2023 Job Completion Reports
Laramie Region
Wyoming Game and Fish Department

Submitted By:
Martin Hicks, Wildlife Management Coordinator

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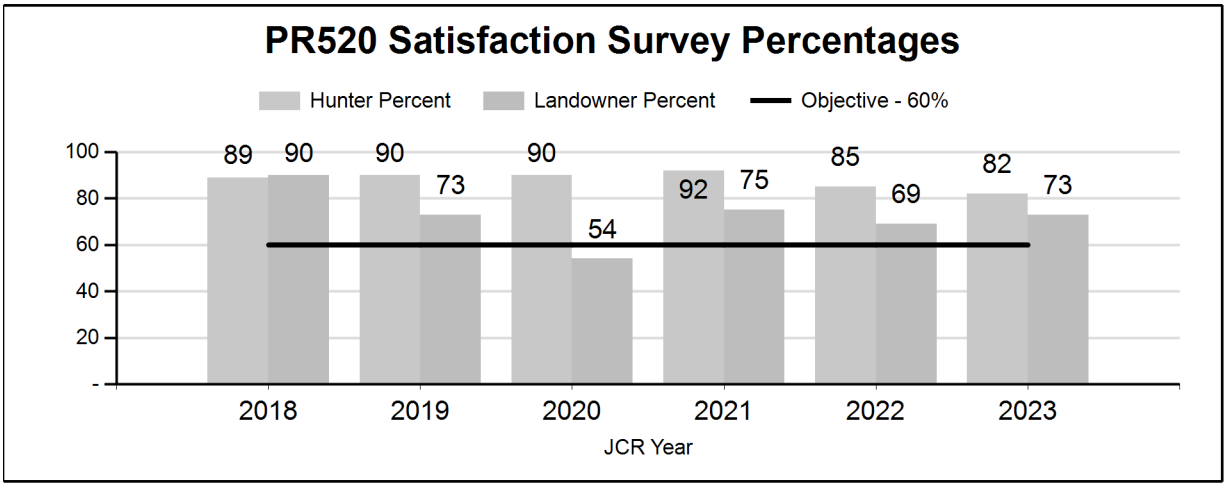
2023 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR520 - CHALK BLUFFS
HUNT AREAS: 111

PERIOD: 6/1/2023 - 5/31/2024
PREPARED BY: KEATON WEBER

	2018 - 2022 Average	2023	2024 Proposed
Hunter Satisfaction Percent	89%	82%	80%
Landowner Satisfaction Percent	71%	73%	68%
Harvest:	164	126	130
Hunters:	171	165	150
Hunter Success:	96%	76%	87 %
Active Licenses:	198	170	180
Active License Success:	83%	74%	72 %
Recreation Days:	657	680	668
Days Per Animal:	4.0	5.4	5.1
Males per 100 Females:	48	31	
Juveniles per 100 Females	57	22	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			18%
Number of years population has been + or - objective in recent trend:			0



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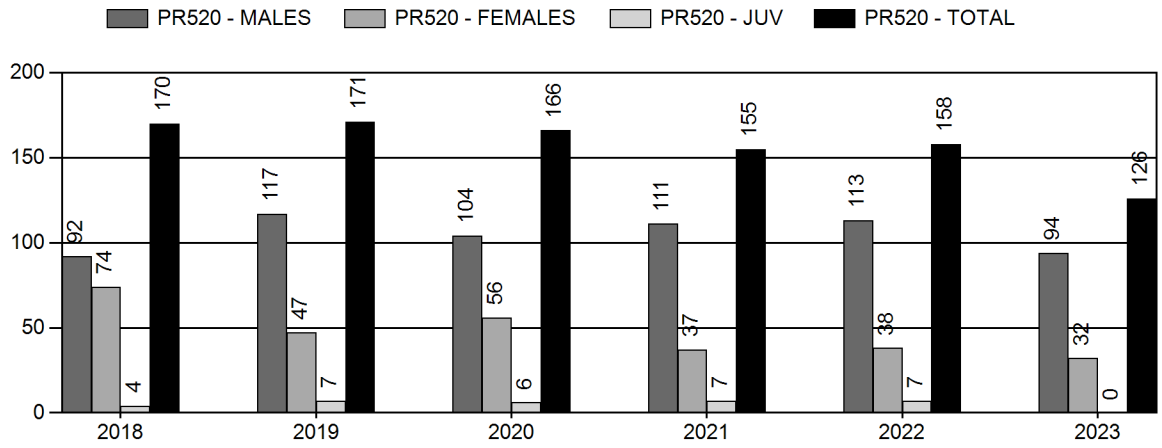
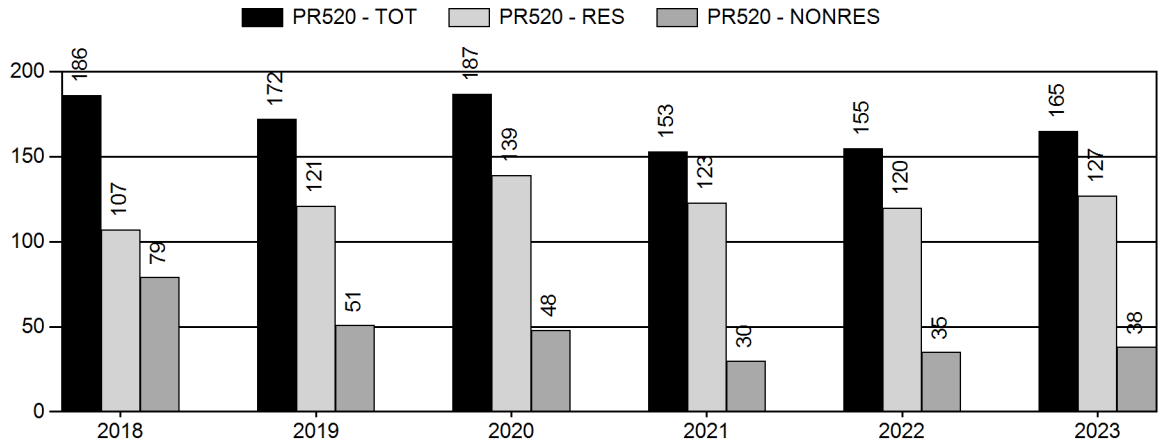


Number of Hunters



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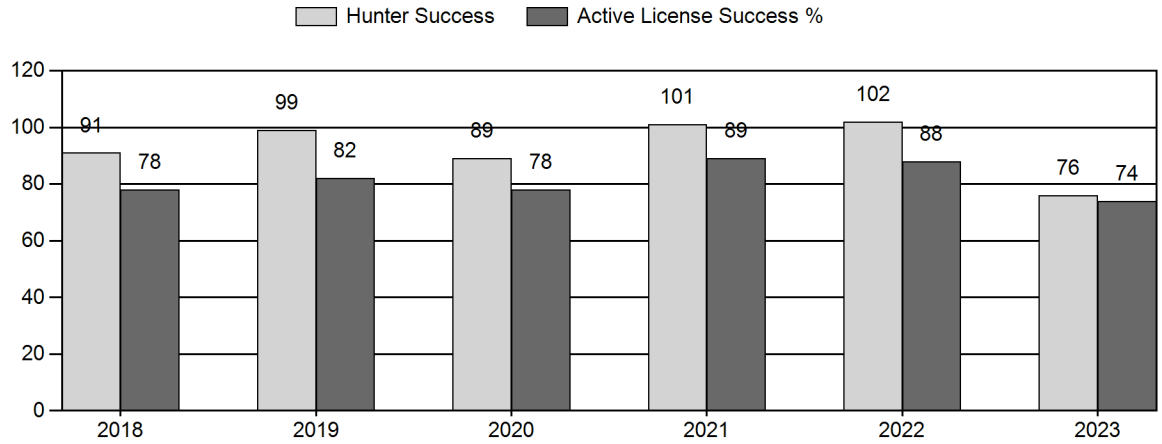

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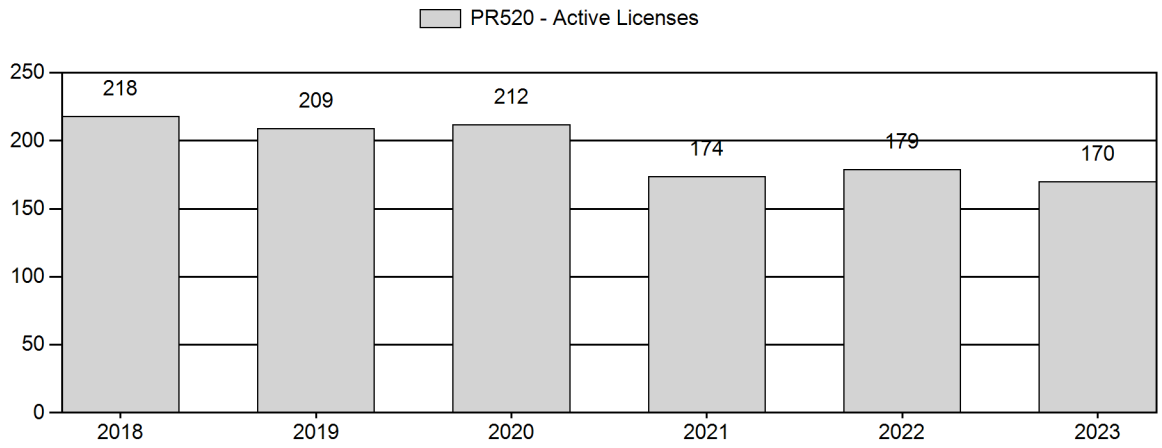
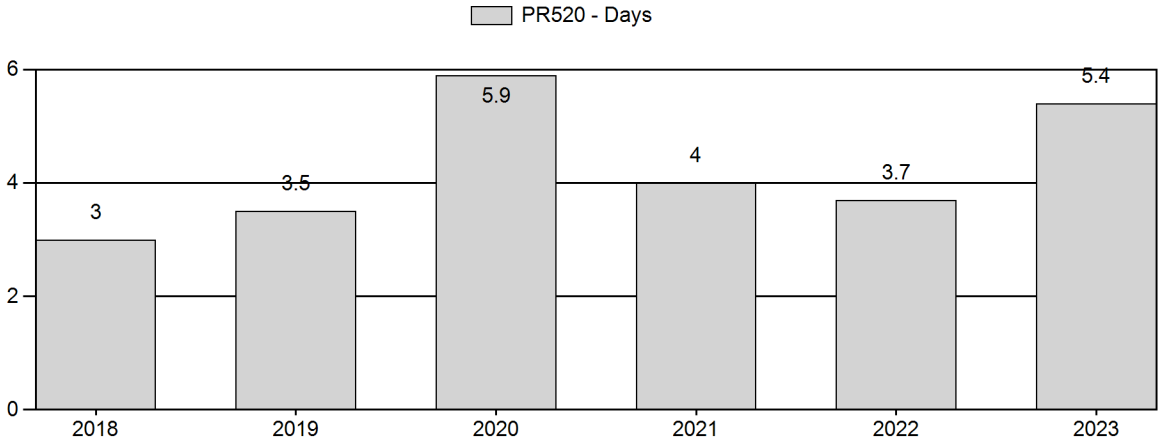
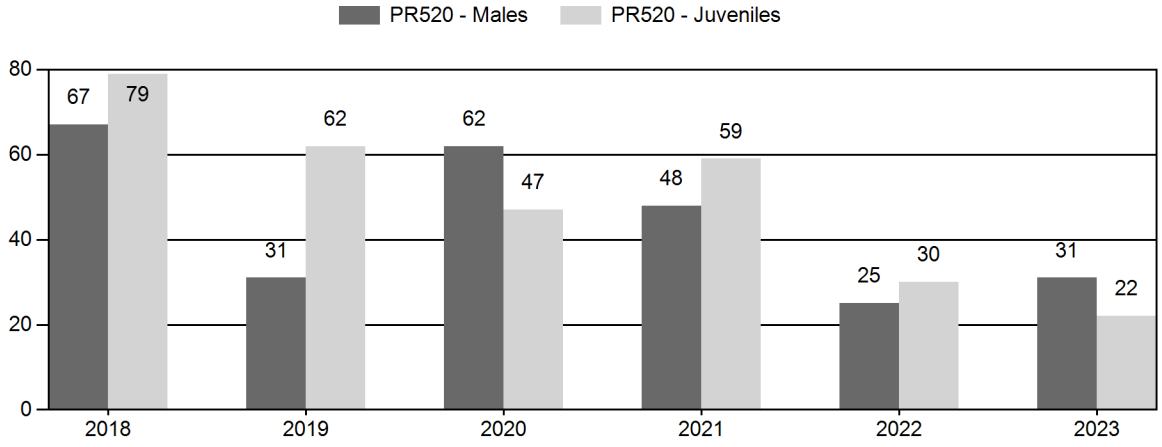


Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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	6	Aug. 15	Sept. 19	Sept. 20	Dec. 31	50	Doe or fawn

2023 Hunter Satisfaction: 82% Satisfied, 10% Neutral, 8% Dissatisfied
2023 Landowner Satisfaction: 13% Above Desired Levels, 73% At Desired Levels, 14% Below Desired Levels

2024 Management Summary
1.) Hunting Season Evaluation: The 2024 season is designed to provide opportunity while maintaining a hunter and landowner satisfaction of 60%. Due to low fawn ratios over the past 5 years (5 year average fawn ratio = 44 fawns per 100 does), removing the Type 1 doe or fawn opportunity is warranted to reduce harvest pressure on the female portion of the population given population decline and poor fawn recruitment. This herd is experiencing consecutive years of poor fawn survival due to multiple years of severe drought and habitat loss. However, the Type 6 season will continue to run through December 31 to mitigate damage situations on croplands as the season progresses into winter. A reduction in Type 6 quota (50) is not warranted at this time due to consistent damage concerns. These 50 doe/fawn licenses do not result in a significant amount of harvest to negatively impact the population. In the last three hunting seasons (2021-2023), on average, only 36 females are harvested annually. Access continues to be an issue in 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. The majority of hunters were overwhelmingly satisfied with their hunt (82% satisfied) in 2023. For the past several years hunter satisfaction has remained high (5 year hunter satisfaction avg. = 86%). It appears that the majority of hunters who are applying for this license have access secured prior to their hunt.

2.) Management Objective Review: In 2023, the Chalk Bluffs pronghorn herd unit was up for objective review. For the past 5 years, the Chalk Bluffs herd unit has had been under Private Land Management strategy and will remain under a Private Land management strategy. Managers reviewed the past five year's population metrics, landowner satisfaction results, weather, and habitat data and determined there current management strategy is still the best way to manage this herd unit. This herd unit will be up for objective review in 2028.

3.) Weather and Habitat: Precipitation events throughout 2023 were above normal during each month of the year in this herd unit. Total precipitation for the year was reported at 32% above average for the Cheyenne NOAA weather station. Marginal habitat conditions exist for pronghorn in this herd unit. The majority of lands in this area have been converted to cropland or face continued pressure of being converted to housing developments on the outskirts of

Cheyenne. Invasive plants such as cheatgrass and Dalmation toadflax are continual threats to native habitats that support pronghorn.

Habitat loss has increased in recent years from growing urbanization and energy development for the western portion of the herd unit. As the City of Cheyenne grows and energy development continues, pronghorn migration habits and forage availability will be negatively impacted.

2023 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2023 - 5/31/2024

HERD: PR521 - HAWK SPRINGS

HUNT AREAS: 34

PREPARED BY: KEATON WEBER

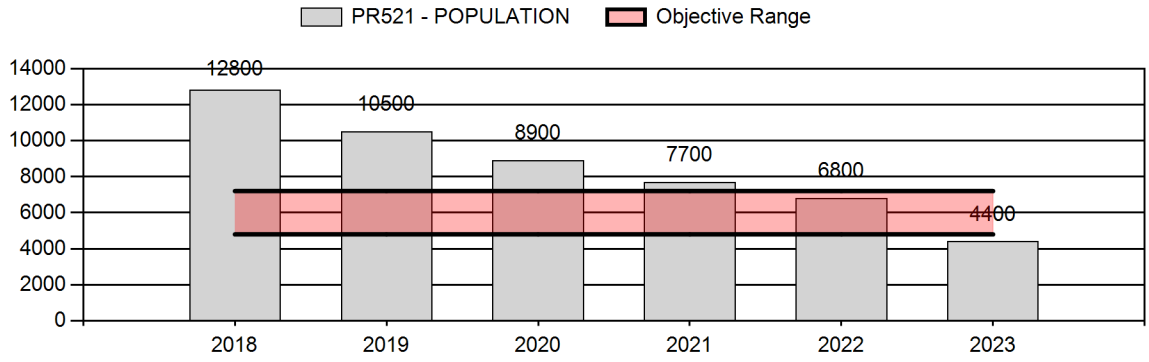
	2018 - 2022 Average	2023	2024 Proposed
Population:	9,340	4,400	3,600
Harvest:	748	454	400
Hunters:	956	493	450
Hunter Success:	78%	92%	89%
Active Licenses:	995	544	500
Active License Success:	75%	83%	80%
Recreation Days:	3,541	2,172	2,100
Days Per Animal:	4.7	4.8	5.2
Males per 100 Females	40	33	
Juveniles per 100 Females	37	22	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-26.7%
Number of years population has been + or - objective in recent trend:	1
Model Date:	3/1/2024

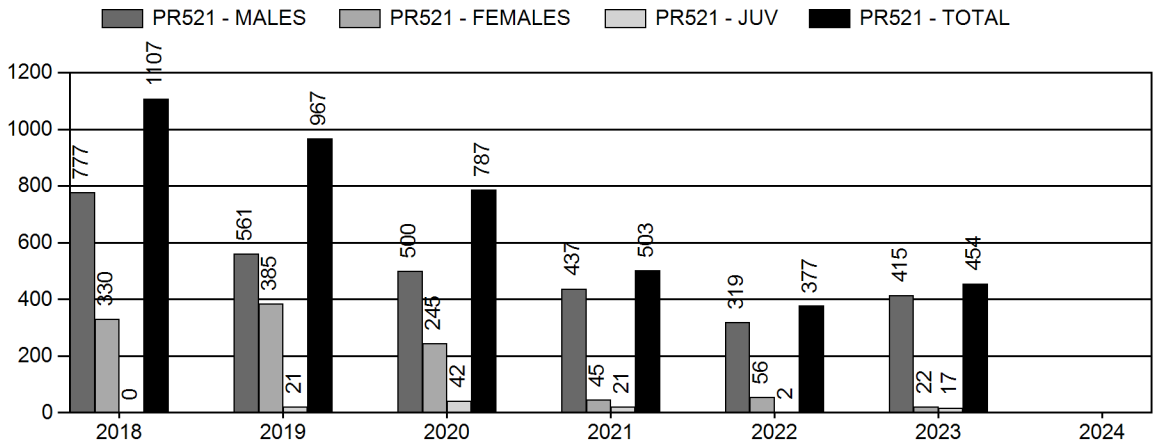
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	20%	21%
Proposed change in post-season population:	-21%	-16%

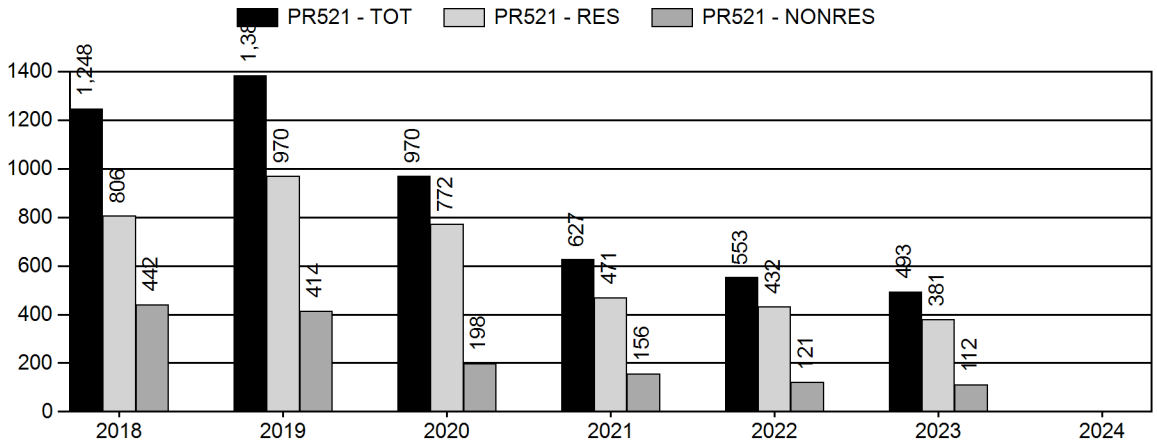
Population Size - Postseason



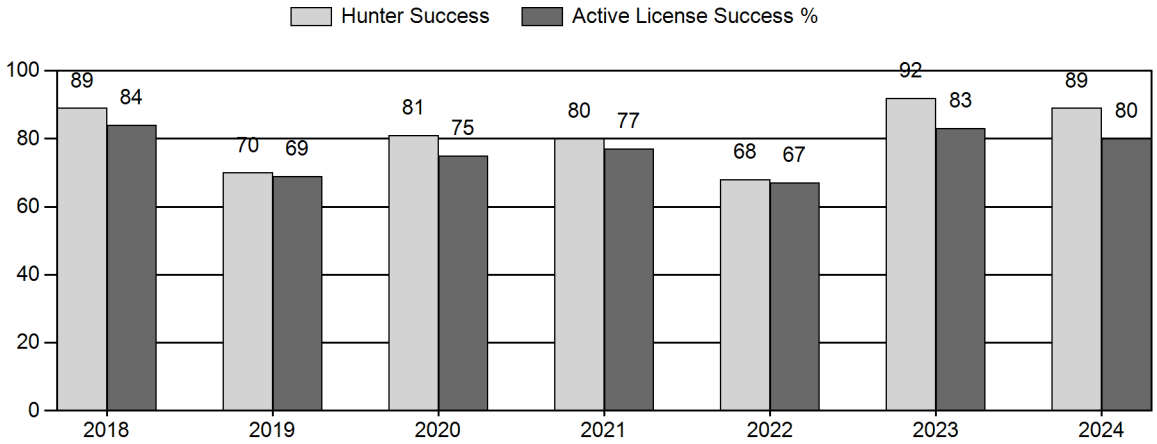
Harvest



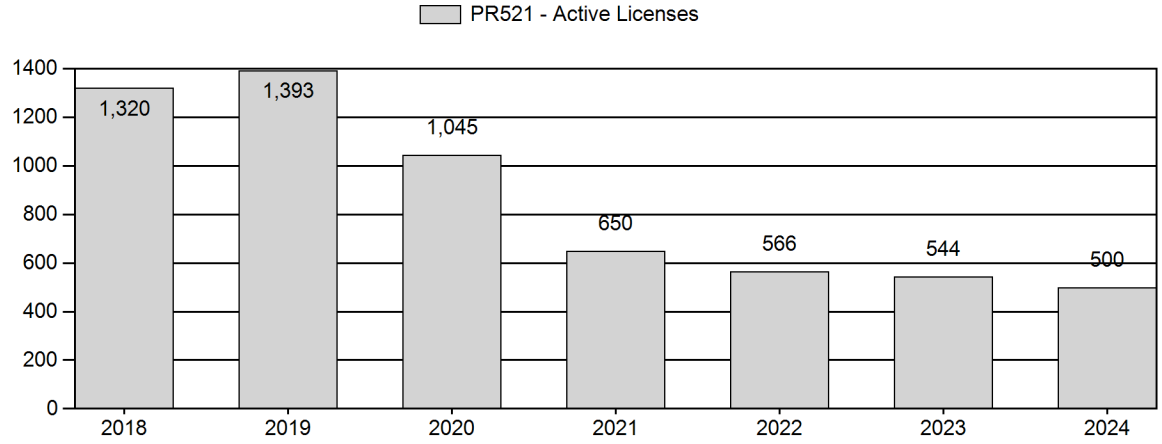
Number of Hunters



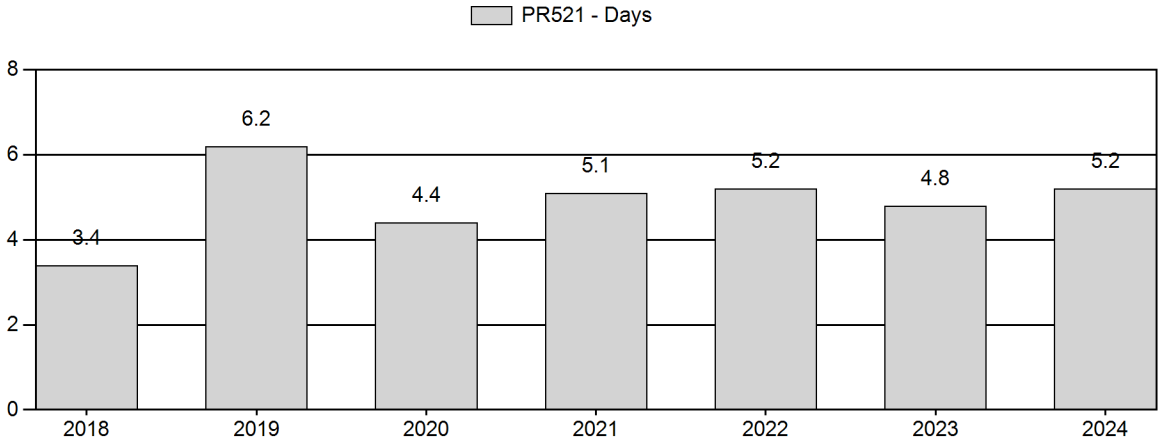
Harvest Success



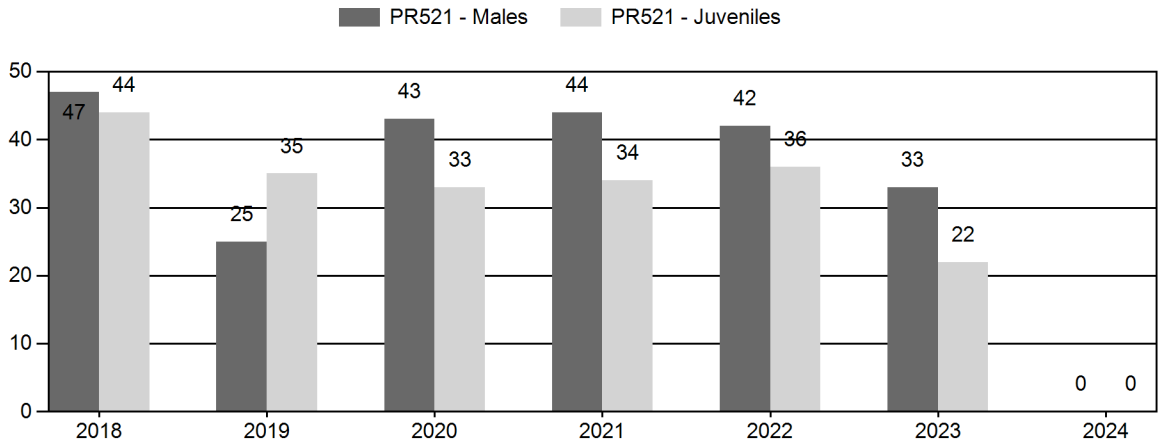
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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	600	Any antelope
34	6	Aug. 15	Sept. 19	Sept. 20	Nov. 30	25	Doe or fawn

2023 Hunter Satisfaction: 81% Satisfied, 17% Neutral, 2% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: Type 1 and Type 6 licenses have drastically been reduced since 2019 to address a population that has experienced harsh winter conditions, late spring snow events, and poor fawn recruitment for five consecutive years (5-year average = 32 fawns per 100 does). A reduction in the Type 6 license quota and season length is warranted to reduce harvest pressure on female pronghorn following the severe winter in 2022-2023 and consecutive years of very low fawn ratios. Since 2019, the Type 1 licenses have been reduced by 40% and the Type 6 licenses have been reduced by 92%. This year's population models indicate that this herd is still in decline due to the consecutive years of extremely poor fawn recruitment. Due to the drastic reductions in licenses over the previous 4 years, managers do not plan to make any license quota changes to the Type 1 licenses this year and will closely monitor population metrics for improvements before increasing or further decreasing licenses again. In 2023, the percentage of buck's harvested > 1 year old was 21%. This is likely attributed to the poor fawn recruitment and population decline in previous years. The 3 year average of buck's harvested > 1 year old is 21%. At this time, this herd cannot withstand an increase in buck harvests to achieve the goal of harvesting 25% of preseason males due to population decline and the extremely poor fawn recruitment over consecutive years.

2.) Management Objective Review: In 2023, the Hawk Springs pronghorn herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the current management strategy of recreational management with an objective of 6,000 is still warranted. This herd unit will be up for objective review again in 2028.

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. A grant was submitted to the USDA in 2020 for a 3-year survival study and was not granted. Managers will continue to seek other funding sources to further investigate the relationship between habitat use, parturition areas, survival and condition of CRP in southeast Wyoming.

4.) Weather and Habitat Data: Precipitation in Hunt Area 34 was above normal for the

biological year. NOAA weather station data from sites in Cheyenne and Torrington documented an increase in annual precipitation of 32% and 13% respectively from average. A remote weather station in Fort Laramie, located on the northern boundary of the herd unit, saw a 24% increase in annual precipitation above long term averages. Timing of precipitation is important to note, as winter precipitation was lacking in much of this herd unit. Pronghorn depend on non-native vegetation for much of their year-round nutritional requirements due to a large amount of native rangelands being converted to dryland croplands in this herd unit. Most CRP stands are in poor condition, lacking vegetative diversity, and are primarily dominated by single cool season introduced grass species. Continued poor fawn survival in this herd unit may be partially attributed to poor mid to late summer forage quality, particularly in areas lacking vegetative diversity, including dryland cropland, introduced cool season grass pastures, and CRP enrolled lands. Cheatgrass continues to be a cause for concern in native habitats, and also in cropland areas.

5). Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 4,400 (CL = 3,800 – 5,100) pronghorn.

