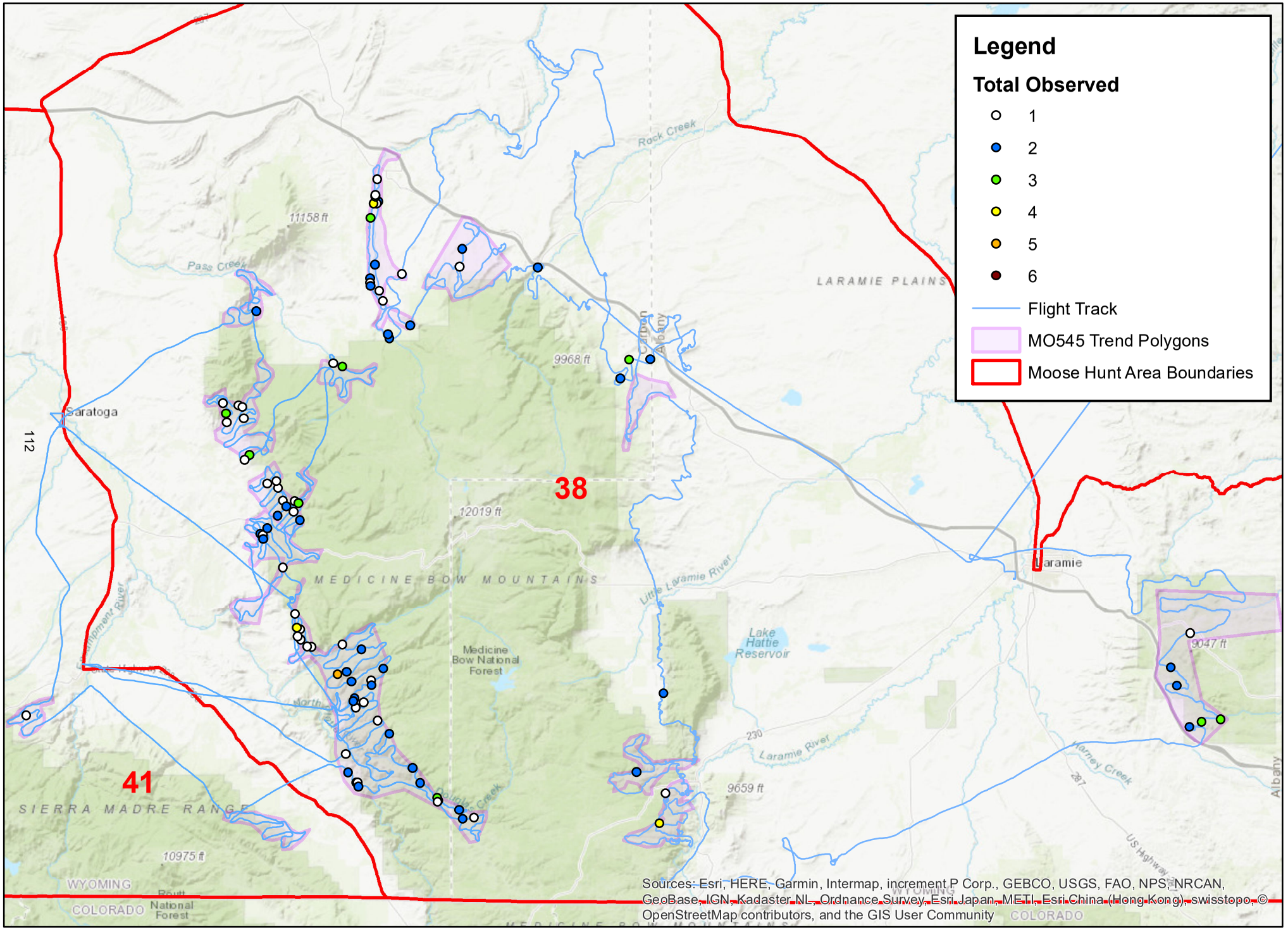
2014 - 2019 Postseason Classification Summary

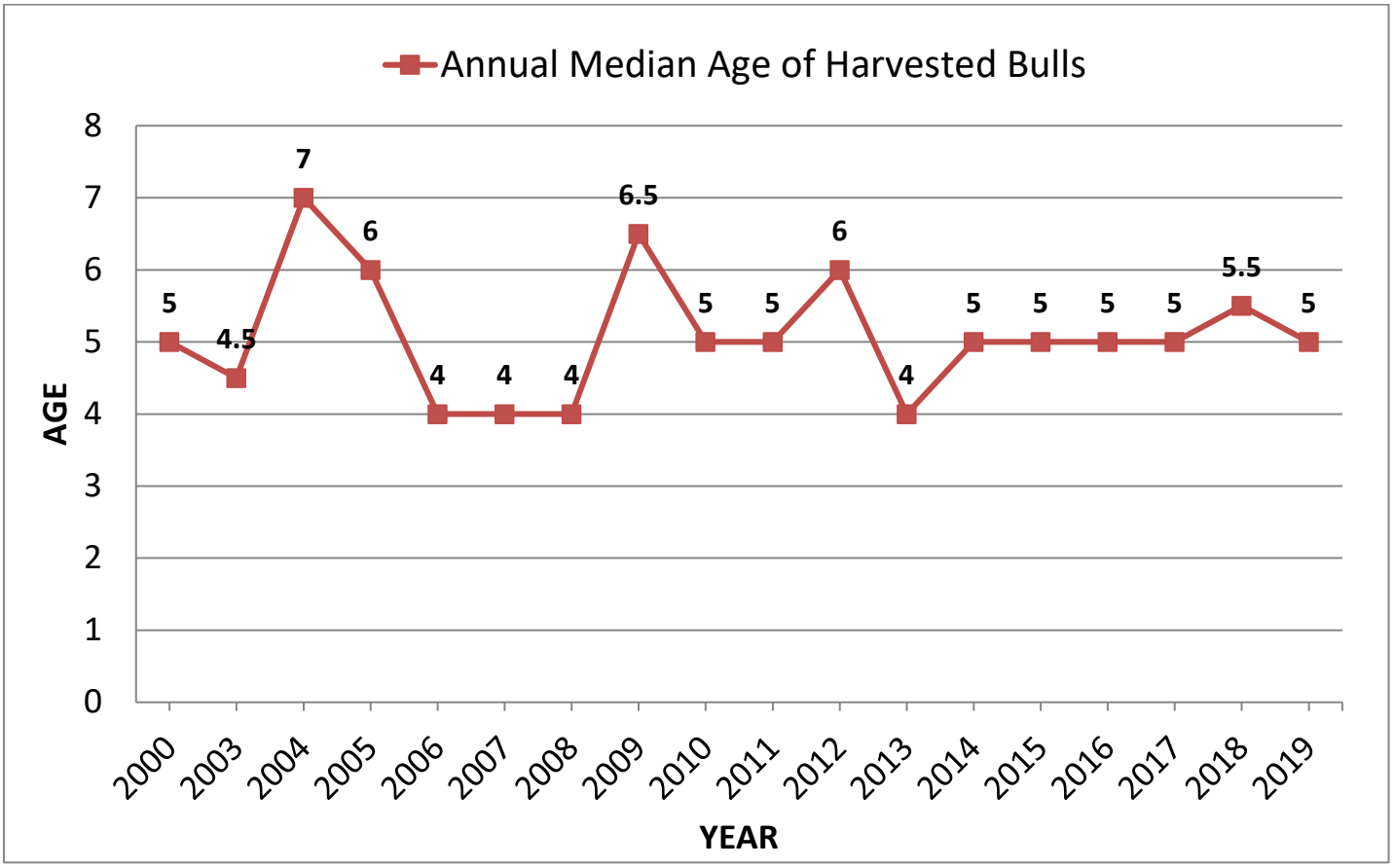
for Moose Herd MO545 - SNOWY RANGE

		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
2014	266	2	20	22	42%	22	42%	8	15%	52	254	9	91	100	± 35	36	± 17	18
2015	0	0	17	17	57%	8	27%	5	17%	30	246	0	212	212	± 0	62	± 0	20
2016	0	9	77	86	44%	76	39%	33	17%	195	0	12	101	113	± 0	43	± 0	20
2017	0	17	49	66	39%	71	42%	32	19%	169	0	24	69	93	± 0	45	± 0	23
2018	0	13	33	46	38%	49	41%	25	21%	120	0	27	67	94	± 0	51	± 0	26
2019	0	8	55	63	37%	73	43%	33	20%	169	0	11	75	86	± 0	45	± 0	24

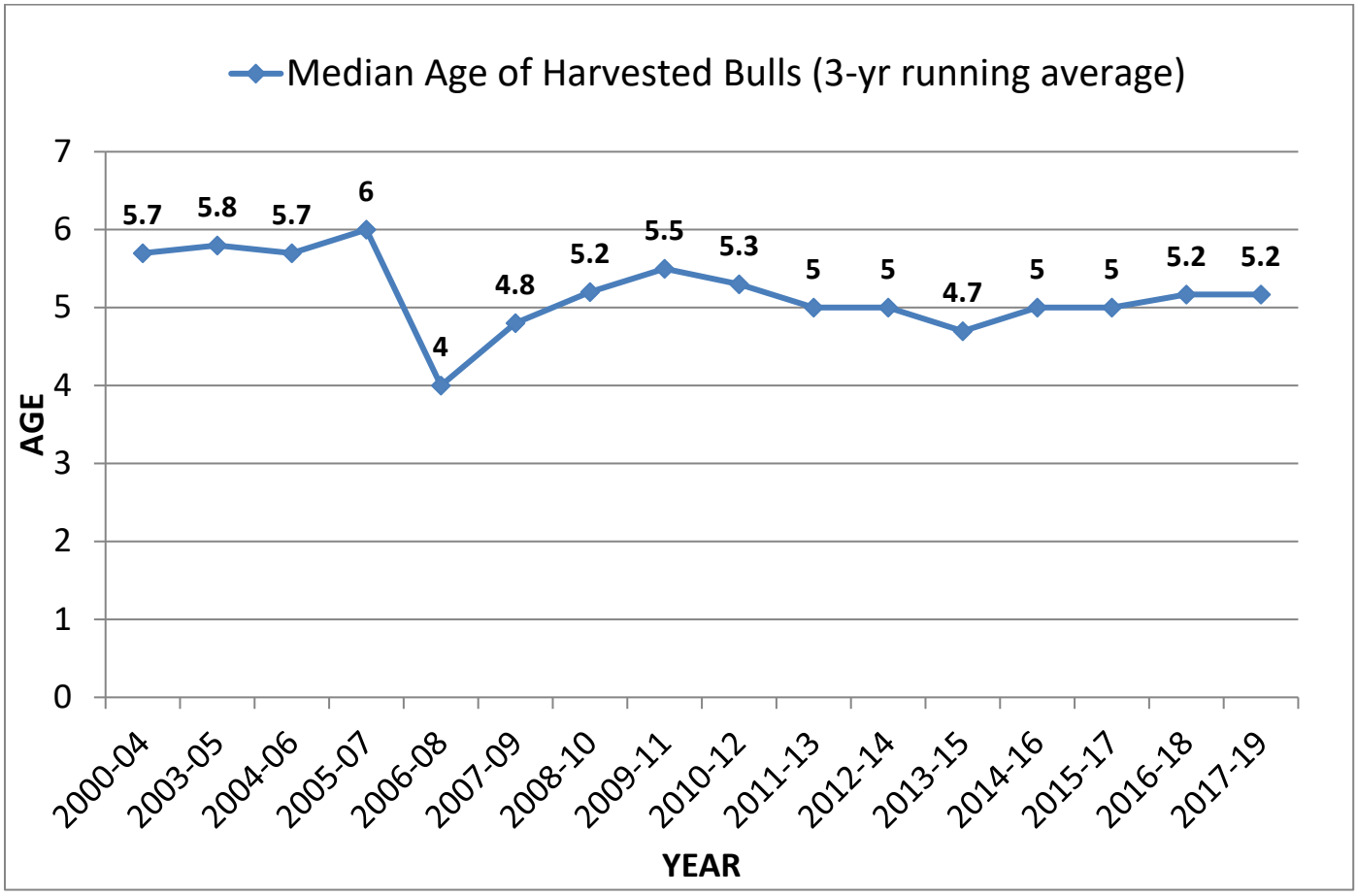
Appendix B

2019 SNOWY RANGE MOOSE (MO545) TREND-JAN 2020

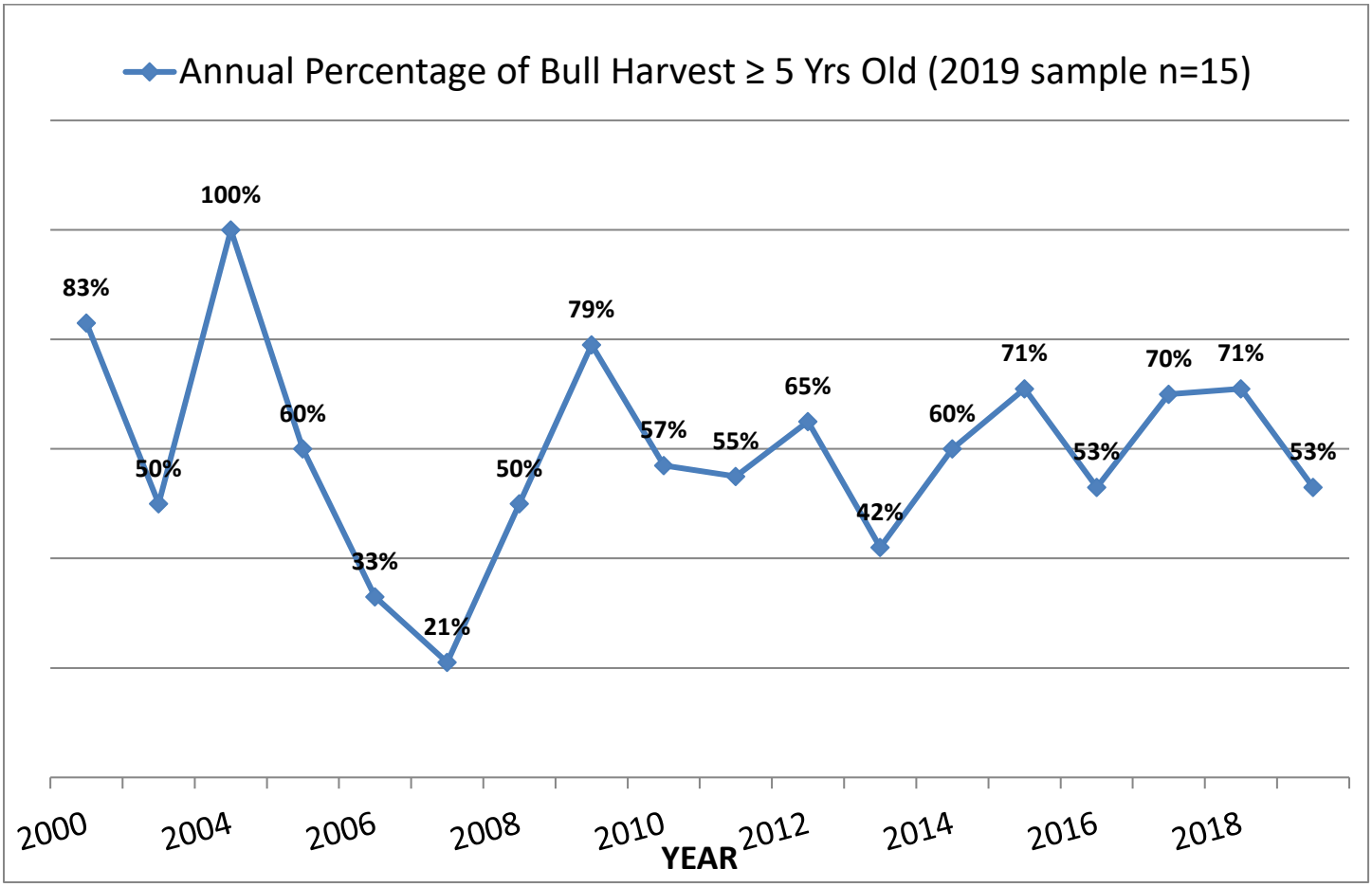




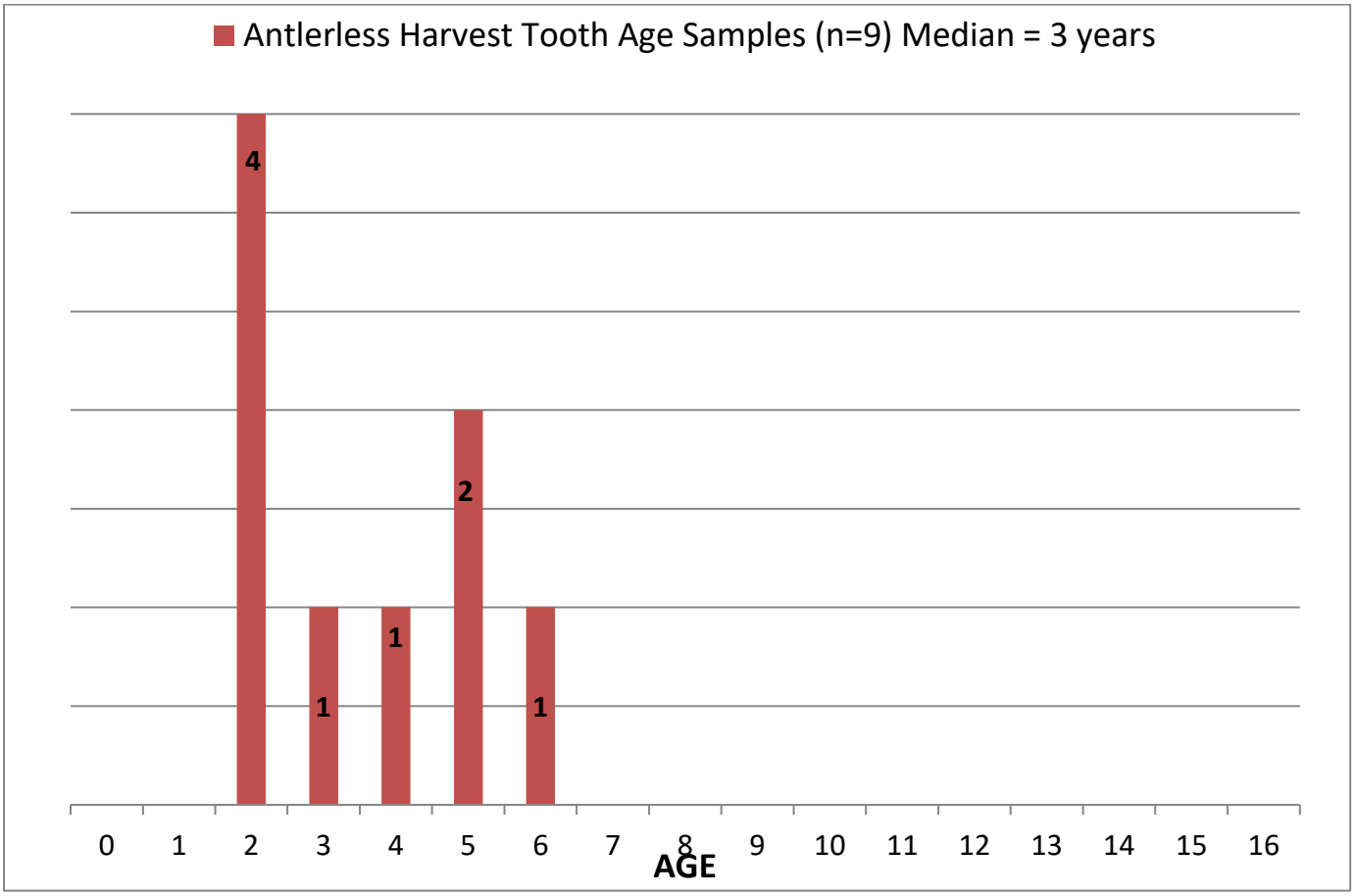
Median age of bulls harvested from the Snowy Range Moose herd unit, from lab aged teeth (n=15) in 2019, Wyoming.



Average (3-year running) median age of bulls harvested from the Snowy Range Moose herd unit, from lab aged teeth, Wyoming.



Annual percentages of the bull harvest ≥ 5-years in age from Snowy Range Moose herd unit, from lab aged teeth, Wyoming.



Age class distribution for antlerless moose harvested from Snowy Range Moose herd unit in 2019, Wyoming.

Appendix D Snowy Range Moose Habitat

Habitat Disturbances

Past large-scale fires within the Sierra Madre Range (Snake fire – 2016, Beaver Creek fire – 2016, and Ryan fire – 2018) and the Snowy Range (Squirrel Creek – 2012, Keystone – 2017, Badger Creek – 2018) are recovering at varying rates. These fires have increased the age class diversity and reset succession within the fire perimeters. Newer shrubs and aspen within these areas may provide wildlife with increased nutrition.

On the eastern half of the Snowy Range, no major land disturbances occurred in 2019. The 20,000 acre Badger Creek wildfire(2018) has seen varying rates of recovery, mostly due to variability in fire severity. High proportions of bare ground are still present in many areas. Aspen suckering post-fire has been high. Moose continue to winter within the perimeters of this wildfire. Depending on snow depths, aspen regeneration may be available to moose at certain periods of the late Fall and again in late spring. To control cheatgrass post-wildfire, aerial application of Imazapic herbicide was completed in fall of 2018. Some injury to resprouting mixed mountain shrubs, most notably Antelope bitterbrush, was documented in fall 2019. This has been seen within other treatment areas around the state. It is expected to subside in the next one to two years, and shrubs will resume normal growth. As seen in summer wildfire contexts, mixed mountain shrub response to fire is varied.

Aspen regeneration and subsequent recruitment has been excellent in areas burned by the Squirrel Creek, Isabell, and Lake Owen wildfires. Many aspen are now above the browse line of elk and moose. In the understory, numerous slopes at mid elevation have seen Ceanothus spp. establish post-fire. Browsing by elk, mule deer, and moose is apparent in these areas, but not considered excessive.

In the Pole Mountain portion of Hunt Area 38, travel management restrictions have been put in place along several riparian areas on United States Forest Service (USFS) lands. In addition to the closures, reclamation efforts were completed to rehabilitate riparian and upland areas where degradation has occurred, mostly caused by off-road vehicle use and subsequent erosion. These closures should result in greater security cover for cow moose during calving and calf rearing in the summer months. Winter recreation in this segment of the hunt area remains high and appears to be growing. High levels of disturbance in moose wintering areas may result in added stress.

Habitat Projects/Treatments

The USFS began the North Savery timber sale in 2018 and continued work in 2019. The project is located in the northern most area of the Sierra Madres on USFS property and proposes up to 6,834 acres of timber harvest activity. The WGFD began shrub and aspen treatments on the Grizzly WHMA in 2018 and continued implementation in 2019. Sagebrush mowing and aspen ripping activities are aimed at aspen enhancement, increasing shrub age class diversity and

forage production on the unit. Approximately 8,000 acres of cheatgrass treatments were conducted in the fall of 2019 on the west slope of the Snowy Range and on the east slope of the Sierra Madres. Further cheatgrass treatments will continue on the west slope of Sierra Madres in 2020.

The USFS and Wyoming State Forestry Division have been working cooperatively to complete conifer and aspen mastication and prescribed fire treatments on USFS, Office of State Lands and Investments, and intermixed private lands on Pole Mountain. Aspen regeneration in treatment areas has been mixed. Some browsing of young aspen has been high, likely by elk, mule deer, and livestock. Disturbance caused by recreationists during much of the growing season likely results in decreased use in places.

The Pilot Hill land acquisition process (5,472 acres) continues to move forward and may result in the establishment of a WHMA on approximately half of the acres in 2020. Some suitable moose habitat is found at the higher elevations in aspen / mixed conifer habitats.

The Squirrel Creek wildfire received its second cheatgrass herbicide treatment in Fall 2019. While still largely deemed a success, herbicide efficacy has decreased in some areas, triggering the USFS action to re-apply Imazapic herbicide via helicopter. Two more years of effective control of cheatgrass are expected post-application.

Summer habitats for moose at high elevations need to be more closely monitored. Desirable willow species found in meadow habitats are likely impacted by moose, elk, and domestic livestock use. Lack of forage in the understory of Lodgepole pine stands (live and dead) likely results in more concentrated use of riparian plant communities in upper elevations. Time permitting, we plan to establish browse transects within willow riparian plant communities in Summer 2020 to monitor use by livestock and wild ungulates.

The USFS continues to work towards completion of the Landscape Vegetation Analysis (LAVA). It is hoped that this will result in the ability to create disturbance on the landscape through mechanical and prescribed fire treatments in conifer and aspen plant communities.

Appendix E- Snowy Range Moose Research

A moose research project was initiated by the Wyoming Cooperative Fish and Wildlife Research Unit and the WGFD in the Snowy Range herd unit during the spring of 2017. The objectives for this research project were to assess survival and cause-specific mortality of adult female moose and evaluate patterns of habitat use of female moose as a function of habitat conditions, with specific reference towards understanding balance between thermal refuge and forage acquisition.

In March 2018, 28 adult female moose were collared as part of this project. This work has pointed to the importance of small wet meadow complexes for not only forage but also behavioral thermoregulation in moose. It highlights the importance of conserving these riparian corridors and wet meadow complexes.

As of January 2020, there were six collared moose mortalities. One moose died from capture myopathy in spring 2018. One moose was harvested by a hunter in fall 2018. Two moose died after being restrained in an ephemeral bog in spring 2019. One of these moose had significant parasite loads (ticks/artery worms) which may have contributed to its mortality. The cause of death for one moose was unknown, but Wyoming State Veterinary Laboratory pathologists noted that the moose had a heavy carotid artery worm burden.

2019 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2019 - 5/31/2020

HERD: MD534 - GOSHEN RIM

HUNT AREAS: 15
PREPARED BY: MARTIN HICKS

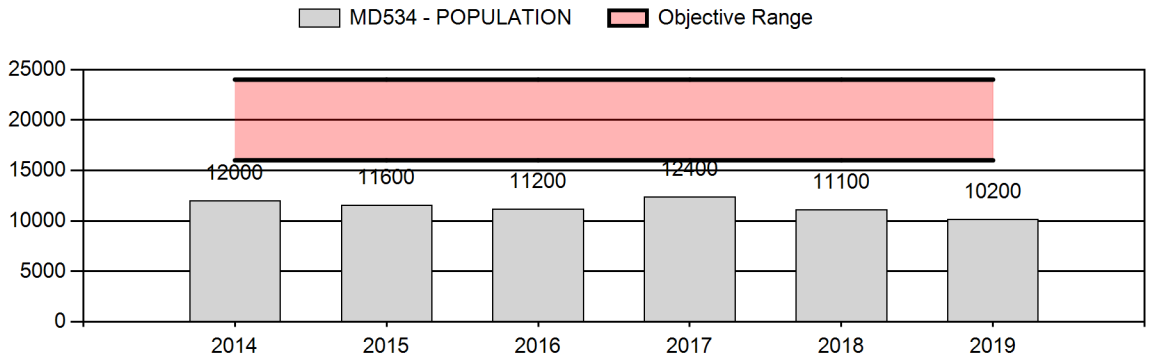
	2014 - 2018 Average	2019	2020 Proposed
Population:	11,660	10,200	8,900
Harvest:	943	937	865
Hunters:	1,755	1,720	1,700
Hunter Success:	54%	54%	51%
Active Licenses:	1,846	1,804	1,785
Active License Success:	51%	52%	48%
Recreation Days:	7,226	7,108	7,000
Days Per Animal:	7.7	7.6	8.1
Males per 100 Females	36	30	
Juveniles per 100 Females	59	53	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-49%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/17/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	3.8%	2.0%
Males ≥ 1 year old:	34.6%	44.6%
Total:	17%	13%
Proposed change in post-season population:	-8%	-12%

Population Size - Postseason



2020 Hunting Seasons
Goshen Rim Mule Deer Herd Unit (MD534)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
15	Gen	Sept. 1	Sept. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer
15	6	Sept. 1	Sept. 30	Oct. 1	Dec. 31	300	Doe or fawn

2020 Region T nonresident quota: 400 licenses

2019 Hunter Satisfaction: 68% Satisfied, 18% Neutral, 14% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: Goshen Rim Mule Deer Herd Unit is 49% below the objective of 20,000 mule deer so the season is structured to be as conservative as possible while still addressing minimal damage concerns throughout the herd unit. Since damage situations have declined in the past years, 100 Type 6 licenses were removed from total allocation. Buck ratios continue to fall within the recreational management range of 20-30 bucks:100 does so there was no need to reduce public opportunity by decreasing hunting days or Region T licenses. CWD is and will continue to be an issue within this herd unit and will be one of the focus herds for surveillance efforts in 2020.

2.) Management Objective Review: The herd unit's objective was last reviewed in 2018 and is slated to be reviewed again in 2023.

3.) Weather and Habitat: Annual precipitation was normal in the Goshen Rim herd unit in 2019. There were delays in plant phenology exhibited in rangeland and perennial/annual cropland environments due to cold, wet weather and several freeze events that occurred in late May. Mixed mountain shrub habitats found on the Goshen Rim largely remain in late seral stages due to a lack of managed disturbance on the landscape. Annual shrub production and shrub nutritive content are both compromised as plants mature. Due to the close proximity of perennial and annual crops, mule deer are likely to shift their diets and utilize these forage resources in this intensive agricultural environment. Cheatgrass remains a large threat in the understory of shrub communities and also in cropland environments. Conservation Reserve Program (CRP) enrolled lands continue their downward spiral and provide very little in the form of hiding, fawning, and thermal cover and equally poor forage production and forage quality for much of the year. Many acres of CRP are expiring in southeast Wyoming in 2020. With proposed per acre USDA soil rental rates, it is highly likely we will see a mass exit from the program and farmers returning to annual crop production or livestock grazing. Over the last 35 years of the CRP programs' existence, we've seen multi-species stands convert to single specie grass stands (e.g. smooth brome) in the majority of CRP tracts. Efforts to work with USDA and farmers to enhance CRP for the benefit of wildlife through stand vegetation renovation are ongoing.

4) Disease: The Goshen Rim Mule Deer Herd Unit has one of the highest prevalence rates for Chronic Wasting Disease (CWD) in the state (Appendix A). Based on tooth data and CWD

testing during the 2018 and 2019 seasons, out of a sample size of 90 male mule deer, the majority of deer that tested positive were both 3.5 and 4.5 years old male deer (Appendix A). Pending WGFD Commission approval managers of the Goshen Rim Herd Unit will take CWD management strategies out for public input in 2020.

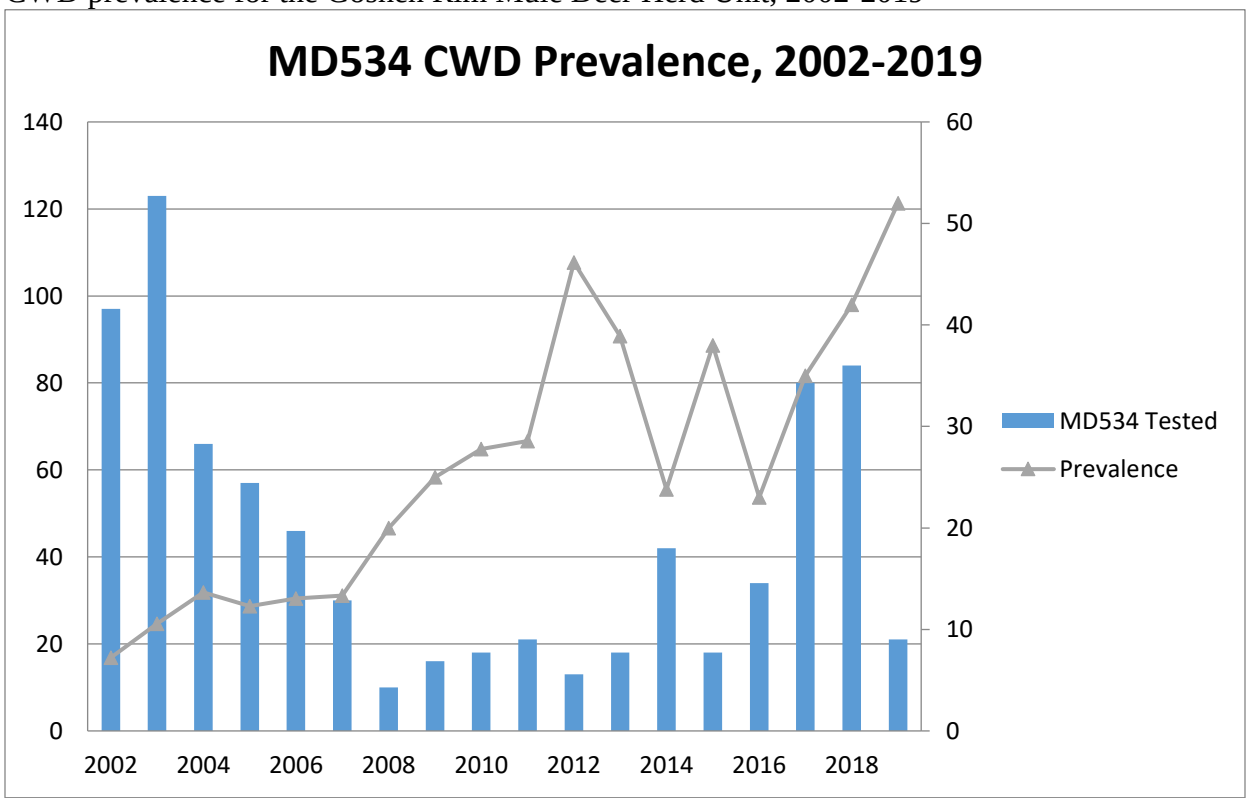
2014 - 2019 Postseason Classification Summary

for Mule Deer Herd MD534 - GOSHEN RIM

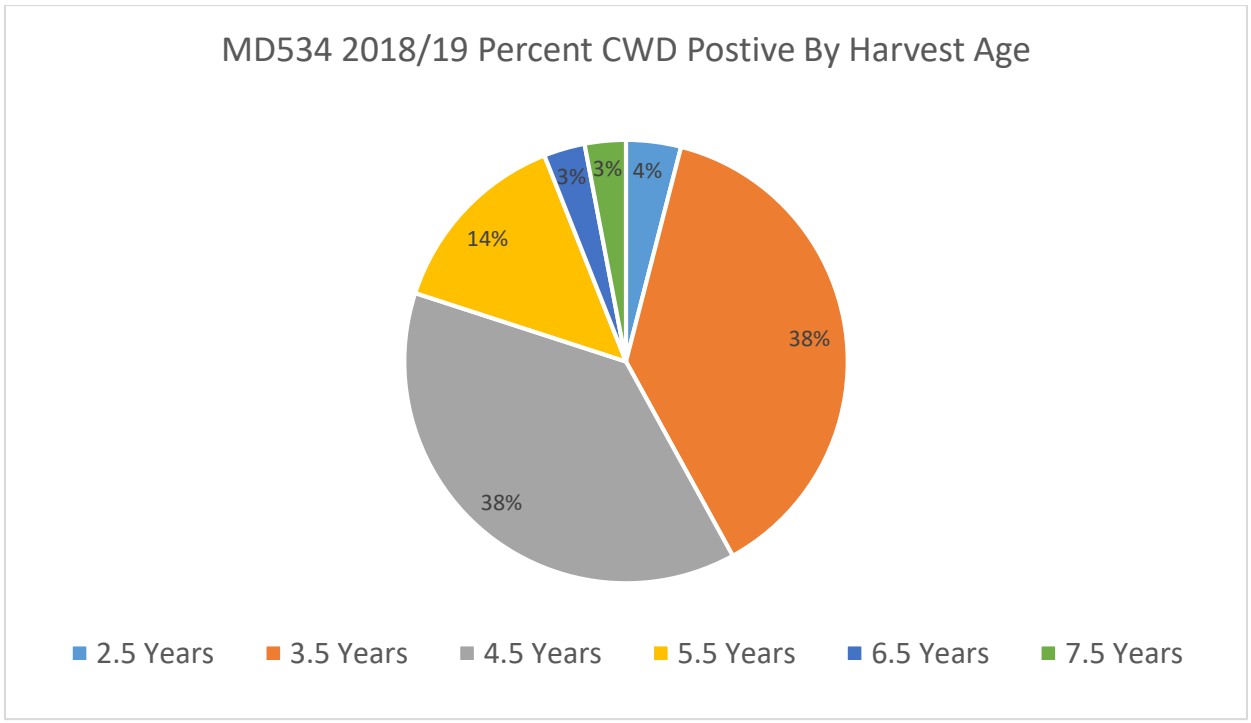
		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2014	12,000	93	53	67	23	7	243	13%	876	48%	706	39%	1,825	1,130	11	17	28	± 2	81	± 5	63
2015	11,600	181	144	64	19	13	421	18%	1,137	50%	726	32%	2,284	1,234	16	21	37	± 2	64	± 3	47
2016	11,200	222	183	91	17	0	513	24%	1,067	49%	594	27%	2,174	1,266	21	27	48	± 3	56	± 3	38
2017	12,400	77	124	63	8	0	272	18%	863	56%	399	26%	1,534	980	9	23	32	± 3	46	± 3	35
2018	11,100	97	142	65	11	0	315	19%	908	55%	432	26%	1,655	824	11	24	35	± 3	48	± 3	35
2019	10,200	102	90	42	4	0	238	16%	800	55%	422	29%	1,460	1,094	13	17	30	± 3	53	± 4	41