2023 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024

HERD: PR522 - MEADOWDALE

HUNT AREAS: 11
PREPARED BY: KEATON WEBER

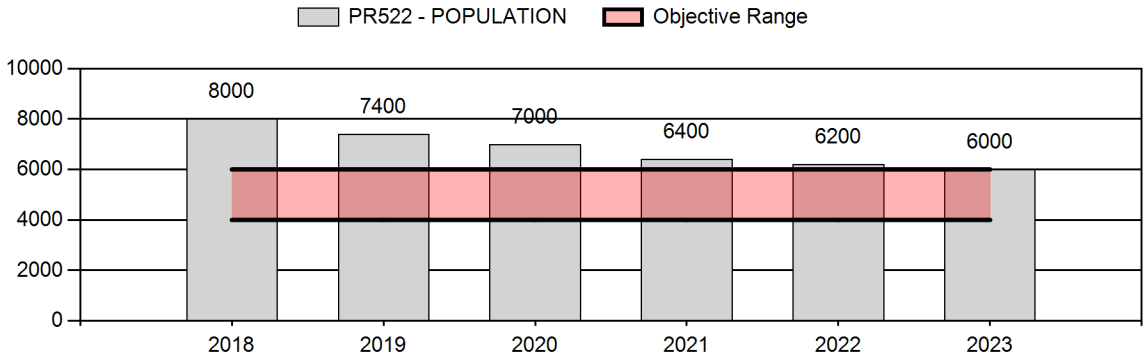
	2018 - 2022 Average	2023	2024 Proposed
Population:	7,000	6,000	6,100
Harvest:	538	313	280
Hunters:	635	335	325
Hunter Success:	85%	93%	86%
Active Licenses:	684	424	400
Active License Success:	79%	74%	70 %
Recreation Days:	2,296	1,505	1,500
Days Per Animal:	4.3	4.8	5.4
Males per 100 Females	34	37	
Juveniles per 100 Females	37	41	

Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	20%
Number of years population has been + or - objective in recent trend:	10
Model Date:	3/1/2024

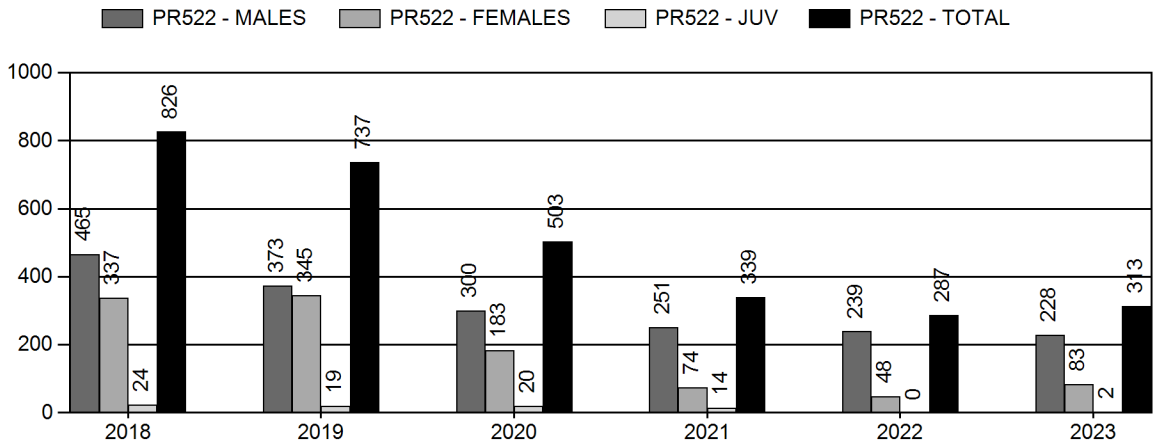
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	16%	16%
Proposed change in post-season population:	-4%	+3%

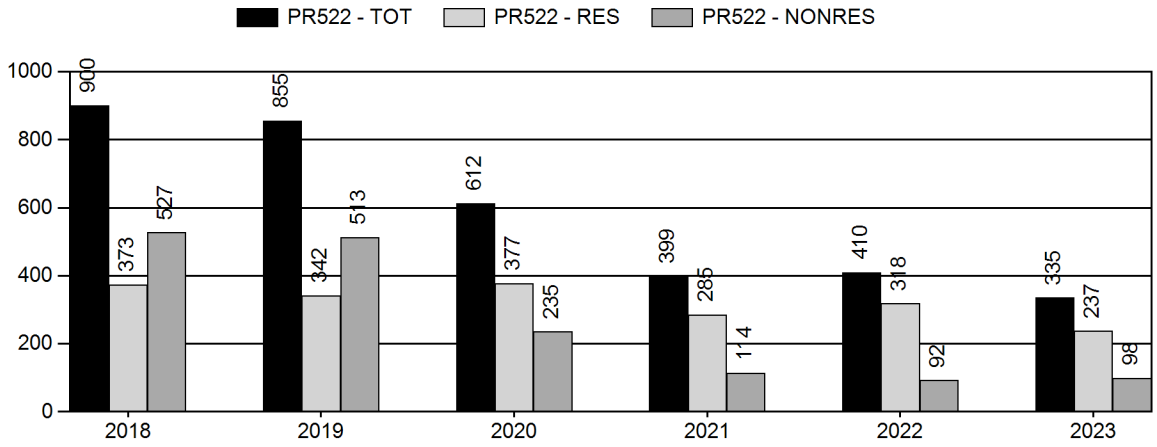
Population Size - Postseason



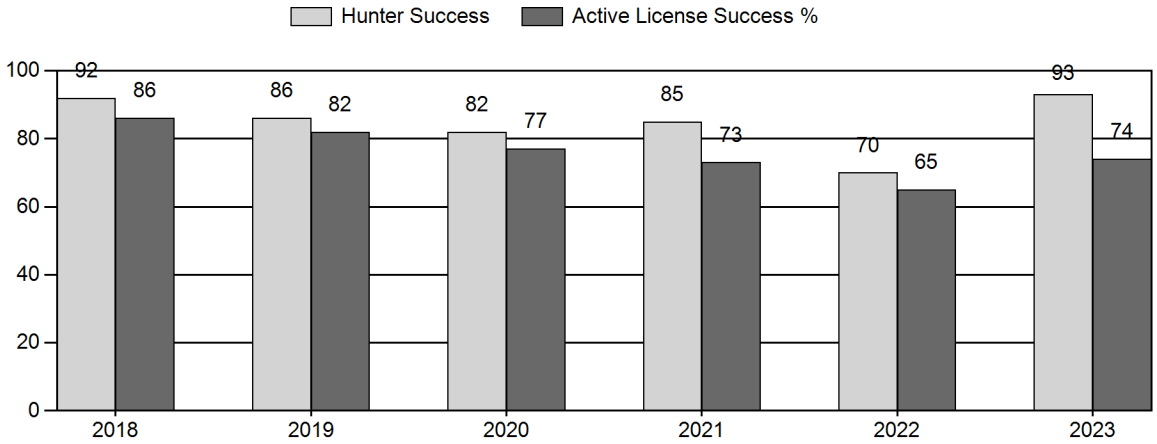
Harvest



Number of Hunters



Harvest Success



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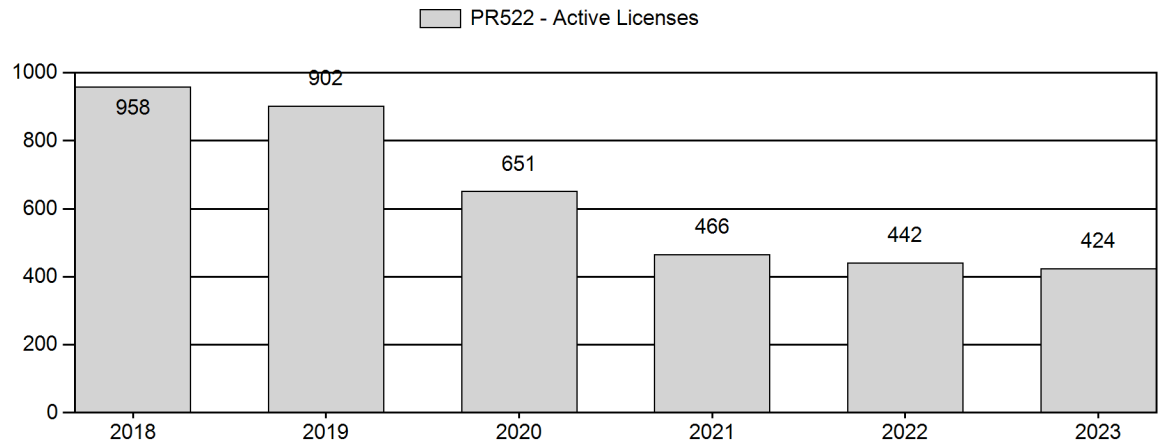
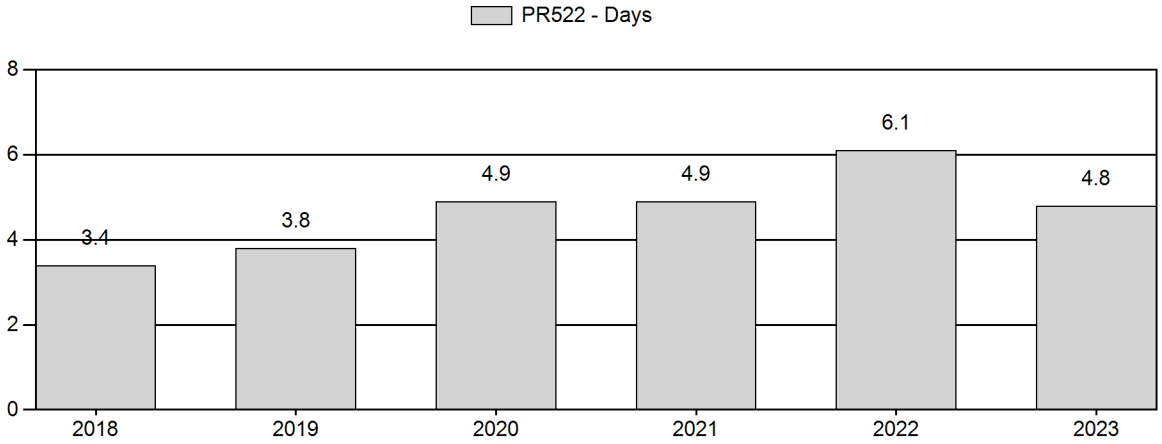
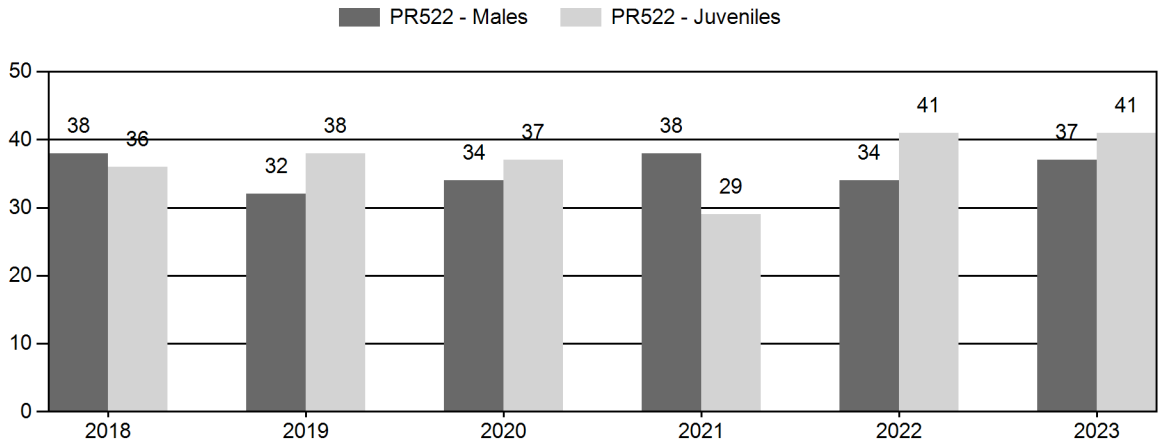


Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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	400	Any antelope
11	6	Aug. 15	Sept. 30	Oct. 1	Nov. 30	50	Doe or fawn

2023 Hunter Satisfaction: 81% Satisfied, 13% Neutral, 6% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: Since 2019, Type 1 and Type 6 licenses have drastically been reduced to address extremely poor fawn recruitment, low buck ratios, and overall population decline. Specifically, Type 1 licenses have been reduced by 28% and Type 6 licenses have been reduced by 75% since 2019. Another reduction with the Type 6 quota is warranted as this herd still continues to struggle with poor fawn recruitment and experienced above normal winter severity in 2022-2023 likely contributed to an increase in winter mortality. The 2023 fawn ratio was 41 fawns per 100 does and the 5-year average fawn ratio is 37 fawns per 100 does. In recent years, there have been concerns of pronghorn damage on croplands during late fall and winter months. Therefore, an extension of season length for the Type 6 is warranted in order for damage situations to be addressed with hunting opportunity as they arise. Buck ratios are still within recreational management guidelines of 30-59 bucks per 100 does, but is trending towards the lower ratio limits (5 year average buck ratio = 35 bucks per 100 does). Managers will continue to monitor harvest metrics, herd composition data and independent density estimates for improvements prior to increasing hunting opportunity within the herd unit. In 2023, harvest success increased from 70% in 2022 to 93% in 2023 and days to harvest decreased from 6.1 days to 4.8 days, indicating that this herd is potentially responding positively to the license reductions over the previous 5 years. In 2023, the percentage of buck's harvested > 1 year old was 16% and the 3 year average is 15%. At this time, this herd cannot withstand an increase in buck harvests to achieve the goal of harvesting 25% of preseason males due to population decline and the extremely poor fawn recruitment over consecutive years.

2.) Management Objective Review: In 2023, the Meadowdale pronghorn herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined there current management strategy of a recreational management with an objective of 5,000 is still warranted. This herd unit will be up for objective review again in 2028.

3.) Weather and Habitat Data: Precipitation in Hunt Area 11 was above average for the biological year. Deep and crusted snows were present in portions of this herd unit in winter months. Persistent snow cover was observed in much of this herd unit through the winter months. Some crusting of snow likely made foraging more difficult for pronghorn. Annual precipitation data collected in Torrington and Douglas was 13% and 26% above long term averages in 2023. A remote weather station at Fort Laramie, located on the southern border of

the herd unit, observed a 24% higher than normal precipitation year. Forage production in this herd unit improved dramatically from the abysmal conditions observed in 2022. Cheatgrass continues to be a cause for concern in native habitats. A lack of sagebrush in this herd unit forces pronghorn to rely upon alternative rangeland forages and cropland to meet nutritional requirements.

5). Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 6,000 (CL = 5,200 – 6,800) pronghorn.

2023 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR523 - IRON MOUNTAIN
HUNT AREAS: 38
PREPARED BY: LEE KNOX

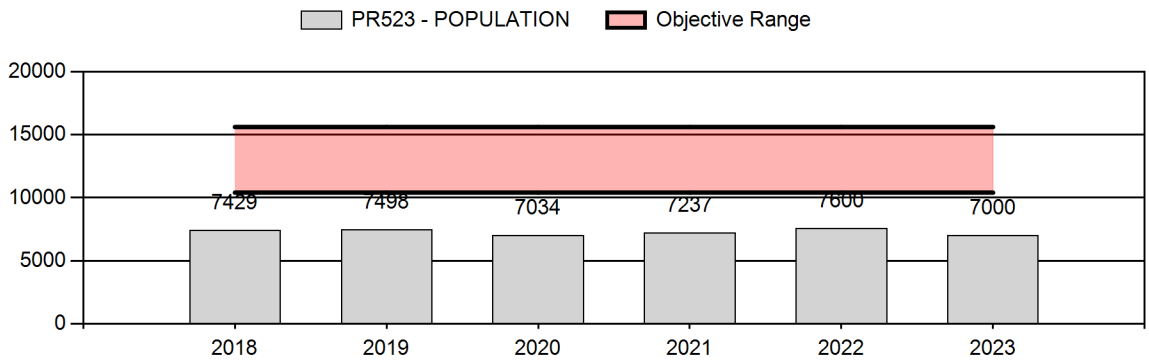
	2018 - 2022 Average	2023	2024 Proposed
Population:	7,360	7,000	7,600
Harvest:	832	585	600
Hunters:	1,077	679	680
Hunter Success:	77%	86%	88 %
Active Licenses:	1,110	691	700
Active License Success:	75%	85%	86 %
Recreation Days:	4,055	2,192	2,200
Days Per Animal:	4.9	3.7	3.7
Males per 100 Females	44	25	
Juveniles per 100 Females	49	34	

Population Objective (± 20%) :	13000 (10400 - 15600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-46.2%
Number of years population has been + or - objective in recent trend:	5
Model Date:	2/11/2024

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:	26%	29%
Proposed change in post-season population:	11%	10%

Population Size - Postseason



2024 Hunting Seasons
Iron Mountain Pronghorn (PR523)

Hunt Area	Type	Archery Dates Opens	Archery Dates Closes	Season Dates Opens	Season Dates Closes	Quota	Limitations
38	1	Aug. 15	Oct. 4	Oct. 5	Oct. 31	400	Any antelope
38	2	Aug. 15	Oct. 4	Oct. 5	Nov. 30	300	Any antelope south of Wyoming Highway 34
38	6	Aug. 15	Oct. 4	Nov. 1	Dec. 31	25	Doe or fawn

2023 Hunter Satisfaction: 86% Satisfied, 12% Neutral, 2% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. The Iron Mountain pronghorn herd is declining due to poor fawn recruitment due to prolonged drought conditions. The last three years fawn ratios have been at historically lows with 42:100 does in 2021, 47:100 in 2022, and 34:100 in 2023. Buck ratios are 25:100 does, below recreational management minimum of 30:100 does and yearling buck ratio remain poor at 6:100 does. The low yearling buck ratio is an indication that along with poor fawn recruitment in August, fawn over winter survival has been low, and we are seeing the long term effects in our adult buck ratios. We have made a significant reduction in licenses from 2,050 in 2018 to 825 in 2022 to address poor fawn recruitment, and the population being 40% below the population objective. For the 2024 season we reduced the type 2 licenses by 100 to address low buck ratios.

Male harvest rates were 29% in 2023 and predicted to be 29% in 2024, meeting the goal of 25% male harvest in recreationally managed herds.

2.) Management Objective Review: The current objective was set at 13,000 in 1997. We will maintain the current postseason population objective and recreational management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2029; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3.) Habitat: Precipitation in Hunt Area 38 was above normal in most portions of the herd unit, except for some lower elevations near Laramie, for the biological year. NOAA weather station data from Laramie documented a 12% decrease, and Cheyenne a 32% increase from average annual precipitation. Forage conditions were good in the majority of the herd unit. While precipitation amounts near Laramie were below average for the year, timing of precipitation

coinciding with mild summer temperatures resulted in greenness being maintained on the landscape for the majority of the summer months, and above average forage production.

During the month of February multiple snow storms hit the area, and temperatures were below average. One storm event on April 4th dropped over 20" of snow in the Laramie Range. While rapid melting was observed after the storm, events such as this, can result in short term hardship for pronghorn.

Cheatgrass continues to be a concern for land managers in this herd unit. Proactive steps are being taken to address large infestations associated with previous wildfires. In 2023, over 2,300 acres were treated with herbicide to control this competitive annual in the herd unit. In the Richeau Hills and further south into Laramie County, Dalmation toadflax is another competitive noxious weed that threatens native rangeland habitats. Efforts are underway to inventory and begin to treat large infestations in 2024. Herbicides effective for Dalmation toadflax control often have negative impacts on mixed mountain shrubs and sagebrush, so caution must be used by land managers to reduce collateral damage to forage utilized by pronghorn.

4.) Population Modeling: The bio-year 2023 postseason population estimate from the PopR IPM was approximately 7,000 (CL = 5,700 – 8,300) pronghorn. The working model was run using 10 years of harvest and classification data and number of licenses as the effort variable. Adult survival was constant while reproduction and juvenile survival was time varying. Although the model had good convergence, it took some effort to get a working model and we do not have a lot of faith in the estimate.

2023 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024

HERD: PR524 - DWYER

HUNT AREAS: 103
PREPARED BY: KEATON WEBER

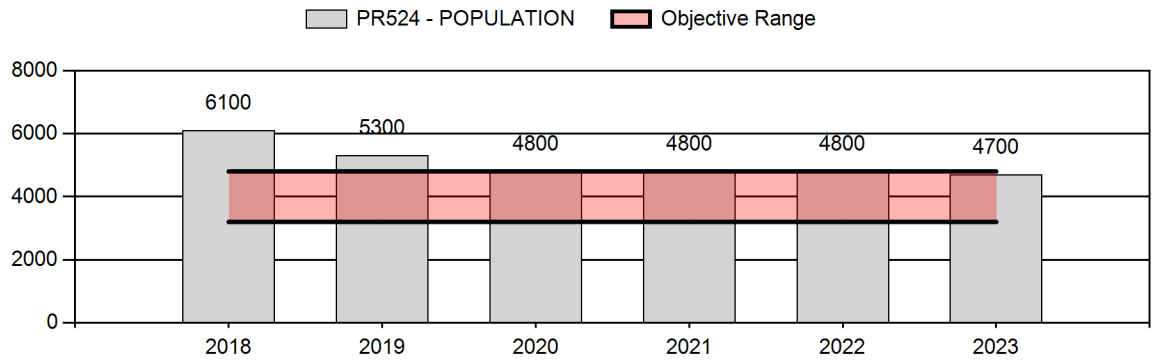
	2018 - 2022 Average	2023	2024 Proposed
Population:	5,160	4,700	4,600
Harvest:	458	213	170
Hunters:	556	232	200
Hunter Success:	82%	92%	85 %
Active Licenses:	602	264	200
Active License Success:	76%	81%	85 %
Recreation Days:	1,908	865	800
Days Per Animal:	4.2	4.1	4.7
Males per 100 Females	36	39	
Juveniles per 100 Females	36	24	

Population Objective (± 20%) :	4000 (3200 - 4800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	18%
Number of years population has been + or - objective in recent trend:	18
Model Date:	3/1/2024

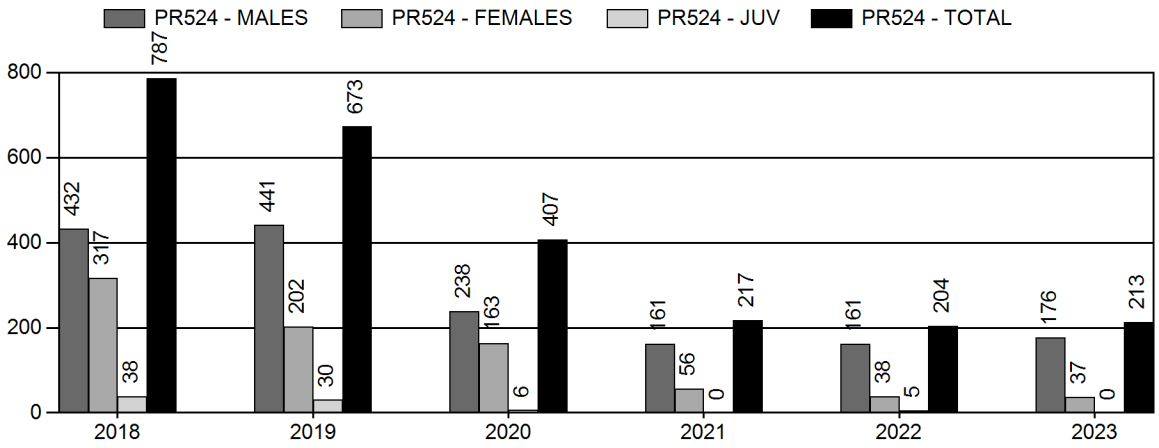
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	2%	39%
Males ≥ 1 year old:	11%	11%
Proposed change in post-season population:	-7%	6%

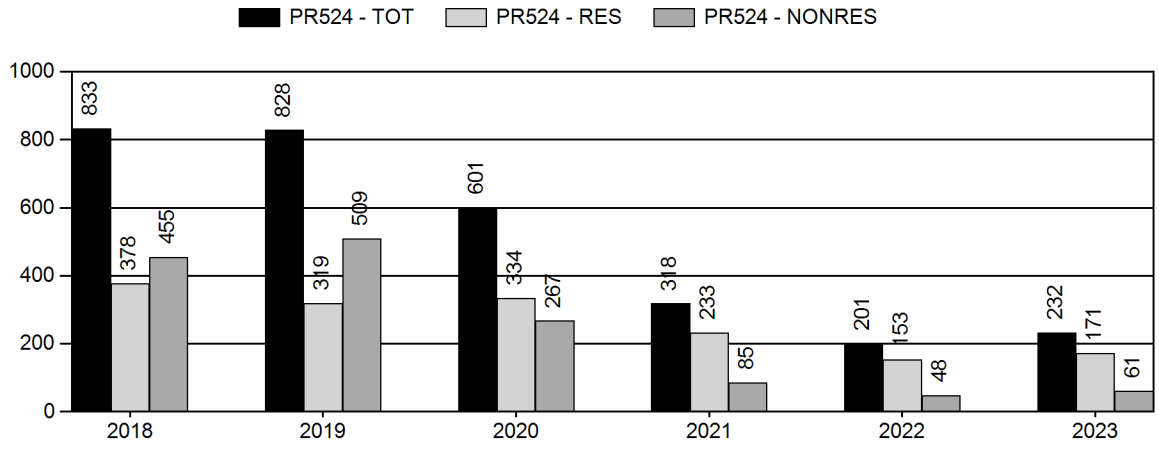
Population Size - Postseason



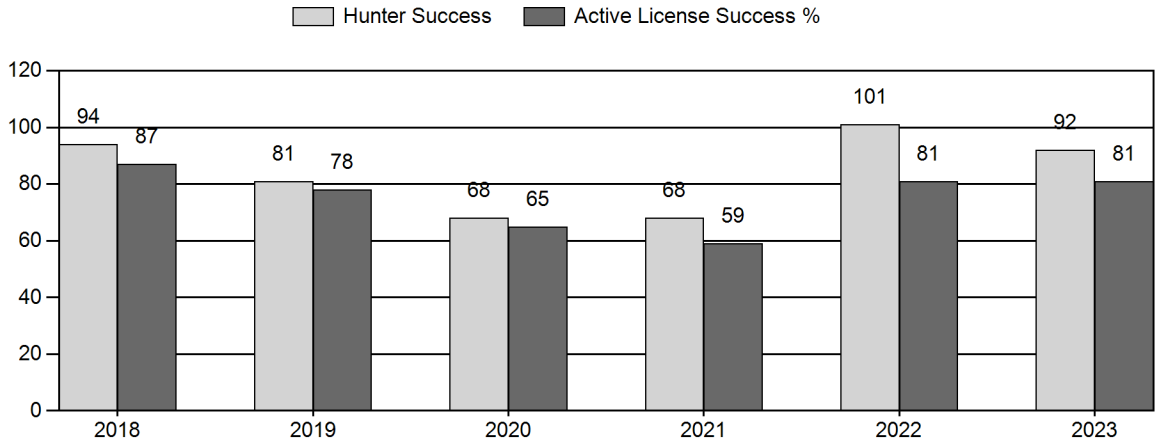
Harvest



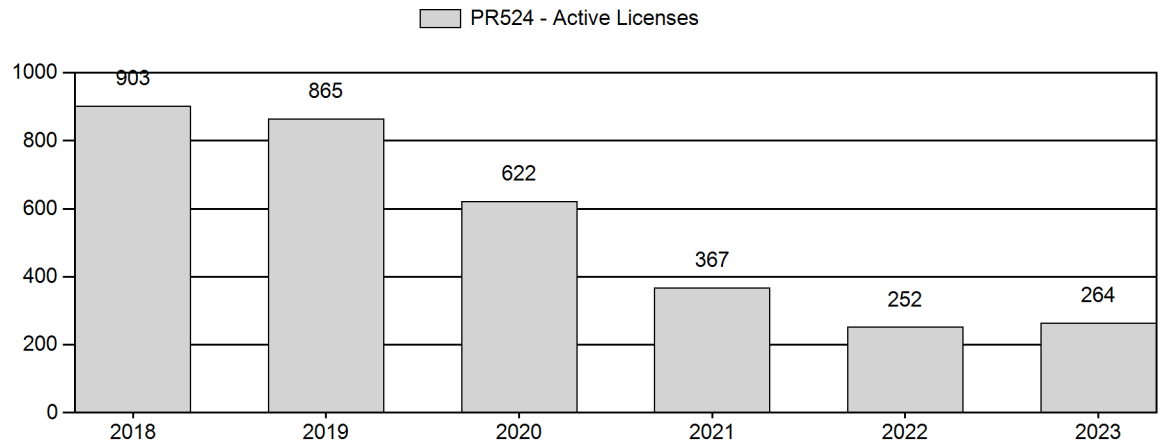
Number of Hunters



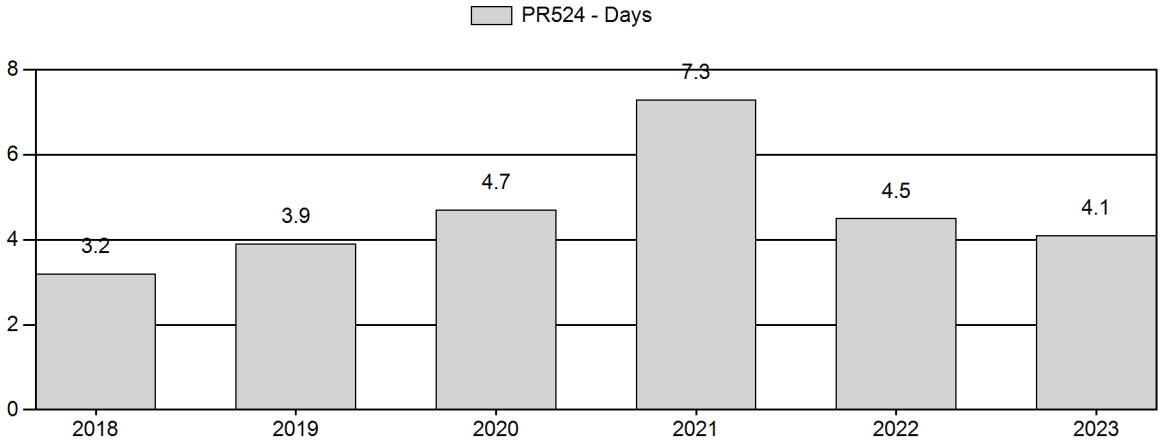
Harvest Success



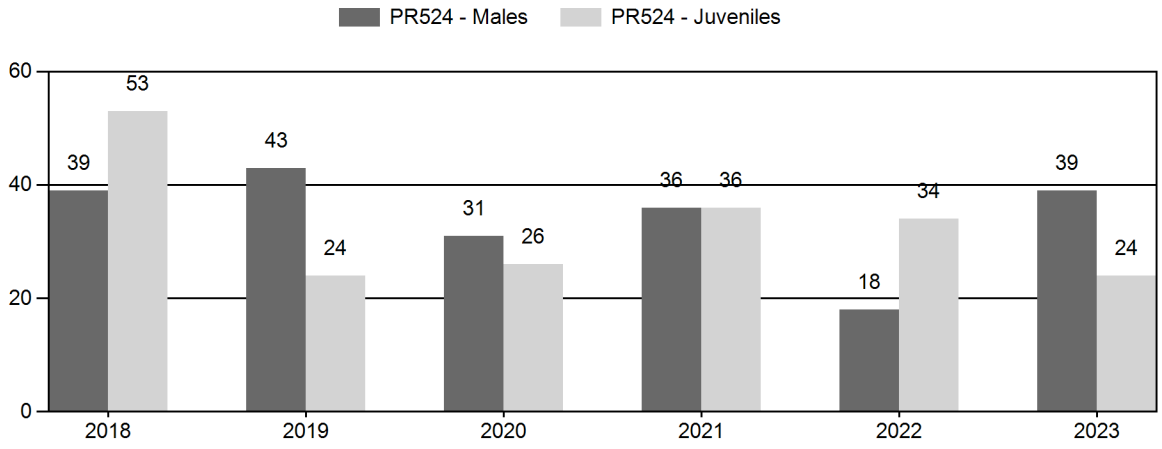
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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	250	Any antelope
103	6	Aug. 15	Oct. 4	Oct. 5	Nov. 30	25	Doe or fawn

2023 Hunter Satisfaction: 75% Satisfied, 16% Neutral, 9% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: Type 1 and Type 6 licenses have been drastically reduced since 2019 to address a population that has experienced poor fawn recruitment for five consecutive years (5 year average = 29 fawns per 100 does) and population decline. Another reduction in the Type 6 license quota is warranted in response to another year of poor fawn production and continuing population decline. The fawn ratio in 2023 was 24 fawns per 100 does and the 5 year average fawn ratio is 29 fawns per 100 does. Despite buck ratios being low (5 year average = 33 bucks per 100 does), they are still within recreational management guidelines of 30-59 bucks per 100 does and likely to increase given the recent year's license reductions. Reductions in licenses for the past 5 years have helped to stabilize the population to the point model simulations indicate a slight increase in the population for future years. There still continues to be isolated damage concerns so the Type 6 licenses are still needed, but at a much lower level than 4 years prior. Hunter success drastically increased from 59% (2021) to 81% (2023), which is likely attributed to the drastic reduction in hunters on the landscape from license reductions in years past. In 2023, the percentage of buck's harvested > 1 year old was 11% and the 3 year average is 11%. Poor adult buck harvest is likely attributed to the following: 1) excessive mortalities due to spring snow storms, 2) poor fawn recruitment over multiple years and 3) overall population decline in recent years. Given the current hunting structure and predicted fawn production, simulated efforts indicate this herd will rebound in the coming years, however, until then, an increase in license numbers is not warranted.

2.) Management Objective Review: In 2024, the Dwyer pronghorn herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the current management strategy of recreational management with an objective of 4,000 is still warranted. This herd unit will be up for objective review again in 2029.

3.) Weather and Habitat Data: Precipitation in this herd unit was above normal in 2023. NOAA weather station data collected in Torrington and Douglas showed a 13% and 26% positive departure from average annual precipitation. A remote weather station in Fort Laramie documented a 24% increase in annual precipitation above long term averages. February brought colder than normal temperatures and several snow storms. A heavy, wet snow of more than 20" fell on April 4th in the higher elevation areas of this herd unit west of the interstate. The storm was followed by rapid melting, but still likely resulted in added stress to wintering pronghorn.

Winter severity was above normal in portions of this herd unit in early 2023, but subsided quickly as spring approached.

Cheatgrass establishment continues to be a concern in native rangeland environments. In 2023, 1,693 acres of rangeland were treated with herbicide within this herd unit by WGFD to control this competitive annual grass.

4). Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 4,700 (CL = 4,000 - 5,200) pronghorn.

2023 - JCR Evaluation Form

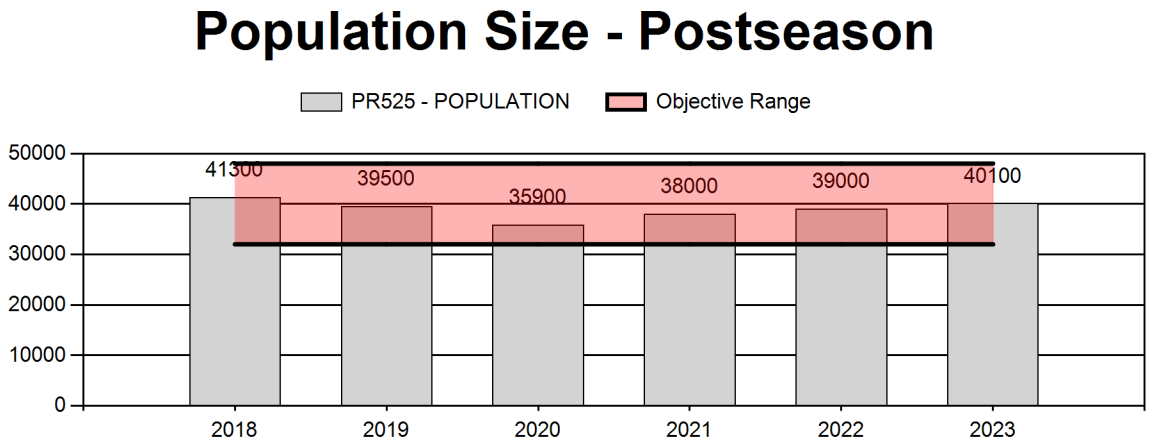
SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR525 - MEDICINE BOW
HUNT AREAS: 30-32, 42, 46-48
PREPARED BY: LEE KNOX

	2018 - 2022 Average	2023	2024 Proposed
Population:	38,740	40,100	41,100
Harvest:	3,286	2,763	2,900
Hunters:	3,616	2,744	3,100
Hunter Success:	91%	101%	94%
Active Licenses:	3,983	3,358	3,500
Active License Success:	83%	82%	83%
Recreation Days:	10,268	10,214	9,000
Days Per Animal:	3.1	3.7	3.1
Males per 100 Females	45	49	
Juveniles per 100 Females	67	59	

Population Objective (± 20%) :	40000 (32000 - 48000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	0%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/25/2024

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%	21%
Proposed change in post-season population:	1%	3%



2024 Hunting Seasons
Medicine Bow Pronghorn Herd Unit (PR525)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
30	1	Aug. 15	Oct. 4	Oct. 5	Oct. 31	400	Any antelope
30	6	Aug. 15	Oct. 4	Oct. 5	Oct. 31	50	Doe or fawn
31	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	75	Any antelope
32	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	700	Any antelope
32	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	500	Doe or fawn
32	7	Aug. 15	Sep. 24	Sep. 25	Oct. 31	100	Doe or fawn valid on or within one (1) mile of irrigated land
42	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	200	Any antelope
42	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	50	Doe or fawn
46	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	100	Any antelope
46	2	Aug. 15	Sep. 24	Oct. 5	Oct. 31	25	Any antelope
47	1	Aug. 15	Sep. 24	Sep. 25	Oct. 31	500	Any antelope
47	2	Aug. 15	Sep. 24	Oct. 5	Oct. 31	500	Any antelope
47	6	Aug. 15	Sep. 24	Sep. 25	Oct. 31	500	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

2023 Hunter Satisfaction: 86% Satisfied, 9% Neutral, 5% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. The current population estimate of 40,100 pronghorn is at the population objective of 40,000 pronghorn. However the effects of two hard winters and a persisting drought have reduced pronghorn numbers in some areas in the Medicine Bow herd unit, with hunt areas 30, 31, 42, and 46, being the slowest to recover. If conditions continue to improve, more opportunity can be added in the future. Licenses were reduced during the 2023 season setting process in hunt area 32 to address potential winter loss from the 20022/2023 winter. However, after spending time in the field talking to constituents and landowners, winter mortality was minimal. Quotas will be increased in hunt area 32 by 100 each on type 1 and type 6 licenses back to 2022 quotas. Hunt areas 30, 31, 42, 46, 47, and 48 season structure will remain status quo in 2024.

Male harvest rates were 21% in 2023 and predicted to be 21% in 2024, shy of meeting the goal of 25% male harvest in recreationally managed herds.

2.) Management Objective review: The current objective was set at 40,000 in 2014. We plan to maintain the current postseason population objective and recreational management strategy based

on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2029; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

4.) Habitat: Precipitation levels were above normal for the 2023 biological year. Winter snow depths were higher than normal in many parts of the Shirley Basin, and conditions were challenging for pronghorn and likely impacted survival. February was filled with numerous snowstorm events and very cold temperatures. A major snowfall event was recorded on April 4, 2023, with accumulations exceeding 20" in the upper elevation portions of Area 42 in the foothills of the Laramie Range. Cool spring weather resulted in delayed snowmelt and greenup. Once temperatures increased in June, forage production was excellent. Precipitation events throughout the remainder of the summer, as is typical for much of this herd unit, were sporadic and covered very small geographic areas. However, due to mild summer temperatures, forage maintained greenness throughout the summer months. NOAA weather stations in Laramie and Rawlins recorded drastic differences in average annual precipitation. Laramie saw a decrease of 12% from average, while Rawlins was nearly 49% above average for 2023. Winter snowfall totals were a huge driver in this drastic difference. Shrub conditions continue to be very poor, with this landscape being dominated by late seral shrub plant communities and long term, severe hedging by and overutilization by big game. Current lower pronghorn numbers and favorable precipitation likely had some positive impact on shrub production in 2023.

In Hunt Area 48, the RR316 wildfire burned 14,200 acres within spring, summer and fall pronghorn ranges in 2020. The burn will result in the loss of sagebrush habitats for decades. Herbaceous production in this burn scar has been excellent. Some small inclusions of cheatgrass have been identified and will be monitored in the burn scar, where more severe soil erosion occurred or in areas where fire severity was higher due to a dense shrub canopy. In 2023, 3.5 miles of woven wire/barbed fence was removed on Wilson Ridge, north of I-80. In 2024, this fence will be converted to a 4 wire fence, utilizing wire spacing that will allow for improved pronghorn movements.

The Department plans to work with conservation partners to improve habitats in uplands in Area 47 and Area 48 through construction of Zeedyk structures in ephemeral draws, which may improve summer forage quality and quantity availability. These structures and subsequent vegetative responses may result in better lactation for does and subsequent improved fawn survival. Department personnel will prioritize potential Zeedyk site selection and structure design and planning in 2024.

5.) Population Modeling: The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 40,100 (CL = 37,200 – 41,100).The 2023 IPM model used a fixed effect structure, licenses was the effort variable, and harvest and classification data was from years 2009-2025. Model convergence was good.

2023 - JCR Evaluation Form

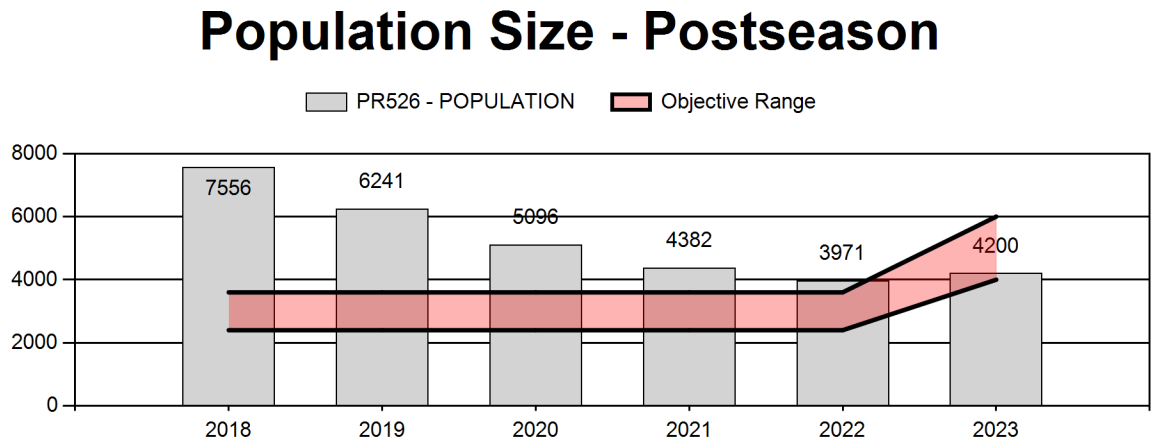
SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR526 - COOPER LAKE
HUNT AREAS: 43
PREPARED BY: LEE KNOX

	2018 - 2022 Average	2023	2024 Proposed
Population:	5,449	4,200	4,500
Harvest:	674	188	210
Hunters:	887	242	240
Hunter Success:	76%	78%	88%
Active Licenses:	944	242	240
Active License Success:	71%	78%	88%
Recreation Days:	2,781	676	650
Days Per Animal:	4.1	3.6	3.1
Males per 100 Females	42	30	
Juveniles per 100 Females	74	82	

Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-16%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/11/2024

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

	JCR Year	Proposed
Females ≥ 1 year old:	8%	0%
Males ≥ 1 year old:	20%	17%
Proposed change in post-season population:	10%	6%



2024 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	250	Any antelope

2023 Hunter Satisfaction: 74% Satisfied, 10% Neutral, 16% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. Cooper Lake is predominantly a private land herd. The majority of the harvest comes from the Laramie River and Diamond Lake Hunter Management Areas (HMA). The Diamond Lake HMA was greatly reduced in size in 2023 for the construction of the Rock Creek Wind Energy Project, and will remain at the reduced acreage during the 2024 season. Hunter success on type 1 licenses remains below desired levels, but improved slightly from the 72% in 2022 to 78% in 2023. Buck ratios in 2023 were at the recreational management minimum of 30:100 does. Yearling buck ratios remain at a five year low at 9:100 does, indicating we are seeing poor fawn recruitment into adult age classes. Fawn recruitment improved from an all-time low at 55:100 does in 2022 to 82:100 in 2023. Significant cuts in licenses were made the last few years from a total of 1,100 licenses in 2021 to 250 licenses in 2023. The season structure in 2024 will remain status quo to continue to allow this population to recover.

The male harvest rate for 2023 was 17%, and is predicted to be 17% in 2024, with a three running average of 23%. The predicted harvest rates do not meet the goal of $\geq$25% male harvest in recreational management herds, but given the low hunter success, well below average fawn recruitment in 2022, the last three seasons the reduction in licenses is justified.

2.) Management Objective Review: The previous objective of 3,000 was set in 1986. The objective was last reviewed during the 2023 season setting process. The objective was increased to 5,000 based on public input. The objective will be reviewed again in 2028

3.) Habitat: Precipitation levels were below normal for the 2023 biological year. Precipitation events in late winter and early spring were minimal. Spring greenup was delayed due to colder temperatures and below normal moisture. However in June, precipitation fell, and paired with normal to slightly below normal temperatures, resulted in favorable forage production. July and August saw higher than normal precipitation fall in the area. NOAA weather station data from Laramie indicated a negative departure from average annual precipitation of 12%. Annual precipitation has been below normal for 5 of the last 6 years at this weather station. Seasonal water sources dried up in 2021 and remained that way in most of 2022. Some seasonal water impoundments and playa lakes finally saw some water return during the summer months of 2023. These areas are important for pronghorn as a water source aiding in pronghorn distribution throughout the herd unit, and as an area to seek out green succulent forage, as water levels recede in late summer.

4.) Population Modeling: The bio-year 2023 postseason population estimate for this herd unit from PopR IPM was approximately 4,216 (CL = 3,703 – 4,751) pronghorn using the fixed effect structure. The effort variable for this model was licenses, and years of classification and harvest data used was 2009-2024. Model convergence was good.

2023 - JCR Evaluation Form

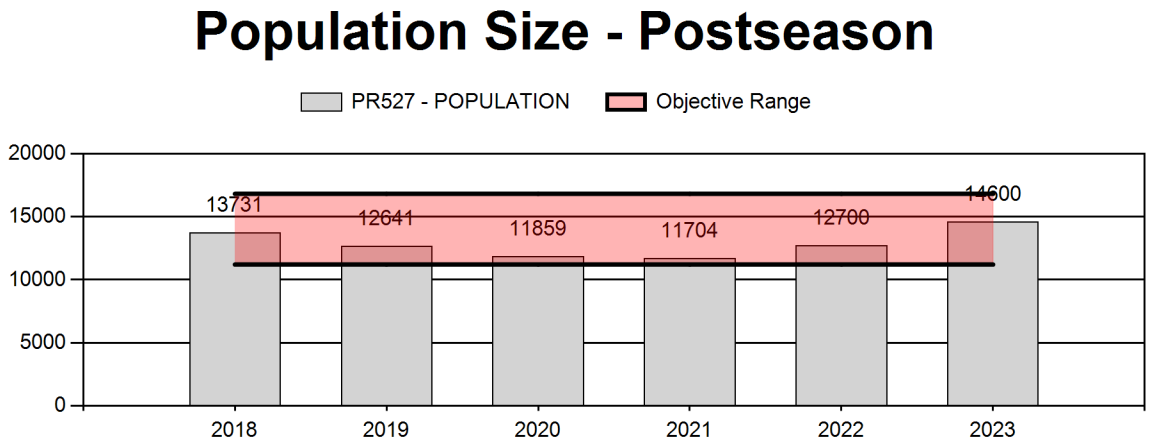
SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR527 - CENTENNIAL
HUNT AREAS: 37, 44-45
PREPARED BY: LEE KNOX

	2018 - 2022 Average	2023	2024 Proposed
Population:	12,527	14,600	17,000
Harvest:	934	832	850
Hunters:	1,063	840	900
Hunter Success:	88%	99%	94 %
Active Licenses:	1,169	976	1,000
Active License Success:	80%	85%	85 %
Recreation Days:	4,012	2,973	3,000
Days Per Animal:	4.3	3.6	3.5
Males per 100 Females	40	49	
Juveniles per 100 Females	55	50	

Population Objective (± 20%) :	14000 (11200 - 16800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	4%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/25/2024

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

	JCR Year	Proposed
Females ≥ 1 year old:	5%	3%
Males ≥ 1 year old:	22%	17%
Proposed change in post-season population:	10%	2%



2024 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. 31	400	Any antelope
37	6	Aug. 15	Sep. 19	Sep. 20	Oct. 31	100	Doe or fawn
44	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	75	Any antelope
45	1	Aug. 15	Sep. 14	Sep. 15	Oct. 31	600	Any antelope
45	6	Aug. 15	Sep. 14	Sep. 15	Oct. 31	50	Doe or fawn

2023 Hunter Satisfaction: 84% Satisfied, 10% Neutral, 6% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The management strategy is recreational management which prescribes for a buck ratio of 30 to 59:100 does. Buck ratios remain within management guidelines with an increase from 40:100 in 2022 to 49:100 in 2023 and a 3 year average buck ratio of 40:100 does. Due to prolonged drought, fawn ratios have remained low at 50:100 does, slightly below the already poor five year average fawn ratio of 55:100 does. Hunter success remained high in hunt area 45 at 91%, however success declined slightly in hunt area 37 from 88% in 2022 to 84% in 2023, and remained low in hunt area 44 at 72%. With hunter success in hunt area 45 over 90%, type 1 licenses will be increased to provide more opportunity while licenses in hunt areas 37 and 44 will remain status quo.

Male harvest rates were 17% in 2023 and predicted to be 17% in 2024. The three year average is 17%, shy of meeting the goal of 25% male harvest in recreationally managed herds. It was difficult to find a working 2023 IPM and we do not have much faith in the estimate. The Centennial herd unit has interchange with Colorado and is not a closed unit. It has always been difficult to model this population in the past, and it is likely that male harvest rate is closer to 25% than simulated in the IPM. We are maximizing opportunity where possible, while also addressing low populations and poor fawn recruitment in parts of the herd unit. We increased Type 1 licenses in Hunt Area 45 and will reevaluate hunter success in 2024.

2.) Management Objective review: The current objective was set at 14,000 in 1997. The management objective was reviewed during the 2023 season setting process with no change. We will review this herd objective again in 2028; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3.) Habitat Precipitation levels were below normal for the 2023 biological year. The NOAA weather station in Laramie received 12% less total precipitation for the year compared to long term averages, with 9.5 inches of total precipitation received. Precipitation events through winter and spring were below normal in low elevations. Mountain snowpack was above normal. Cool spring temperatures combined with below average precipitation accumulation delayed spring greenup. However, by June spring rains arrived and precipitation amounts were above normal for June

through August. Late July and early August brought favorable moisture patterns, resulting in herbaceous vegetation staying green much later into the year than normal. In the Centennial herd unit, private irrigated lands continue to be important for pronghorn by providing green succulent forages late in summer, when precipitation is below normal. Through fall and early winter 2023, conditions remained mild and precipitation for this period was below normal. Annual precipitation has been below normal in 5 of the last 6 years in this herd unit. It is important to note that timing of precipitation can be a large contributor to annual forage production. While precipitation was below normal for the calendar year, forage production was considered above average, largely due to timeliness of events.

4.) Population Modeling: The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 14,600 (CL = 12,300 – 16,500) pronghorn. The 2023 IPM model used a fixed effect structure, licenses was the effort variable, and harvest and classification data was from years 2009-2025. Model convergence was pretty likely, but not perfect. It was difficult to find a working 2023 IPM and we do not have a lot of faith in the estimate. Past line transect surveys vary from 17,000 to 32,000 and the model cannot seem to account for such large variations in the population. This herd is not a closed herd unit, but has significant interchange with Colorado which also creates issues with finding a working model. A line transect survey is scheduled for the spring of 2024 and hopefully will provide more a better population estimate.

2023 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR528 - ELK MOUNTAIN
HUNT AREAS: 50
PREPARED BY: TEAL CUFAUDE

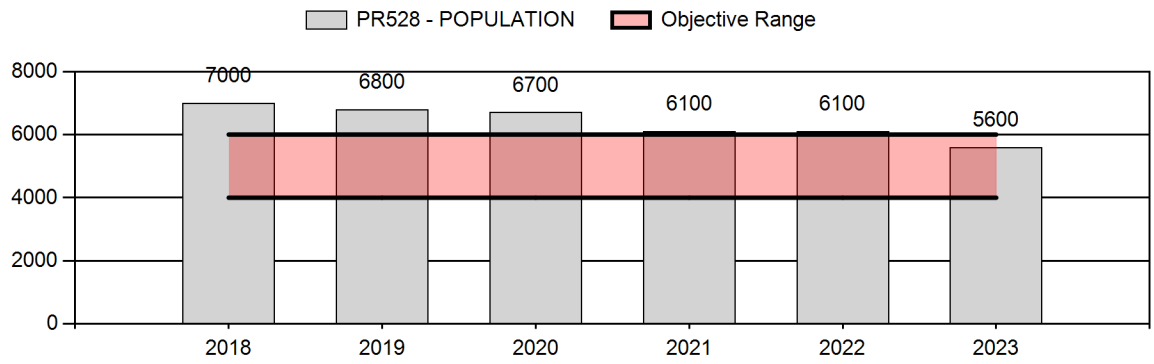
	2018 - 2022 Average	2023	2024 Proposed
Population:	6,540	5,600	5,900
Harvest:	390	309	309
Hunters:	418	326	326
Hunter Success:	93%	95%	95%
Active Licenses:	462	391	391
Active License Success:	84%	79%	79%
Recreation Days:	1,283	1,042	1,025
Days Per Animal:	3.3	3.4	3.3
Males per 100 Females	43	42	
Juveniles per 100 Females	46	36	

Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	12%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/18/2024

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:	18%	18%
Proposed change in post-season population:	-7%	5%

Population Size - Postseason



2024 Hunting Seasons
Elk Mountain Pronghorn (PR528)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Open	Close	Open	Close		
50	0			Sept. 1	Sept. 15	50	Any Antelope, muzzle-loading firearms only
50	1	Aug. 15	Aug. 31	Sept. 16	Oct. 31	300	Any Antelope
50	6	Aug. 15	Aug. 31	Sept. 16	Oct. 31	100	Doe or Fawn

2023 Hunter Satisfaction: 88.1% Satisfied, 8.3% Neutral, 3.6% Dissatisfied

2024 Management Summary

1. **Hunting Season Evaluation:** The buck to doe ratio 42 bucks: 100 does was similar to the five-year average 43 bucks: 100 does which is within the recreational management objective of 30-59 bucks: 100 does. Managers have concerns for future buck recruitment based on lower fawn survival when comparing the 2023 pre-season fawn ratios of 36 fawns: 100 does to the five year averages of 46 fawns: 100 does. The yearling-buck to doe ratio 10 yearling-bucks: 100 does was similar to the five year average of 12 yearling-bucks: 100 does which indicates that over-winter juvenile survival has been steady for this herd. Days to harvest (3.4) and hunter success (94.8%) was similar with the five year average. Given hunter satisfaction, success and effort were all similar to their respective five year averages. There were adequate opportunities for harvest, and it does not appear based on these metrics that this population experienced above average winter mortality which was the main factor in pronghorn mortality in herd units to the west.

   Liberal season structures coupled with times of severe drought and the 2022/23 winter all likely contributed in a decrease in the population towards the objective of 5,000 pronghorn over the past five years. If this herd experiences average fawn production and we achieve the prescribed harvest rates, then the population is projected to increase slightly from 5,600 to 5,900 pronghorn. The harvest rate of adult bucks is projected to be 18% which is similar to the three year average of 19.6%. With the loss of the Overland and Pass Creek Hunter Management Areas, which provided over 20,000 acres of access, in conjunction with well-below-average fawn recruitment there does not appear to be opportunity to increase Type 1 licenses at this time to try and achieve a 25% harvest rate of adult bucks.
2. **Management Objective Review:** The objective was last reviewed in 2019 and will be reviewed in 2025. We are pushing this review back because managers received comments that indicated that the public may be concerned about the current number of pronghorn in the Elk Mountain herd. Extending this a year will give managers another year to gather feedback on the current objective of 5000 pronghorn.
3. **Weather/Habitat:** Through fall and early winter 2022-2023, conditions remained mild with no persistent snow accumulations in Hunt Area 50. As winter progressed, persistent snow events led to higher-than-normal snowpack at low elevations. By late February/mid-March, lower elevations had 8-24 inches more snow than normal. Higher than normal snowpack continued until early April when snow began to melt. Given the extreme winter conditions, movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality.

Spring precipitation was highly variable, with May and July receiving below-average precipitation while June and August received above-average precipitation. Late August monsoonal moisture patterns resulted in some green-up of herbaceous vegetation, which likely aided fawn rearing does in meeting nutritional demands. NOAA weather station data from Rawlins reported a 59% increase in average annual precipitation.

4. **Line Transect (LT) Survey:** A LT was conducted to estimate pronghorn abundance at the end of the 2022 biological year. The population estimate was 5,180 pronghorn (95% confidence interval= 2,922-7438 pronghorn).
5. **Population Modeling:** In 2021, WGFD managers started using PopR Integrated population models (IPM) to estimate population indices for pronghorn. The 2023 post-season population estimate for this herd unit was 5,635 (CI= 4,975-6,339).

2023 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2023 - 5/31/2024
HERD: PR529 - BIG CREEK
HUNT AREAS: 51
PREPARED BY: TEAL CUFAUDE

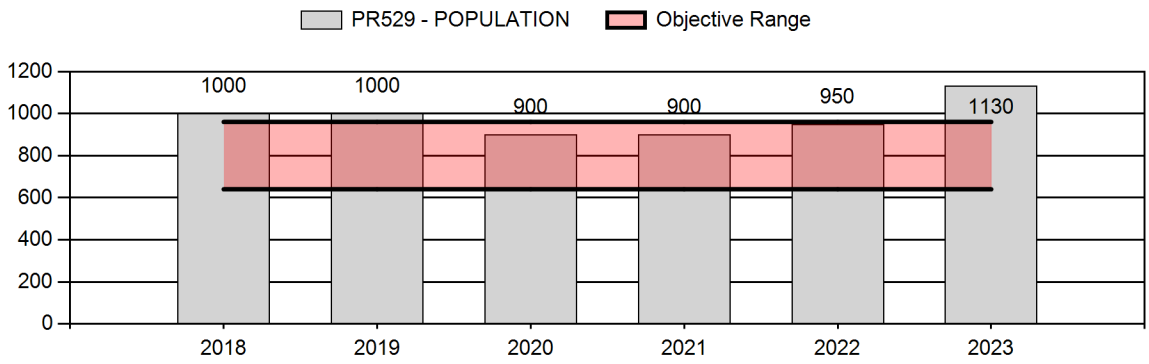
	2018 - 2022 Average	2023	2024 Proposed
Population:	950	1,130	1,165
Harvest:	152	88	88
Hunters:	167	106	100
Hunter Success:	91%	83%	88 %
Active Licenses:	195	106	106
Active License Success:	78%	83%	83 %
Recreation Days:	609	345	350
Days Per Animal:	4.0	3.9	4.0
Males per 100 Females	69	60	
Juveniles per 100 Females	61	34	

Population Objective (± 20%) :	800 (640 - 960)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	41%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/09/2024

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

	JCR Year	Proposed
Females ≥ 1 year old:	5%	5%
Males ≥ 1 year old:	14%	15%
Proposed change in post-season population:	-9%	3%

Population Size - Postseason



2024 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	Sep. 16	Nov. 14	25	Doe or fawn

2023 Hunter Satisfaction: 90% Satisfied, 5% Neutral, 5% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The 2023 preseason buck to doe ratio (60/100) was lower than the preceding five year average (69/100) but remained within the recreational management objective parameters of 30-59 bucks per 100 does. The yearling buck to doe ratio (10/100), indicated poor over-winter fawn survival in 2022-23. Additionally, the fawn to doe ratio (34/100) was the lowest observed since 2011.

Winter conditions preceding the 2023 hunting season were severe and pronghorn production and recruitment were negatively affected. However, the 2023 harvest metrics for type 1 licenses (87.5% hunter success, 4.1 days to harvest, and high hunter satisfaction) indicated pronghorn hunting was adequate in 2023.

Pronghorn can be difficult to access in this herd unit as they often congregate on private land during the hunting season. The 2023 type 6 hunter success (61%) remained low and was attributed to fewer does available to harvest on public land. Participation on the type 6 licenses also remained low in 2023 limiting our interest in adding more type 6 licenses. Reported private land damage was minimal in 2023 and we don't anticipate pronghorn damage in 2024, so type 6 license quotas were maintained at 25 in 2024.

If type 1 hunter success remains unchanged in 2024, the harvest rate of adult bucks is projected to be 14%. Publically accessible buck pronghorn are limited and without improved hunter access in the herd unit this adult male harvest rate is acceptable. The 2024 license allocation is expected to maintain pronghorn numbers slightly above the 800 (±20%) pronghorn objective range.

2.) Management Objective Review: We plan to maintain the current postseason population objective and recreational management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2029; however, if the situation arises that a change is needed, we will review and submit a proposal as needed. The management objective for Big Creek pronghorn is a postseason population objective of 800 (±20%) pronghorn.

3.) Weather/Habitat: Through fall and early winter 2022-23, conditions remained mild, with no persistent snow accumulations in Hunt Area 51. As winter progressed, persistent snow events led

to higher-than-normal snowpack at low elevations. By late January, lower elevations had 8-24 inches more snow than normal. Higher than normal snowpack continued until mid-April when snow began to melt. Given the extreme winter conditions, movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality. While annual precipitation was normal in the 2022-2023 water year, moisture events in the critical growing months for herbaceous and woody vegetation were below normal. Moisture events in August provided some late summer green-up of forage which likely aided fawn rearing does in meeting nutritional demands.

Past large-scale wildfires within the Sierra Madre Range (Beaver Creek fire – 2016, and Ryan fire – 2018) are recovering at varying rates. These fires have increased shrub and aspen age class diversity and reset succession within the fire perimeters.

4.) Line Transect (LT) Survey: A LT survey was conducted to estimate pronghorn abundance at the end of biological year 2018. The end of biological year population estimate was 2,704 pronghorn (95% CI 1,946-3,757 pronghorn). A LT will be conducted in 2024.

5.) Population Modeling: The 2023 postseason population estimate for this herd unit from the PopR IPM was 1,130 (923-1,344) pronghorn. A IPM model with a slightly different structure (constant juvenile survival v. varying juvenile survival) estimated a lower postseason population estimate that was within the objective range and indicated type 1 license hunter success similar to 2023 would harvest a higher percentage of preseason bucks than the chosen model.

2023 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2023 - 5/31/2024

HERD: MD534 - GOSHEN RIM

HUNT AREAS: 15
PREPARED BY: KEATON WEBER

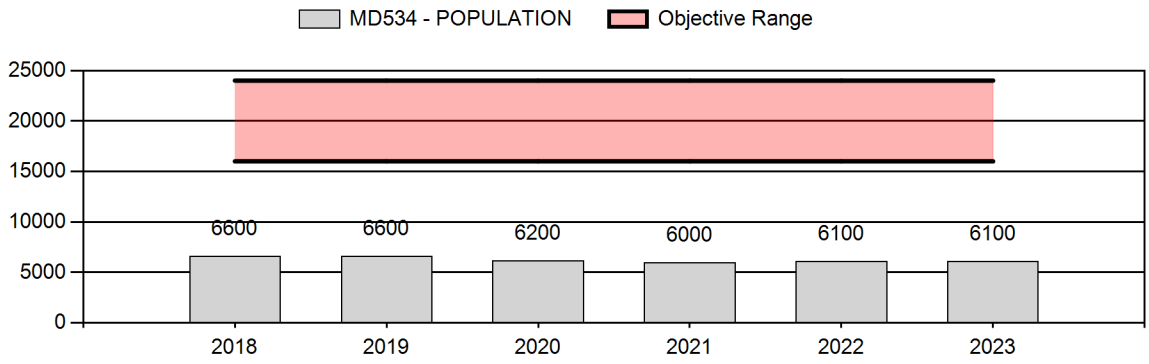
	2018 - 2022 Average	2023	2024 Proposed
Population:	6,300	6,100	6,400
Harvest:	799	631	600
Hunters:	1,650	1,349	1,200
Hunter Success:	48%	47%	50%
Active Licenses:	1,723	1,439	1,400
Active License Success:	46%	44%	43%
Recreation Days:	7,081	5,975	6,000
Days Per Animal:	8.9	9.5	10
Males per 100 Females	30	30	
Juveniles per 100 Females	46	60	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-69.5%
Number of years population has been + or - objective in recent trend:	31
Model Date:	3/1/2024

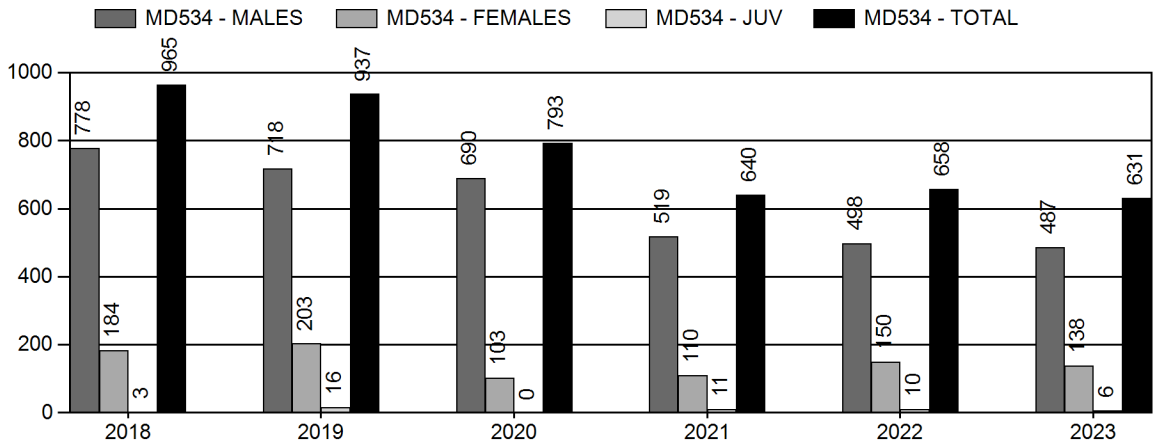
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	35%	35%
Proposed change in post-season population:	+7%	5%

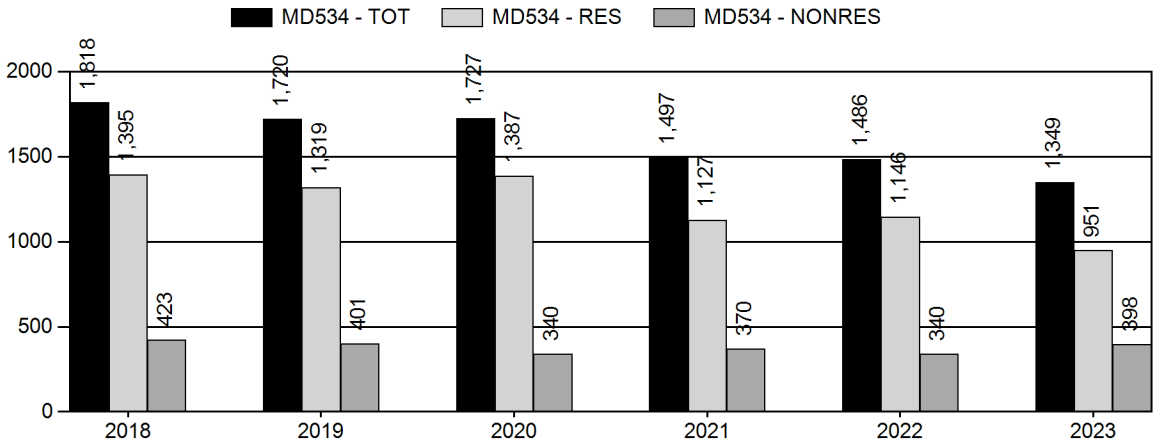
Population Size - Postseason



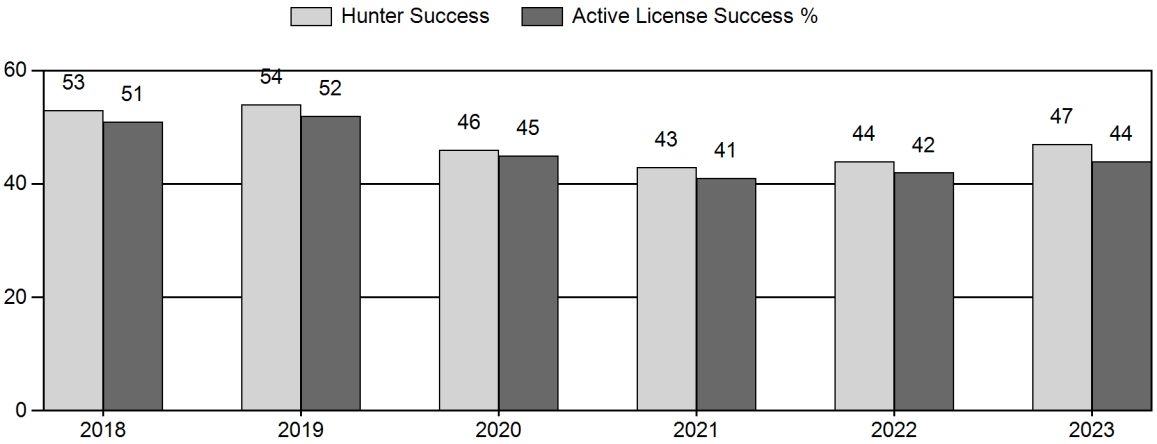
Harvest



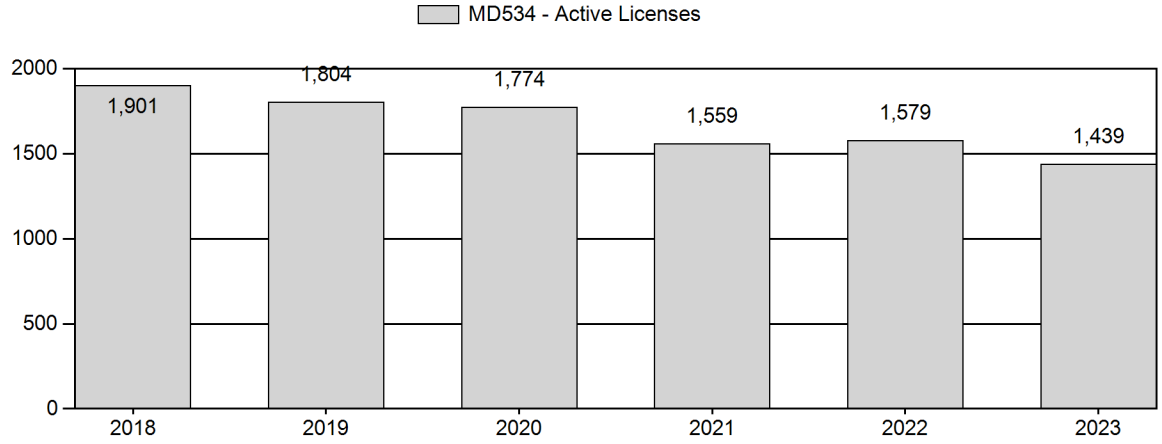
Number of Hunters



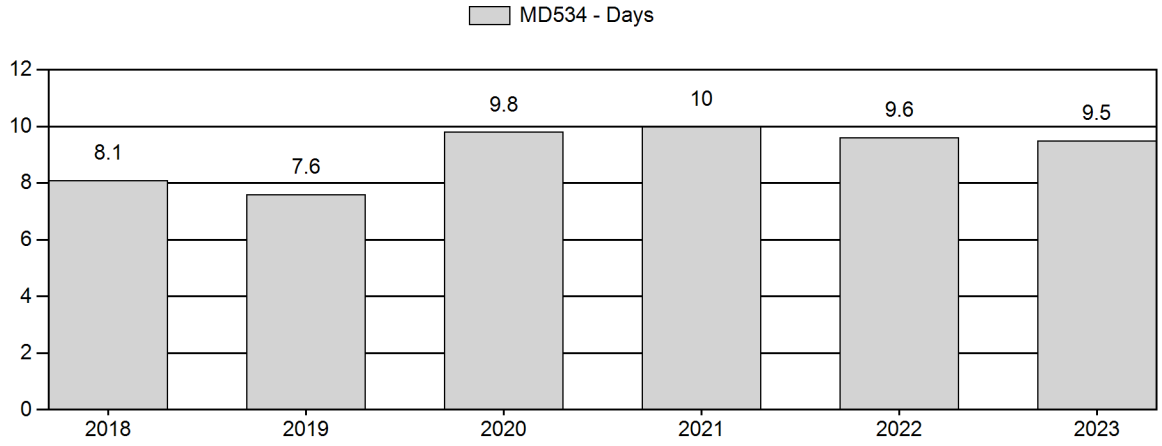
Harvest Success



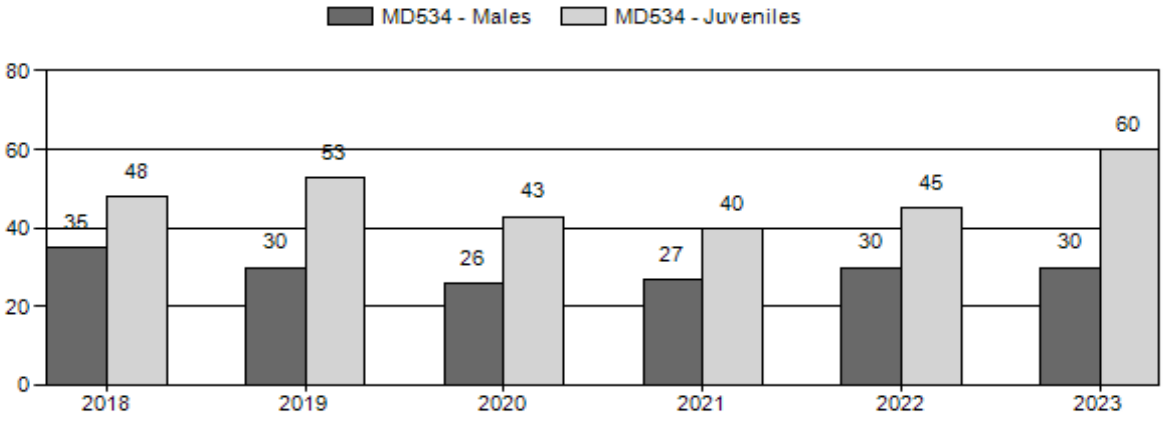
Active Licenses



Days Per Animal Harvested



Postseason Animals per 100 Females



2024 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	150	Doe or fawn valid on private land

2024 Region T nonresident quota: 400 licenses

2023 Hunter Satisfaction: 54% Satisfied, 22% Neutral, 23% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: Goshen Rim Mule Deer Herd Unit has been below the objective of 20,000 mule deer for well over the past 30 years, so the season is structured to be as conservative as possible while still addressing minimal damage concerns throughout the herd unit. A reduction of 100 Type 6 licenses will reduce harvest pressure on the female portion of the population. Additionally, due to a decrease in damage claims throughout the hunt area, there is less of a need for Type 6 licenses to address those damage concerns. Type 6 licenses are valid on private land only to minimize doe harvest on the limited public lands and to make sure those licenses are available to address damage claims on private croplands. Fawn ratios in 2023 were 60 fawns per 100 does. This is the highest fawn ratio within this herd unit since 2015. The previous 5 year average (2018-2022) fawn ratio was 46 fawns per 100 does. This high fawn ratio is likely a direct response to the excellent spring and summer moisture that allowed for high fawn survival. Buck ratios in 2023 were 30 bucks per 100 does and the 5-year average buck ratio is 29 bucks per 100 does (Appendix A). Since buck ratios are within the management strategy limits (20-30 bucks per 100 does) there does not appear to be a 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 up for priority surveillance again in 2025.