Appendix A

CWD prevalence for the Goshen Rim Mule Deer Herd Unit, 2002-2019



MD534 Age Structure of Positive Male Mule Deer, 2018 and 2019 combined (n=90)



2019 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2019 - 5/31/2020

HERD: MD537 - LARAMIE MOUNTAINS

HUNT AREAS: 59-60, 64
PREPARED BY: MARTIN HICKS

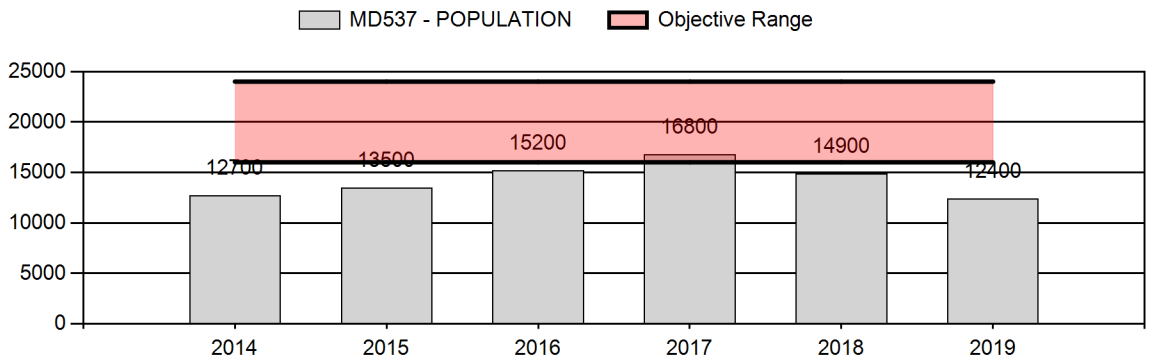
	2014 - 2018 Average	2019	2020 Proposed
Population:	14,620	12,400	11,900
Harvest:	1,109	942	1,075
Hunters:	1,984	1,906	1,925
Hunter Success:	56%	49%	56 %
Active Licenses:	2,028	1,967	1,950
Active License Success:	55%	48%	55 %
Recreation Days:	8,958	8,021	8,500
Days Per Animal:	8.1	8.5	7.9
Males per 100 Females	47	39	
Juveniles per 100 Females	68	53	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-38%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/17/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	2.1%	1.7%
Males ≥ 1 year old:	25.6%	30.6%
Total:	7.0%	8.0%
Proposed change in post-season population:	-11%	-3%

Population Size - Postseason



2020 Hunting Seasons
Laramie Mountains Mule Deer Herd Unit (MD537)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
59	Gen	Sept. 1	Sept. 30	Oct. 15	Oct. 31		Antlered mule deer any white-tailed deer
59,64	6	Sept. 1	Sept. 30	Oct. 15	Oct. 31	150	Doe or fawn, valid on private land
59,64	6			Nov. 1	Dec. 31		Doe or fawn white-tailed deer
60	1	Sept. 1	Sept. 30				Curt Gowdy State Park closed
60	1			Oct. 20	Nov. 5	100	Antlered deer on national forest, any deer off national forest; all lands within Curt Gowdy State Park, archery only
60	1			Nov. 6	Nov. 30		Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	2	Sept. 1	Sept. 30				Curt Gowdy State Park closed
60	2			Oct. 20	Nov. 5	200	Any deer off national forest; all lands within Curt Gowdy State Park, archery only
60	2			Nov. 6	Nov. 30		Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	6	Sept. 1	Sept. 30				Curt Gowdy State Park closed
60	6			Oct. 20	Nov. 30	50	Doe or fawn; all lands within Curt Gowdy State Park, archery only
64	Gen	Sept. 1	Sept. 30				Valid in all of Area 64
64	Gen			Oct. 15	Oct. 31		Antlered mule deer or any white-tailed deer except the Wyoming Game and Fish Commission's Tom Thorne/Beth Williams Wildlife Habitat Management Area and the Laramie Peak

							Wildlife Habitat Management Area north of the Tunnel Road (Albany County Road 727) shall be closed
64	2	Sept. 1	Sept. 30	Oct. 15	Oct. 31	100	Antlered mule deer or any white-tailed deer

2020 Region J nonresident quota: 900 licenses

2019 Hunter Satisfaction: 61% Satisfied, 21% Neutral, 18% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The Laramie Mountains Mule Deer Herd Unit is 38% below the population objective of 20,000 mule deer and as a result the 2020 season is conservative in structure. There are a small amount of Type 6 licenses available throughout the herd unit to address damage concerns. The general season will remain at 16 days to take advantage of buck ratios (39 bucks:100 does) that are well past the upper end of the recreational management threshold (20-30 buck:100 does). Hunters will need to keep in mind that the majority of the male deer fall within the Class I and II categories, there are very few Class III males on the landscape, most likely due to high prevalence of CWD (long-term average of 23%) within this herd unit.

2.) Management Objective Review: The population objective review for the Laramie Mountains Herd Unit was last reviewed in 2019 and will be reviewed again in 2024.

3.) Weather and Habitat: Precipitation in the hunt area was normal for 2019. Cold, wet spring weather, including measurable snowstorms at the end of May, likely had some negative impacts on newborn fawns at the onset of the fawning period. Plant phenological shifts were displayed in the spring due to cool daytime temperatures and freezing nighttime temperatures. Temperatures for the remainder of the summer season were normal, with no extended periods of high, stressful temperatures.

Mixed mountain shrub annual production was normal and slightly delayed due to the cold spring weather. Generally, shrub communities throughout the Laramie Range remain mostly in late seral successional stages, with decreased shrub productivity and nutritive content compared to more early seral shrub communities, associated with disturbances (e.g. prescribed fire). The USFS and WY State Forestry continue to complete aspen, conifer, and shrub mastication and prescribed fire projects on the Pole Mountain unit of the Medicine Bow National Forest. Results of habitat treatments are varied, based largely on levels of herbivory post-treatment.

4.) Disease: The Laramie Mountains Mule Deer Herd Unit is one of the herds with the highest Chronic Wasting Disease prevalence as well as sample size (Appendix A) in the state. Based on tooth data and CWD testing during the 2018 and 2019 seasons, out of a sample size of 197 male mule deer, the majority of deer that tested positive was 4.5 years old male deer (Appendix A). Pending WGFD Commission approval managers plan to take management options to the public starting in 2020.

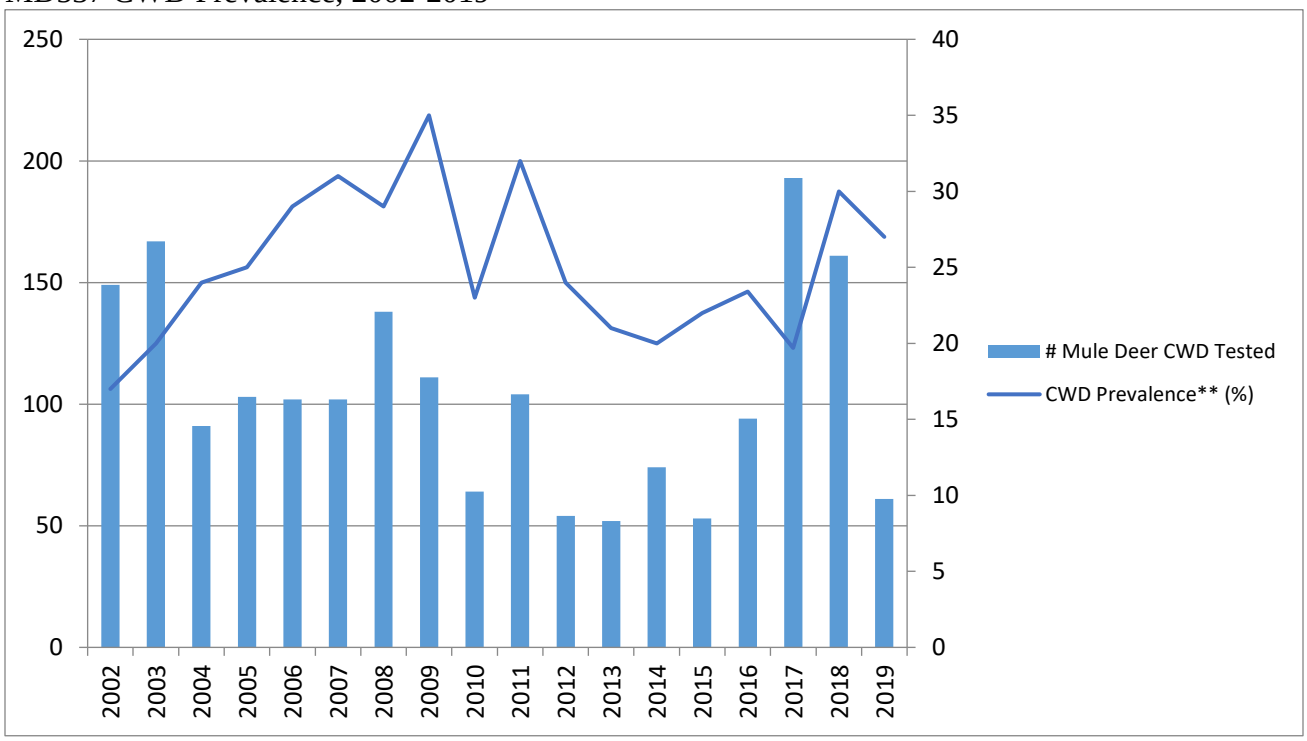
2014 - 2019 Postseason Classification Summary

for Mule Deer Herd MD537 - LARAMIE MOUNTAINS

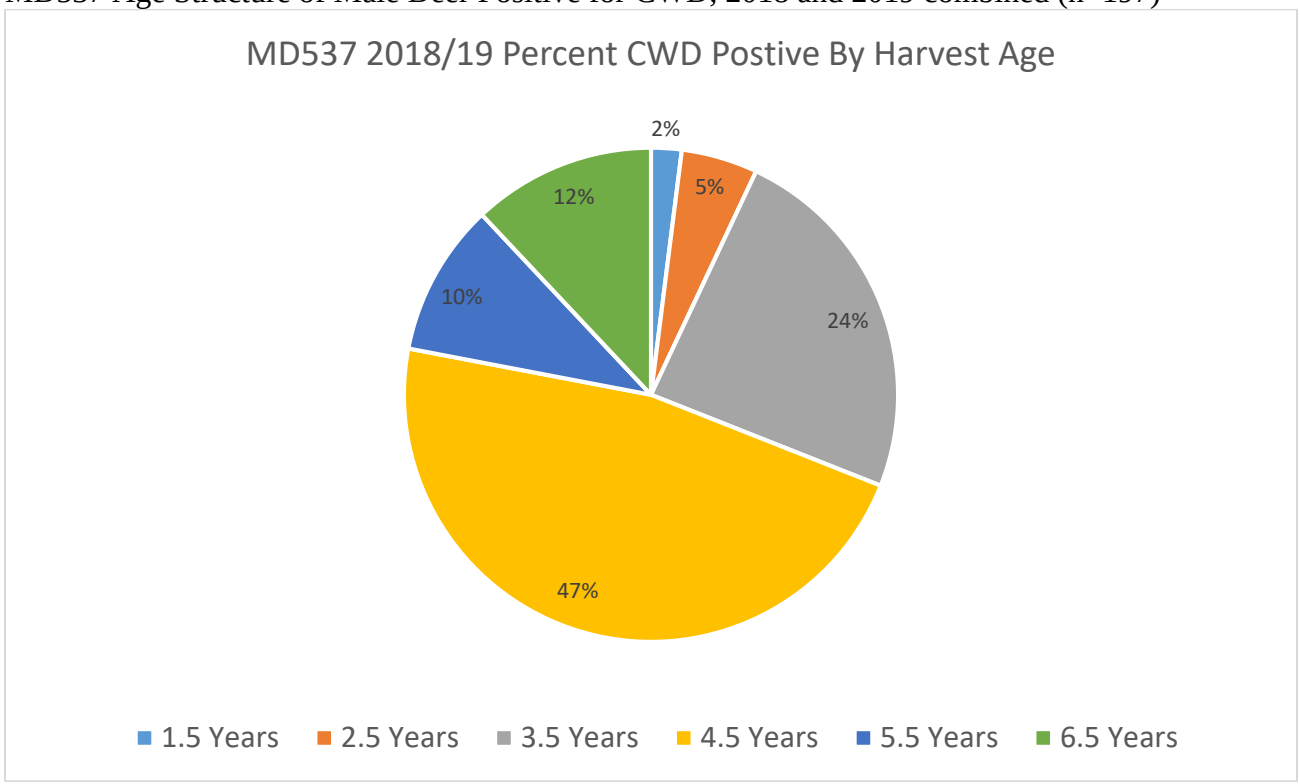
		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2014	12,700	147	177	161	36	0	521	17%	1,384	46%	1,115	37%	3,020	1,135	11	27	38	± 2	81	± 4	59
2015	13,500	290	203	97	16	0	606	23%	1,164	44%	850	32%	2,620	1,304	25	27	52	± 3	73	± 4	48
2016	15,200	168	168	94	13	0	443	23%	900	46%	625	32%	1,968	1,308	19	31	49	± 3	69	± 4	47
2017	16,800	159	266	109	4	0	538	29%	893	48%	446	24%	1,877	1,535	18	42	60	± 4	50	± 3	31
2018	14,900	76	123	50	3	0	252	18%	706	52%	409	30%	1,367	1,258	11	25	36	± 3	58	± 4	43
2019	12,400	117	181	92	13	0	403	20%	1,038	52%	554	28%	1,995	1,329	11	28	39	± 3	53	± 3	

Appendix A

MD537 CWD Prevalence, 2002-2019



MD537 Age Structure of Male Deer Positive for CWD, 2018 and 2019 combined (n=197)



2019 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2019 - 5/31/2020

HERD: MD539 - SHEEP MOUNTAIN

HUNT AREAS: 61, 74-77
PREPARED BY: LEE KNOX

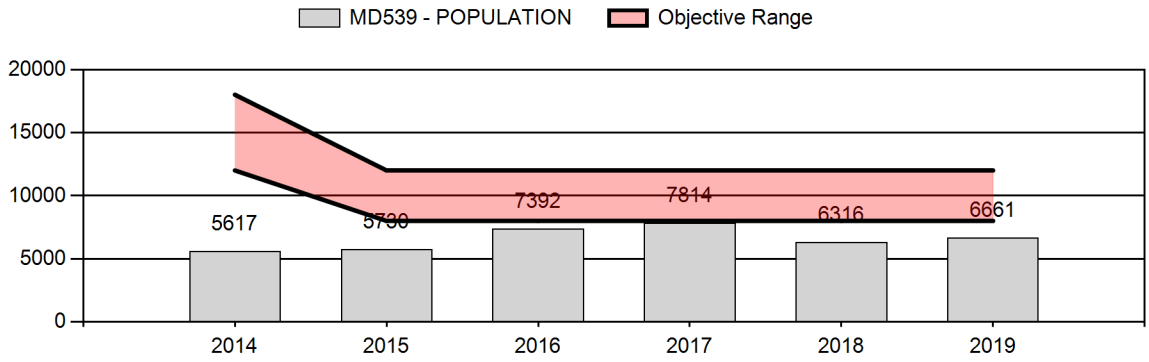
	2014 - 2018 Average	2019	2020 Proposed
Population:	6,574	6,661	7,100
Harvest:	379	295	400
Hunters:	1,373	1,319	1,400
Hunter Success:	28%	22%	29 %
Active Licenses:	1,373	1,319	1,400
Active License Success:	28%	22%	29 %
Recreation Days:	7,186	7,592	7,000
Days Per Animal:	19.0	25.7	17.5
Males per 100 Females	40	38	
Juveniles per 100 Females	62	57	

Population Objective (± 20%) :	10000 (8000 - 12000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-33.4%
Number of years population has been + or - objective in recent trend:	20
Model Date:	3/2/2020

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

	JCR Year	Proposed
Females ≥ 1 year old:	.3%	.3%
Males ≥ 1 year old:	22%	24%
Total:	4%	4%
Proposed change in post-season population:	6%	6%

Population Size - Postseason



2020 Hunting Seasons
Sheep Mountain Mule Deer (MD539)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
61	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer
74	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer
75	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer
76	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer
77	Gen	Sep. 1	Sep. 30	Oct. 1	Oct. 14		Antlered mule deer or any white-tailed deer

2020 Region D nonresident quota: 400 licenses

2019 Hunter Satisfaction: 52% Satisfied, 23% Neutral, 25% Dissatisfied

2020Management Summary

1.) Hunting Season Evaluation: The Sheep Mountain Herd Unit remains below the population objective of 10,000. The 2019 post season population estimates was 6,700, a slight increase from 2018. Season structures the last three years have been conservative with a 10 day antlered only season. The 2019 season saw a 38% decline in harvest from 2018, likely due to weather events. During classification flights we saw an increase in buck ratios from 31bucks:100 does in 2018, to 38 bucks:100 does in 2019 (Appendix A). This herd is under recreational management, however buck ratios the last five years have exceeded the recreational maximum of 29 bucks:100 does, with the five year average of 41 bucks:100 does. Extending the season length by 4 days will increase harvest and assist in aligning buck ratios in line with recreational guidelines.