2.) Management Objective Review: In 2023, the Goshen Rim Mule Deer herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the best course of action is to remain at recreational management with a population objective of 20,000 mule deer. This herd unit will be up for objective review again in 2028.

3.) Weather and Habitat: Annual precipitation was above normal in the Goshen Rim herd unit in 2023. NOAA weather station data from Torrington, Cheyenne, and Fort Laramie showed a 13%, 32%, and 24% increase respectively from average for the year. Winter severity was slightly more difficult, especially in the northern quarter of the herd unit. Several heavy snows and subsequent crusting of snow during midwinter partial thawing events likely contributed to difficult wintering conditions in December through late February. Due to the juxtaposition of annual and perennial agricultural croplands intermixed with rangeland habitats, mule deer utilize row crops and alfalfa in addition to native rangeland forage to meet their nutritional demands

throughout the year. Mixed mountain shrub habitats found on the Goshen Rim 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. 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 exhibit equally poor forage production and nutritive quality for much of the year. In above average precipitation years, cover values in CRP may be temporarily better in summer months. Juniper encroachment into riparian areas and upland areas, including Ponderosa pine forests in the northern portion of the herd unit, and mixed mountain shrub habitats throughout the entire herd unit, have resulted in more xeric conditions and a reduction of understory herbaceous forages in portions of this herd unit.

Cheatgrass control was completed on private and BLM lands in northern portions of Hunt Area 15, totaling 1,639 acres.

4.) Chronic Wasting Disease Management: Prevalence estimates and sample sizes are below (Table 1). Most recently, we have sustained a 39% prevalence through 2021-2023. This herd was up for priority surveillance in 2020-2021 and will be back up for priority surveillance in 2026. Managers are concerned with this high prevalence in the herd unit and are in the process of gaining public input on CWD management options within the Department's CWD Management Plan.

Table 1. CWD prevalence for hunter-harvested mule deer in the Goshen Rim Mule Deer Herd, 2021 - 2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%)	Yearling Males	Adult Females
2021	**54% (n=28)**	0% (n=5)	0% (n=1)
2022	**31%(n=36)**	0% (n=1)	0% (n=6)
2023	**35% (n=23)**	0% (n=1)	25% (n=4)
2021-2023	**39% (20-50%, n=87)**	0% (n=7)	9% (n=11)

5.) Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2023 postseason population estimate for this herd unit was 6,100 (CL = 5,300 – 7,100) mule deer.

Appendix A. MD534 Postseason classification summary from 2018-2023.

2018 - 2023 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
2018	6,600	97	142	65	11	0	315	19%	908	55%	432	26%	1,655	824	11	24	35	± 3	48	± 3	35
2019	6,600	102	90	42	4	0	238	16%	800	55%	422	29%	1,460	1,094	13	17	30	± 2	53	± 4	41
2020	6,200	82	96	37	3	0	218	15%	837	59%	356	25%	1,411	806	10	16	26	± 2	43	± 3	34
2021	6,000	62	75	30	0	0	167	16%	621	60%	250	24%	1,038	0	10	17	27	± 3	40	± 4	32
2022	6,100	35	45	26	0	0	106	17%	353	57%	158	26%	617	0	10	20	30	± 4	45	± 5	34
2023	6,100	79	93	44	2	0	218	16%	736	53%	441	32%	1,395	0	11	19	30	± 3	60	± 4	46

2023 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2023 - 5/31/2024

HERD: MD537 - LARAMIE MOUNTAINS

HUNT AREAS: 59-60, 64
PREPARED BY: KEATON WEBER

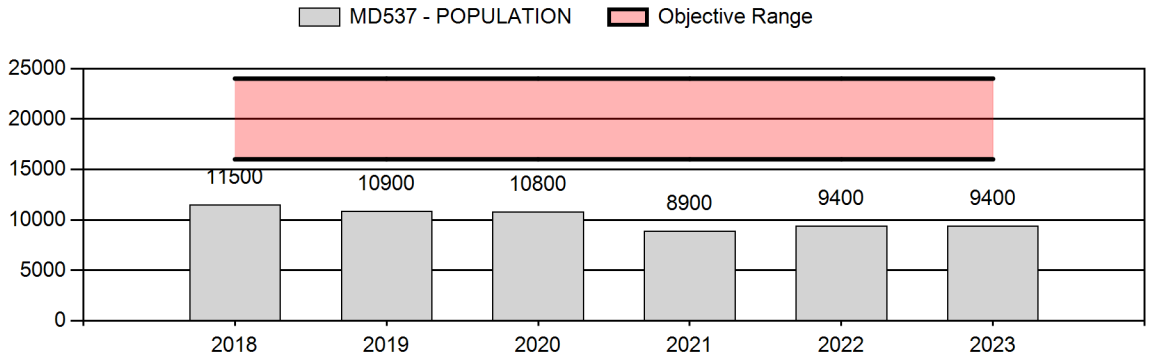
	2018 - 2022 Average	2023	2024 Proposed
Population:	10,300	9,400	8,900
Harvest:	895	748	650
Hunters:	1,903	1,685	1,600
Hunter Success:	47%	44%	41%
Active Licenses:	1,954	1,724	1,600
Active License Success:	46%	43%	41%
Recreation Days:	8,958	7,983	8,000
Days Per Animal:	10.0	10.7	12.3
Males per 100 Females	37	28	
Juveniles per 100 Females	54	69	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-53%
Number of years population has been + or - objective in recent trend:	31
Model Date:	3/20/2024

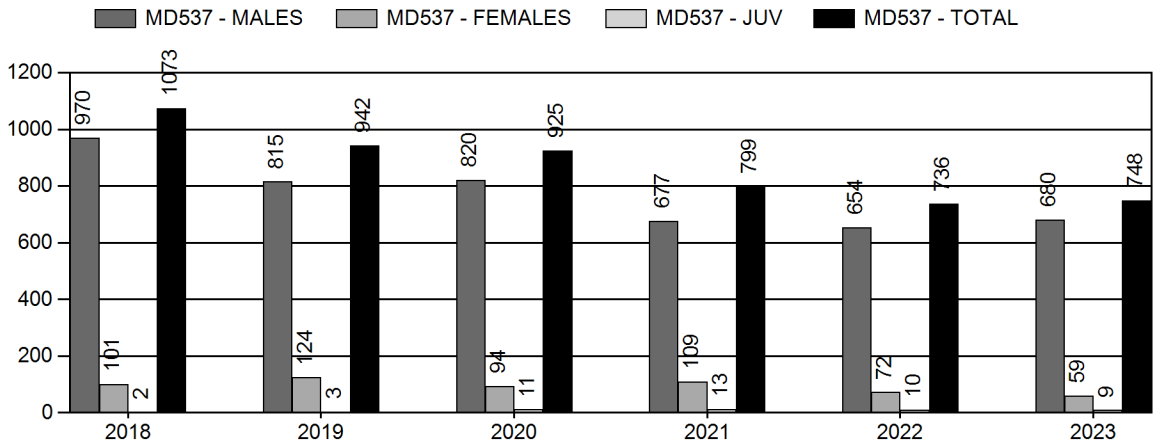
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	2%	2%
Males ≥ 1 year old:	29%	29%
Proposed change in post-season population:	1%	-6%

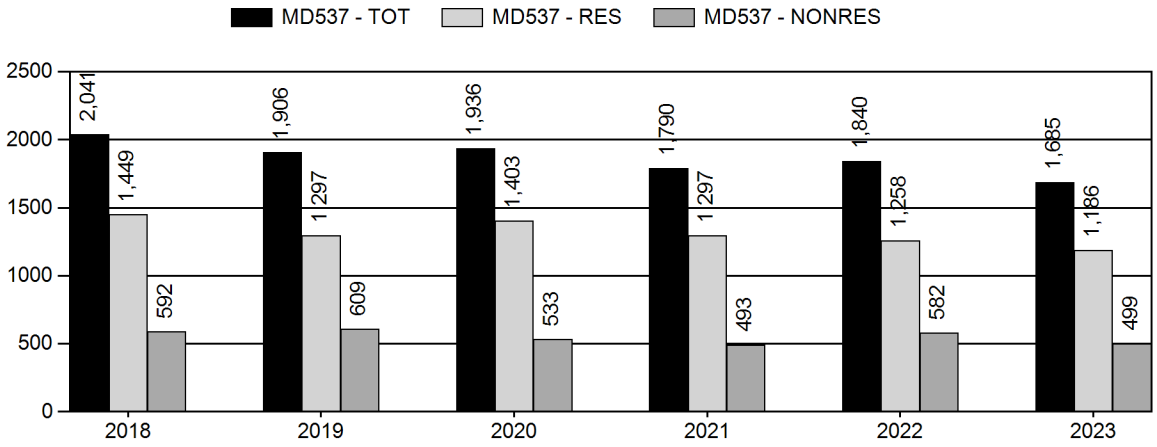
Population Size - Postseason



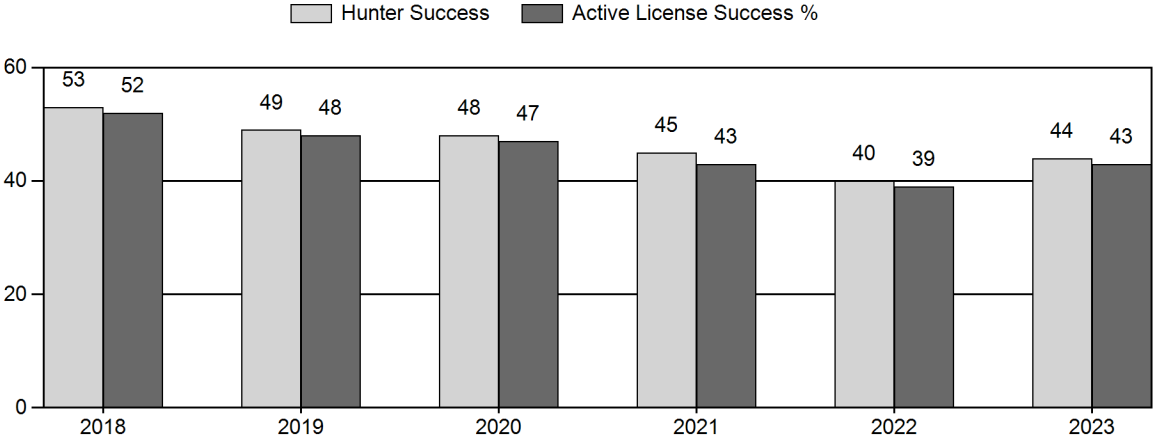
Harvest



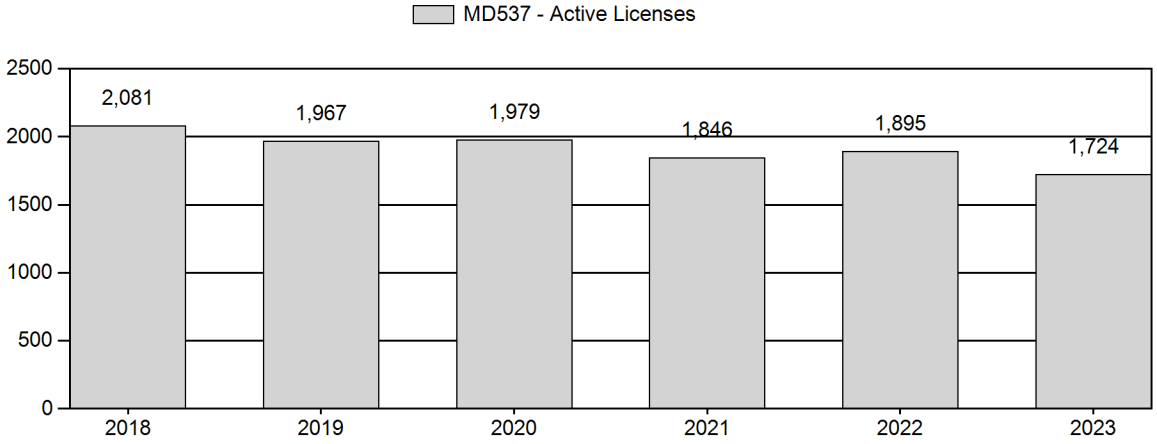
Number of Hunters



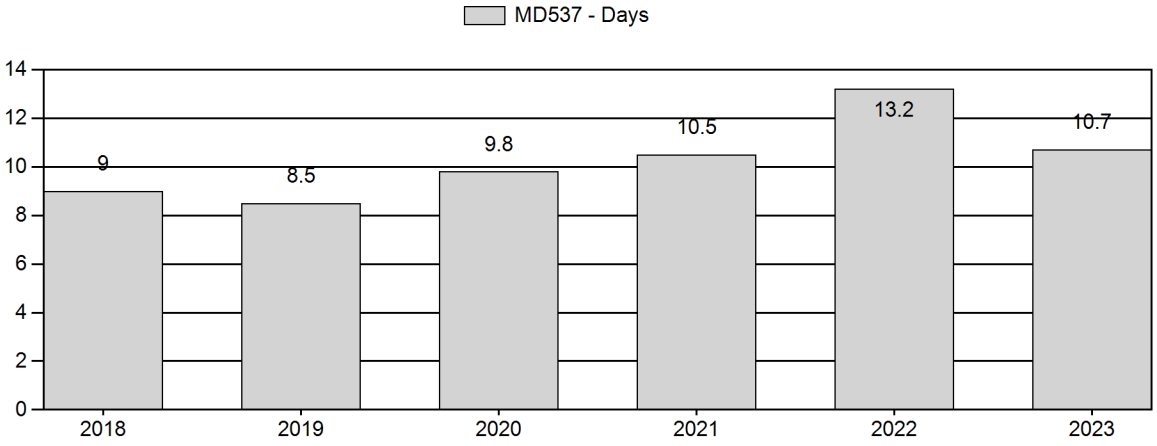
Harvest Success



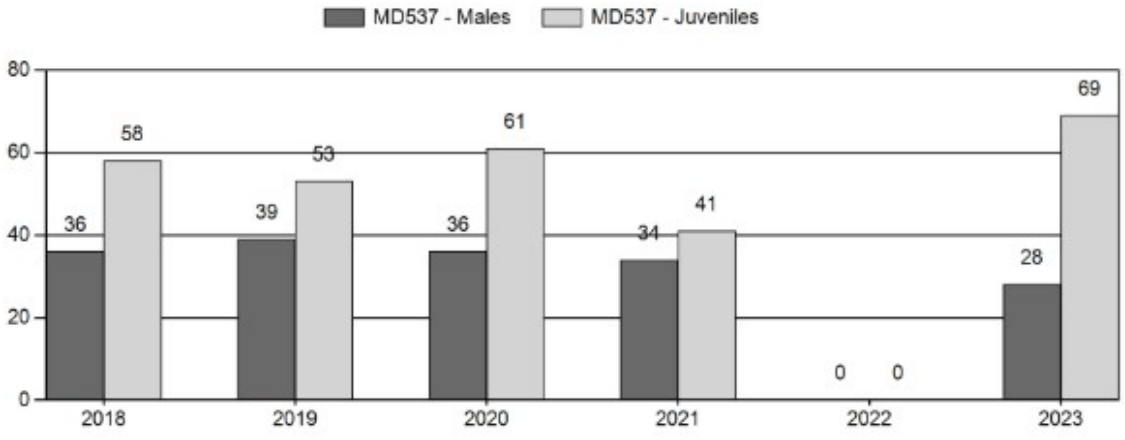
Active Licenses



Days Per Animal Harvested



Postseason Animals per 100 Females



2024 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	100	Doe or fawn valid on private land
59,64	6			Nov. 1	Dec. 31		Doe or fawn white-tailed deer, valid in the entire area
60	1	Sept 1	Sept 30	Oct. 15	Nov. 5	100	Any deer
60	2	Sept 1	Sept 30	Oct. 15	Nov. 5	200	Any deer off national forest
60	6	Sept 1	Sept 30	Oct. 15	Nov. 30	50	Doe or fawn
64	Gen	Sept. 1	Sept. 30				Antlered mule deer or any white-tailed deer valid in the entire area
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

2024 Region J nonresident quota: 750 licenses

2023 Hunter Satisfaction: 51% Satisfied, 24% Neutral, 25% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The Laramie Mountains Mule Deer Herd Unit's population continues to be well below the objective of 20,000 mule deer and as a result the 2023 season is conservative in structure. The general seasons will remain at 16 days to take advantage of high buck ratios (2023 buck ratio: 28 bucks per 100 does) that are above the upper end of the recreational management guidelines of 20-30 bucks per 100 does (Appendix A *PENDING).* The 5 year average buck ratio is 35 bucks per 100 does. In 2022, managers conducted a Sightability Survey flight that encompassed roughly 30 hours of flight time to provide a reliable density estimate, which resulted in an estimate of 11,700 deer. This herd's population continues to decline due to multiple years of poor fawn recruitment, consecutive years of drought, and high prevalence of Chronic Wasting Disease. However, fawn ratios in 2023 were the highest they have been since 2015. The 2023 fawn ratio was 69 fawns per 100 does and the 5 year average fawn ratio is 54 fawns per 100 does. This high fawn ratio is likely a direct response to the excellent spring and summer moisture that allowed for high fawn survival. Based on harvest data and previous post-season composition surveys the majority of mule deer on the landscape are Class I (≤19" antler width) and Class II (20-24" antler width) bucks. Over the last 5 years of classification data (Appendix A), 45% of males are Class I, 23% of males are Class II and 3% were Class III (≥25" antler width). There are very few Class III males (> 25" in antler width) on the landscape, most likely due to high prevalence of CWD within this herd unit. Consecutive years of poor fawn production also plays a role in the number of older age class males within the population.

In 2022, the Department began a 5-year statewide focal mule deer monitoring research project. Five mule deer herds throughout the state were selected for a robust GPS collaring effort. This includes the following herd units: Laramie Mountains, Sweetwater, Wyoming Range, Upper Shoshone, and North Bighorns. The goal of this focal herd project is to better understand survival, as it relates to the role of disease, habitat and predation has on the population. Additionally, managers will learn more about movement patterns, seasonal ranges, drivers of herd performance and more. In each of these five herds, 80 does, 30 bucks and 100 juveniles (6 month olds) are collared with GPS collars. The doe and buck sample sizes will be maintained throughout the five years and 100 juveniles will be collared each year, for the first three years of the project.

The Laramie Mountains herd unit is one of two herds that has a cause-specific mortality component, which will provide managers with a clearer picture of what each cohort is succumbing to. In the event of a collar mortality notification, WGFD personnel respond in a timely manner to investigate and determine what the cause of death was. These cause-specific mortality results are pending.

During the winter of 2022-2023, the Laramie Mountains, experienced above normal winter severity. Survival rates of bucks, does, and fawns within the Laramie Mountains herd unit were

high compared to the other four focal herds for 2023 (Appendix B). Laramie Mountains mule deer overwinter (Dec. 1, 2022 – May 31, 2023) doe survival was 79% and overwinter buck survival was 86%. Overwinter survival for juveniles was 66%. Survival rates for all statewide focal herds can also be found in Appendix B.

2.) Management Objective Review: In 2024, the Laramie Mountains mule deer herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the current management strategy of recreational management with an objective of 20,000 is still warranted. This herd unit will be up for objective review again in 2029.

3.) Weather and Habitat: Annual precipitation in the hunt area was mixed for 2023 based on weather data analyzed from Cheyenne and Laramie weather stations. NOAA weather station data from Laramie, Cheyenne, and Douglas showed a 12% decline and a 32% and 26% increase from average for the year. High variation in precipitation amounts was witnessed throughout the herd unit. Winter severity was above normal, particularly in the northern third of the herd unit and resulted in some winter mortality. Snow loading, sub-zero wind chills, and some crusting of snows due to mid-winter thawing events resulted in tougher conditions for deer at times. One large snowstorm event happened on April 4th, dropping over 20" or more of snow in much of the herd unit. Herbaceous forage production was very good throughout the herd unit in spring. While precipitation amounts were above normal in much of the herd unit, emphasis must be placed on the timing of precipitation this year, and the role it played in contributing to herbaceous forage production, as much as overall precipitation did. 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 recent disturbances.

Six Rapid Habitat Assessments (RHA's) were completed on 580 acres in the Laramie Mountains as part of the Focal Herd mule deer study. Aspen habitats in the Pole Mountain area showed varied levels of age class diversity. Riparian areas in Sybille Canyon and Pole Mountain showed some negative impacts from browsing due to utilization by livestock and big game species. Rangelands assessed were comprised of mostly late seral shrub stands with mostly mature to decadent shrubs present. We will continue to sample habitats utilized by collared doe mule deer for several years as part of the Focal Herd study.

Cheatgrass spraying occurred in the Pole Mountain, Curt Gowdy State Park, Mule Creek PAA, and Sybille Canyon areas in 2023, totaling over 12,000 acres. Treatments occurred in areas burned by wildfire, prescribed fire, and also where cheatgrass had encroached into undisturbed habitats. Dalmation toadflax and cheatgrass are both present in mixed mountain shrub habitats in the southern portions of the herd unit, causing concern for habitat managers, as herbicides traditionally used for Dalmation toadflax control result in significant non-targeted plant injury. The use of Rejuvra herbicide may aid in control of cheatgrass and Dalmation toadflax in the future, and result in less non-targeted plant injury. Approval of this herbicide for use by BLM is paramount to large scale control efforts going forward in landscapes consisting of mixed

ownerships. We continue to observe high cheatgrass composition in areas burned by the Britania wildfire, and slower but consistent encroachment into areas not burned by wildfire.

Fence conversion efforts from woven wire/barbed wire or 5 to 6 strand barbed wire continue in the Laramie Mountains herd unit. In 2023, a total of 8.25 miles were converted on three separate sites including the Mule Creek PAA, Thorne Williams WHMA, and Laramie Peak WHMA, to wildlife friendly line spacing and wire heights. An additional 11 miles are slated for conversion in 2024 on the same three sites.

Competition with elk for basic habitat requirements is likely a contributing factor for poor mule deer performance within the herd unit. Within deer hunt areas 59 and 60 we continue to see exponential elk herd growth, putting strains on habitats historically and previously occupied mostly by mule deer. Dietary overlap in spring, summer, and fall ranges between elk, mule deer, and cattle can, and likely do result in increased competition for resources.

4.) Chronic Wasting Disease Management: This was a Tier 1 surveillance herd in 2022 in which managers needed to collect 200 CWD samples. By implementing mandatory CWD sampling, managers collected 390 CWD samples in 2022. Mandatory sampling helped increase sample sizes from areas with historically low levels of CWD samples. Specifically, Hunt Area 60 has limited licenses available, so managers have struggled obtaining sufficient sample sizes. The average annual sample size from 1997-2021 in hunt area 60 was 13 samples, in 2022, 67 samples were collected, which is an 81% increase in sample size. Mandatory sampling also enabled managers to collect female samples, which in the past was difficult to accomplish. The average annual sample size from 1998-2021 in the herd unit was 5 female samples, in 2022, 60 female samples were collected throughout the herd unit. This sample size of 60 allowed for managers to obtain a more confident CWD prevalence within the female portion of the population (Table 1). Thus, allowing for a better understanding of how CWD is impacting the reproductive portion of the population.

A local CWD Working Group, comprised of 11 members of the public from the local area, was created in July of 2022. The goal of this Local CWD Working Group was to formulate CWD management recommendations from the Department's CWD Management Plan. Over the course of 12 months and 6 meetings, the group reviewed the Department's CWD management plan and what CWD management actions within that management plan would be applicable and acceptable on a local level to implement within the Laramie Mountains mule deer herd unit.

Below is a summary of the CWD management options within the Department's CWD Management Plan and the Local CWD Working Group's recommendations on those options:

1. Reduce artificial sources of concentration – YES (unanimous)
    a. Reduce concentrations of deer (i.e. exclusion fencing, exclusion from salt/mineral sources, etc.)
2. Hunter Harvest Management
    a. Increase mature male harvest – YES (8 in favor, 3 opposed)
    b. Decrease deer densities in localized areas ("hot spots") of high prevalence – NO (unanimous)

3. Regulatory and Agency Actions – YES (unanimous)
    a. Regulations on carcass disposal, carcass transport, feeding, etc.
    b. Education, outreach, and research on CWD
    c. Inter-agency (State, Federal, Tribal and International) communication on CWD management
    d. Mandatory CWD Sampling

In July 2023, managers presented the above recommendations to the WGFD Commission to seek approval to begin implementation of these recommendations. After public comment and deliberation by the Commission, it was decided that there was not enough broad public support to implement harvest management. More specifically, there was strong public and Commission opposition in proposing a late season to increase mature male harvest in an attempt to stabilize or reduce CWD prevalence within the herd unit. On the contrary, managers will begin to implement the other approved management options that were recommended by the working group.

Table 1. CWD prevalence for hunter-harvested mule deer in the Laramie Mountains Mule Deer Herd, 2021 – 2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%)	Yearling Males	Adult Females
2021	**19% (n=83)**	0% (6)	25% (4)
2022	**19% (n=390)**	8% (37)	3% (60)
2023	**19% (n=88)**	0% (7)	0% (10)
2021-2023	**19% (13%-22%, n=561)**	6% (50)	4% (74)

5.) Population Modeling: In 2021, WGFD managers began using PopR integrated population models (IPM) to estimate population indices for mule deer and pronghorn. The bio-year 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 9,400 (CL = 7,900 – 10-900) mule deer

Appendix A. MD537 postseason classification summary from 2018-2023

2018 - 2023 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
2018	11,500	76	123	50	3	0	252	18%	706	52%	409	30%	1,367	1,258	11	25	36	± 3	58	± 4	43
2019	10,900	117	181	92	13	0	403	20%	1,038	52%	554	28%	1,995	1,329	11	28	39	± 3	53	± 3	38
2020	10,800	27	48	30	3	0	108	18%	302	51%	183	31%	593	955	9	27	36	± 5	61	± 7	45
2021	8,900	20	55	29	4	0	108	19%	321	57%	132	24%	561	0	6	27	34	± 5	41	± 5	31
2022	9,400	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2023	9,400	22	13	11	3	0	49	14%	173	51%	119	35%	341	0	13	16	28	± 6	69	± 10	54

Appendix B. MD537 collared mule deer survival results.

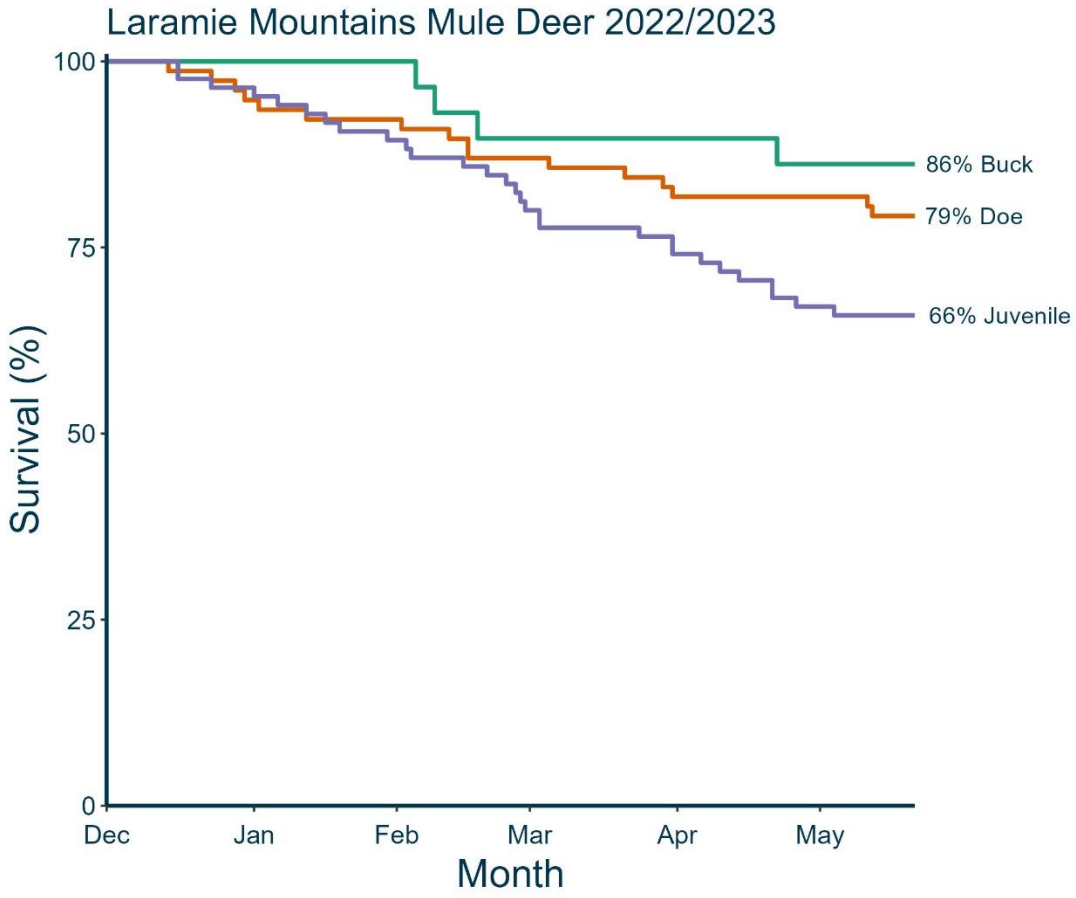


Image 1. Overwinter (Dec. 1, 2022 – May 31, 2023) survival rates for Laramie Mountains mule deer.

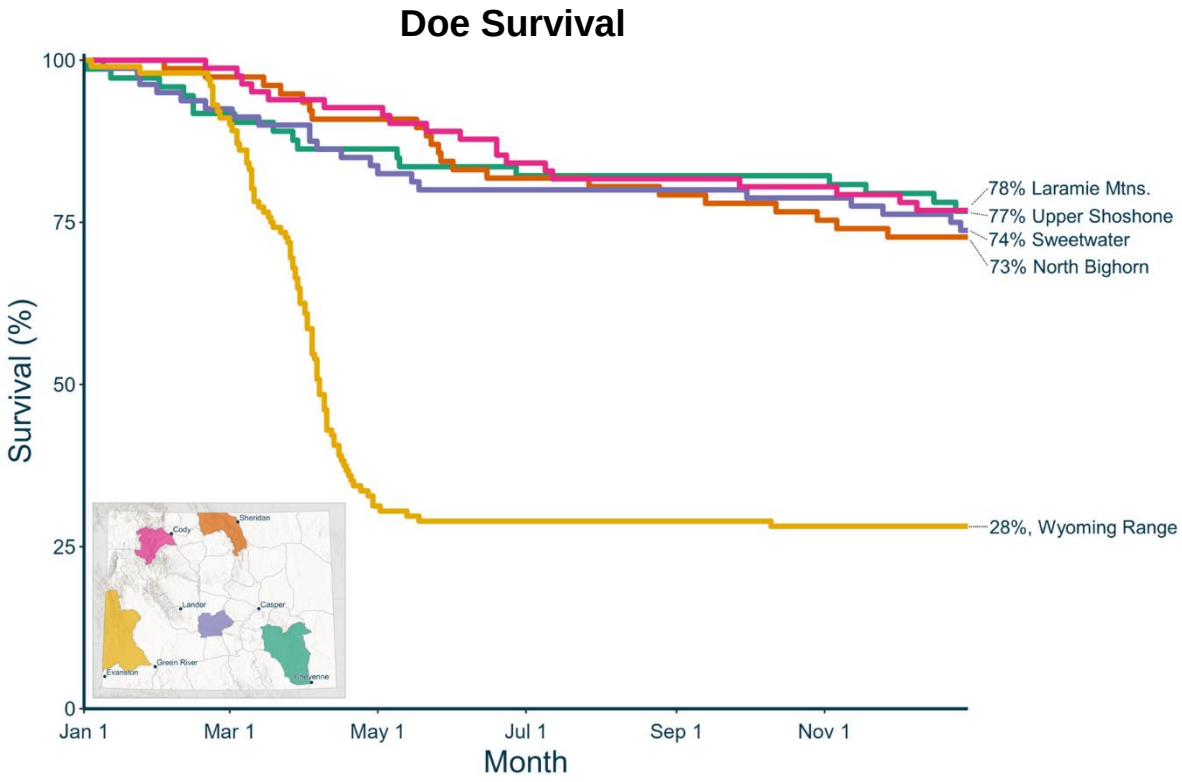


Image 2. Statewide Adult doe survival rates for Wyoming Focal Herd Project during 2023.