2.) Management Objective: The management objective for the Sheep Mountain Herd Unit is a post season population estimate of 10,000 mule deer. Based on internal conversations with area mangers and our constituents, we are maintaining this herd at the current post season population objective of 10,000 mule deer. We reviewed population and habitat data and an objective change at this time is not warranted. We will continue providing opportunity under a recreational management strategy of 20 to 29 bucks:100 does.

3.) CWD Management: CWD surveillance was shifted in the 2019 season to focus on specific herds instead of the blanket state wide approach that we had been conducting. Deer herds statewide will be on a five year rotation with the goal of increase surveillance to maintain adequate samples sizes. Sheep Mountain Mule Deer was a focal herd in 2019. We increased field presence, check stations, and implemented DYI CWD samplings stations at key locations. We collected 63 samples from adult male mule deer, nine of which were positive for a prevalence of 14.3%. The five year prevalence is 7.4% with a 95% confidence of 4.7%-12.1%.

We will be maintaining our increased CWD sampling efforts in 2020, with the goal of collecting 200 samples by 2021.

4.) Research: In March of 2017 60 doe mule deer were collared throughout winter ranges within the herd unit. Collars collected locations every two hours for two years, coming off in April of 2019. Over the course of the study a total of 75 doe mule deer were collared. Mortality rates for 2017 and 2019 were 82% and 80% respectively. The data was cleaned and run through the Migration Mapper application to develop migration routes. (Appendix B).

5) Habitat and Weather: The cold, wet Spring of 2019 resulted in delayed green-up at all elevations within the Snowy Range. Late snow storms in May likely created short term stressful conditions for mule deer. More than 6" of wet, heavy snow fell in the last week of May at elevations greater than 7,500'. Temperatures through summer months were moderate. Snowmelt was slow, and higher elevations were not free of snow until mid to late June. Plant phenology was delayed in the Spring due to cooler daytime temperatures and freezing temperatures at night. Heavy snowfall occurred in the Snowy Range in mid-October and several subsequent storms resulted in earlier movements to winter ranges. For more habitat and weather information refer to Appendix C.

Appendix A

Classification

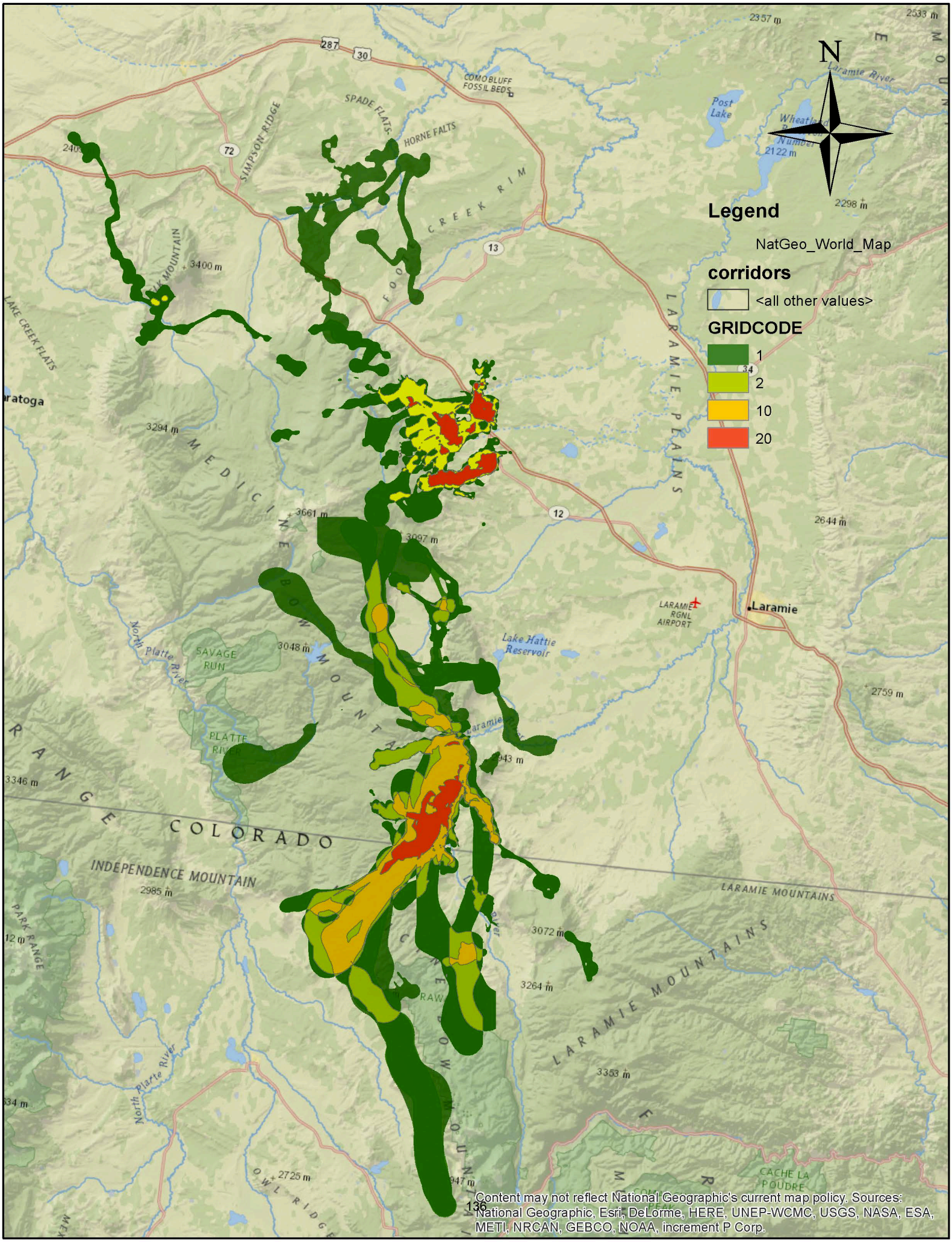
2014 - 2019 Postseason Classification Summary

for Mule Deer Herd MD539 - SHEEP MOUNTAIN

		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
2014	5,617	31	23	14	8	0	76	13%	290	50%	218	37%	584	1,109	11	16	26	± 4	75	± 8	60
2015	5,730	83	56	47	21	0	207	19%	531	49%	347	32%	1,085	1,099	16	23	39	± 4	65	± 5	47
2016	7,392	99	104	83	23	0	309	23%	633	48%	373	28%	1,315	1,124	16	33	49	± 4	59	± 4	40
2017	7,814	54	88	73	19	0	234	23%	490	49%	277	28%	1,001	1,015	11	37	48	± 5	57	± 5	38
2018	6,316	39	39	38	15	0	131	16%	423	52%	260	32%	814	1,001	9	22	31	± 4	61	± 6	47
2019	6,661	65	60	44	13	0	182	20%	474	51%	268	29%	924	0	14	25	38	± 4	57	± 5	41

Appendix B

Migration Route Analysis


N
Legend
NatGeo_World_Map
corridors
<all other values>
GRIDCODE
1
2
10
20
Laramie River
Post Lake
COMO BLUFF FOSSIL BEDS
SPADE FLATS
HORNE FALTS
SIMPSON RIDGE
CREEK RIM
FOOT
LARAMIE PLAINS
MEDICINE BOW MOUNTAIN
LAKE CREEK FLATS
ratoga
3400 m
3294 m
3661 m
3097 m
2644 m
LARAMIE RGNL AIRPORT
Laramie
Lake Hattie Reservoir
North Platte River
SAVAGE RUN
PLATTE RIVER
3048 m
2759 m
3346 m
COLORADO
INDEPENDENCE MOUNTAIN
2985 m
LARAMIE MOUNTAINS
3072 m
3264 m
3353 m
PARK RANGE
2725 m
OWL RIDGE
CACHE LA POUDRE
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Appendix C

RHA and PRISM Data Analysis

Sheep Mountain (MD539) Mule Deer Objective Review Habitat Report

Overall Recommendation

Habitat data collected from 2015-2019 is presented below and results in the recommendation that the habitat resources are relatively in balance with the existing population objective of this herd. Based on current habitat conditions, we feel this herd objective can remain at the current number of 10,000.

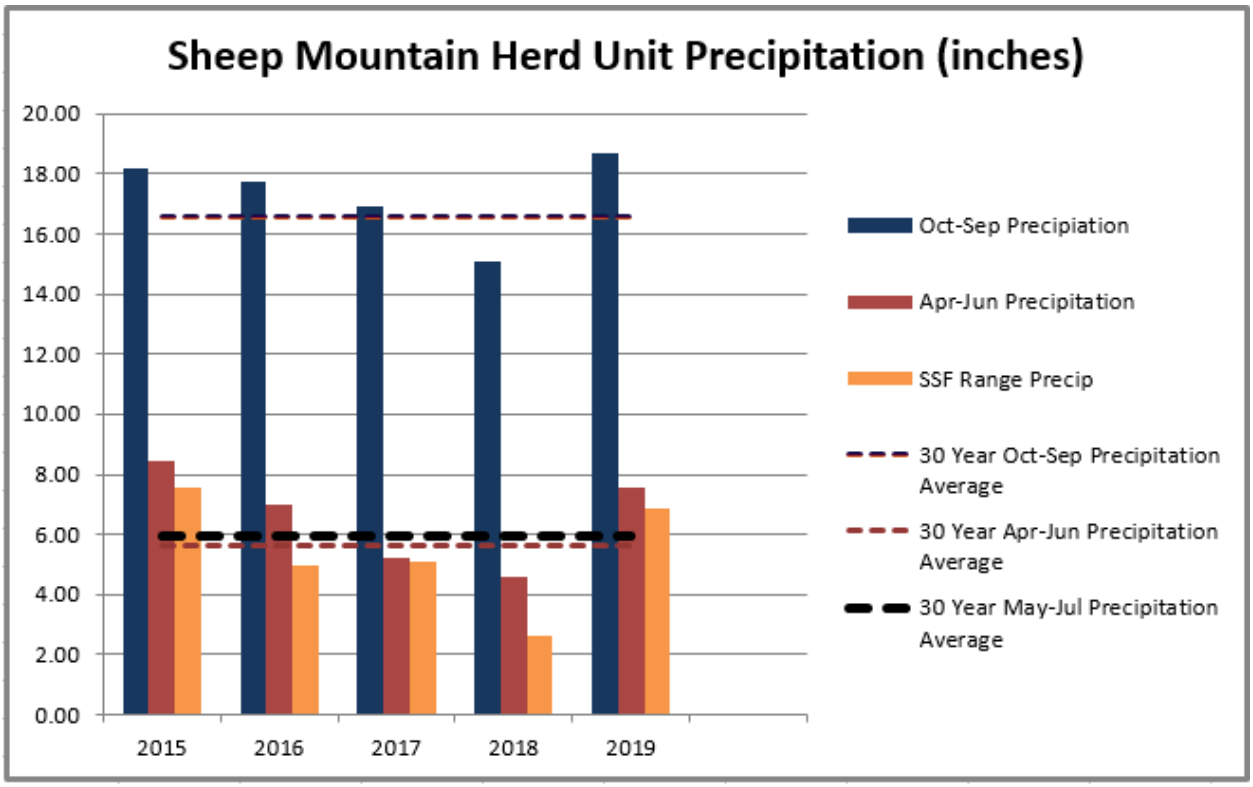


Figure 1. Parameter-Evaluation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating climate regressions for each Digital Evaluation Model grid cell (4 km resolution) for the Sheep Mountain mule deer herd unit.

Within the 5 year review period of 2015 – 2019, annual precipitation exceeded the 30 year average in 4 of the 5 years. The greatest deficiency in annual and growing season precipitation was observed in 2018. Snowpack in high elevations plays a significant role in the annual precipitation recorded in this herd unit. Moisture received in the Spring and early Summer of 2015 and 2019, while mostly considered beneficial for herbaceous and woody forage production, can come in the form of wet snows and freezing rain. Late storms and freeze events may result in delayed plant phenology, and can result in added stress to mule deer does trying to meet the nutritional demands of fawning and lactation.

In 2015, Department personnel initiated the Rapid Habitat Assessment (RHA) methodology

to survey important mule deer habitats. This method strives to capture large scale habitat quality metrics to better understand how the habitat is providing for the current population of mule deer. The overall end result of this effort is to provide a standardized habitat component for discussions about how mule deer objectives should or should not be adjusted based on the general concept of carrying capacity.

Data was summarized for 2015 – 2019 in order to help inform the discussion on the Sheep Mountain mule deer herd objective review. Some of the most significant findings include:

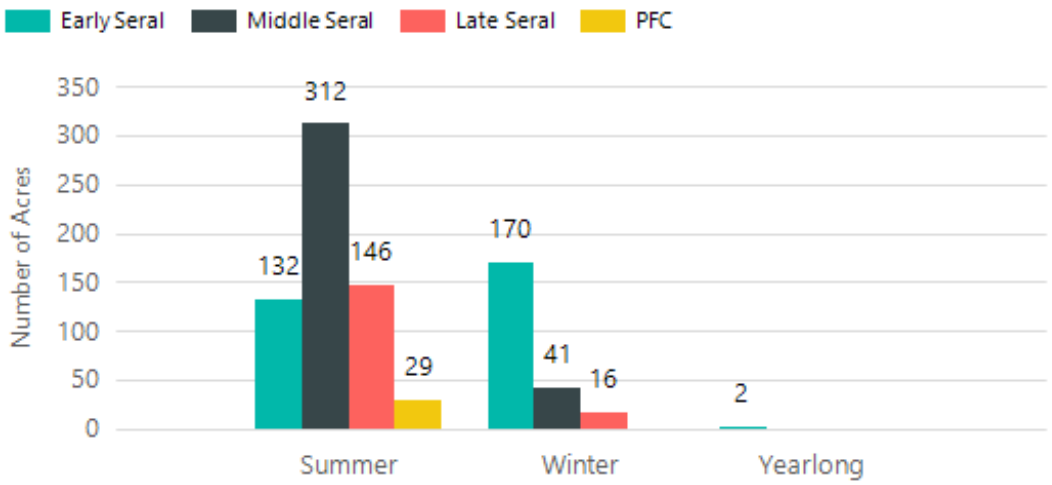
- Aspen habitats that have not seen recent disturbance (e.g. wildfire in the last 20 years), are generally classified as mid to late seral. Herbivory within these stands was typically higher, as the number of aspen suckers (<3') was limited, concentrating browse use. In many cases, browse could be attributed to elk.
- Herbivory in recently disturbed aspen stands (e.g. 2006 – 2017 wildfires) was classified as light. This can likely be attributed to the size/scale of disturbances (wildfires) that spread herbivory by wild and domestic ungulates out across the landscape. We also theorize that heavy recreational use of the USFS lands by ATV's also tends to lead to some displacement of wildlife from these habitats, and could result in temporary benefits to regenerating aspen stands.
- In shrub and rangeland environments, most habitats assessed were classified as late seral. Later seral plant communities can often be typified by a reduction in species diversity. Overall herbivory levels in the majority of acres assessed was not considered excessive. Late seral shrub stands often exhibit signs of historic high browse use by wild and/or domestic ungulates at some point, shown in growth form and stature of woody plants. Annual leader growth produced by key winter range shrubs is not excessively used. However, it is important to note that quality of woody forages produced may not meet the nutritional demands of mule deer for basic body maintenance in winter months.
- The majority of riparian areas assessed were found to be in late seral stages. Grass and forb diversity was identified as "low". Species diversity was generally found to decrease with advancements in seral state. In the limited amount of area assessed, there is concern with browsing by ungulates. This includes moose, elk, mule deer, and domestic livestock concentrating in riparian areas at high elevations. General coniferous forest habitat conditions are likely leading to more concentrated use in the limited riparian areas available.

The next 5 years:

With approval of the USFS LaVA analysis, plans for treatments in forested habitats totaling over 300,000 acres could be completed in the next 15 years. Logging of live and dead timber, prescribed burning, and other planned and unplanned treatments are anticipated to have positive impacts on plant communities that mule deer rely upon.