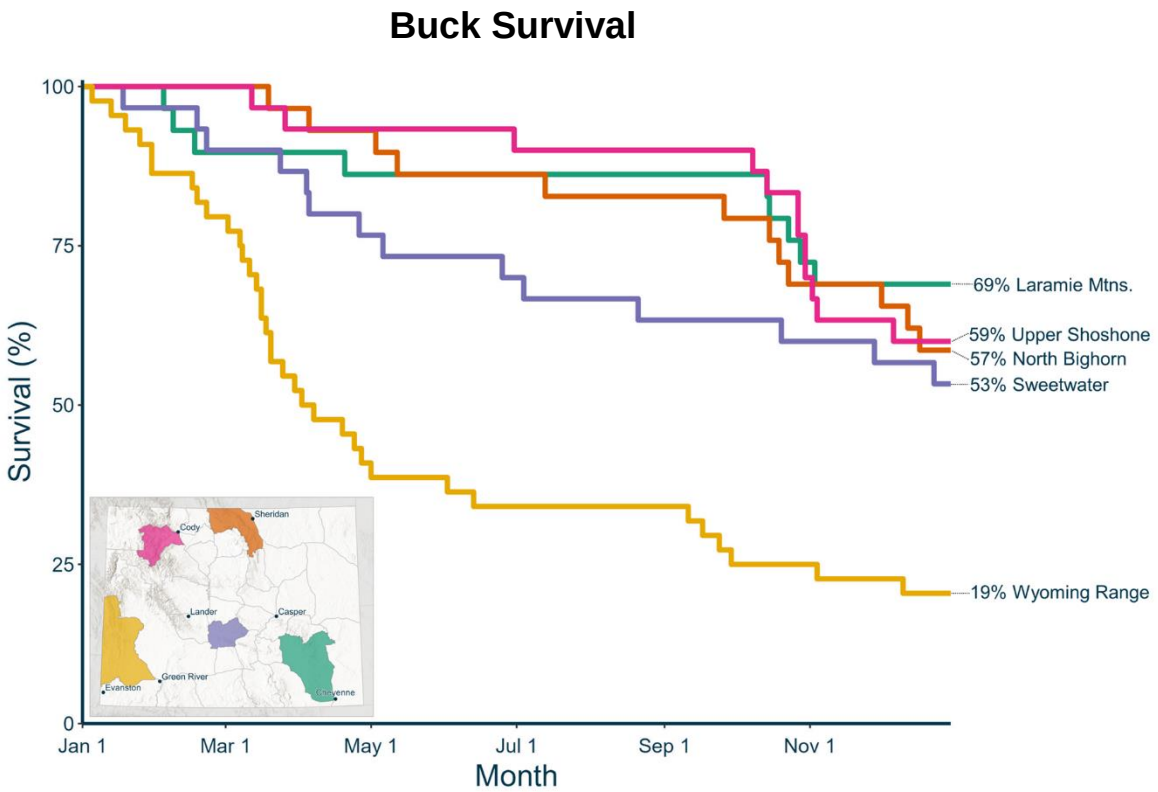


Image 3. Statewide Buck survival rates for Wyoming Focal Herd Project during 2023.

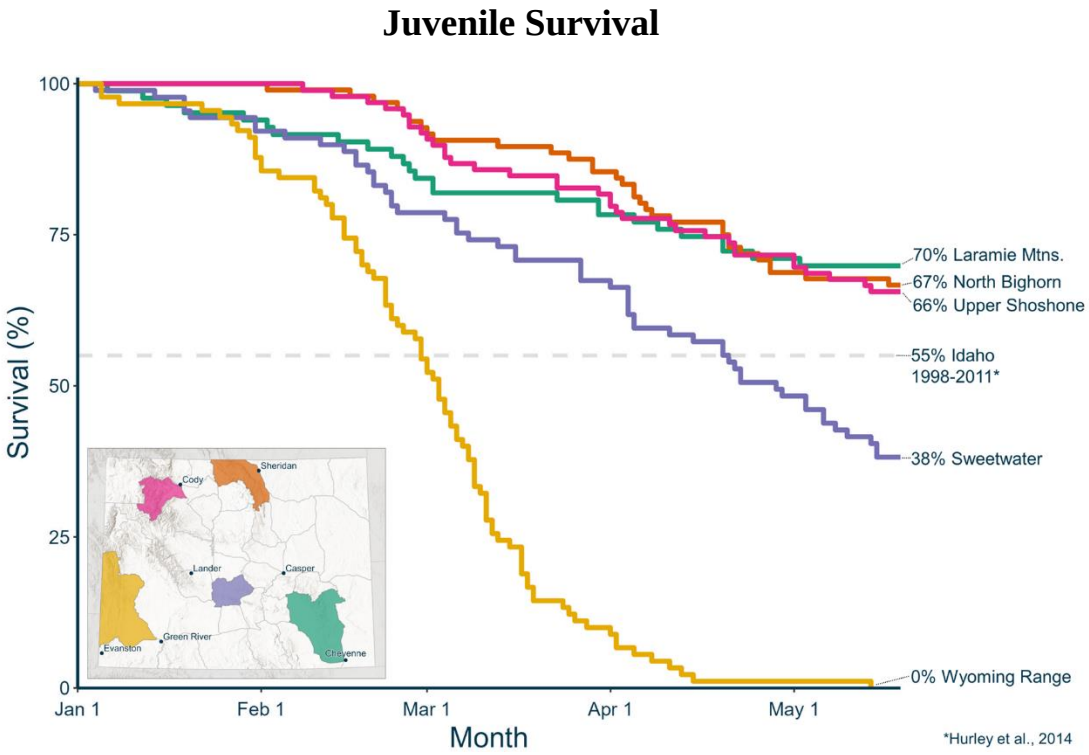


Image 4. Statewide Juvenile overwinter (Jan. 1 – May 31) survival rates for Wyoming Focal Herd Project.

2023 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2023 - 5/31/2024

HERD: MD539 - SHEEP MOUNTAIN

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

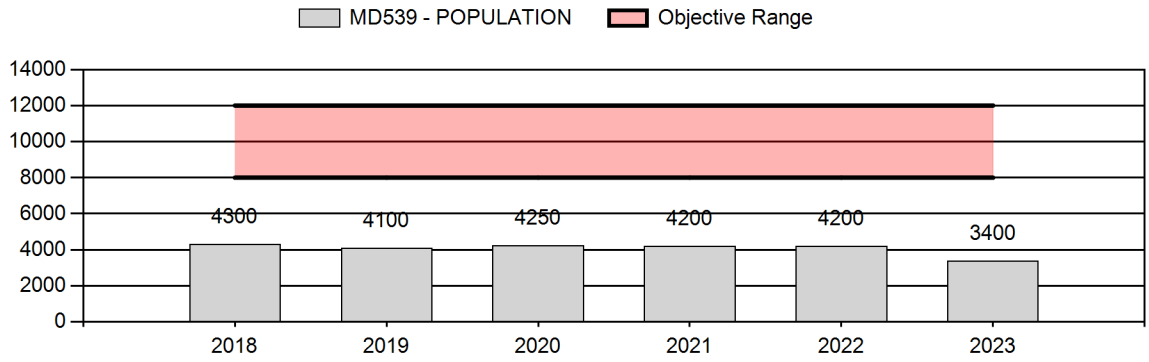
	2018 - 2022 Average	2023	2024 Proposed
Population:	4,210	3,400	3,500
Harvest:	384	342	400
Hunters:	1,473	1,443	1,500
Hunter Success:	26%	24%	27%
Active Licenses:	1,473	1,443	1,500
Active License Success:	26%	24%	27%
Recreation Days:	8,371	8,697	8,000
Days Per Animal:	21.8	25.4	20
Males per 100 Females	31	33	
Juveniles per 100 Females	59	54	

Population Objective (± 20%) :	10000 (8000 - 12000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-66%
Number of years population has been + or - objective in recent trend:	20
Model Date:	2/25/2024

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

	JCR Year	Proposed
Females ≥ 1 year old:	1%	0%
Males ≥ 1 year old:	35%	35%
Proposed change in post-season population:	-3%	3%

Population Size - Postseason



2024 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

2024 Region D nonresident quota: 300 licenses

2023 Hunter Satisfaction: 43% Satisfied, 32% Neutral, 25% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The management strategy is recreational management which prescribes for a buck ratio of 20 to 29:100 does. The Sheep Mountain Mule Deer Herd Unit remains below the population objective of 10,000. The 2023 post season population estimates was 3,400 mule deer, which is 66% below the objective. This is not a reflection of a significant loss of the population, but rather driven by the 2021 sightability estimate of 3,300. An estimate of 3,400 mule deer is likely a more accurate population estimate than previously estimated and the objective will be revisited in 2025. The 2023 hunting season was warm and dry, providing better than average access throughout the herd unit. However the same conditions likely contributed to mature buck mule deer being less vulnerable to harvest which is indicated in our harvest statistics. We saw 13% fewer hunters in the field in 2023 which we anticipated with the statewide public concern of severe winter loss from the 20022/2023 winter and a lack of mature bucks. We did see a slight 10% decline in hunter harvest from the five year average of 380 to 340 deer harvested in 2023. Hunter success only declined slightly from the five year average of 26% to 24% in 2023, indicting more of a difficult hunting season due to weather than a drastic loss in the mule deer populations. Fawn ratios declined below the five year average of 60:100 does to 54:100 does in 2023. We saw more of a decline in fawn numbers in hunt areas 74 and 75 where winter conditions were more severe than to the south in hunt areas 76 and 77. Spring and summer rains created excellent forage conditions throughout the herd unit and we saw above average adult doe survival with only one mortality out of 30 collared doe mule deer in 2023. We have maintained a 14 day season for three years, and the buck ratio still exceeds recreational management guidelines at 33:100 does, with the five year average buck ratio at 31:100 does. The 2024 season will remain status quo to continue to

provide two weeks of hunting opportunity, and to maintain buck ratios within recreational management guidelines.

2.) Management Objective: The management objective for the Sheep Mountain Mule Deer Herd is a post season population estimate of 10,000 mule deer. The management objective was last reviewed in 2020, maintaining a recreational management strategy of 20 to 29 bucks:100 does. When the objective is reviewed again in 2025 managers will explore a more realistic objective.

3.) CWD Management: CWD surveillance was shifted in the 2019 season to focus on specific herds instead of the blanket statewide approach. Deer herds statewide will be on a five year rotation with the goal of increase surveillance to maintain adequate sample with a goal of 200 samples in 3 years. Sheep Mountain Mule Deer was a Tier 2 focal herd and was a priority for CWD sampling from 2019 to 2021 with an prevalence of 14.7% (n=170). Prevalence estimates and sample sizes from 2021-2023 are presented below in Table 1.

Table 1. CWD prevalence for hunter-harvested mule deer in the Sheep Mountain Mule Deer Herd, 2021-2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%)	Yearling Males	Adult Females
Focal years 2019-2021	**14.7% (8.4-20.9%, n=170)**	0% (34)	0% (15)
2021	**16.3% (n=80)**	0%	0%
2022	**7.7% (n=39)**	10%(10)	0%
2023	**18.9% (n=37)**	0%	0%
2021-2023	**14.7% (8.3-21.3%, n=156)**	2.9% (35)	0% (11)

6.) Habitat and Weather: Precipitation received in water year 2023 was 10% above long term 30 year averages. Within the 5 year review period of 2019 – 2023, annual precipitation exceeded the 30 year average in 2 years. In addition to an overall annual precipitation exceeding the 30 year average, moisture events in the critical growth months for herbaceous and woody vegetation was 20% higher than normal. Significant precipitation also occurred in May – July period in Spring, Summer, Fall ranges for mule deer, where percent departures from normal precipitation falling during this period were 18% above 30 year averages. Precipitation falling in this time period is essential for growth at high elevations in the herd unit. The importance of lush, succulent and nutritious forage availability in summer fawn rearing habitats cannot be overstated. Mountain snowpack was well above normal in the higher elevations, above 8,000'. Slow snowmelt and green-up occurred at higher elevations. The foothills and plains located adjacent to the Snowy Range experienced very dry conditions through winter months, with a slightly delayed green-up in the spring. However, late spring and summer moisture was excellent. Throughout the herd unit, some late summer monsoonal weather patterns developed and continued to bring rain to higher and lower elevations. Green forages were found throughout the landscape throughout the summer and into fall, resulting in animals heading into winter in very good body condition.

7.) Population Modeling: The bio-year 2023 post season population estimate from the PopR IPM was approximately 3,400 (CL = 3,050– 3,850) mule deer. Classification and harvest data was used from years 2009-2025. The effort variable that best matched harvest was days to harvest. Model convergence was good.

2023 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2023 - 5/31/2024

HERD: MD540 - SHIRLEY MOUNTAIN

HUNT AREAS: 70
PREPARED BY: TEAL CUFAUDE

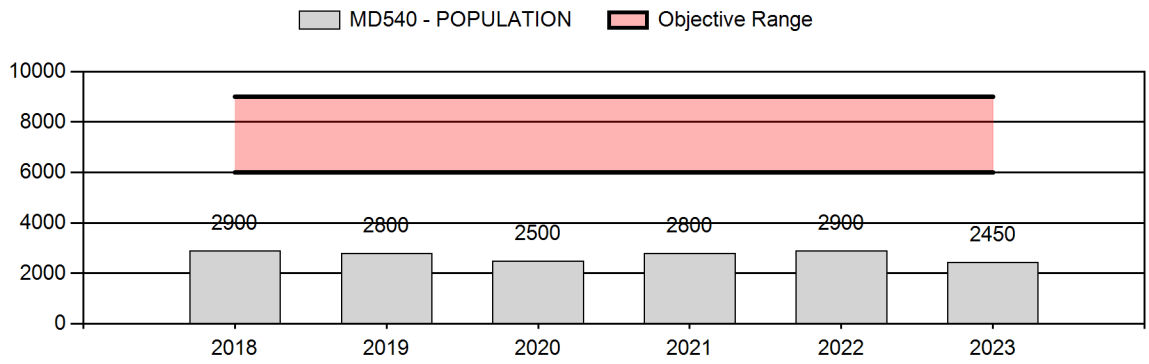
	2018 - 2022 Average	2023	2024 Proposed
Population:	2,780	2,450	2,440
Harvest:	217	152	152
Hunters:	542	458	490
Hunter Success:	40%	33%	31%
Active Licenses:	543	458	490
Active License Success:	40%	33%	31%
Recreation Days:	2,224	1,930	1,900
Days Per Animal:	10.2	12.7	12.5
Males per 100 Females	36	0	
Juveniles per 100 Females	61	0	

Population Objective (± 20%) :	7500 (6000 - 9000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-67.3%
Number of years population has been + or - objective in recent trend:	7
Model Date:	02/21/2024

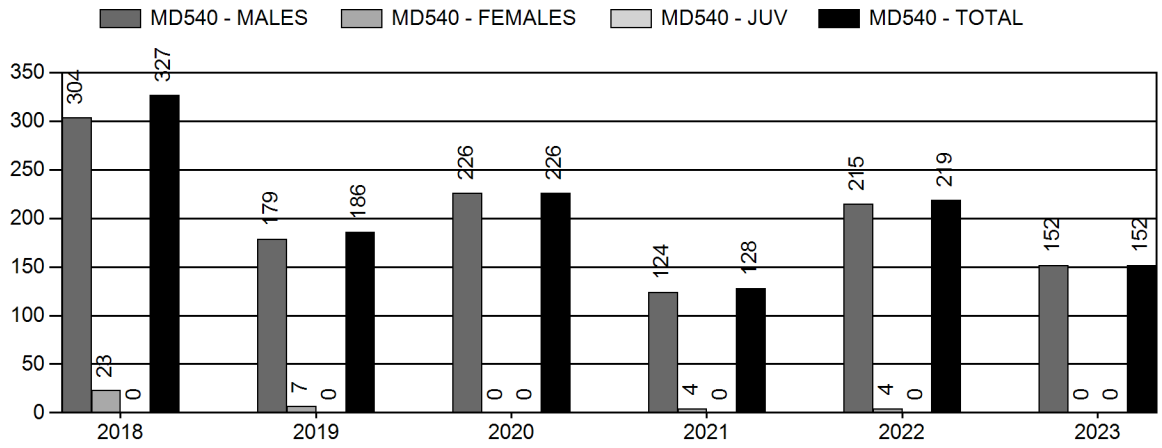
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	26%	26%
Proposed change in post-season population:	0%	-1%

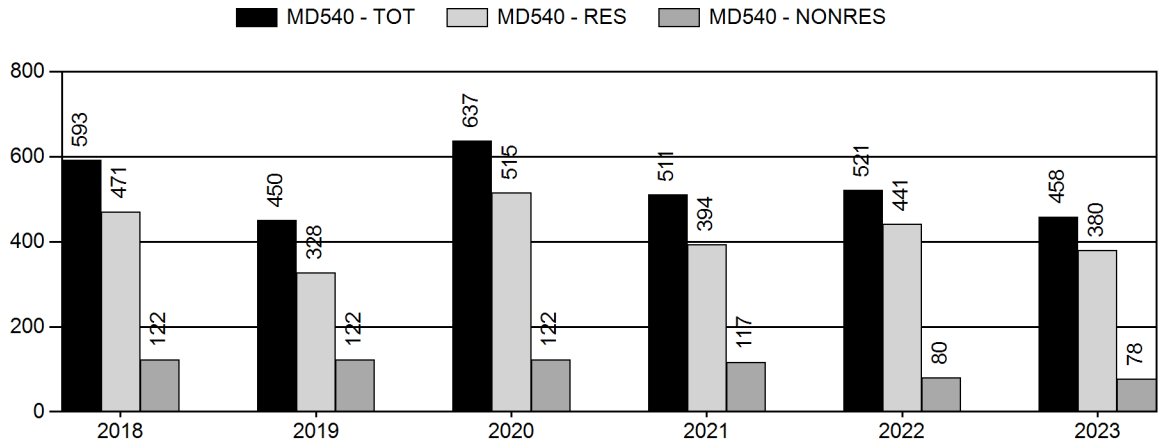
Population Size - Postseason



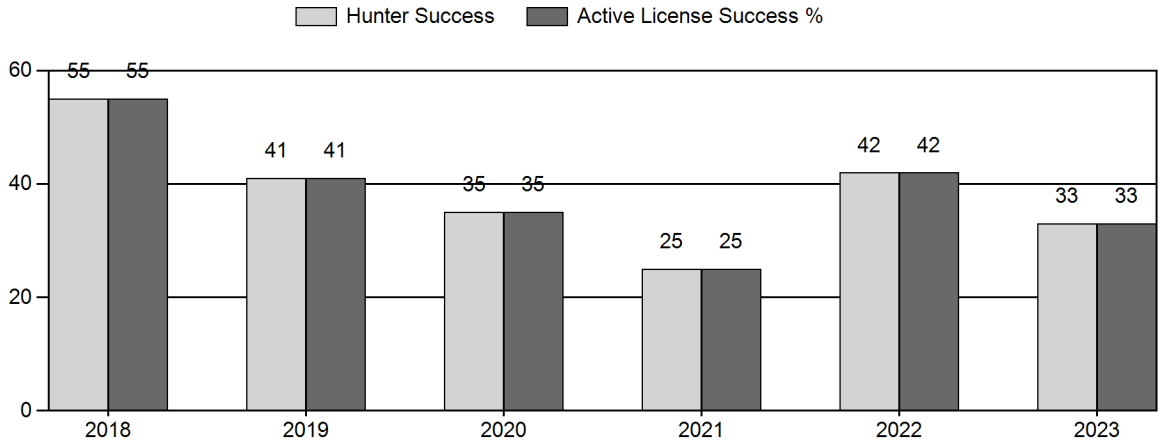
Harvest



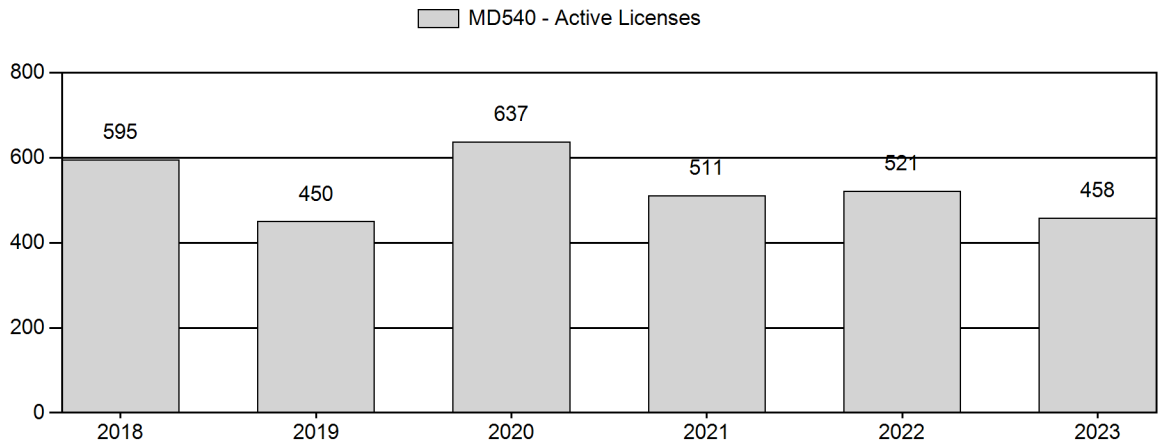
Number of Hunters



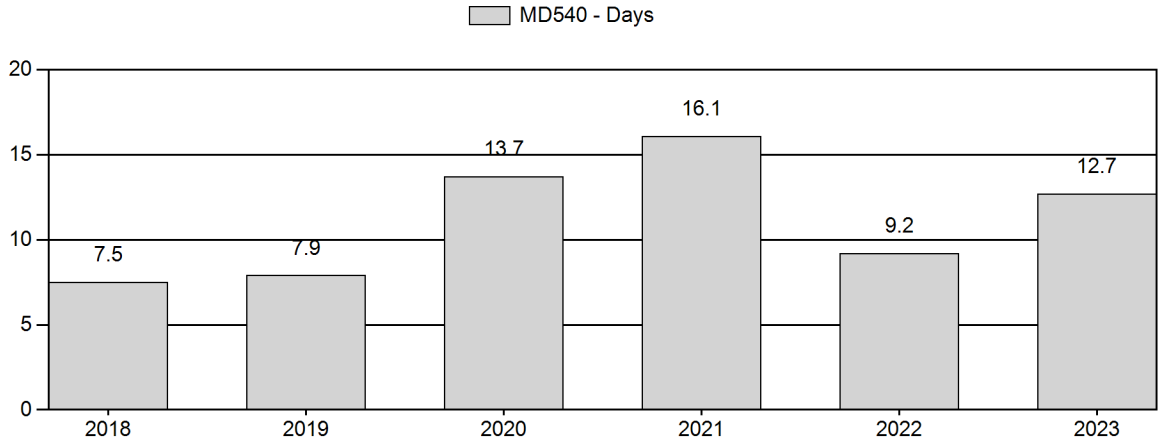
Harvest Success



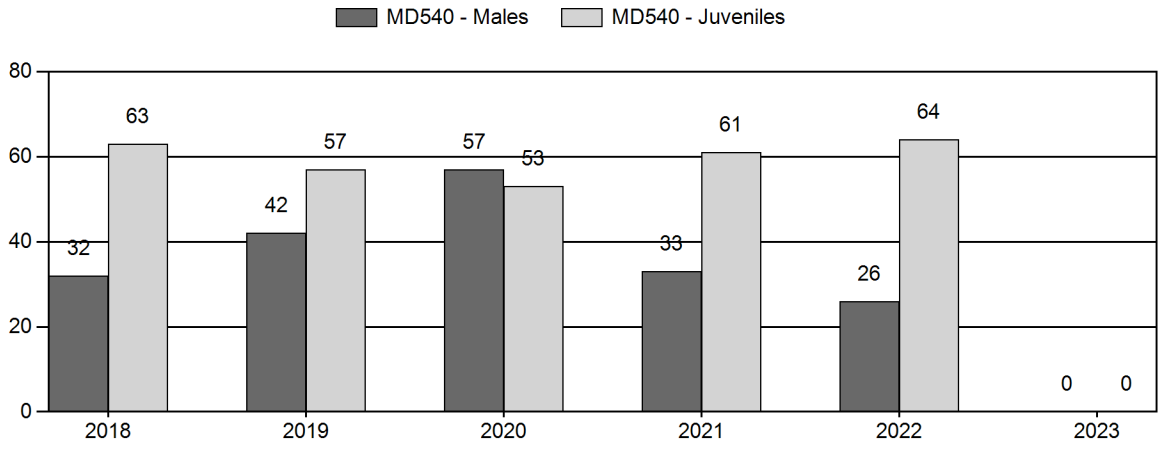
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2024 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

2024 Region D nonresident quota: 300 licenses

2023 Hunter Satisfaction: 35% Satisfied, 35% Neutral, 30% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The 2023 harvest survey report indicated 458 hunters harvested 152 buck mule deer for an overall success of 33%. Hunter success decreased and days to harvest (12.7) increased compared to the respective five-year averages (39.6% and 10.8). These harvest metrics indicated mule deer hunting in 2023 was more challenging than recent years. Winter severity in 2022-23 was high and above average winter mortality across deer age and sex cohorts was expected in this herd unit. 2023 deer hunter participation decreased which may have been because of public concerns of reduced overwinter deer survival and reduced availability of harvestable mule deer bucks. During the 2023 hunting season, warm and dry weather allowed for better hunter access across the herd unit, however these conditions also contributed to making mule deer bucks less vulnerable to harvest.

In January 2024, we completed a sightability survey in this herd. The abundance estimate from this survey was 2,900 (95% CI 1,950-3,900) mule deer and provided the most reliable estimate for this herd. Composition data, including age and sex, was collected opportunistically in 2023 during a January elk survey (Appendix A). As is the case in previous years with small classification samples, these data need to be interpreted with caution.

A seven-day general season for antlered mule deer or any white-tailed deer was prescribed in 2024 and the Region D nonresident quota was maintained at 300 licenses. The 2024 season structure should maximize hunter opportunity. If the projected harvest of 150 mule deer bucks and normal fawn production is attained in 2024 the predicted postseason population of 2,440 (2,010-2,875) mule deer will continue to be below the objective range of 7,500 ±20% mule deer.

2.) Management Objective Review: The management objective was evaluated in 2020 and will be reviewed again in 2025. The recent sightability survey, confirmed our presumption that the number of mule deer in the herd unit were substantially below the postseason herd objective. Historical model postseason estimates, which the previous objectives were based on, have always been evaluated as unrealistic. We acknowledge the public's desire for a more robust deer herd in the Shirley Mountain herd unit, however the current objective is not likely attainable given the challenges this mule deer herd is facing, including late seral stage habitats, prolonged drought conditions, high disease (Chronic Wasting Disease) prevalence, increasing development on and near crucial ranges, etc. We plan to recommend a lower postseason population objective during the next review.

3.) Weather/Habitat: Precipitation levels were above normal for the 2023 biological year. Winter

snow depths were higher than normal in many parts of the Shirley Basin, and conditions were tough for pronghorn and likely impacted survival. February was filled with numerous snowstorm events and very cold temperatures. Once temperatures increased in June, forage production was excellent. Precipitation events throughout the remainder of the summer, as is typical for much of this herd unit, were sporadic and covered very small geographic areas. However, due to mild summer temperatures, forage maintained greenness throughout the summer months. NOAA weather stations in Laramie and Rawlins recorded drastic differences in average annual precipitation. Laramie saw a decrease of 12% from average, while Rawlins was nearly 49% above average for 2023. Winter snowfall totals were a huge driver in this drastic difference. Shrub conditions continue to be very poor, with this landscape being dominated by late seral shrub plant communities and long term, severe hedging by and overutilization by big game.

4.) Chronic Wasting Disease (CWD) Management: CWD was first detected in the Shirley Mountain mule deer herd in 2006. This is a Tier 3 surveillance herd and will be intensely sampled, with the goal of sampling 200 hunter-harvested mule deer, from 2023-25. In 2023, only 40 adult male mule deer were sampled. Table 1 presents the CWD prevalence estimates from 2021-23. Shirley Mountain mule deer herd will be a mandatory CWD sampling herd in 2024.

Table 1. CWD prevalence for hunter-harvested mule deer in Shirley Mountain Mule Deer Herd, 2021-2023.

Year(s)	Percent CWD-Positive and (n) – Hunter Harvest Only		
	Adult Males (CI = 95%)	Yearling Males	Adult Females
2021	22.2% (n=9)	0.0% (n=12)	0.0% (n=0)
2022	16.7% (n=18)	0.0% (n=3)	100.0% (n=1)
2023	16.3% (n=43)	0.0% (n=12)	0.0% (n=0)
2021-2023	17.1% (7.8-28.0%, n=70)	0.0% (n=15)	100.0% (n=1)

5.) Population Modeling: The 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 2,475 (2,112-2,863) mule deer. The PopR IPM estimate and long-term postseason abundance trend seems plausible.

2018 - 2023 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
2018	2,900	27	20	15	1	0	63	16%	198	51%	125	32%	386	1,011	14	18	32	± 5	63	± 9	48
2019	2,800	19	29	16	1	0	65	21%	155	50%	89	29%	309	965	12	30	42	± 7	57	± 9	40
2020	2,500	9	26	14	2	0	51	27%	90	48%	48	25%	189	1,024	10	47	57	± 12	53	± 12	34
2021	2,800	8	21	8	2	0	39	17%	117	52%	71	31%	227	894	7	26	33	± 8	61	± 11	46
2022	2,900	26	13	8	1	0	48	14%	182	52%	117	34%	347	0	14	12	26	± 5	64	± 9	51
2023	2,450	7	15	6	0	0	28	25%	52	46%	32	29%	112	643	13	40	54	± 16	62	± 17	40

2023 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2023 - 5/31/2024
HERD: MD541 - PLATTE VALLEY
HUNT AREAS: 78-81
PREPARED BY: TEAL CUFAUDE

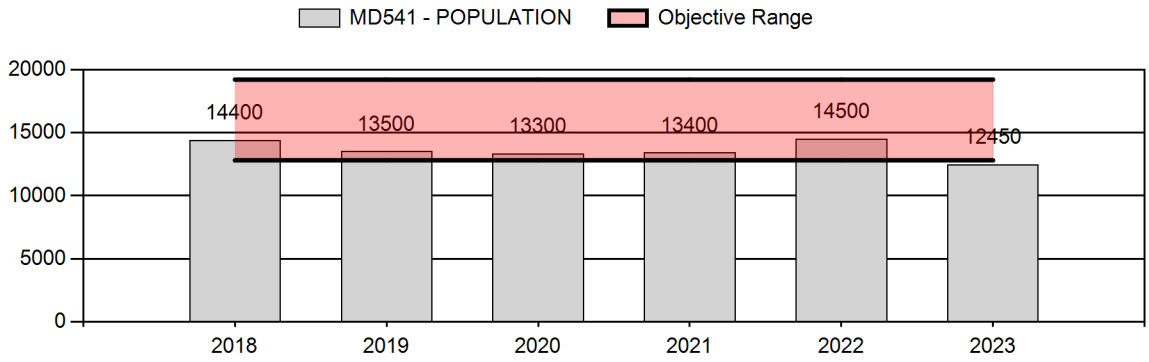
	2018 - 2022 Average	2023	2024 Proposed
Population:	13,820	12,450	12,750
Harvest:	538	312	312
Hunters:	1,013	858	750
Hunter Success:	53%	36%	42 %
Active Licenses:	1,013	858	750
Active License Success:	53%	36%	42 %
Recreation Days:	6,239	5,911	5,000
Days Per Animal:	11.6	18.9	16.0
Males per 100 Females	40	27	
Juveniles per 100 Females	64	65	

Population Objective (± 20%) :	16000 (12800 - 19200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-22.2%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/23/2024

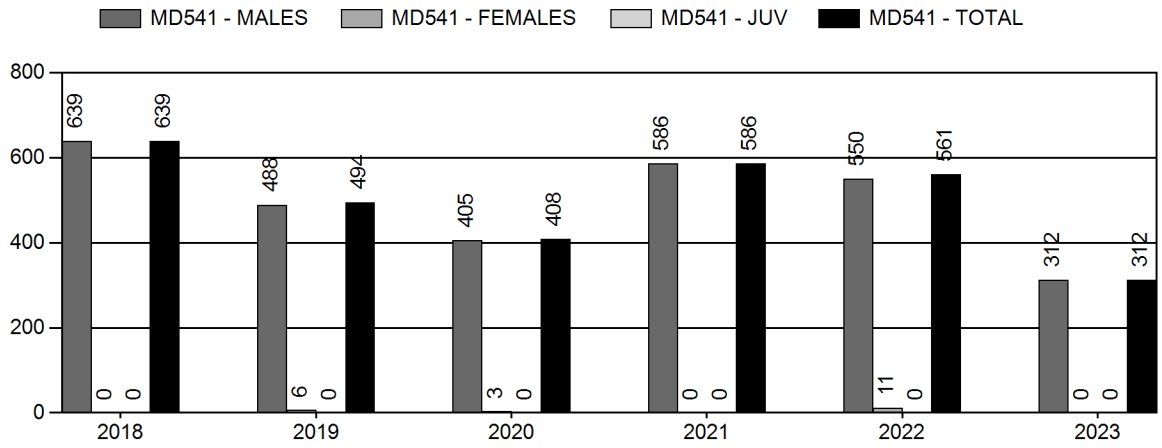
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	15%	15%
Proposed change in post-season population:	-4%	2%

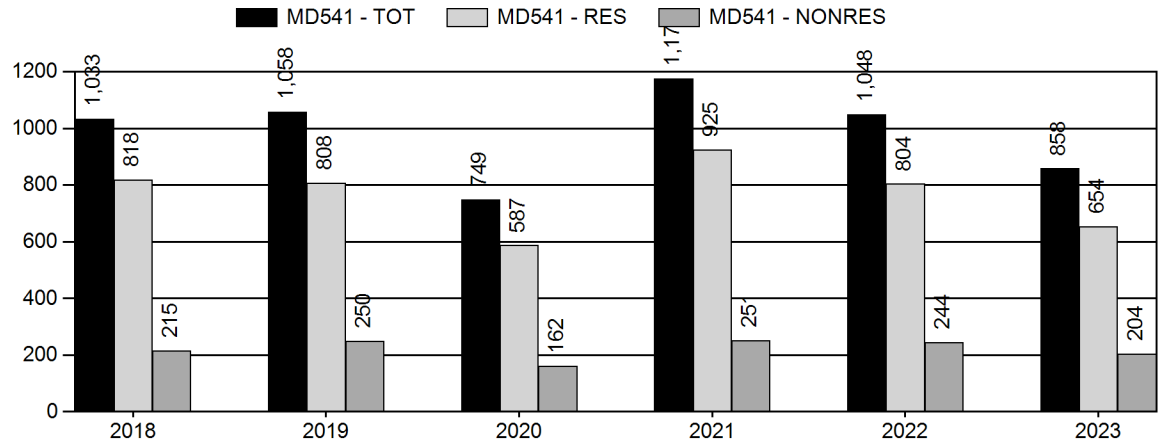
Population Size - Postseason



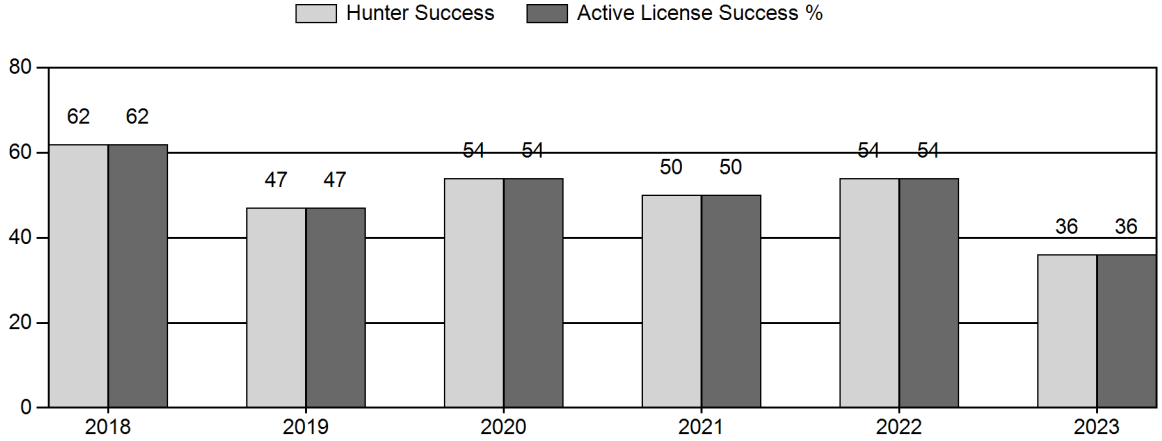
Harvest



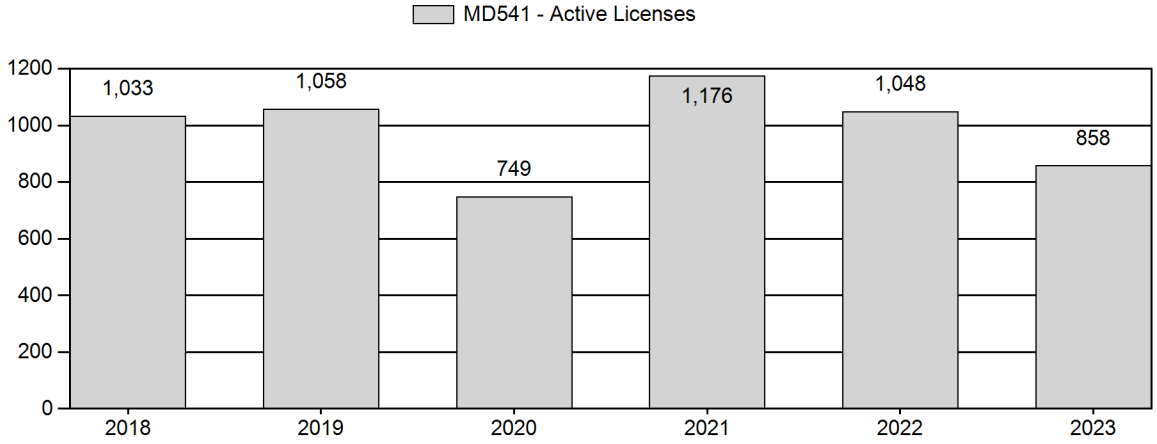
Number of Hunters



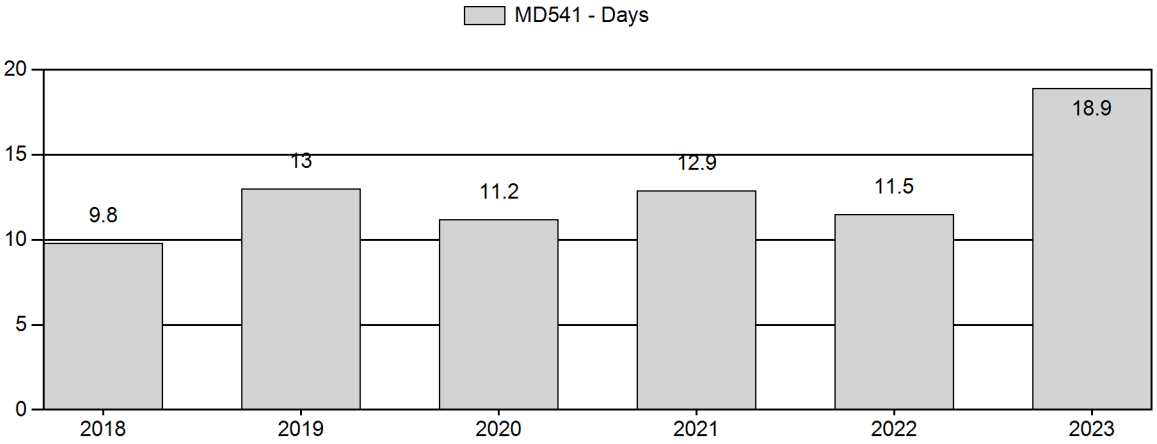
Harvest Success



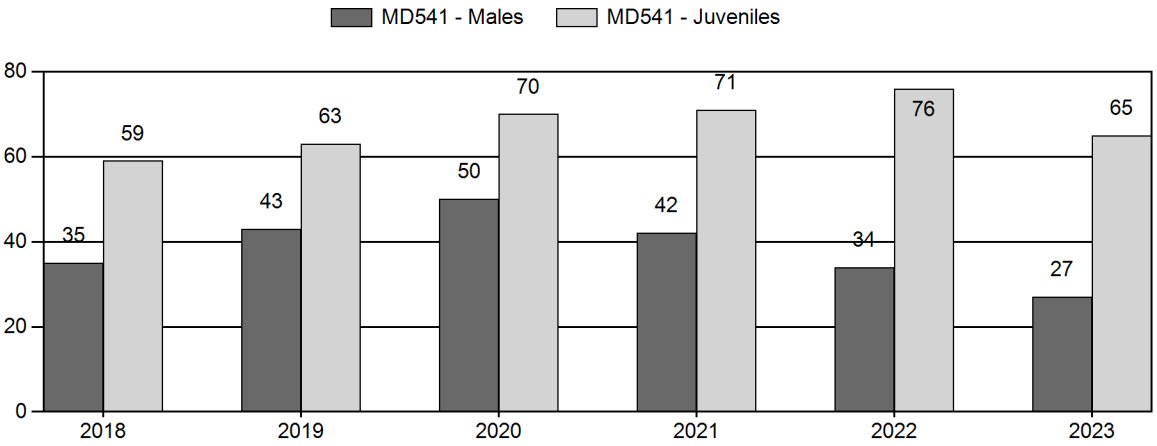
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2024 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	250	Antlered mule deer or any white-tailed deer
79	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	250	Antlered mule deer or any white-tailed deer
80	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	150	Antlered mule deer or any white-tailed deer
81	1	Sep. 1	Sep. 30	Oct. 1	Oct. 14	175	Antlered mule deer or any white-tailed deer

2023 Hunter Satisfaction: 39% Satisfied, 22% Neutral, 39% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: According to the 2023 harvest survey report, a total of 858 hunters harvested 312 buck mule deer in 2023. Due to reduced license quotas and lower hunter participation, 2023 had the lowest deer harvest ever reported in the Platte Valley. Hunter success (36.4%) and satisfaction decreased while days to harvest (18.9) increased compared to 2022, which indicated hunters had a difficult time finding harvestable buck deer. Hunter survey comments, satisfaction, and days to harvest indicated that mule deer hunting in the Platte Valley was the most challenging it has been since going to a limited quota license structure in 2013.

Only 79% of type 1 licenses sold were actively hunted on. Reduced hunter participation may have been because hunters were concerned about the impacts of winter 2022-23 on Platte Valley mule deer. Ninety (90) deer were harvested in hunt area 79 and success was 36% which was lower than the ten-year average success (52%). Thirty-five (35) deer were harvested in hunt area 80 and success was the lowest reported in all Platte Valley hunt areas at 25%. The days to harvest (24.1) in hunt area 80 was more than double the ten-year average (11) days to harvest. One-hundred and one (101) deer were harvested in hunt area 81, and success was 50%, which was lower than the ten-year average (60%), and 12.9 days to harvest exceeded the ten-year average (8.6). Eighty-six deer (86) were harvested in hunt area 78, success was 32%, which was lower than the ten-year average (54.4%) and 23.6 days to harvest was greater than the ten-year average (11.5).

The 2023 postseason fawn to doe ratio of 65/100 was below the five-year average (68/100). We expected productivity would have been reduced due to the observed body condition of many female deer in spring 2023. This fawn ratio was below the fawn to doe ratio (66/100) generally needed to maintain a population. The postseason buck to doe ratio of 27/100 was within the recreational management strategy parameters of 20-29/100, however this was the lowest observed buck ratio in that last ten years. The yearling buck to doe ratio (8/100) also indicated below normal recruitment from 2022 to 2023. Winter conditions in 2023-24 have been mild across the herd unit's winter ranges so overwinter survival and productivity should be improved in 2024.

Adult (>1.5 years of age) bucks were assigned to antler classes during postseason classification surveys. The total adult buck classification sample (n=84) resulted in the following: 62% Class 1 (<20”wide) bucks, 31% Class 2 (20-25”wide) bucks, and 7% Class 3 (>26” wide) bucks (Appendix A), which were similar to the five-year averages.

Postseason we conducted a composition abundance survey to assess herd composition and estimate mule deer abundance. The abundance estimate derived from this survey was 11,525 (6,800-16,000) mule deer. Although this was a low-precision estimate, we felt this survey represented the decline in mule deer we observed from 2022 to 2023.

The 14-day limited quota seasons for antlered mule deer or any white-tailed deer were retained for 2024. License quotas were reduced in each hunt area based on past hunter success and observed postseason buck ratios. The 2024 license quotas are the lowest license prescriptions that we have had in the Platte Valley. If approximately 300 bucks are harvested and normal fawn production is attained in 2024 the predicted postseason population of 12,750 (CL=10,050-15,250) mule deer will be below the objective of 16,000 (±20%) mule deer. Hunter participation on licenses sold should increase in 2024 so we evaluated a model with increased 2024 and 2025 buck harvest similar to the five-year average (500 bucks). These models indicated the population trajectory would be slightly increasing in 2024 and 2025 whether buck harvest remained the same as 2023 or increased closer to the five-year average. Even with improved hunter participation in 2024, we estimated only 15% of preseason bucks would be harvested and no female mule deer would be harvested.

The 2023 postseason buck and fawn ratios along with the projected population trajectory indicated that maintaining license quotas were appropriate, however concerns of reduced quality of hunt metrics and public comment in support of reduced quotas prompted another reduction in license quotas across the herd unit. We continue to monitor the quality of hunt metrics within the Platte Valley Mule Deer Plan, however consideration will also be given to disease prevalence and reduced carrying capacities of deer habitats in the herd unit. Hunt areas in this herd unit have limited quota seasons to improve hunt quality, however the hunting season and quotas are intended to maximize recreational opportunity. The 2024 license quotas reduced hunter opportunity substantially and may no longer align with the guidelines of recreational management strategy.

2.) Management Objective Review: We maintained the current postseason population objective of 16,000 (±20%) mule deer and recreational management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data (Appendix B) and a change is not warranted at this time. We will review this herd objective again in 2029; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

3.) Platte Valley Mule Deer Initiative Secondary Management Objectives: In 2012, Wyoming Game and Fish Department (WGFD) 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 2023, the buck harvest success rate was 36%, and the three-year average was 46%. In 2023, 9% of field-checked bucks (including yearlings) were ≥24". Yearling bucks made up 13% (n = 20) of the field-checked bucks. The 2021-23 average percentage of field-checked bucks ≥24" was 14%. Thirty-nine percent of harvest survey respondents were satisfied or very satisfied with their 2023 hunting experience, and the three-year average satisfaction was 50%. These secondary management objectives were not met in 2023 and the poor performance on these objectives will likely impact performance metrics over the next three years.

4.) Weather/Habitat: We used the Derived Environmental Variability Indices Spatial Extractor (DEVISE) interface to extract precipitation metrics for the Platte Valley mule deer herd unit. We selected monthly temporal precipitation data using Parameter-Elevation Relationships on Independent Slopes Model (PRISM) data to estimate annual, growing season, and high elevation (spring/summer/fall; SSF) precipitation (PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, created 4 Feb 2004). Within the 6-year review period of 2018-2023, annual precipitation exceeded or was at the 30-year average in 2 of the 6 years (Figure 1). The largest deficit in annual and growing season precipitation occurred in 2018, followed by 2021. Across the entire herd unit, precipitation from October 2022 through September 2023 (water year) was at the 30-year average of 18.91 inches.

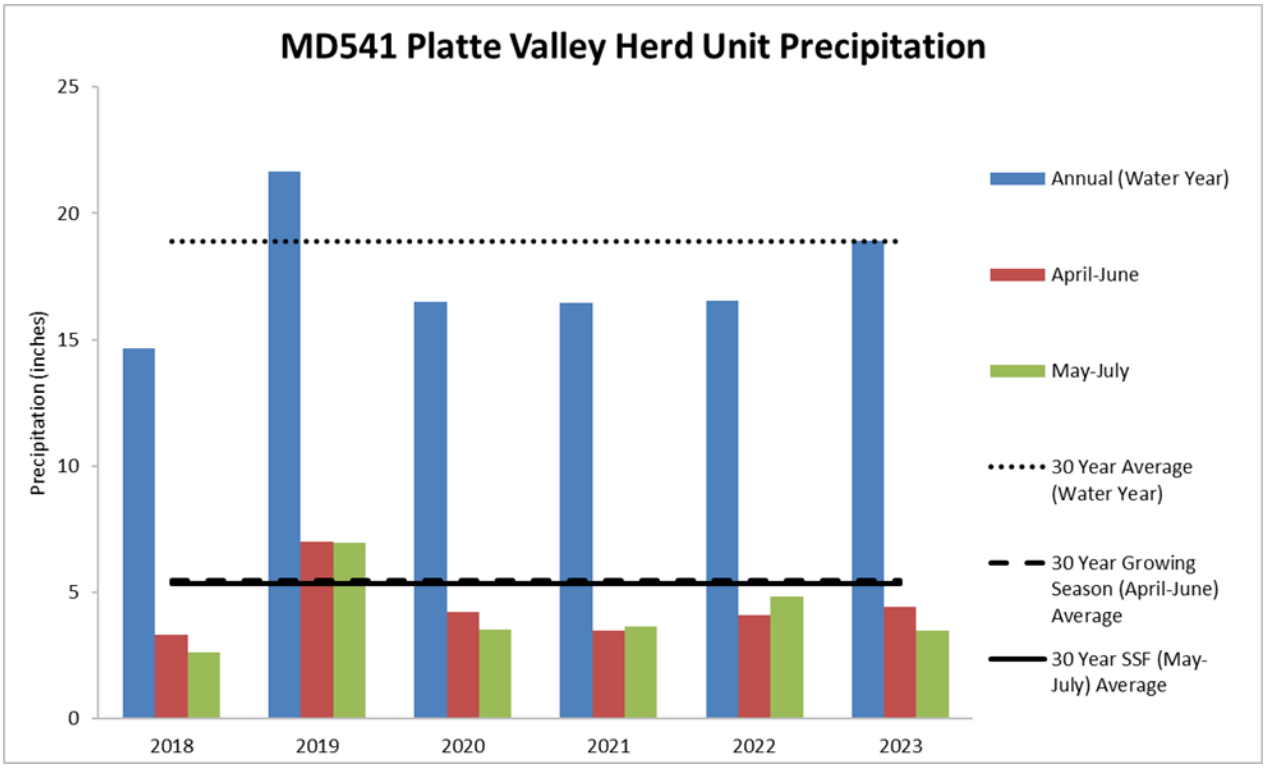


Figure 1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM) estimate of annual, growing season, and spring/summer/fall (SSF) precipitation from 2018-2023 for the Platte

Valley mule deer herd unit in Carbon County, Wyoming.

While annual precipitation was normal in the 2022-2023 water year, moisture events in the critical growing months for herbaceous and woody vegetation were below normal. The most significant deficits during these crucial growing months occurred during May – July. In 5 of the last 6 years, moisture during this period was below normal. Growing season (April – June) precipitation was higher than SSF (May-July) precipitation, however, it was still below the 30-year average. Precipitation falling during these months is essential for plant growth at high elevations in this herd unit. Mid-June to late July monsoonal moisture patterns provided some late summer green-up of forage which likely aided fawn rearing does in meeting nutritional demands.

The majority of precipitation in the Platte Valley herd unit occurs outside of the primary growing season, generally in the form of snow. The 2022-2023 winter started mild, with no persistent snow accumulations through fall and early winter at lower elevations. As winter progressed, conditions became severe and led to one of the worst winters the state has seen in many decades. By the end of December, most SNOTEL sites at higher elevations within the Platte Valley mule deer herd unit were reporting above-average snowpack. Snowpack remained 20-50% above normal through early May. Not only was snowpack above-average at higher elevations but lower elevation, winter ranges also had above-average snowpack for much of January through early April. Given the extreme winter conditions, movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality.

Habitat biologists continue to monitor the recovery of the Mullen Fire (2020) burn scar and the presence of cheatgrass. Over 10,334 acres on the western slope of the Snowy Range were aerially treated with the herbicide Rejuvra in 2021. Large-scale monitoring has taken place each year since 2021 to evaluate herbicide efficacy post-treatment. Recovery of native, perennial grasses looks promising thus far. Plant species diversity was comparable pre- and post-treatment with the exception of a few native annual forbs. Cheatgrass was documented in areas where soil movement had occurred. Additionally, high densities of cheatgrass were documented within the no-spray buffer around the North Platte River. We will continue to monitor herbicide efficacy in 2024 and evaluate the need for retreatment.

Antelope bitterbrush, serviceberry, and big sagebrush seedlings were observed throughout the burn scar, which is a promising sign for shrub recovery. Several thousand shrub seedlings were planted west of the North Platte River by USFS, WGFD personnel, and a group of volunteers in the fall of 2021 and 2022. In 2023, the Mule Deer Foundation implemented a large-scale shrub planting south of the Six Mile campground within the Platte Valley mule deer migration corridor and winter year-long seasonal range. Past large-scale wildfires within the Sierra Madre Range (Snake fire – 2016, Beaver Creek fire – 2016, and Ryan fire – 2018) are recovering at varying rates and continue to provide good early successional habitat for mule deer.

Appendix C describes significant events and habitat monitoring efforts in the herd unit during biological year 2023.

5.) Chronic Wasting Disease (CWD) Management: CWD was first observed in the Platte Valley herd unit in 2002. This is a Tier 1 surveillance herd and was scheduled to be intensely sampled, with the goal of sampling 200 hunter-harvested mule deer, in 2023. During the 2023 hunting season,

we were not able to obtain the sampling goal of 200 adult male mule deer as harvest was reduced due to conservative season structures and reduced hunter success. Prevalence estimates and sample sizes for 2021-23 are presented below (Table 1). The 2023 prevalence and 2021-23 prevalence are similar to the prevalence observed in 2023 hunter-harvested mule deer in Colorado's D-3 mule deer herd, Baggs mule deer herd, and Sheep Mountain mule deer herd. We are concerned with this prevalence and started gathering public input in 2023 to determine feasible management strategies through the guidelines of the WGFD CWD Management Plan.

Table 1. CWD prevalence for hunter-harvested mule deer in Platte Valley Mule Deer Herd, 2021-2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males (CI = 95%)	Yearling Males	Adult Females
2021	6.0% (n=67)	9.1% (n=11)	0.0% (n=1)
2022	7.1% (n=42)	0.0% (n=3)	0.0% (n=0)
2023	13.3% (n=113)	16.7% (n=6)	0.0% (=0)
2021-2023	9.9% (5.7-14.6%, n=222)	10.0% (n= 20)	0.0% (n=1)

6.) Research: In 2018, The Platte Valley Mule Deer Migration Corridor was designated. The Platte Valley Mule Deer Migration Corridor represents high use seasonal migration corridors documented through GPS collar technology and delineated using a Brownian Bridge Movement Model. In February 2020, 45 additional mule deer does were fitted with GPS collars in an effort to better understand mule movement in this herd.

7.) Population Modeling: The 2023 postseason population estimate for this herd unit from the PopR IPM was approximately 12,450 (CL = 10,800-14,200) mule deer. This indicated an approximately 4% decline from the IPM predicted 2022 postseason population. The trend in future abundance appeared biologically plausible.

2018 - 2023 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
2018	14,400	147	200	188	33	0	568	18%	1,638	52%	971	31%	3,177	1,123	9	26	35	± 2	59	± 3	44
2019	13,500	229	308	246	40	0	823	21%	1,918	49%	1,209	31%	3,950	1,092	12	31	43	± 2	63	± 2	44
2020	13,300	57	104	67	15	0	243	23%	487	46%	340	32%	1,070	1,168	12	38	50	± 5	70	± 6	47
2021	13,400	43	85	50	7	0	185	20%	441	47%	315	33%	941	1,150	10	32	42	± 5	71	± 7	50
2022	14,500	32	50	32	8	0	122	16%	361	48%	275	36%	758	1,414	9	25	34	± 4	76	± 8	57
2023	12,450	33	52	26	6	0	117	14%	426	52%	275	34%	818	1,104	8	20	27	± 4	65	± 6	51

Appendix B- MD541 Objective Review Habitat Report

Overall Recommendation

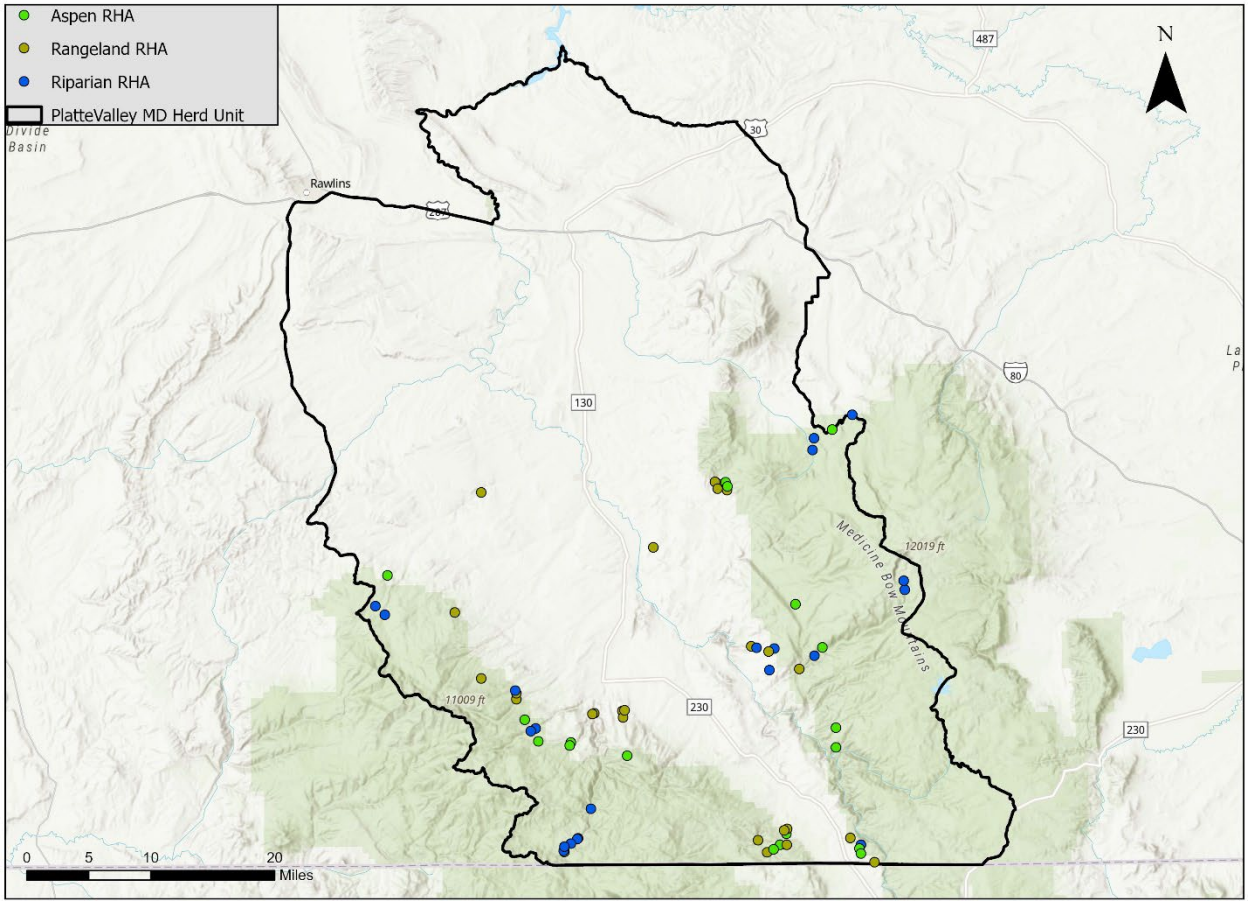
Habitat data collected from 2019-2023 is presented below. Based on these data, we believe the habitat resources are relatively in balance with the existing population objective and do not recommend any changes to the existing objective.

Rapid Habitat Assessments

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 provides for the current mule deer population. This effort aims to provide a standardized habitat assessment to contribute to discussions on mule deer objectives and potential adjustments based on the general concept of carrying capacity.

Data from 2019-2023 was summarized to inform discussions surrounding the Platte Valley mule deer herd unit objective review.

2019-2023 Platte Valley Rapid Habitat Assessments



Rangelands (26 surveys, 1,907 acres)

Rangeland RHAs generally indicated rangelands were either meeting or partially meeting mule deer habitat needs in the Platte Valley mule deer herd unit. While some summer ranges met mule deer habitat needs over the five-year period, most rangelands across seasonal ranges were only partially meeting mule deer habitat needs. The majority of the rangeland communities we assessed were in mid to late seral states. Mostly moderate levels of herbivory occurred on migration and summer ranges, while it remained light to moderate on winter ranges. Invasive species were absent in many of the migration range assessments but were present in many rangeland RHAs on summer and winter ranges. In 38% of rangeland RHAs completed on winter range, invasive species (mainly cheatgrass) were present at management-limiting levels.

Rangeland RHA								
Migration			Summer			Winter Range		
Acres		1,158	Acres		251	Acres		498
Seral State	Early	1%	Seral State	Early	11 %	Seral State	Early	0%
	Middle	29%		Middle	62 %		Middle	49%
	Late	70%		Late	27 %		Late	51%
Herbivory	Light	10%	Herbivory	Light	28 %	Herbivory	Light	49%
	Moderate	90%		Moderate	72 %		Moderate	51%
	Severe	0%		Severe	0%		Severe	0%
Species Diversity	Low	1%	Species Diversity	Low	0%	Species Diversity	Low	0%
	Medium	67%		Medium	50 %		Medium	10%
	High	33%		High	50 %		High	90%
Invasives	None	86%	Invasives	None	66 %	Invasives	None	31%
	Present	14%		Present	34 %		Present	31%
	Mgmt Limiting	0%		Mgmt Limiting	0%		Mgmt Limiting	38%
Meet Objectives	Yes	1%	Meet Objectives	Yes	28 %	Meet Objectives	Yes	0%
	Partial	99%		Partial	72 %		Partial	100 %
	No	0%		No	0%		No	0%

Aspen (19 surveys, 496 acres)

Aspen stands throughout the Platte Valley mule deer herd unit were highly varied among the four main categories we assessed (i.e. seral state, herbivory, species diversity, and invasives) over the 2019-2023 assessment period. Only ~5% of surveyed aspen stands were found to be in Proper Functioning Conditioning, with the remaining aspen stands ranged from early to late seral state. Moderate to severe levels of herbivory could be limiting aspen regeneration in migration and yearlong ranges. Invasive species (cheatgrass and non-native thistles) were present in 30% of the acres surveyed. Overall, aspen RHAs indicate that aspen stands within migration and summer ranges are meeting or partially meeting mule deer habitat needs in the Platte Valley herd unit. Aspen stands in yearlong range are partially meeting or not meeting mule deer habitat needs.

Aspen RHA								
Migration			Summer			Yearlong		
Acres		224	Acres		184	Acres		89
Seral State	Early	15%	Seral State	Early	0%	Seral State	Early	0%
	Middle	74%		Middle	36%		Middle	48%
	Late	0%		Late	64%		Late	52%
	Proper Function	11%		Proper Function	0%		Proper Function	0%
Herbivory	Light	2%	Herbivory	Light	65%	Herbivory	Light	0%
	Moderate	88%		Moderate	28%		Moderate	52%
	Severe	11%		Severe	7%		Severe	48%
Species Diversity	Low	6%	Species Diversity	Low	16%	Species Diversity	Low	0%
	Medium	58%		Medium	24%		Medium	0%
	High	35%		High	60%		High	100%
Invasives	None	49%	Invasives	None	81%	Invasives	None	100%
	Present	51%		Present	19%		Present	0%
	Mgmt Limiting	0%		Mgmt Limiting	0%		Mgmt Limiting	0%
Meet Objectives	Yes	13%	Meet Objectives	Yes	7%	Meet Objectives	Yes	0%
	Partial	87%		Partial	72%		Partial	48%
	No	0%		No	21%		No	52%

Riparian (21 surveys, 366 acres)

Riparian RHAs generally indicated that riparian habitats were meeting or partially meeting mule deer habitat needs in the Platte Valley herd unit. Some riparian areas with summer range are not meeting mule deer habitat needs due to conifer encroachment into the riparian areas. Invasive species were not present in most of the riparian RHAs but where they were identified, they were not at management limiting levels. The majority of riparian areas assessed had intact native herbaceous communities and medium to high species diversity.

Riparian RHA								
Migration			Summer			Yearlong		
Acres		82	Acres		245	Acres		39
Riparian Herbaceous Community	Native	97%	Riparian Herbaceous Community	Native	100%	Riparian Herbaceous Community	Native	100%
	Mix	3%		Mix	0%		Mix	0%
	Introduced	0%		Introduced	0%		Introduced	0%
Herbivory	Light	60%	Herbivory	Light	14%	Herbivory	Light	0%
	Moderate	40%		Moderate	53%		Moderate	100%
	Severe	0%		Severe	33%		Severe	0%
Species Diversity	Low	3%	Species Diversity	Low	0%	Species Diversity	Low	0%
	Medium	60%		Medium	42%		Medium	0%
	High	37%		High	58%		High	100%
Invasives	None	74%	Invasives	None	70%	Invasives	None	25%
	Present	26%		Present	30%		Present	75%
	Mgmt Limiting	0%		Mgmt Limiting	0%		Mgmt Limiting	0%
Meet Objectives	Yes	71%	Meet Objectives	Yes	9%	Meet Objectives	Yes	0%
	Partial	29%		Partial	59%		Partial	100%
	No	0%		No	33%		No	0%

Significant Events

Habitat treatments were conducted throughout the herd unit over the past five years by cooperating natural resource agencies and the Department. Most notably, 19,341 acres of aerial herbicide cheatgrass treatments, 2,290 acres of juniper removal, 837 acres of shrub enhancements (shrub mowing, prescribed fire, and shrub plantings), and 31.7 miles of wildlife-friendly fence conversions were completed in the Platte Valley mule deer herd unit between 2019-2023. Continued collaborative efforts are planned for the future including wildlife-friendly fence conversions in crucial winter ranges and migration corridors, large-scale cheatgrass treatments, juniper removal, and aspen enhancements.

LaVA

The WGFD began working with the USFS and other federal, state, and local cooperators on planning the Landscape Vegetation Analysis (LaVA) project for the Medicine Bow National Forest in 2017. The LaVA Project was developed in response to landscape-level tree mortality caused by the bark beetle epidemic and other forest health issues. LaVA institutes conditional NEPA, creating a more efficient pathway for planning vegetation treatments intended to reestablish a more natural, healthy forest landscape. The Final Record of Decision (ROD) was released on August 13, 2020, allowing up to 288,000 acres to be treated over the next 15 years. Shortly after the Final ROD, the Mullen Fire burned across approximately 176,800 acres in the southern portion of the Snowy Range on the Medicine Bow National Forest. LaVA project implementation within the burned area was put on hold while USFS personnel completed a supplemental information report (SIR). The SIR was finalized in August 2021 and it was

determined that project implementation may continue in the Mullen Fire burn area. Since 2021, the WGFD has continued to propose projects across the LaVA project area, with a focus on increasing age class diversity, improving herbaceous understory conditions, and increasing forage quality and quantity. Implementation of LaVA projects will have many benefits for wildlife as it will increase the quantity of habitat work being completed within several Mule Deer Initiative (MDIs) herd units in the project area.

Mullen Fire

In September 2020, the Mullen Fire burned approximately 176,850 acres on the Medicine Bow National Forest. Approximately 110,226 acres within the burn scar were identified as moderate to high soil burn severity. Through post-wildfire mapping efforts, an estimated 17,174 acres of native plant communities were identified as high risk for the probability of cheatgrass invasion based on slope, aspect, fire severity, and known infestations. The USFS, WGFD, and numerous other partners worked together to plan for cheatgrass herbicide treatments. During the summer of 2021, 10,300 acres on the western side of the Snowy Range were aerially treated with indaziflam (Rejuvra) to combat cheatgrass invasion. An additional 2,800 acres of BLM lands on the west side of the North Platte River were also targeted for treatment in the Prospect Mountain area. In 2022, 6,288 acres were aerially treated on the eastern side of the Snowy Range, focusing on the Albany to Woods Landing area. In 2023, 578 acres along the eastern side of the burn scar were treated.