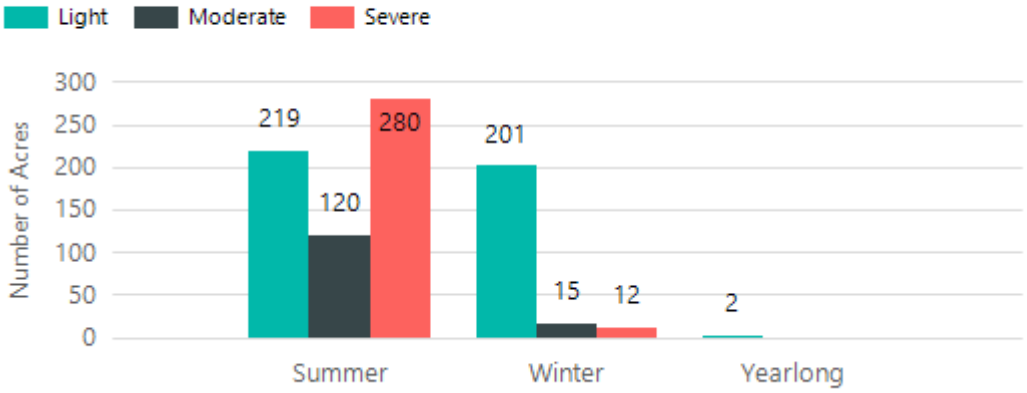
Aspen 2015 to 2019 848 Acres

Seral State

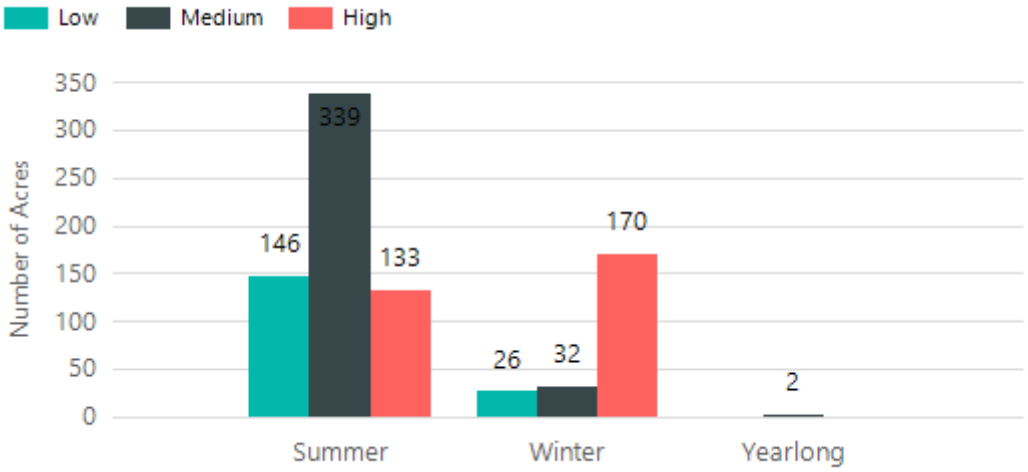


Herbivory

2015 to 2019 MD539 848 Acres



Species Diversity



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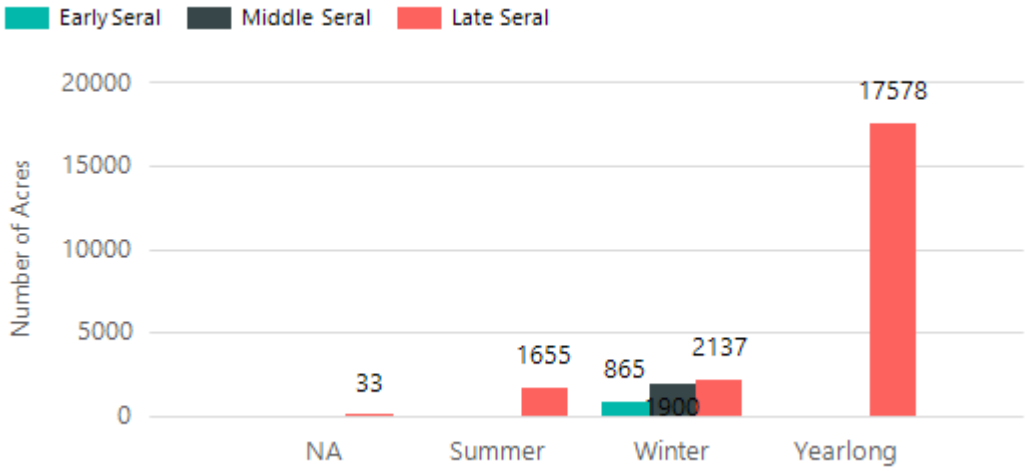
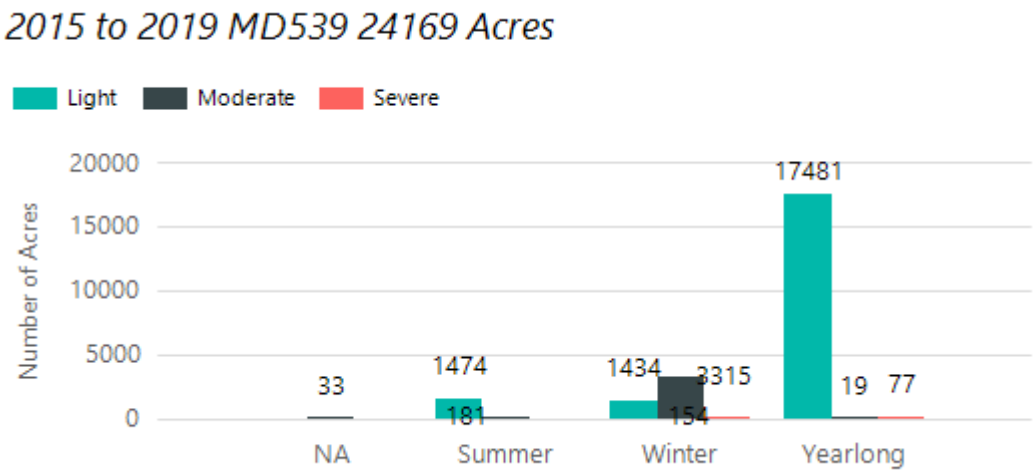
Rangeland 2015 to 2019 MD539

24169 Acres

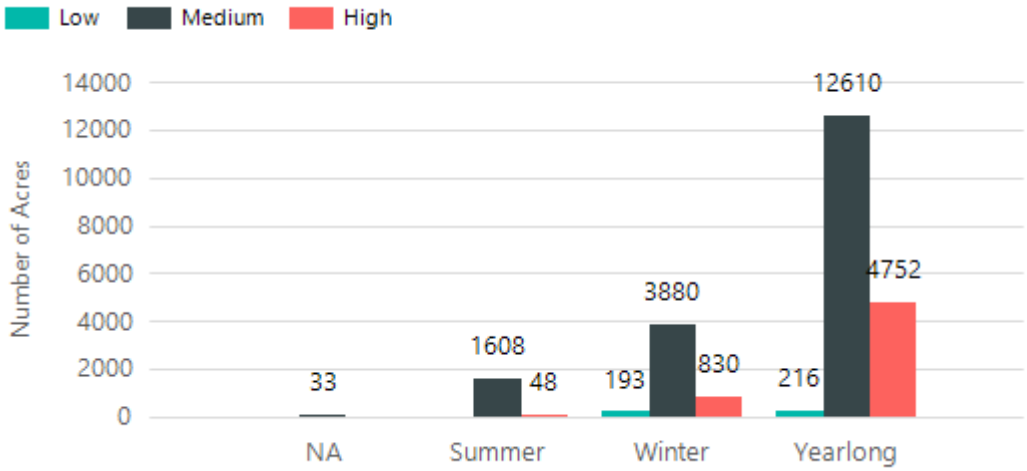
Seral State



Herbivory



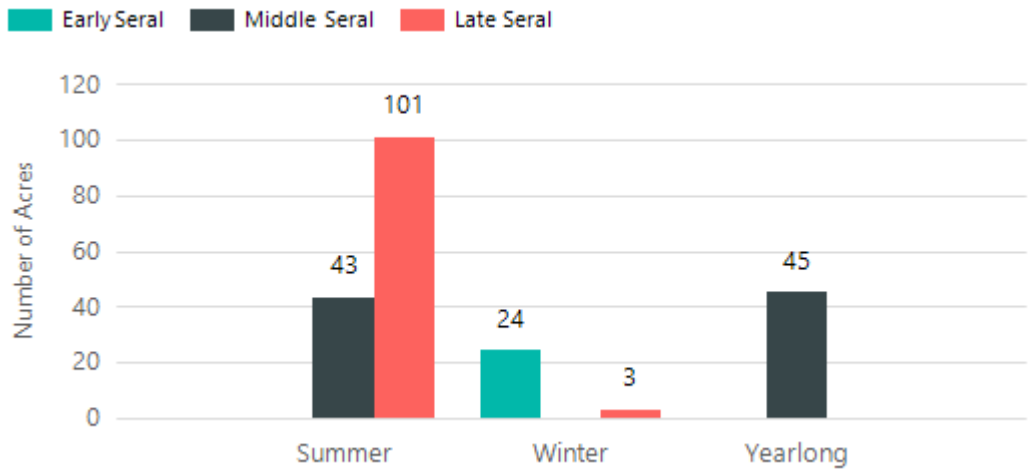
Species Diversity



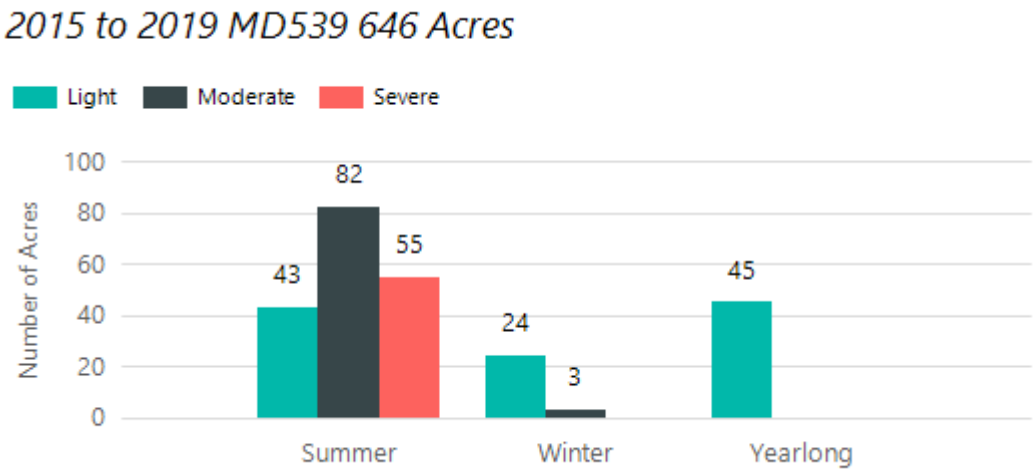
Riparian 2015 to 2019 MD539

646 Acres

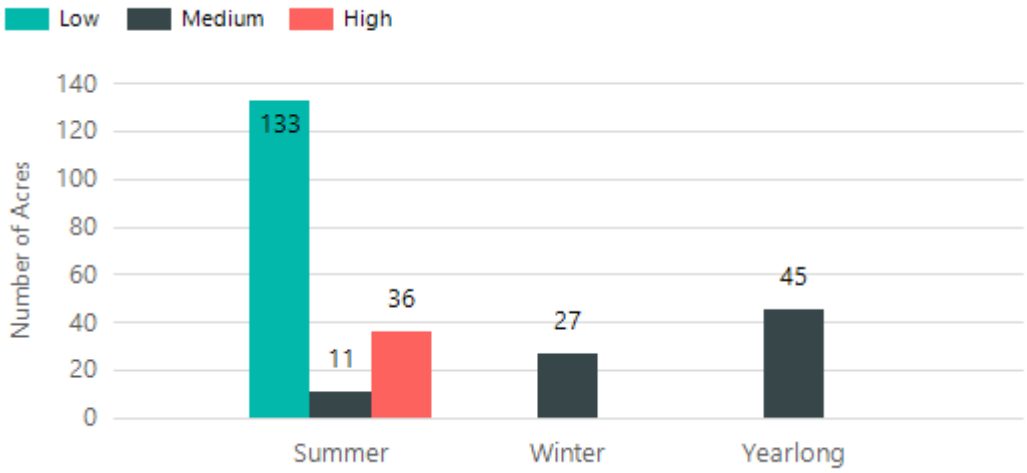
Seral State



Herbivory



Species Diversity



2019 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2019 - 5/31/2020

HERD: MD540 - SHIRLEY MOUNTAIN

HUNT AREAS: 70
PREPARED BY: TEAL CUFAUDE

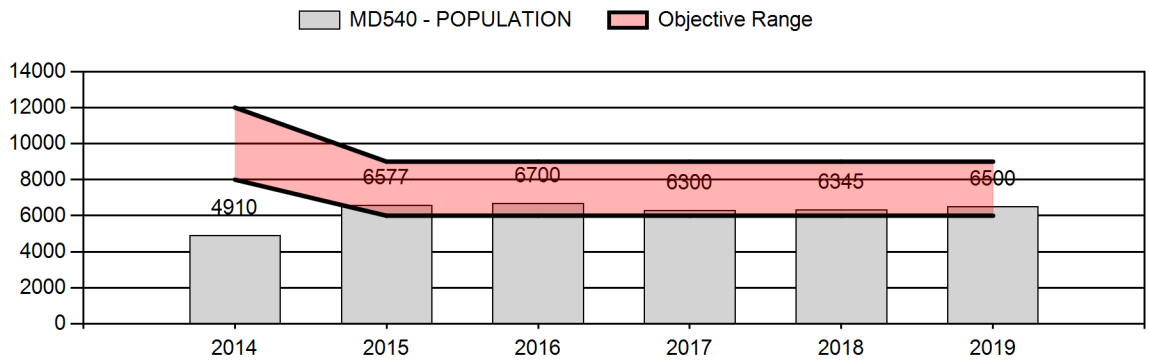
	2014 - 2018 Average	2019	2020 Proposed
Population:	6,166	6,500	6,590
Harvest:	261	186	225
Hunters:	585	450	500
Hunter Success:	45%	41%	45%
Active Licenses:	593	450	500
Active License Success:	44%	41%	45 %
Recreation Days:	2,412	1,476	2,100
Days Per Animal:	9.2	7.9	9.3
Males per 100 Females	36	42	
Juveniles per 100 Females	58	57	

Population Objective (± 20%) :	7500 (6000 - 9000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-13.3%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/28/2020

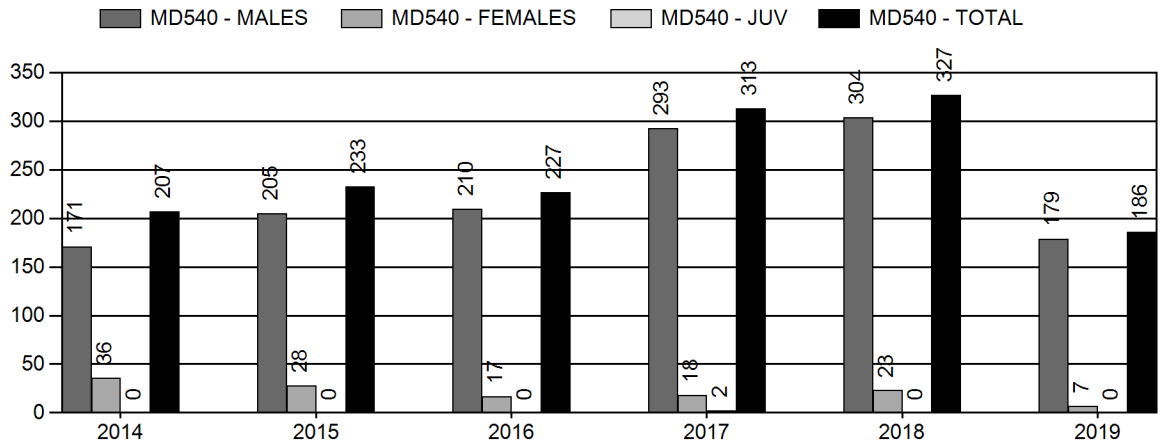
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	.2%	.2%
Males ≥ 1 year old:	12%	18.7%
Total:	-3%	-5%
Proposed change in post-season population:	-3%	-1%