A monitoring plan was developed by USFS and partners at Colorado State University (CSU) to better understand the relationship between cheatgrass and the natural environment post-fire and post-cheatgrass treatment. One hundred and fifty monitoring plots were established and visited by field personnel in 2021 to assess species diversity (native vs. introduced), cheatgrass presence/absence, % composition of cheatgrass, and fire severity. This intensive monitoring could not have been achieved without the cooperative efforts of USFS, WGFD, USGS, and CSU. Relatively low amounts of vegetation and high amounts of bare soil were observed early in the summer of 2021. Species diversity varied across sites, with 17-33 species found at most sites. In 2022 and 2023, we revisited a subset of the 150 monitoring plots to evaluate herbicide efficacy post-treatment. Recovery of native, perennial grasses looks promising thus far. Plant species diversity was comparable pre- and post-treatment with the exception of a few native annual forbs. Cheatgrass was documented in areas where soil movement had occurred. Additionally, high densities of cheatgrass were documented within the no-spray buffer around the North Platte River. High densities of noxious thistles have also been documented throughout the burn scar. The USFS had plans to spray the thistles in 2023 but the contractor fell through. Treatment should occur in 2024.

Lack of precipitation and unusually high temperatures resulted in poor aspen recovery in the first year post-fire but has steadily increased over the last three years. Many aspens within the burn scar are 4-6 feet tall. Antelope bitterbrush, serviceberry, and big sagebrush seedlings were observed throughout the burn scar, which is a promising sign for shrub recovery. Several thousand shrub seedlings were planted west of the North Platte River by USFS, WGFD personnel, and a group of volunteers in the fall of 2021 and 2022. In 2023, the Mule Deer Foundation implemented a large-

scale shrub planting south of the Six Mile campground within the Platte Valley mule deer migration corridor and winter year-long seasonal range.

RR316 Fire

The RR316 Wildfire burned 14,200 acres outside of Hanna, Wyoming in late summer 2020. High fire severity resulted in loss of substantial sagebrush cover, affecting sage-grouse core area, as well as spring, summer, fall ranges for pronghorn and mule deer. In 2021, WGFD and the Medicine Bow Conservation District repaired 10 miles of fencing that had burned in the fire. The old, woven wire/barbed wire combination fence was replaced with four-wire wildlife-friendly fence. All fences were marked with reflectors to improve visibility for sage-grouse and assist big game with navigating fences. In addition to the newly replaced fence, approximately one mile of unnecessary fence was permanently removed. WYDOT rebuilt approximately 7 miles of fence along HWY 72 and HWY 287, converting woven wire/barbed wire to five-wire fence. To assist with vegetation recovery, grazing was deferred in portions of the burn scar for two years. WGFD, along with partners, are working to rebuild the pipeline that was burned in the fire as well as install additional water developments to accommodate proper rest, as well as help facilitate rotational grazing systems going forward.

Biological Risk and Opportunity Assessment

The Platte Valley Mule Deer Migration Corridor was developed based on results from a movement study led by the University of Wyoming Cooperative Fish and Wildlife Research Unit. In the study, conducted from 2011-2013, 55 female mule deer in the Platte Valley herd unit were fitted with GPS collars to document important areas used for seasonal migration. In 2018, following a broad public outreach effort, the Platte Valley Mule Deer Migration Corridor was designated through the Wyoming Game and Fish Commission Migration Corridor Strategy (2016). This designation was then codified when Governor Mark Gordon included the corridor in Executive Order 2020-1 Wyoming Mule Deer and Antelope Migration Corridor Protection. The Order also provided a framework for the WGFD to work with partners to complete a biological risk and opportunity assessment for the migration corridor.

The Platte Valley Mule Deer Migration Corridor Draft Biological Risk and Opportunity Assessment uses the best available spatial data to identify existing and potential threats to mule deer movement within the migration corridor footprint. This includes data retrieved from within the Department and data collected from numerous collaborators including USFS, BLM, WYDOT, and Carbon County. The Platte Valley Mule Deer Migration Corridor was partitioned into five segments in the draft Biological Risk and Opportunity Assessment to facilitate more site-specific analyses and to focus recommendations on meaningful sections of the herd. This comprehensive review identifies conservation challenges and opportunities within the corridor such as protected areas, zoning and exurban development, fences, roads, energy development, trails and recreation, invasive species, and habitat improvement initiatives.

Research

In February 2020, 47 Platte Valley mule deer does were fitted with GPS collars. The project area encompasses Deer Hunt Areas 78, 79, 80, and 81. The primary objective is to evaluate detailed movement data. The movement data will be analyzed to delineate important areas used for Platte

Valley mule deer migration. The results will be refined per the WGFD's Ungulate Migration Corridor Strategy to update the designated migration corridor, stopover areas, and bottlenecks. Managers will also collect information on the timing of migration and doe survival. Data will be used to inform priority opportunities for habitat improvement projects including fence conversions, shrub enhancements, roadway crossings, and invasive species mitigation. Collars were released in December 2022 and collected by Department personnel. Biologists plan to analyze the data in 2024-2025.

Weather

In 2019, the Platte Valley mule deer herd unit received above-average growing season precipitation, resulting in excellent grass and forb production. That winter also brought above-average levels of snowfall. Since 2019, the herd unit has experienced moderate to severe drought conditions, leading to earlier senescence of grasses and forbs. As herbaceous vegetation dries out earlier in the season, mule deer likely shift their diets to woody vegetation earlier than normal. Outside of the 2019-2020 winter, winter conditions were mild from 2020-2022. Through fall and early winter 2022-2023, conditions remained mild, with no persistent snow accumulations. However, winter conditions became severe and led to one of the worst winters the state has seen in many decades. Snow depths were above normal over much of the Platte Valley mule deer herd unit and persisted until early May 2023. Given the extreme winter conditions, movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality.

Appendix C- MD541 Habitat Summary

Significant Events

The Platte Valley Habitat Partnership continued to implement habitat projects across the Platte Valley herd unit. These projects included 1 mile of fence conversions to wildlife-friendly design and the permanent removal of 0.82 miles of unnecessary, hazardous fence. Additionally, 3.5 miles of fence were removed with a plan to reconstruct wildlife-friendly fence in the spring of 2024. The BLM and Saratoga-Encampment-Rawlins Conservation District (SERCD) continued their long-term juniper removal in 2023. Approximately, 214 acres of juniper was removed within sage-grouse core area and mule deer winter range. These projects were funded by SERCD, BLM, WWNRT, US Fish and Wildlife Service Partners for Fish and Wildlife, private landowners, and WGFD.

Habitat Monitoring

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 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. In 2023, WGFD personnel surveyed twelve RHAs in the Platte Valley herd unit, totaling 442 acres. For the Platte Valley mule deer herd unit, WGFD personnel completed two aspen assessments (82.2 acres), six rangeland (342.40 acres), and four riparian assessments (17.61 acres). These data will provide population managers and the public with documentation of the current state of mule deer habitat conditions in the Platte Valley.

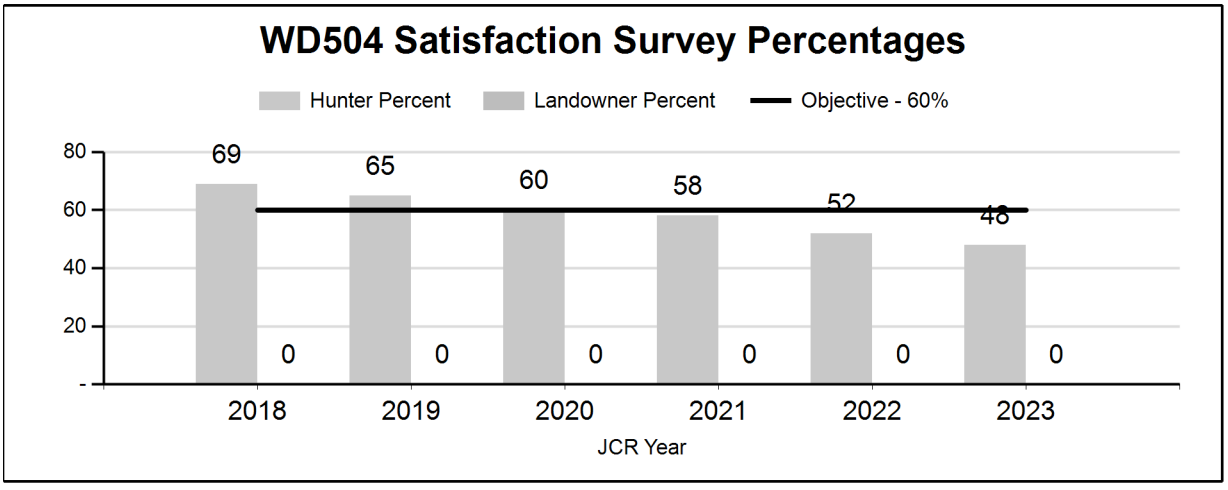
2023 - JCR Evaluation Form

SPECIES: White tailed Deer
HERD: WD504 - SOUTHEAST WYOMING
HUNT AREAS: 15, 59-64, 70, 73-81, 83, 161

PERIOD: 6/1/2023 - 5/31/2024
PREPARED BY: KEATON WEBER

	2018 - 2022 Average	2023	2024 Proposed
Hunter Satisfaction Percent	61%	48%	55%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	1,043	852	900
Hunters:	2,486	2,226	2,300
Hunter Success:	42%	38%	39 %
Active Licenses:	2,846	2,820	2,800
Active License Success:	37%	30%	32 %
Recreation Days:	12,500	12,511	12,500
Days Per Animal:	12.0	14.7	13.9
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	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:	3



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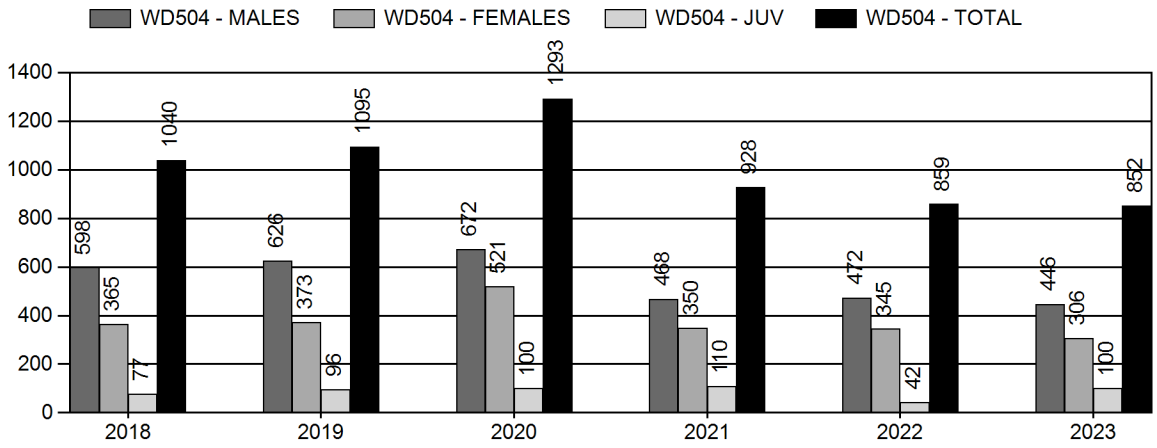
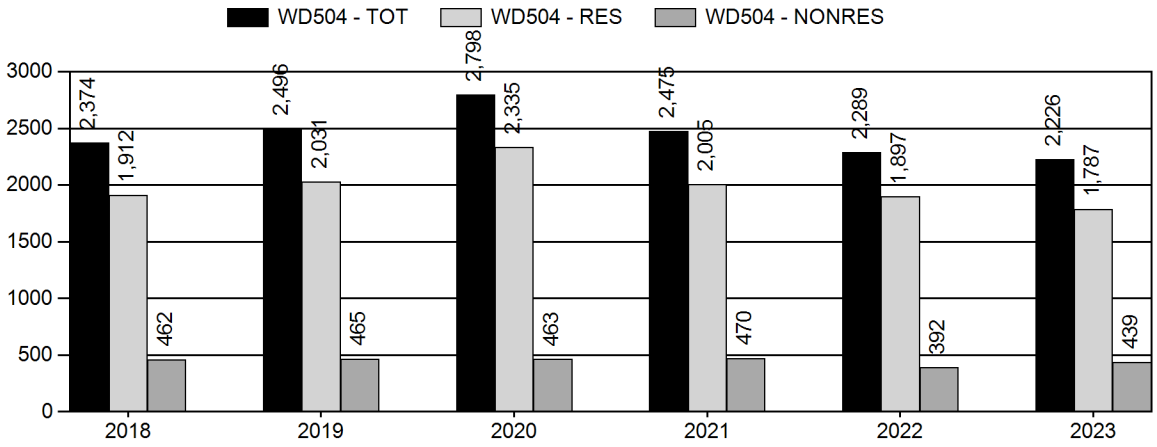
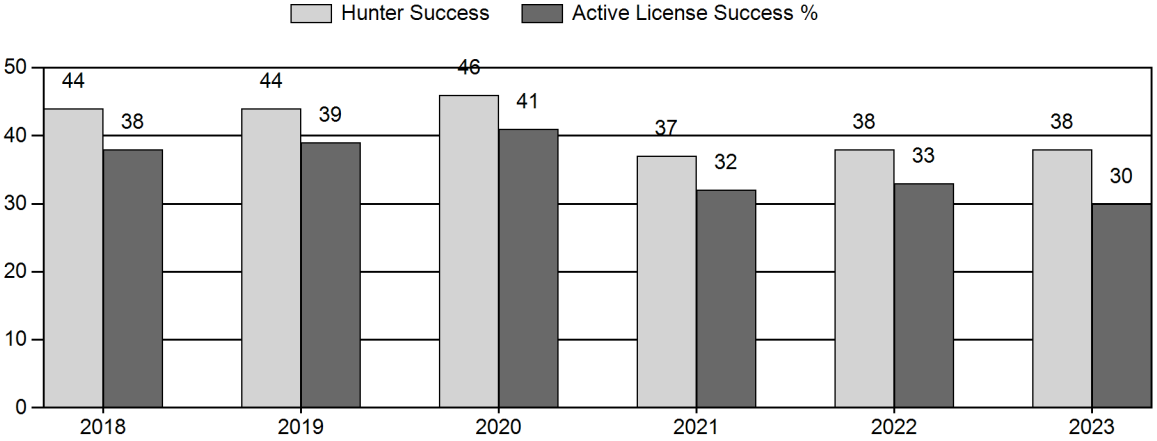


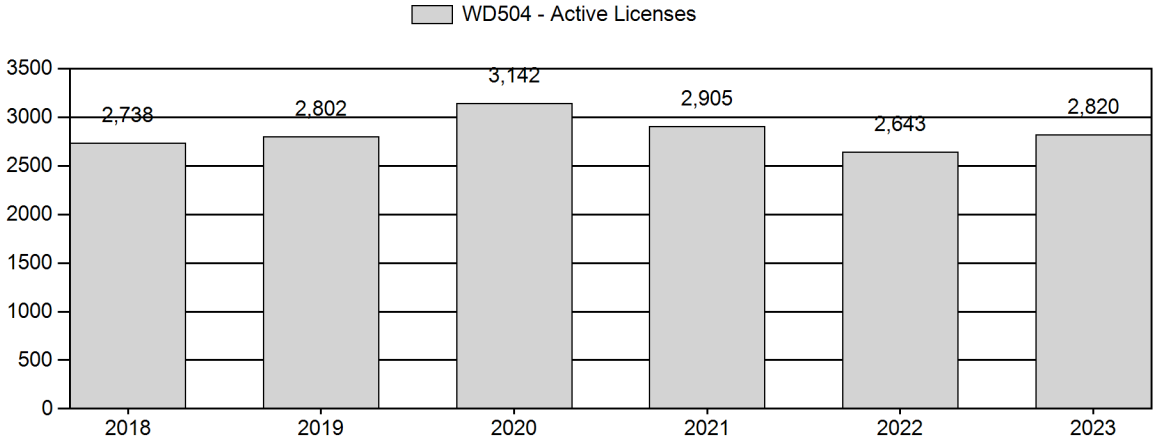
Number of Hunters



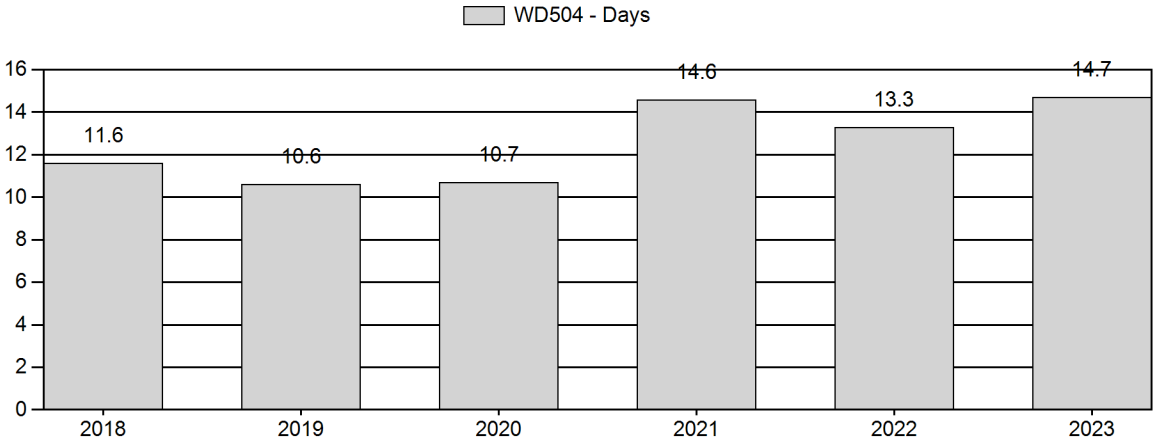
Harvest Success



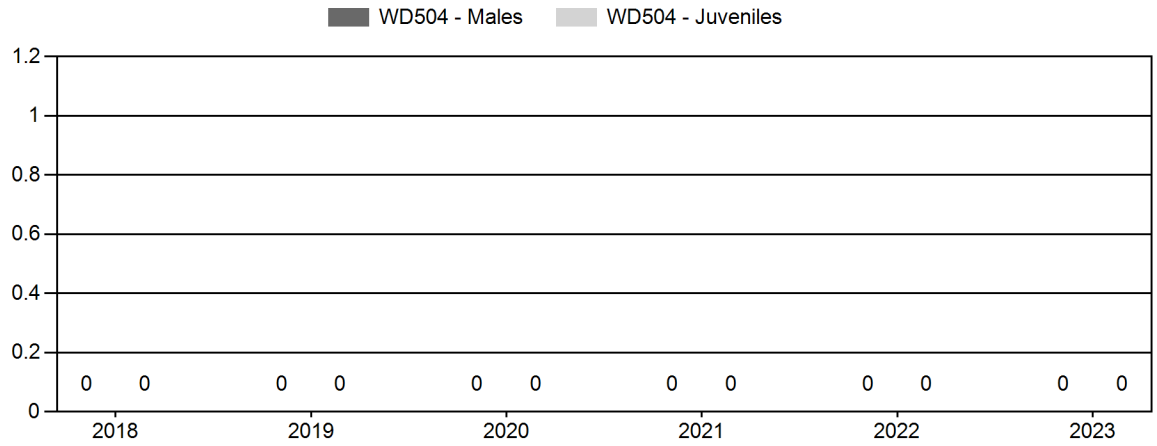
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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		Antlerless white-tailed deer
15	8	Sept. 1	Sept. 30	Oct. 1	Dec. 31	450	Doe or fawn white-tailed deer
59, 64	3	Sept 1	Sept 30	Oct. 1	Nov. 30	250	Any white-tailed deer
59, 64	3			Dec. 1	Dec. 31		Antlerless white-tailed deer
59, 64	8	Sept 1	Sept 30	Nov. 1	Dec. 31	350	Doe or fawn white-tailed deer
60	3	Sept 1	Sept 30	Oct 1	Dec. 31	100	Any White-tailed deer
60	8	Sept 1	Sept 30	Oct 1	Dec. 31	100	Doe or Fawn white-tailed deer
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	75	Doe or fawn white-tailed deer
75,76,77	3	Sept. 1	Sept. 30	Oct. 1	Nov. 30	75	Any white-tailed deer
75,76,77	3			Dec. 1	Dec. 31		Antlerless 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	50	Any white-tailed deer
78,79,80,81	8			Sept. 1	Dec. 31	125	Doe or fawn white-tailed deer

2023 Hunter Satisfaction: 48% Satisfied, 28% Neutral, 24% Dissatisfied

2024 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. There were small localized outbreaks of Epizootic Hemorrhagic Disease (EHD) in the summer of 2021 within hunt areas 15,

59 and 64, but there were no known EHD outbreaks in 2022 or 2023 within the herd unit. Portions of hunt areas 15, 59, and 64 that experienced these isolated EHD outbreaks may see lower deer densities in the coming years and likely will not see as many mature bucks for the coming years until fawn recruitment can replace cohorts that were lost. Hunter satisfaction has decreased since these EHD outbreaks and may remain low until the mature buck age class returns. Managers within hunt areas 75, 76, and 77 hope to reduce hunting pressure on males to improve quality and quantity of older age class bucks while still providing opportunity throughout the late season to harvest females. White-tailed deer in the Platte Valley (hunt areas 78-81) have increased in population and expanded their range in recent years. The increase in type 8 licenses aligned with improved access to private lands inhabited by white-tailed deer in the Platte Valley. The majority of white-tailed deer are located on private land so the Department is limited in management of this herd unit.

2.) Management Objective Review: In 2024, the Southeast Wyoming White-tailed Deer Herd Unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the current satisfaction management strategy is still warranted. This herd unit will be up for objective review again in 2029.

3.) Weather and Habitat: Annual precipitation across southeast Wyoming in areas occupied by white-tailed deer was mostly above normal. Based on NOAA weather station data from Cheyenne, Torrington, Fort Laramie, and Douglas, precipitation was 32%, 13%, 24%, and 26% above average for the year. Laramie weather station data showed a decrease in annual precipitation of 12% from average. While records indicate a negative departure from average at the Laramie weather station, conditions witnessed on the ground were favorable for above normal forage production. Timing of precipitation events can be as or more important than amounts received. Winter conditions in the Laramie and Centennial Valley area were very mild. White-tailed deer are typically associated with riparian habitats and irrigated cropland areas. Favorable growing conditions over the majority of the herd unit resulted in positive impacts on fawning and fawn rearing habitats. Forage production and associated cover heights in riparian areas, favored by white-tailed deer, were above normal. No significant EHD events were reported this year in any portions of the herd unit.

4.) Chronic Wasting Disease: CWD samples are collected on white-tailed deer opportunistically. Results from the Southeast Wyoming White-tailed Deer Herd Unit are located below (Table 1.). The majority of deer tested and that are positive come from Hunt Areas 15, 59, 60 and 64.

Table 1. CWD prevalence for hunter-harvested white-tailed deer in the Southeast Wyoming White-tailed Deer Herd, 2021-2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*		
	Adult Males	Yearling Males	Adult Females
2021-2023	**13%, n=93**	0% (6)	15% (46)

2023 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2023 - 5/31/2024
HERD: EL531 - IRON MOUNTAIN
HUNT AREAS: 6
PREPARED BY: LEE KNOX

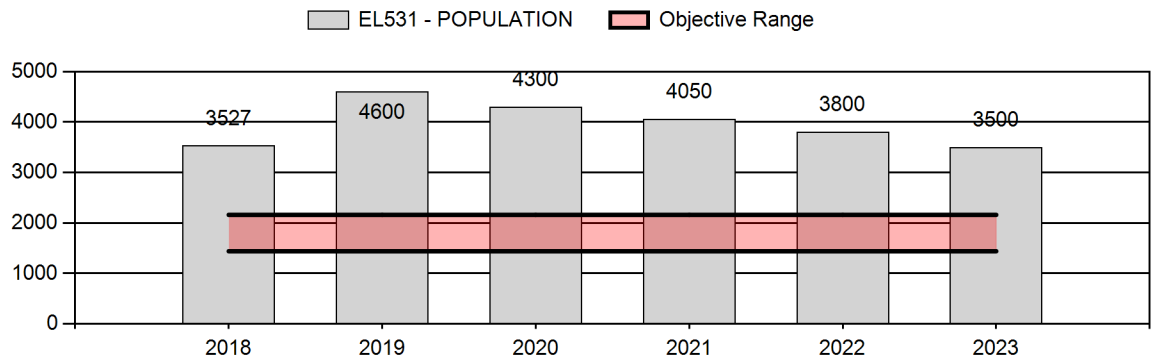
	2018 - 2022 Average	2023	2024 Proposed
Population:	4,055	3,500	3,000
Harvest:	599	632	650
Hunters:	1,316	1,274	1,300
Hunter Success:	46%	50%	50 %
Active Licenses:	1,352	1,433	1,500
Active License Success:	44%	44%	43 %
Recreation Days:	8,074	8,050	8,100
Days Per Animal:	13.5	12.7	12.5
Males per 100 Females	32	0	
Juveniles per 100 Females	46	0	

Population Objective (± 20%) :	1800 (1440 - 2160)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	94%
Number of years population has been + or - objective in recent trend:	20
Model Date:	2/29/2024

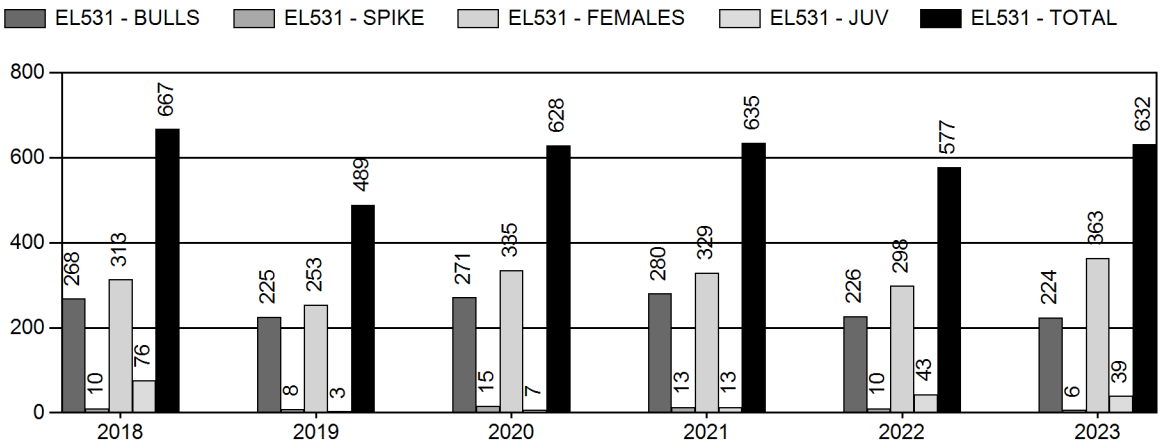
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	15%	27%
Males ≥ 1 year old:	27%	21%
Proposed change in post-season population:	-10%	-21%

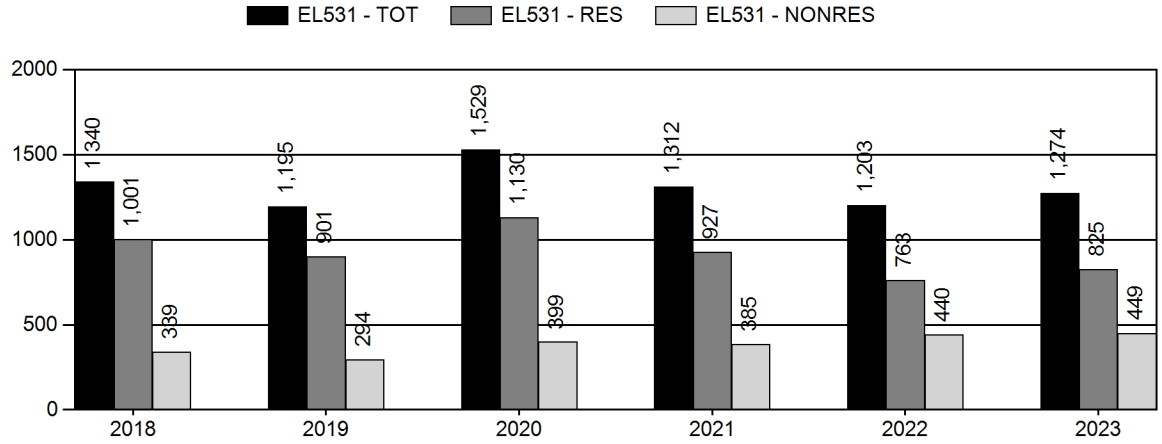
Population Size - Postseason



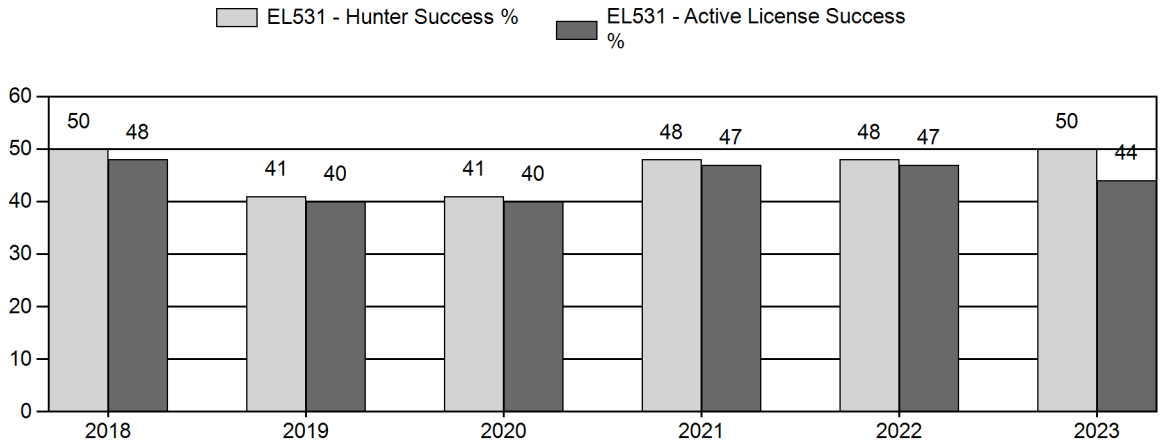
Harvest



Number of Hunters



Harvest Success



2024 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	Dec. 31		Antlerless elk valid off national forest
6	1	Sep. 1	Sep. 30	Oct. 1	Oct. 31	50	Any elk
6	1			Nov. 1	Jan. 31		Antlerless elk
6	4	Sep. 1	Sep. 30	Oct. 1	Jan. 31	25	Antlerless elk
6	8			Aug. 15	Jan. 31	Unlimited	Cow or calf valid off national forest

2024 Region E Nonresident Elk quota: 600 licenses

2023 Hunter Satisfaction: 68% Satisfied, 19% Neutral, 13% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The Iron Mountain Elk Herd remains well above the population objective of 1,800 elk. The season structure is designed to maximize cow elk harvest and hunter opportunity. The 2023 sightability post season population estimate was 4,893 (95% CI 2,987-6,801). We harvested 630 elk in 2023 during the regular hunting season, slightly above the five year average of 600 elk, and a 20% increase in cow elk harvest from 2022. An additional 304 cow elk were harvested on Chapter 56 permits for a total of 673 cow elk harvested. We will need to harvest a minimum of 900 cow elk in 2024 to reduce the population towards the objective. We have always maintained a quota for the type 6 licenses that would ensure anyone can purchase a tag throughout the season to maximize harvest. For the 2024 season we replaced the type 6 license type with a type 8 license type. The type 8 will be unlimited, and will allow for one hunter to pose more than three licenses. The type 1 and type 4 licenses are the only hunt area 6 licenses valid on forest, and provide the opportunity to have a quality hunt on public land. In 2023 hunter success was 33% on type 1 licenses, and 18% on type 4 licenses with a five year average of 33% and 8% respectively. Type 1 and type 4 licenses were reduced by 25 licenses each to address poor hunter success and general license structure will be status quo for 2024. We will continue to utilize Chapter 56 permits in 2024 to increase cow elk harvest.

In biological year 2023, there were twenty eight chapter 56 permits authorized in hunt area 6. In total 304 elk were harvested under these permits. Details as follows:

Lethal take (Chapter 56) Harvest Reporting Hunt Area 6

- Twenty eight 56 permits issued

- September 1st 2023- March 31, 2024
- Total harvest- 304 elk (282 cows, 22 caves)

3.) Management Objective review:
The management objective for Iron Mountain is a post season population objective of 1800 elk. This objective was set in 1997, last reviewed in 2022 and will be reviewed again in 2027.

4.) CWD management: This is a Tier 2 surveillance herd, and was last prioritized for CWD sampling in 2022. It is scheduled to be intensely sampled, with the goal of sampling 200 harvested elk in 2027.

Table 1. CWD prevalence for hunter harvested elk in the Iron Mountain Elk Herd Unit, 2021-2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*
	All Elk (CI = 95%)
2021	15.3%, n=92
2022	9.0 %, n=111
2023	7.0%, n=227
2021-2023	9.3% (6.1%-12.5%, n=430)

5.)Sightability: The Laramie region conducted an elk sightability in the Iron Mountain Herd Unit May 4th through May 8th 2023. A pre fixed wing flight on transects was conducted on April 23rd to determine if elk had distributed from winter range, and broken into smaller groups. We selected 963 of 977 possible subunits as occupied habitat. Of the 963 sub units, we randomly selected 300 subunits to fly. We observed 1,403 elk and flew 37 hours to complete the survey. The sightability model used was Elk Sightability Model for the Bell 47G by Mark A. Hurley. The estimate was 4,894 LCI 2987 UCI 6,801 p 0.920.

6.) Habitat and Weather: Precipitation in the herd unit area was above normal for 2023. NOAA weather station data gathered from Laramie documented annual precipitation decline of 12% from average. While precipitation amounts recorded at this weather station showed a decline, forage production was very favorable in most of the herd unit, as timing of precipitation events was excellent. A lack of winter moisture was largely to blame for overall annual precipitation declines witnessed here. Cheyenne weather station data showed a 32% increase over average annual precipitation levels, with above average precipitation documented every month of the water year. While forage production was favorable throughout the herd unit, high population numbers and elk use on private lands continues to create conflicts with domestic livestock producers.

Cheatgrass spraying occurred in the Pole Mountain and Curt Gowdy State Park areas in 2023, totaling over 7,800 acres. Dalmation toadflax and cheatgrass are both present in mixed mountain shrub habitats in the southern portions of the herd unit, causing concern for habitat managers, as herbicides traditionally used for Dalmation toadflax control result in significant non-targeted plant injury.