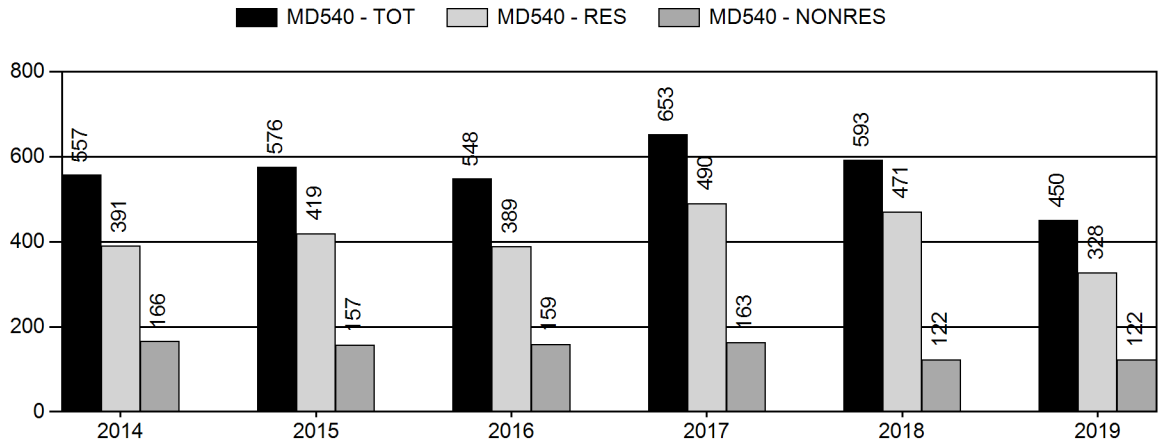
Population Size - Postseason



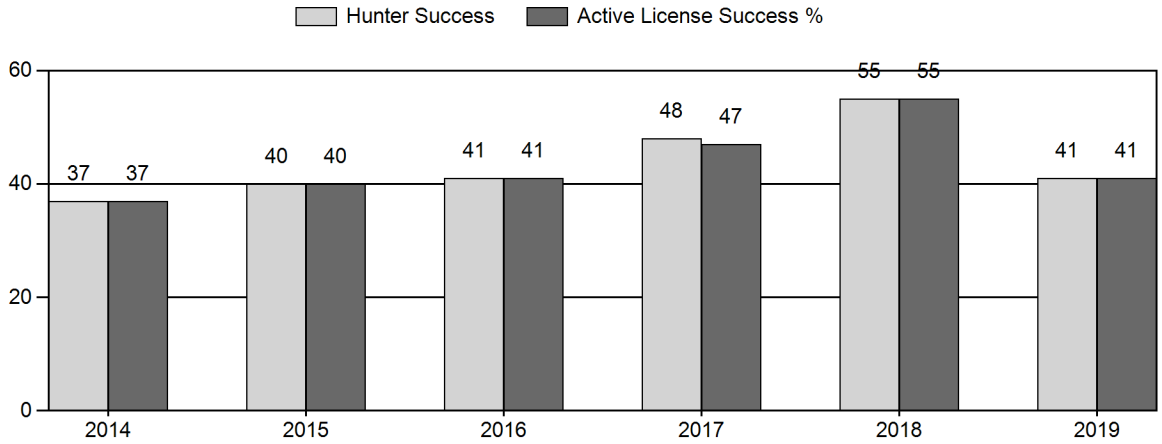
Harvest



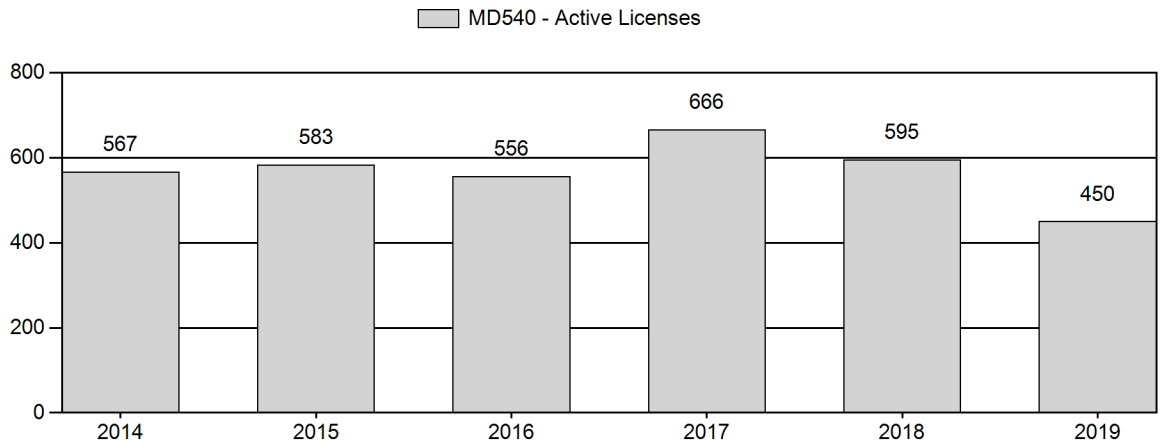
Number of Hunters



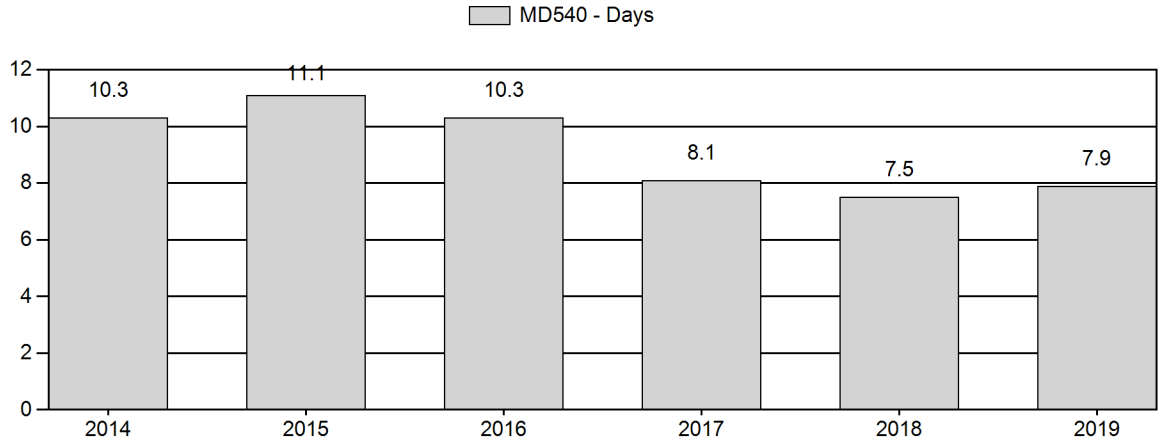
Harvest Success



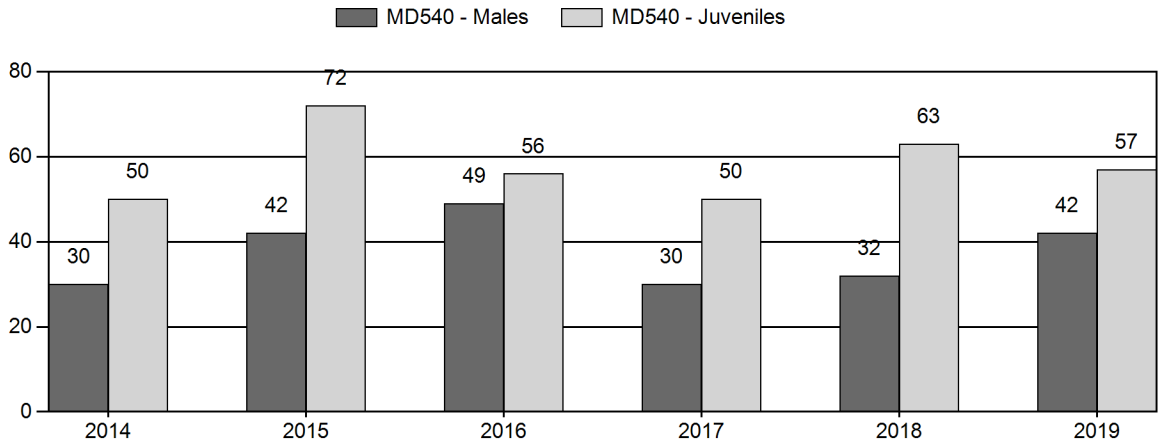
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2020 Hunting Seasons
Shirley Mountain Mule Deer (MD540)

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

2020 Region D nonresident quota: 400 licenses

2019 Hunter Satisfaction: 45% Satisfied, 29% Neutral, 26% Dissatisfied

Management Summary

1.) Hunting Season Evaluation: The 2019 harvest survey report indicated 450 active licensed hunters harvested 186 mule deer for an overall success rate of 41%. General season buck harvest and hunter numbers decreased substantially when compared to the 2018 hunting season. The 2019 postseason fawn ratio of 57 fawns/ 100 does was slightly below the five-year average, but the classification sample size was less than adequate. As shown in the classification summary in Appendix A, the 2019 postseason total bucks per 100 does increased from 32/100 in 2018 to 42/100 in 2019. Adult (>1.5 years of age) bucks were assigned to antler classes during postseason classification surveys. The total adult buck classification sample (n=46) resulted in the following: 63% Class I (<20”wide) bucks, 35% Class II (20-25”wide) bucks, and 2% Class III (>26” wide) bucks. The 2019 hunting season was the third season without the antler point restriction since 2012. A seven-day general season for antlered mule deer or any white-tailed deer was offered in 2020. The Region D nonresident quota was retained at 400 licenses. If the projected harvest of 300 mule deer bucks and normal fawn production is attained in 2020 the predicted mule deer postseason population of 6,590 will remain below the objective of 7,500.

2.) Management Objective Review: Mule deer in the Shirley Mountain herd unit are managed toward a postseason population objective of 7,500 with a recreational management strategy. This strategy directs Wyoming Game and Fish Department to manage harvest opportunity to maintain 20-29 bucks/100 does postseason. We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data and a change is not warranted at this time. We will review this herd objective again in 2025; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3.) Weather/Habitat: Overall precipitation from October 2018 through September 2019 was above average when evaluated across the entire herd unit. Higher than average snow accumulations during the 2018-19 winter paired with cold spring temperatures in 2019 in southeast and south-central Wyoming resulted in persistent snowpack at high elevations. Although growing season (April through June) precipitation was above average for both lower (April-June) and higher (May-July) elevations the persistent cold temperatures into June effectively reduced the length of the growing season. The limited number of habitat transects established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. Most shrub-steppe habitat in this herd unit is decadent and in need of treatments to improve the nutritional value of sagebrush and other plants.

4.) Disease: Chronic wasting disease (CWD) was first detected in the Shirley Mountain mule deer herd unit in 2006. The five-year (2015-19) prevalence in the herd unit was 12.5% (112 sampled). Due to small sample size, however, CWD prevalence may not be represented accurately.

5.) Hunt Area Boundary Change: For the 2020 hunting season, Hunt Area 161 was eliminated and the boundaries for Hunt Areas 79 and 70 were expanded. The previous boundary between Hunt Areas 161 and 70 followed the Medicine Bow River to Seminoe Reservoir/North Platte River. In 2020, the boundary between Hunt Areas 79 and 70 was changed to follow Big Ditch to Seminoe Reservoir/North Platte River. The new boundary, as shown in Appendix B, better represented local deer populations and simplified hunting season regulations. Big Ditch provided an easily identifiable hunt area boundary for hunters. It is not expected that deer hunting access will improve in the checkerboard portion of the hunt areas, so this boundary change will impact very few hunters and landowners.

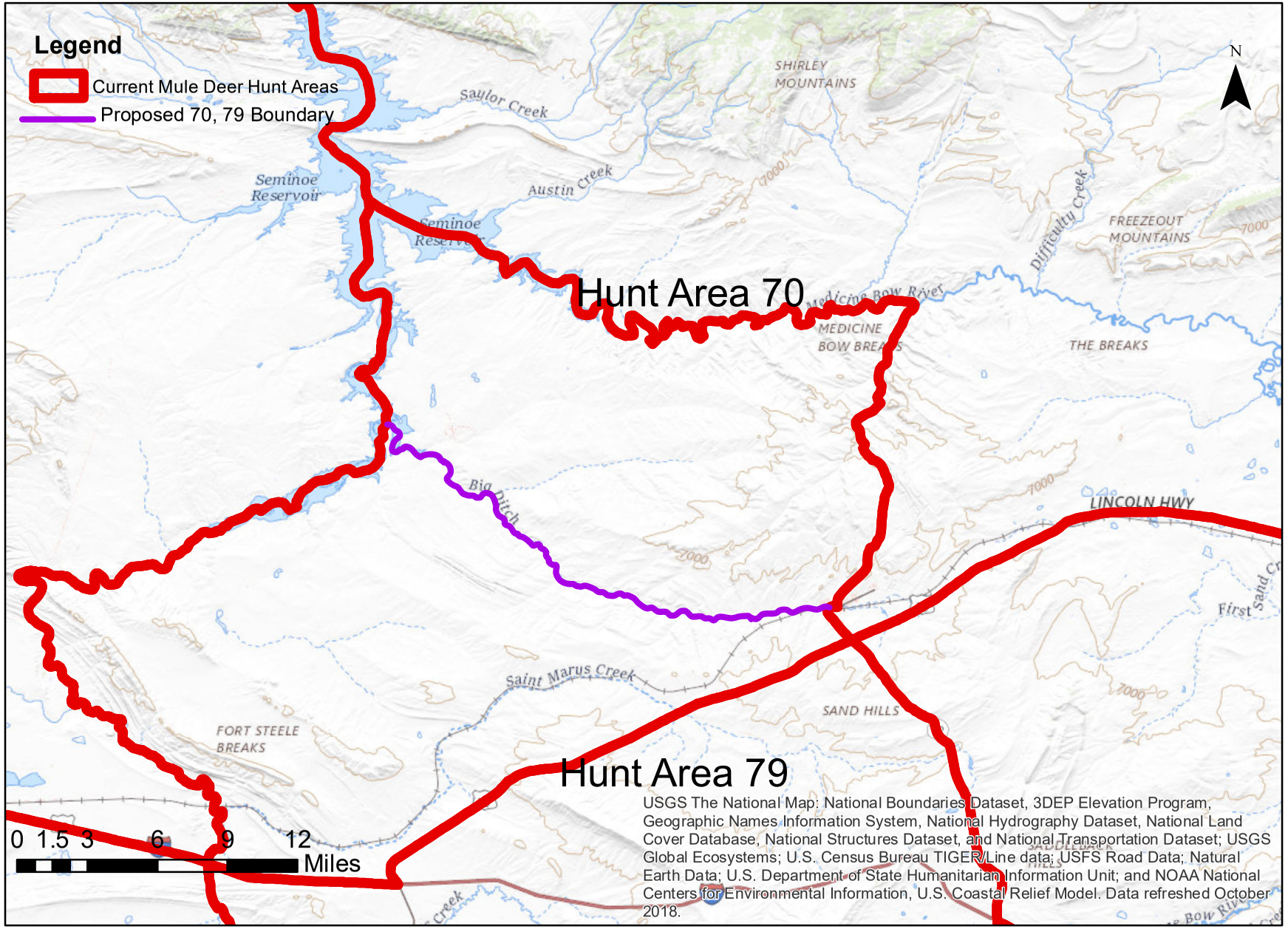
6.) During the 2019 hunting season, antler spread measurements (n=8) were collected from adult bucks harvested in the Shirley Mountain mule deer herd unit. Class III (>26”) bucks represented 0% of the adult bucks deer measured, Class II (20-25”) represented 50% of the adult bucks measured, and Class I (<20”) represented 50% of the adult bucks measured. The inadequate sample size of field checked bucks in this herd unit limits the utility of this antler class data when monitoring management and harvest statistics.

Appendix A

2014 - 2019 Postseason Classification Summary

for Mule Deer Herd MD540 - SHIRLEY MOUNTAIN

		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
2014	4,910	20	21	9	1	0	51	17%	170	56%	85	28%	306	915	12	18	30	± 6	50	± 8	38
2015	6,577	27	18	12	1	0	58	20%	137	47%	99	34%	294	831	20	23	42	± 8	72	± 12	51
2016	6,700	19	26	22	2	0	69	24%	142	49%	80	27%	291	863	13	35	49	± 9	56	± 10	38
2017	6,300	13	23	18	3	0	57	17%	191	56%	96	28%	344	870	7	23	30	± 6	50	± 8	39
2018	6,345	27	20	15	1	0	63	16%	198	51%	125	32%	386	1,011	14	18	32	± 6	63	± 9	48
2019	6,500	19	29	16	1	0	65	21%	155	50%	89	29%	309	965	12	30	42	± 8	57	± 10	40


Legend
Current Mule Deer Hunt Areas
Proposed 70, 79 Boundary
N
Hunt Area 70
Hunt Area 79
SHIRLEY MOUNTAINS
Saylor Creek
Seminoe Reservoir
Austin Creek
Difficulty Creek
FREEZEOUT MOUNTAINS
MEDICINE BOW BREAKS
THE BREAKS
Big Ditch
LINCOLN HWY
Saint Marus Creek
SAND HILLS
FORT STEELE BREAKS
0 1.5 3 6 9 12
Miles
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

2019 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2019 - 5/31/2020

HERD: MD541 - PLATTE VALLEY

HUNT AREAS: 78-81, 83, 161
PREPARED BY: TEAL CUFAUDE

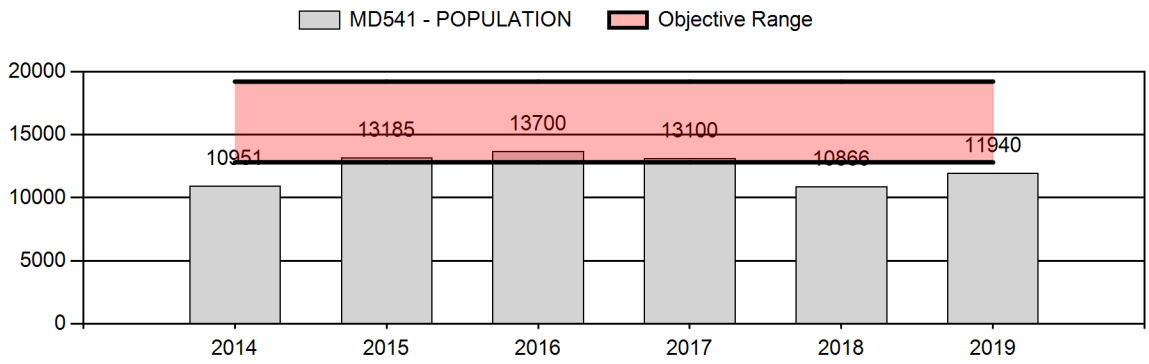
	2014 - 2018 Average	2019	2020 Proposed
Population:	12,360	11,940	12,144
Harvest:	581	494	600
Hunters:	962	1,058	1,030
Hunter Success:	60%	47%	58 %
Active Licenses:	962	1,058	1,030
Active License Success:	60%	47%	58 %
Recreation Days:	5,544	6,405	5,800
Days Per Animal:	9.5	13.0	9.7
Males per 100 Females	41	43	
Juveniles per 100 Females	62	63	

Population Objective (± 20%) :	16000 (12800 - 19200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-25.4%
Number of years population has been + or - objective in recent trend:	6
Model Date:	2/28/2020

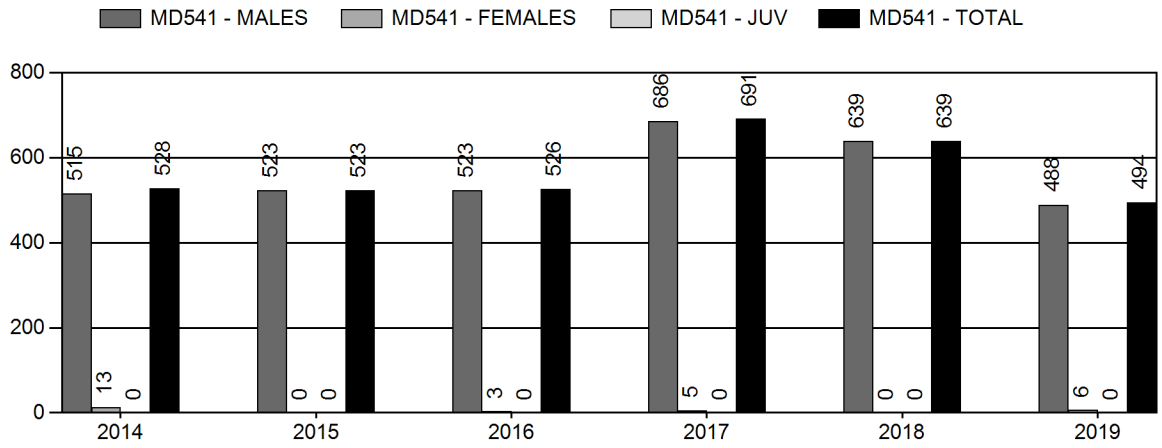
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	.1%	.1%
Males ≥ 1 year old:	18.9%	20.7%
Total:	-5%	-5%
Proposed change in post-season population:	7%	2%

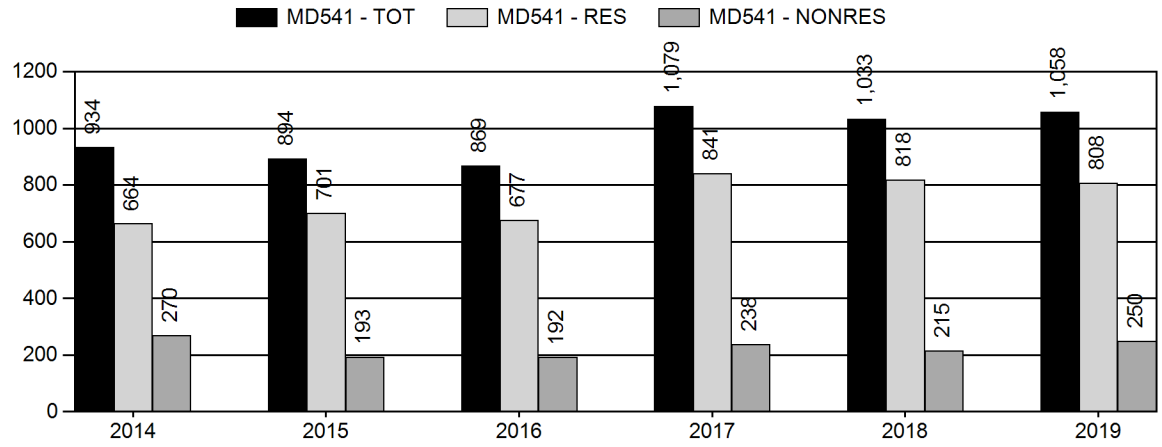
Population Size - Postseason



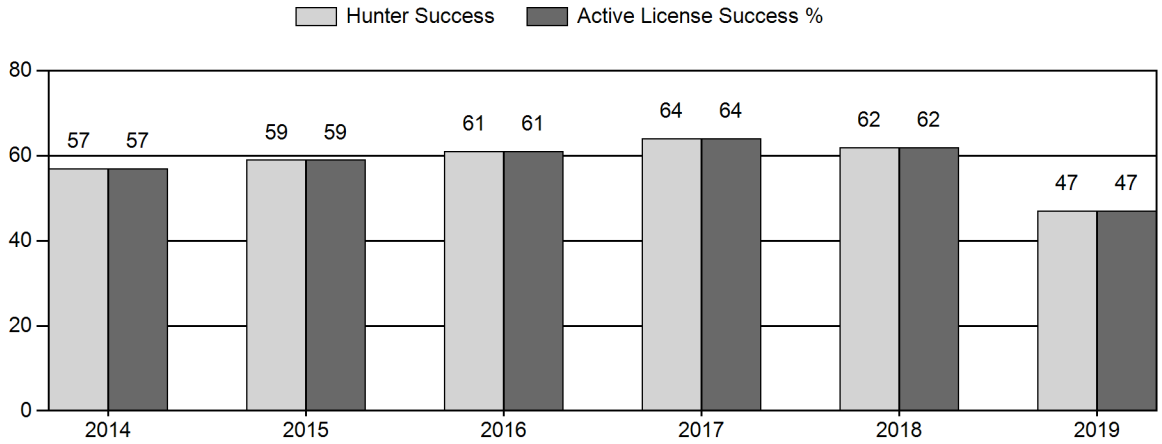
Harvest



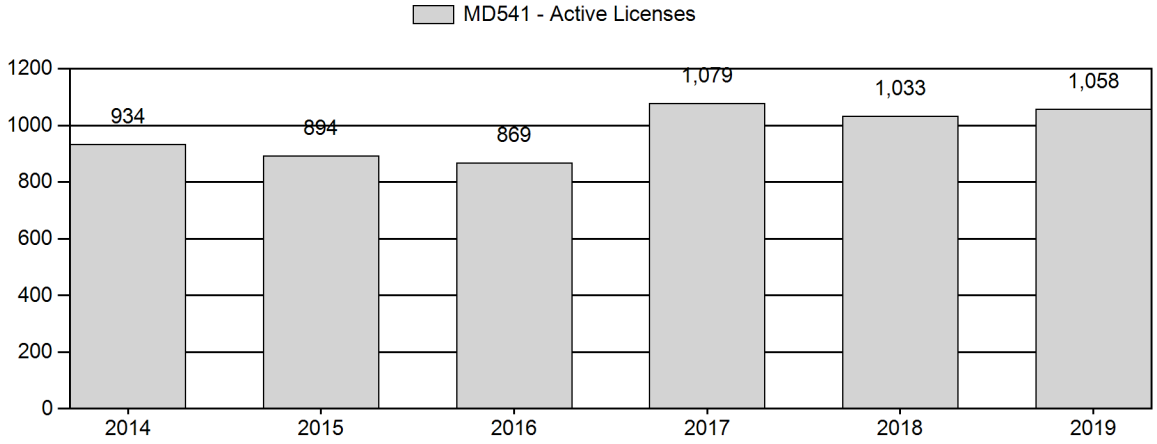
Number of Hunters



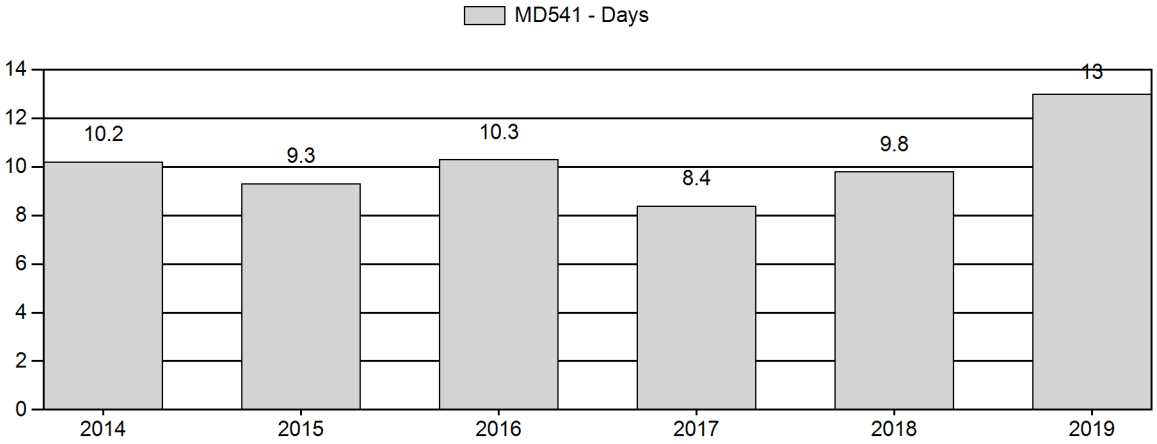
Harvest Success



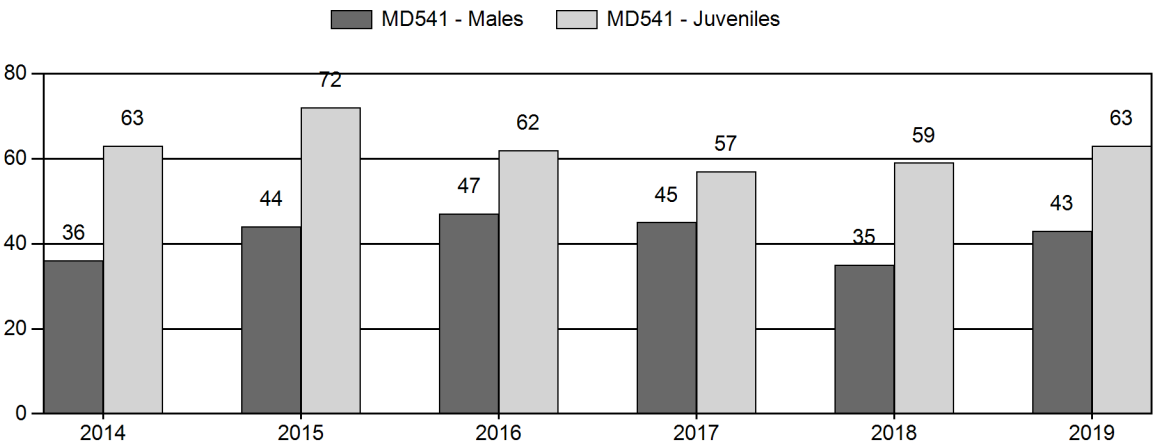
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2020 Hunting Seasons
Platte Valley Mule Deer (MD541)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
78	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	375	Antlered mule deer or any white-tailed deer
79	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	400	Antlered mule deer or any white-tailed deer
80, 83	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	250	Antlered mule deer or any white-tailed deer
81	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	200	Antlered mule deer or any white-tailed deer

2019 Hunter Satisfaction: 52.7% Satisfied, 21.9% Neutral, 25.4% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: A total of 1,105 active licensed hunters harvested 510 bucks in 2019. Harvest success and hunter satisfaction decreased and days per harvest increased in 2019. A total of 113 hunter harvested bucks were checked in the field in 2019. Hunting season conditions were challenging in 2019 largely due to moderate/mild weather during the firearm season, which likely contributed to reduced harvest. In 2019, the Hunt Area 81 license quota was reduced to 200 to accommodate the increase in hunter numbers due to the 2018 Ryan Fire carryover licenses. The 2019 postseason fawn ratio of 63 fawns/ 100 does was slightly above the five-year average, and coincided with the 63 fawns/100 does observed during Colorado's postseason classification survey. As shown in the classification summary in Appendix A, the 2019 postseason total bucks per 100 does increased from 35/100 in 2018 to 43/100 in 2019. Adult (>1.5 years of age) bucks were assigned to antler classes during postseason classification surveys. The total adult classification sample (n=594) resulted in the following: 52% Class I (<20"wide) bucks, 41% Class II (20-25"wide) bucks, and 7% Class III (>26" wide) bucks. The 14-day limited quota season was retained for 2020. If the projected harvest of 590 mule deer bucks and normal fawn production is attained in 2020 the predicted postseason mule deer population of 12,100 will continue to remain below the objective of 16,000.

2.) Platte Valley Mule Deer Initiative Secondary Management Objectives: In 2012, Wyoming Game and Fish Department collaboratively developed the Platte Valley Mule Deer Plan and began to implement strategies identified to improve the quality of the hunting experience in this herd unit. These strategies included: 1.) change hunting season structure from traditional general seasons to limited quota seasons; 2.) achieve a buck harvest success rate of 40%; 3.) set a goal of at least 20% of field-checked harvested bucks meeting an antler spread of 24" or more; and 4.) 60% of the harvest survey respondents replying they were "satisfied" or "very satisfied" with their hunting experience. During the development of these harvest parameters it was recognized that each could be affected by annual events unrelated to management decisions, such as weather during hunting seasons. To lessen the effect of these variables, these management objectives were based on a three-year running average. In 2019, the buck harvest success rate was 46%, and the three-year (2017-19) average was 57%. In 2019, 19% of field-checked bucks (including yearlings) were ≥24".

Yearling bucks made up 12% (n = 14) of the field checked bucks, which was the same as 2018. In 2018, 30% of field-checked bucks were ≥24". Access to exact antler spread measurements was not possible for 2017, however, 10% of field-checked bucks were classified as Class III. The three-year (2017-19) average percent of field-checked bucks ≥24" was 19.7%, but this was likely underestimated considering the 2017 dataset. In 2019, 52.7% of harvest survey respondents were satisfied or very satisfied with their hunting experience. The three-year (2017-19) average for hunter satisfaction was 68%.

3.) Weather/Habitat: Precipitation: Across the entire herd unit, precipitation from October 2018 through September 2019 was above average. Higher than average snow accumulations during the 2018-19 winter paired with cold spring temperatures in 2019 in southeast and south central Wyoming resulted in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. Although growing season (April through June) precipitation was above average for both lower (April-June) and higher (May-July) elevations the persistent cold temperatures into June effectively reduced the length of the growing season. The 2019-20 winter began early with significant snow hitting the higher elevations in mid-October and has been accumulating in higher elevations consistently throughout the winter. Although snow has accumulated at lower elevations, high winds and occasional warm spells have cleared some areas making browse available in the central part of the Platte Valley. Snow depths continue to persist near the WY/CO state line and snow accumulations and drifting may be affecting wintering deer in the northern part of the herd unit as well. SNOTEL sites on the west side of the Snowy Range currently report 132-170% of average snowfall. West slope Sierra Madre SNOTEL sites report 79-93% of average snowpack. Appendix B provides more information on weather, habitat monitoring, and projects occurring in the herd unit. The 2018 Annual Strategic Habitat Plan details habitat management projects within this herd unit
(https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

4.) Disease: Chronic wasting disease (CWD) was first observed in the Platte Valley herd unit in 2002. The five-year (2015-19) prevalence in the herd unit was 6.7% (300 sampled, 20 CWD positive). Prevalence may not be represented accurately, however, due to small sample sizes in this herd unit. The Platte Valley herd unit is classified as a Tier 1 CWD Surveillance Area and is scheduled to be intensely sampled, with the goal of sampling 200 hunter harvested mule deer in 2023.

5.) Research: In 2018, The Platte Valley Mule Deer Migration Corridor was designated. The Platte Valley Mule Deer Migration Corridor network represents high use seasonal migration corridors documented through GPS collar technology and delineated using a Brownian Bridge Movement Model. Appendix C describes 2020 research efforts to gather more movement data in this herd unit.

6.) Hunt Area Boundary Change: For the 2020 hunting season, Hunt Area 161 was eliminated and the boundaries for Hunt Areas 79 and 70 were expanded. The previous boundary between Hunt Areas 161 and 70 followed the Medicine Bow River to Seminoe Reservoir/North Platte River. In 2020, the boundary between Hunt Areas 79 and 70 was changed to follow Big Ditch to Seminoe Reservoir/North Platte River. The new boundary, as shown in Appendix D, better represented local deer populations and simplified hunting season regulations. Big Ditch provided an easily identifiable hunt area boundary for hunters. It is not expected that deer hunting access will improve

in the checkerboard portion of the hunt areas, so this boundary change will impact very few hunters and landowners.

Appendix A

2014 - 2019 Postseason Classification Summary

for Mule Deer Herd MD541 - PLATTE VALLEY

		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
2014	10,951	85	118	86	30	0	319	18%	888	50%	560	32%	1,767	964	10	26	36	± 3	63	± 4	46
2015	13,185	143	82	130	19	0	374	21%	842	46%	604	33%	1,820	962	17	27	44	± 3	72	± 5	50
2016	13,700	96	206	250	7	0	559	23%	1,188	48%	731	29%	2,478	1,159	8	39	47	± 3	62	± 3	42
2017	13,100	64	125	114	29	0	332	22%	738	50%	419	28%	1,489	1,165	9	36	45	± 4	57	± 4	39
2018	10,866	147	200	188	33	0	568	18%	1,638	52%	971	31%	3,177	1,123	9	26	35	± 2	59	± 3	44
2019	11,940	229	308	246	40	0	823	21%	1,918	49%	1,209	31%	3,950	1,092	12	31	43	± 2	63	± 2	44

Appendix B- Platte Valley Mule Deer Herd Unit Weather and Habitat

Weather

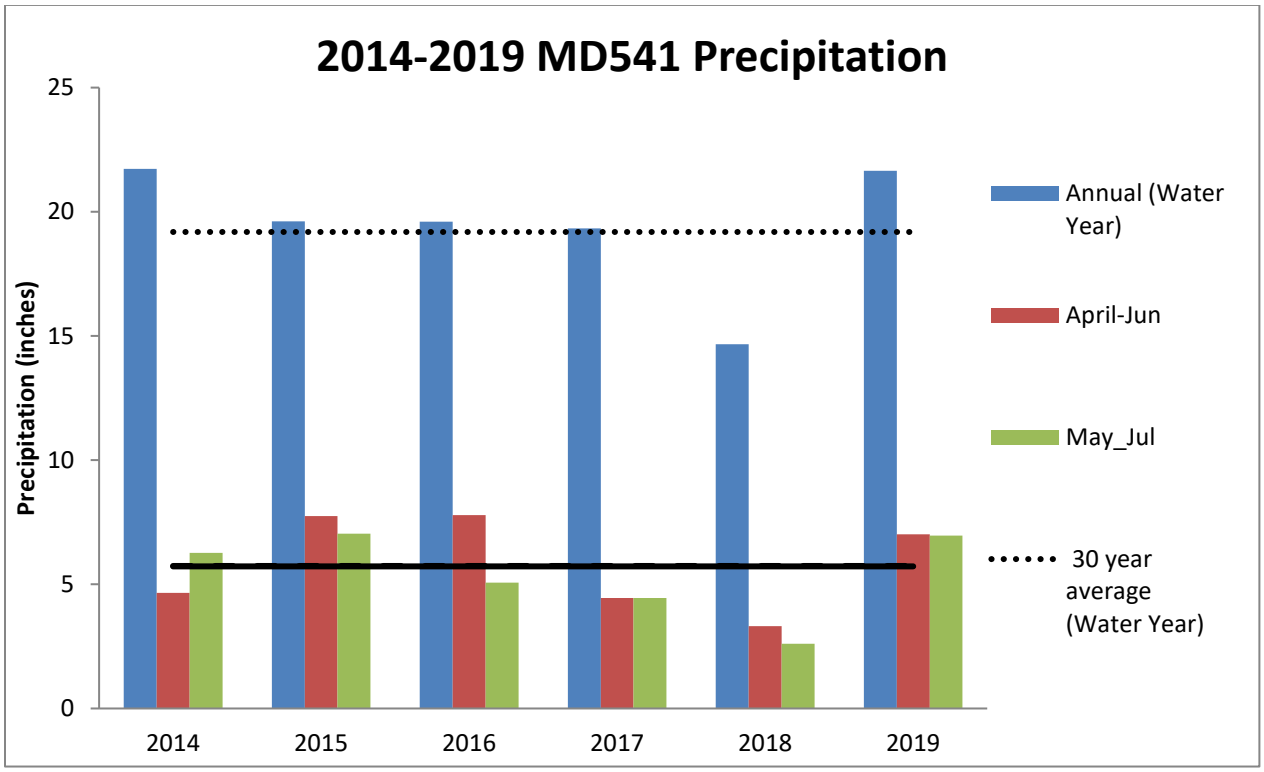


Figure1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating climate-elevation regressions for each Digital Elevation Model grid cell (4 km resolution) for the Platte Valley mule deer herd unit in Carbon County, Wyoming.

Habitat

Although forage production was higher in the Platte Valley in 2019, than the past four years, it was not as high expected given the growing season precipitation. This is likely due to above average snow accumulations during the 2018-2019 winter paired with cold spring temperatures in 2019, resulting in persistent snowpack at high elevations within the Snowy and Sierra Madre Mountain ranges. The "late spring" created phenological delays for plants, especially at higher elevations and effectively shortened the growing season across the herd unit. The short growing season likely affected leader production as well, especially at higher elevations. However, there was plenty of forage and browse across the herd unit.

Significant Events

The Platte Valley Habitat Partnership continued to implement habitat projects across the herd unit. These projects included just under 8,000 acres of aerial cheatgrass treatments, 100 acres of prescribed burning, 4.5 miles of fence conversions, 28 stream miles of leafy spurge treatments, 10 acres of aspen treatments, and 1,124 acres of juniper encroachment work. There were no large wildfires within the herd unit in 2019. However, large wildfires that burned within the unit

within the past 5 years continue to recover and provide good early successional habitat for mule deer.

Habitat Monitoring

In 2015, Department personnel initiated the Rapid Habitat Assessment methodology to survey important mule deer habitats. This method strives to capture large-scale habitat quality metrics to better understand how the habitat is providing for the current population of mule deer. The goal of this effort is to provide a standardized habitat component to inform mule deer objective reviews. In 2019, 186 acres of rangeland, 54 acres of aspen, and 109 acres of riparian RHAs were completed by personnel in the Platte Valley mule deer herd unit.

Appendix C- Platte Valley Mule Deer Movement Research

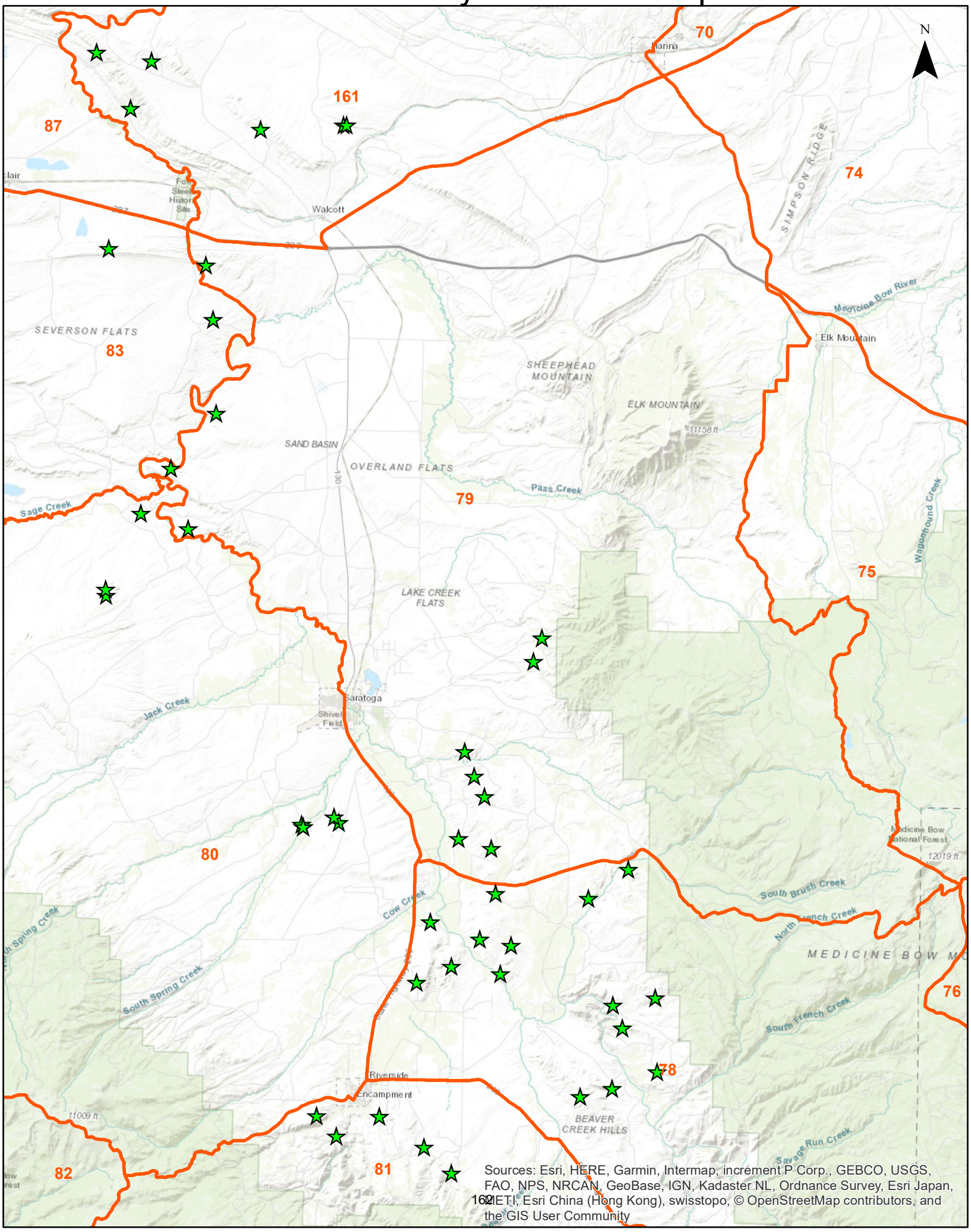
Forty-seven (47) Platte Valley mule deer does were fitted with GPS collars in February 2020. The project area encompasses Deer Hunt Areas 78, 79, 80, 81, 83, and 161.The primary objective of this project is to evaluate detailed movement data. The movement data will be analyzed using a Brownian bridge movement model (BBMM) to quantify and delineate important areas used for Platte Valley mule deer migration. The BBMM results will be refined in accordance with the Wyoming Game and Fish Department's Ungulate Migration Corridor Strategy to update the designated migration corridor, stopover areas, and bottlenecks. Through the course of the project, managers will also collect information on timing of migration and doe survival. The collars are programmed to release from the deer in November 2022. Funding for this project was provided by Department of Interior and the Knobloch Family Foundation.

Helicopter slinging mule deer doe to staging area. Photo courtesy of Jordan Seitz.

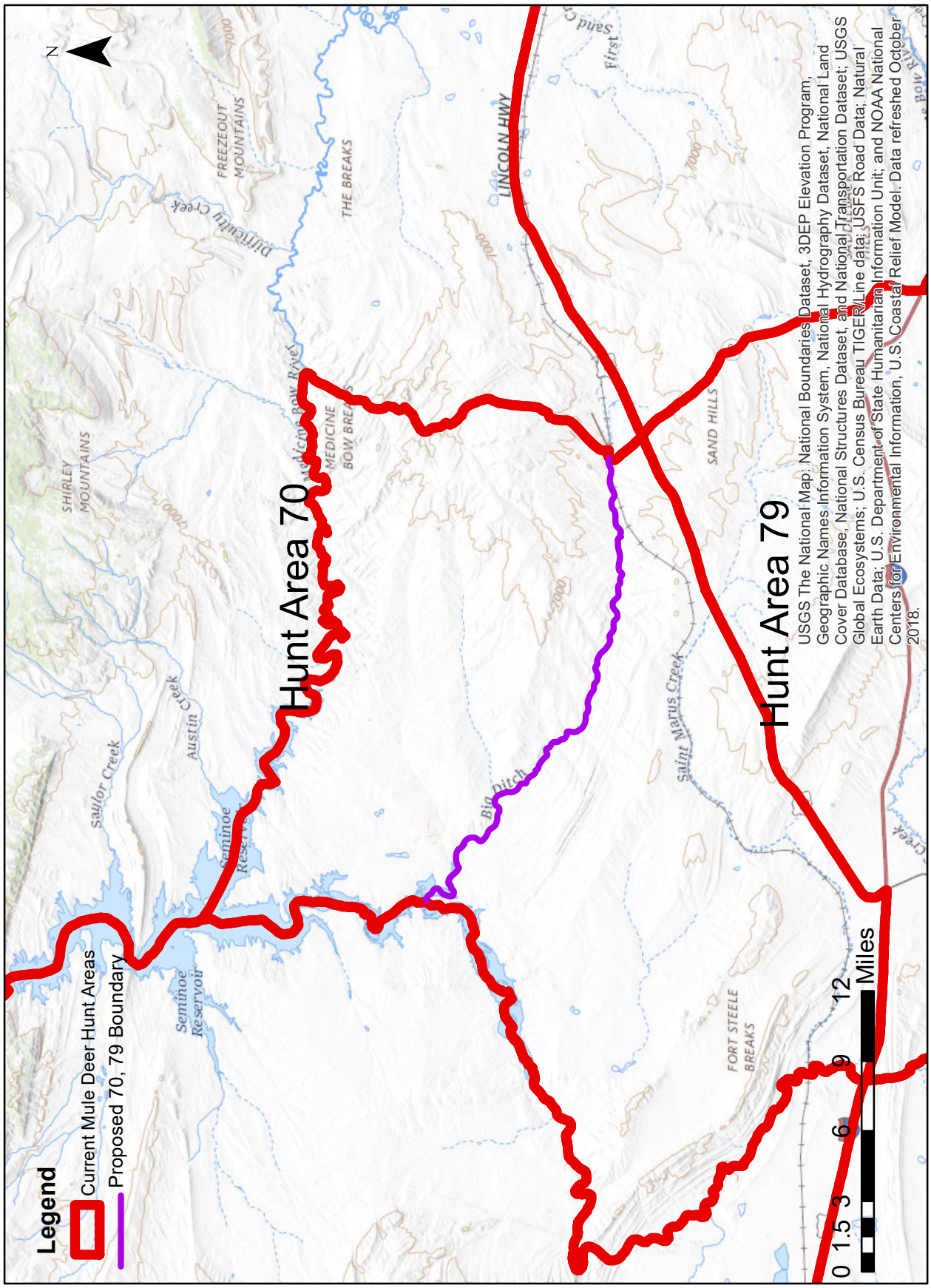
Mule deer doe at staging area. Photo courtesy of Jordan Seitz.

Released mule deer doe fitted with GPS collar. Photo courtesy of Jordan Seitz.

2020 Platte Valley Mule Deer Capture



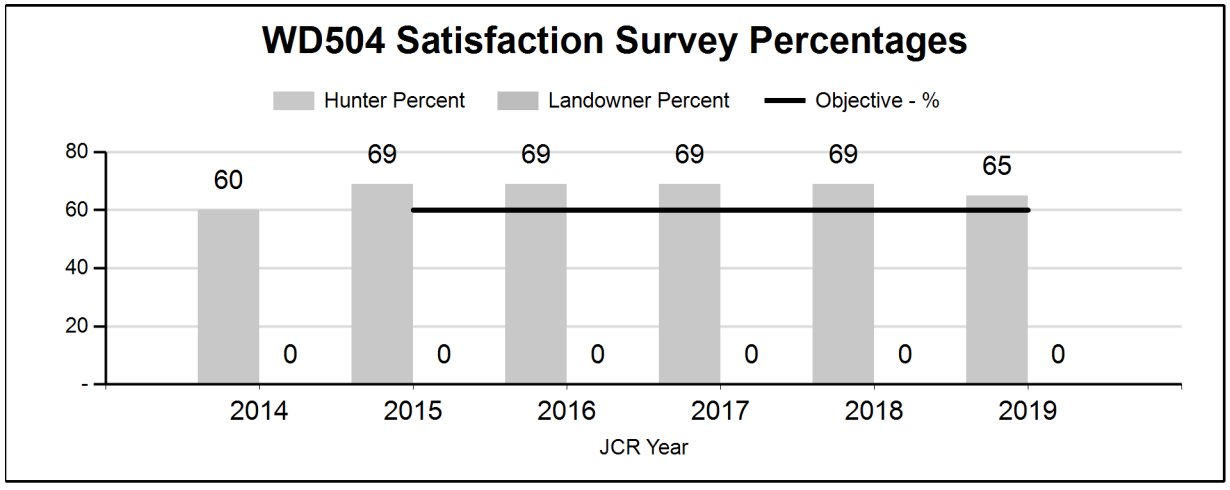
Appendix D- Hunt Area Boundary Change



2019 - JCR Evaluation Form

SPECIES: White tailed Deer
PERIOD: 6/1/2019 - 5/31/2020
HERD: WD504 - SOUTHEAST WYOMING
HUNT AREAS: 15, 59-64, 70, 73-81, 83, 161
PREPARED BY: MARTIN HICKS

	2014 - 2018 Average	2019	2020 Proposed
Hunter Satisfaction Percent	67%	65%	60%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	913	1,095	1,120
Hunters:	2,201	2,496	2,535
Hunter Success:	41%	44%	44 %
Active Licenses:	2,494	2,802	2,830
Active License Success:	37%	39%	40 %
Recreation Days:	10,277	11,628	11,700
Days Per Animal:	11.3	10.6	10.4
Males per 100 Females:	39	0	
Juveniles per 100 Females	89	0	
Satisfaction Based Objective			60%
Management Strategy:			Recreational
Percent population is above (+) or (-) objective:			N/A%
Number of years population has been + or - objective in recent trend:			5



2020 Hunting Seasons
Southeast Wyoming White-tailed Deer Herd Unit (WD504)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
15	3	Sept. 1	Sept. 30	Oct. 1	Nov. 30	500	Any white-tailed deer
15	3			Dec. 1	Dec. 31		Doe or fawn white-tailed deer
15	8	Sept. 1	Sept. 30	Oct. 1	Dec. 31	450	Doe or fawn white-tailed deer
59,60,64	3	Sept. 1	Sept. 30				Curt Gowdy State Park closed
59,60,64	3			Oct. 1	Nov. 30	250	Any white-tailed deer; all lands within Curt Gowdy State Park, archery only
59,60,64	3			Dec. 1	Dec. 31		Doe or fawn white-tailed deer
59,60,64	8	Sept. 1	Sept. 30				Curt Gowdy State Park closed
59,60,64	8			Nov. 1	Dec. 31	350	Doe or fawn white-tailed deer; all lands within Curt Gowdy State Park, archery only
70,74	3	Sept. 1	Sept. 30	Oct. 1	Dec. 31	50	Any white-tailed deer
70,74	8	Sept. 1	Sept. 30	Oct. 1	Dec. 31	100	Doe or fawn white-tailed deer
75,76,77	3	Sept. 1	Sept. 30	Oct. 1	Dec. 31	75	Any white-tailed deer
75,76,77	8	Sept. 1	Sept. 30	Oct. 1	Dec. 31	100	Doe or fawn white-tailed deer
78,79,80,81,	3	Sept. 1	Sept. 30	Oct. 1	Dec. 31	25	Any white-tailed deer
78,79,80,81,	8			Sept. 1	Dec. 31	50	Doe or fawn white-tailed deer

2019 Hunter Satisfaction: 65% Satisfied, 19% Neutral, 16% Dissatisfied

2020 Management Summary

1.) Hunting Season Evaluation: The season is designed to take advantage of high densities of white-tailed deer throughout southeast Wyoming as access allows. The majority of white-tailed

deer are located on private land so the Department is limited in management of this herd unit. Hunt Area 161 was combined with Hunt Area 79 based on collar data from mule deer and to simplify the regulations.

2.) Management Objective Review: The Southeast WY White-tailed Deer Herd Unit's objective was last reviewed in 2015 and so it is up for review this biological year. The manages of this herd unit do not see any need to address the current hunter satisfaction survey objective given the complexity of trying to manage white-tailed deer in a predominately private land landscape.

3.) Weather and Habitat: There were no major weather events documented to cause above average mortality rates for this herd unit. There were no known EHD outbreaks documented as well