2023 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2023 - 5/31/2024

HERD: EL533 - SNOWY RANGE

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

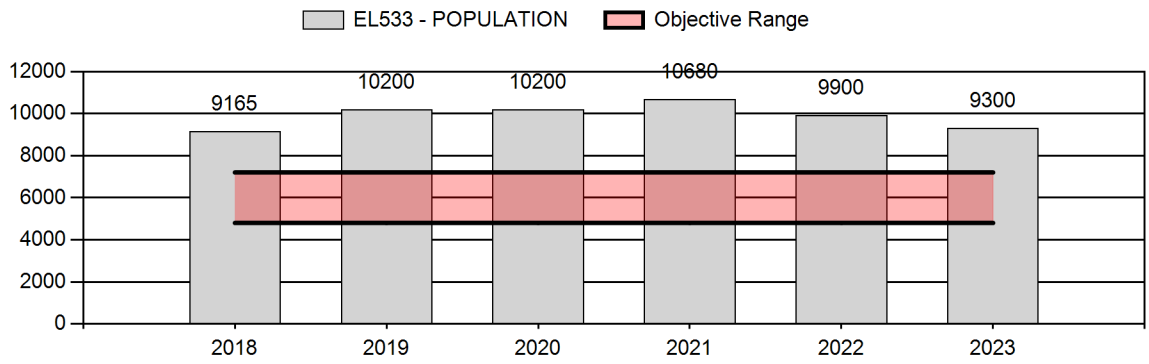
	2018 - 2022 Average	2023	2024 Proposed
Population:	10,029	9,300	8,200
Harvest:	2,053	2,491	2,275
Hunters:	5,487	5,747	5,700
Hunter Success:	37%	43%	40 %
Active Licenses:	5,909	6,924	7,000
Active License Success:	35%	36%	32 %
Recreation Days:	44,454	52,786	47,500
Days Per Animal:	21.7	21.2	20.9
Males per 100 Females	30	20	
Juveniles per 100 Females	38	34	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	55%
Number of years population has been + or - objective in recent trend:	9
Model Date:	02/21/2024

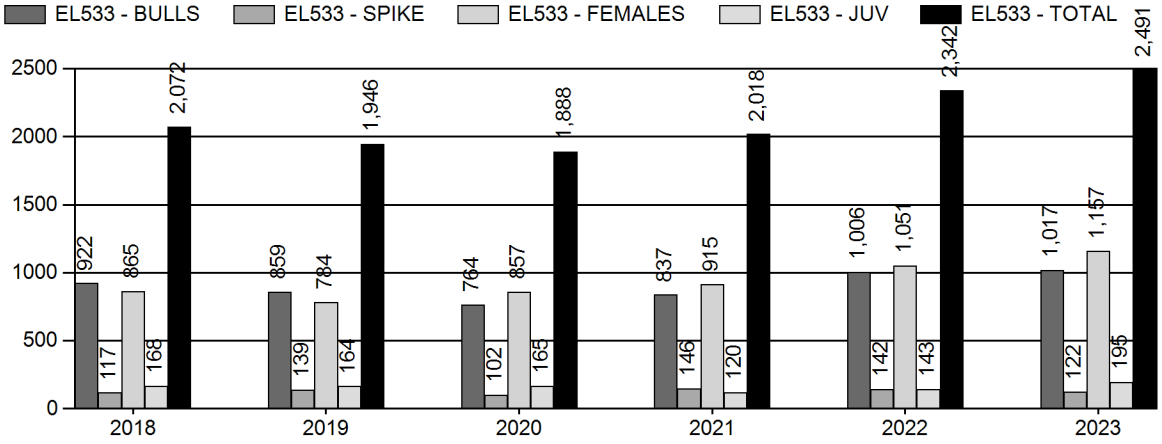
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	-5%	-11%
Males ≥ 1 year old:	-11%	-22%
Proposed change in post-season population:	-13%	-11%

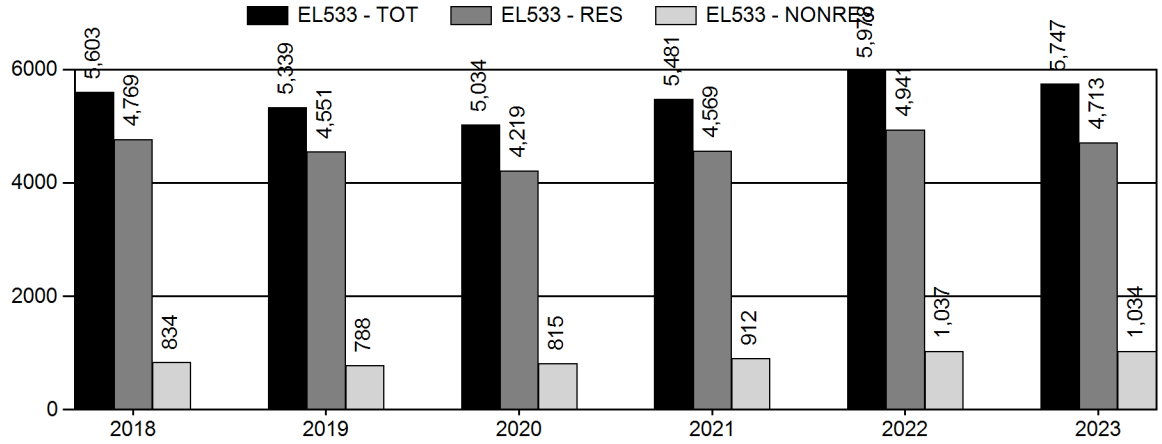
Population Size - Postseason



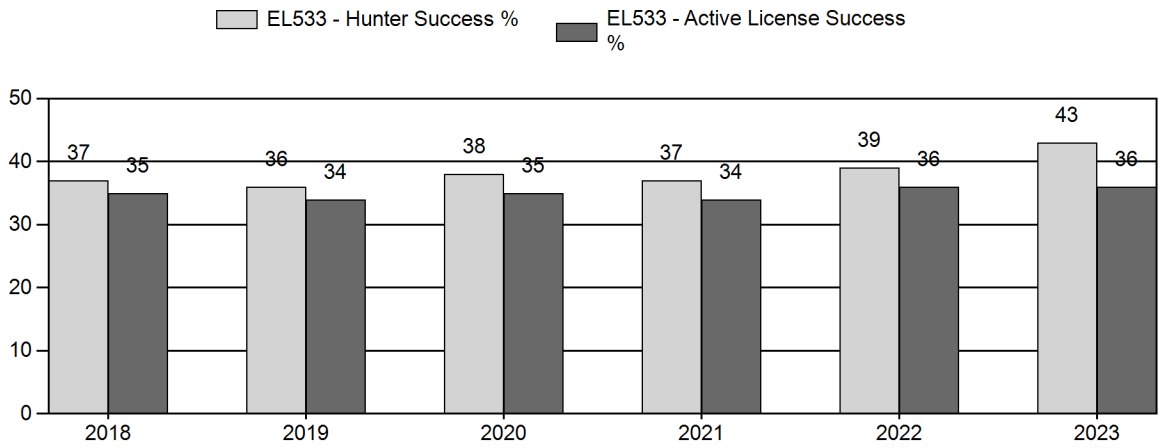
Harvest



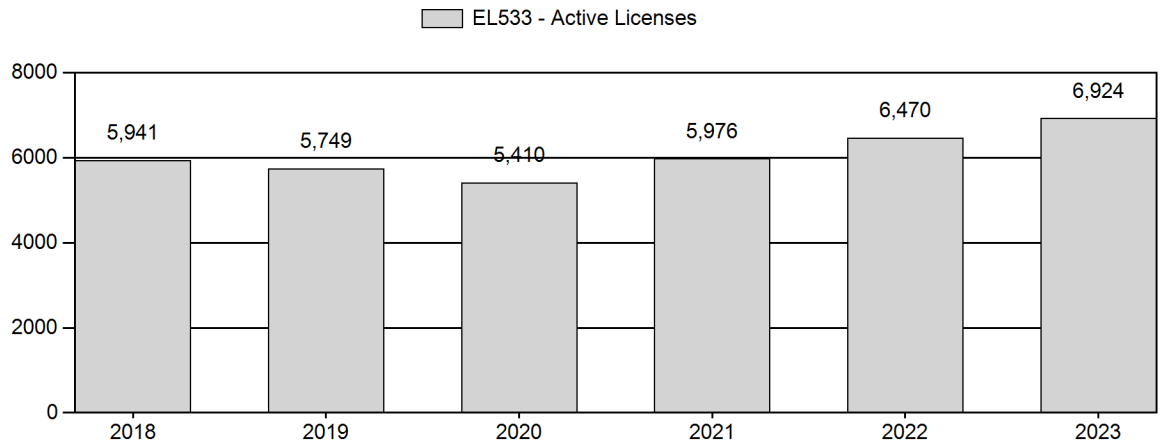
Number of Hunters



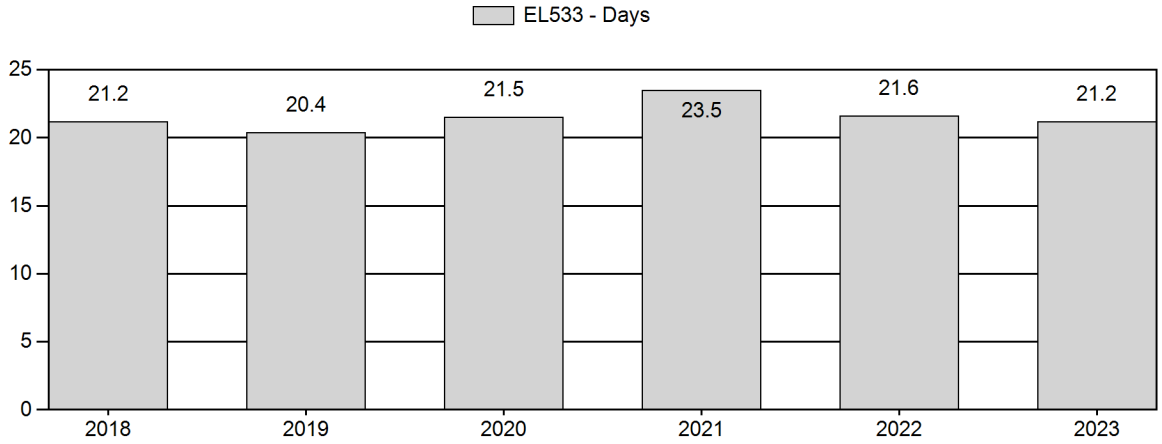
Harvest Success



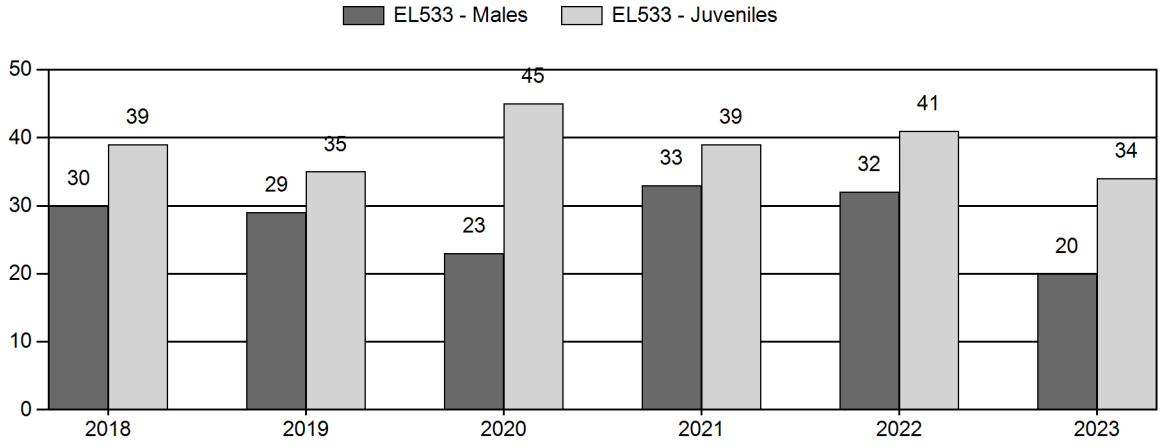
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2024 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	8			Aug. 15	Jan. 31	Unlimited	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	250	Cow or calf
9, 10	7			Aug. 15	Jan. 31	350	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	300	Cow or calf
11	1	Sep.15	Sep. 30	Oct. 1	Nov. 30	200	Any elk
11	1			Dec. 1	Jan. 31		Any elk valid off national forest
11	4	Sep. 15	Sep. 30	Oct. 1	Jan. 31	100	Antlerless elk
11	6			Aug. 15	Sep. 30	450	Cow or calf valid off national forest; and off Wick Wildlife Habitat Management Area
11	6			Oct. 1	Jan. 31		Cow or calf
11	9			Sep. 1	Sep. 30	75	Any elk, archery only
12	Gen	Sep. 1	Sep. 30	Oct. 15	Oct. 31		Any elk
12	6	Sep. 1	Sep. 30	Oct. 1	Dec. 31	300	Cow or calf
12, 13, 15, 110	7			Aug. 15	Jan. 31	350	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	Dec. 31	300	Cow or calf
125	1	Sep. 1	Sep. 30	Oct. 1	Dec. 31	200	Any elk
125	1			Jan. 1	Jan. 31		Antlerless elk
125	6	Sep. 1	Sep. 30	Oct. 1	Jan. 31	200	Cow or calf

2024 Nonresident General Elk Region S Quota: 1,050 licenses

2023 Hunter Satisfaction: 64% Satisfied, 21% Neutral, 15% Dissatisfied

2024 Management Summary

1.) Hunting Season Evaluation: The harvest survey report indicated 5,747 hunters harvested 2,491 elk in 2023. Hunter success (43%) increased and days to harvest (21.2) decreased compared to the past five years (37% and 21.6), which indicated elk hunting was fair in 2023. More antlerless elk were harvested in 2023 than any year since 2013. A total of 1,139 bulls (yearling and branch-antlered) were harvested in 2023 which was also higher than the ten-year average bull harvest (1,007).

In biological year 2023, there was one authorization for auxiliary elk harvest in this herd unit under Chapter 34 Regulation and one Chapter 56 permit. In total, 59 elk were harvested under these permits in addition to totals reported in the 2023 harvest survey. Details are as follows:

Auxiliary Hunt (Chapter 34) - Elk Hunt Area 8

- Albany County- 3 participating landowners
- Season Dates: July 25,2023- August 14,2023
- Up to 75 antlerless elk auxiliary licenses authorized
- 11 auxiliary licenses issued/sold
- Total harvest= 1 cow elk

Lethal Take (Chapter 56) - Elk Hunt Area 8

- Albany County– 6 participating landowners
- Permit Dates: February 6,2024 – March 31,2024
- Authorization for removal of up to 200 antlerless elk
- Total harvest = 58 elk (57 cows and 1 calf)

Appendix A describes the postseason classification summary from 2018-23. The 2023 postseason male (branched antlered and yearling) to female ratio (20/100) and juvenile to female ratio (34/100) were below the respective five–year averages of 29/100 and 39/100. Classification data were collected opportunistically during deer surveys in the western portion of the herd unit and were not collected in the eastern portion, which may have contributed to the change in ratios. Mild conditions may have also affected the number of adult bulls observed, as they were likely still dispersed at higher elevations during the time of the survey. We suspected productivity (calf to cow ratios) would be reduced because of severe winter conditions in winter 2022-23. The 2023 postseason population estimate of 9,300 elk remained above the objective of 6,000 ±20% elk. The 2024 hunting seasons in the Snowy Range herd unit provided recreational elk hunting opportunities while reducing the overall elk population toward the objective.

Hunt areas 9, 10, 12, and 110 remained general license hunting seasons and hunt areas 8, 11, and 125 remained limited quota hunting seasons in 2024. Hunting access for antlerless elk hunters should remain good because of newly enrolled Access Yes properties in hunt areas 12 and 110. Hunt area 11 type 4 season remained open until January 31 to increase hunter opportunity. Hunt area 8 type 6 and 7 licenses were removed for the 2024 season and replaced with the new unlimited type 8 license.

In 2024, nonresident regional general elk hunt areas and general elk license quotas were established. The Nonresident General Elk Southern Region (Region S) had a quota of 1,050 licenses. The license quota was based off of the 2019-21 average nonresident hunters in the general license hunt areas that comprise Region S. Geographically, Region S encompasses several limited quota hunt areas, however nonresidents with general elk region licenses are only permitted to hunt in areas designated as general (9, 10, 12, 13, 15, 21, 105-107, 110, 130) and not within limited quota hunt areas.

2.) Management Objective Review: The postseason population objective was last reviewed in 2023 and will be reviewed again in 2028.

3.) Weather/Habitat: PRISM data, extracted from the Derived Environmental Variability Indices Spatial Extractor (DEVISE) interface, for the Snowy Range elk herd unit was analyzed to estimate precipitation across the herd unit. Precipitation in critical growing months for herbaceous and woody vegetation (April-July) fluctuated around the 30-year average, with well above-average precipitation in June and August and near-average precipitation in April, May, and July. Snowpack and total annual precipitation were above the 30-year average for the majority of this herd unit. SNOTEL sites in the Snowy Range reported above-average (104-155%) snowpack from January through March 2023.

The Mullen Fire (2020) burned approximately 176,800 acres in the Snowy Range. Over 10,300 acres on the western half of the Snowy Range elk herd unit were aerially treated with the herbicide Rejuvra in 2021. Large-scale monitoring has taken place each year since 2021 to evaluate herbicide efficacy post-treatment. Recovery of native, perennial grasses looks promising thus far. Plant species diversity was comparable pre- and post-treatment with the exception of a few native annual forbs. Cheatgrass was documented in areas where soil movement had occurred. Additionally, high densities of cheatgrass were documented within the no-spray buffer around the North Platte River. We will continue to monitor herbicide efficacy in 2024 and evaluate the need for retreatment.

In 2023, 578 acres were aerially treated with Rejuvra herbicide to control cheatgrass on the eastern side of the Snowy Range. To control cheatgrass infestations in the Badger Creek burn scar, 3,927 acres were also aerially treated in 2023. Aspen habitat enhancement through conifer cutting in foothill areas within the Foote Creek and Wagonhound Creek drainages is planned for 2024. Prescribed burning will be scheduled two to three years post-mechanical cutting.

4.) Chronic Wasting Disease (CWD) Management: This is a Tier 2 surveillance herd, and was last prioritized for CWD sampling in 2019. It is scheduled to be intensely sampled, with the goal of sampling 200 hunter-harvested elk, in 2024. The prevalence estimate from 2019 priority sampling and the three-year (2021-23) CWD prevalence estimates are presented in Table 1.

Table 1. CWD prevalence for hunter-harvested elk in the Snowy Range Elk Herd, 2019 and 2021-23.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*
	All Elk (CI = 95%)
2019	1.3% (n=225)
2021	0.0% (n=142)
2022	3.1% (n=98)
2023	1.9% (n=107)
2021-2023	1.4% (0.5-3.3%, n=347)

2018 - 2023 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	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
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
2020	10,200	41	46	87	13%	384	60%	174	27%	645	573	11	12	23	± 3	45	± 5	37
2021	10,680	155	234	390	19%	1,170	58%	462	23%	2,022	556	13	20	33	± 2	39	± 3	30
2022	9,900	90	184	274	19%	855	58%	350	24%	1,479	475	11	22	32	± 3	41	± 3	31
2023	9,300	143	123	266	13%	1,317	65%	447	22%	2,030	560	11	9	20	± 2	34	± 2	28

2023 - JCR Evaluation Form

SPECIES: Elk
HERD: EL534 - SHIRLEY MOUNTAIN
HUNT AREAS: 16

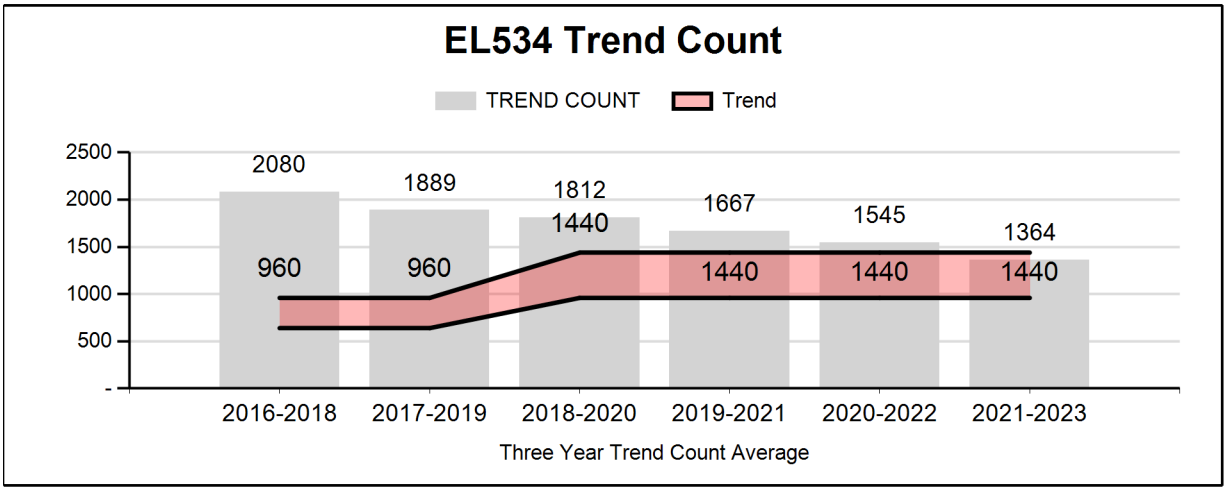
PERIOD: 6/1/2023 - 5/31/2024
PREPARED BY: TEAL CUFAUDE

	2018 - 2022 Average	2023	2024 Proposed
Trend Count:	1,699	1,034	1,200
Harvest:	442	680	690
Hunters:	752	859	865
Hunter Success:	59%	79%	80%
Active Licenses:	771	963	950
Active License Success	57%	71%	73 %
Recreation Days:	5,722	6,959	7,000
Days Per Animal:	12.9	10.2	10.1
Males per 100 Females:	33	59	
Juveniles per 100 Females	39	28	

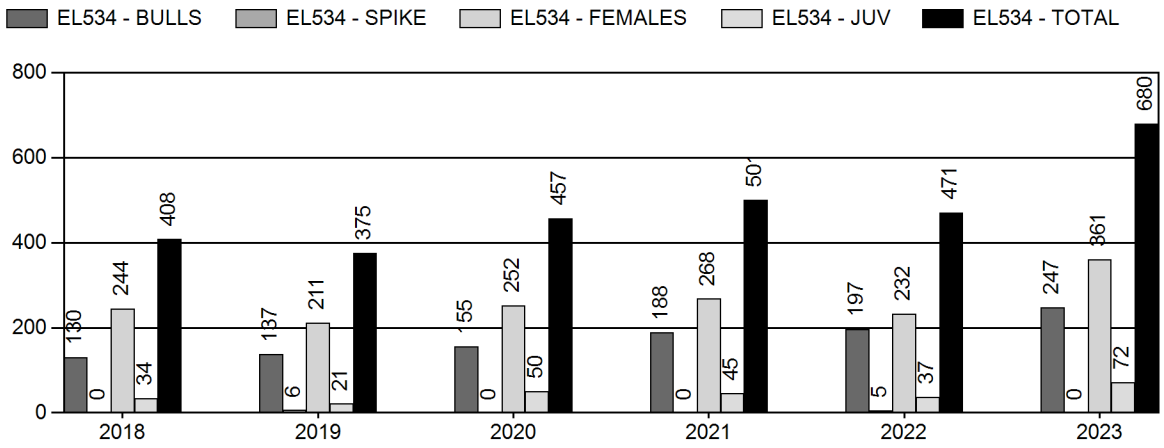
Trend Based Objective (± 20%)	1,200 (960 - 1440)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-13.8%
Number of years population has been + or - objective in recent trend:	3

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

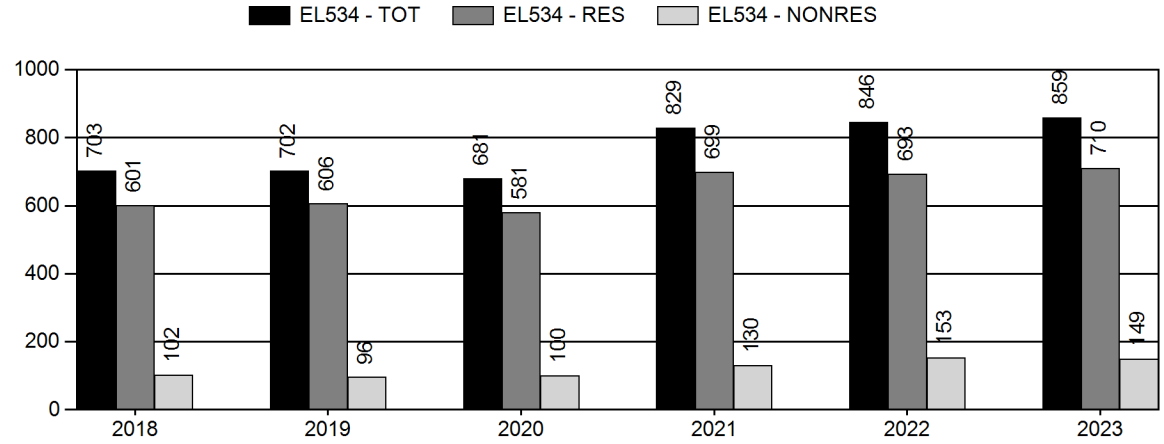
	JCR Year	Proposed
Females ≥ 1 year old:	N/A%	N/A%
Males ≥ 1 year old:	N/A%	N/A%
Juveniles (< 1 year old):	N/A%	N/A%



Harvest



Number of Hunters



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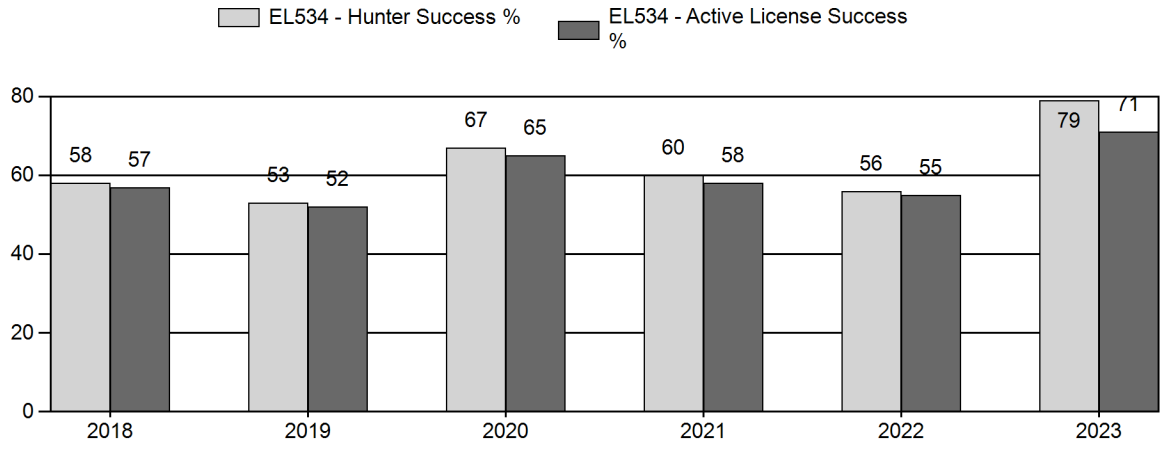
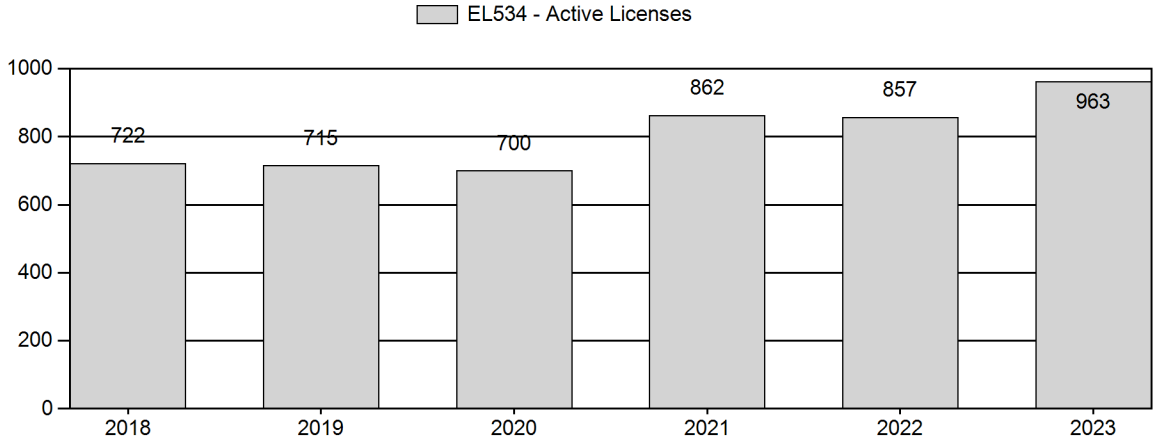
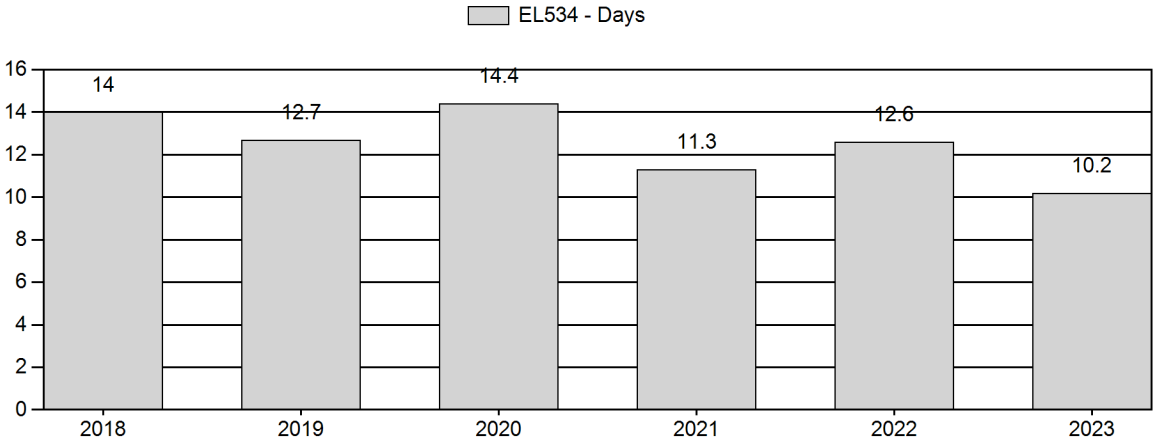


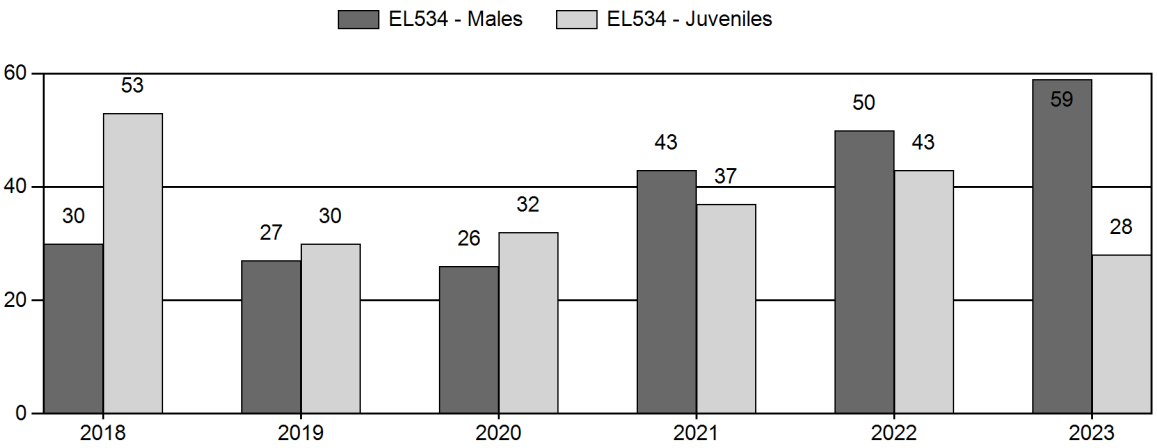
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2024 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	250	Any elk
16	1			Dec. 1	Jan. 31		Antlerless elk
16	2	Sep. 1	Sep. 30	Nov. 1	Nov. 30	100	Any elk
16	2			Dec. 1	Jan. 31		Antlerless elk
16	4			Sep. 1	Sep. 30	300	Antlerless elk valid on private land; also valid on or within one-half (½) mile of irrigated land
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
16	6	Sep. 1	Sep. 30	Oct. 1	Nov. 30		Cow or calf valid in the entire area
16	7			Dec.1	Jan. 31	200	Cow or calf

2023 Hunter Satisfaction: 82% Satisfied, 9% Neutral, 9% Dissatisfied

2024 Management Summary
1.) Hunting Season Evaluation: The harvest survey report indicated 859 hunters harvested 680 elk in 2023, with an overall success of 79%. The percentage of branch-antlered bulls (100%) in the antlered elk harvest and male to female ratio (59/100) observed during the trend survey met the special management parameters. The mid-winter trend count to estimate the wintering population of elk in the herd unit was conducted in January 2024 and 1,024 elk were counted. The three-year (2021-23) trend count average of 1,364 elk was within the objective range of 1,200 (±20%) elk.

Type 1 and 2 license success has exceeded 60% over the last three years. Both the type 1 and 2 license quotas were increased in 2022 and 2023. These licenses are highly coveted and license holders expect a high quality hunt experience. Hunter success has been high, but hunter comments on the harvest survey report and in the field indicated that public lands are becoming increasingly crowded and could contribute to reduced success in the future by putting a disproportionate amount of hunting pressure on “public land elk.” A large portion of this herd unit is unavailable to type 1 and 2 hunters due to the checkerboard land ownership pattern and limited private land access so managers prefer to take a conservative approach to increases in the type 1 and 2 license quotas.

We do not anticipate August or September Hanna Draw Hunter Management Area permission slips

will be allocated in 2024, so that portion of the type 4 and 6 limitations was removed. The type 4 and 6 “within one-half (½) mile of irrigated land” limitation was retained to address elk damage. The type 7 license valid from December- January was retained to increase cow elk harvest, while minimizing hunter crowding concerns during the popular type 1 and 2 hunting seasons. Given the location of winter ranges elk typically occupy in December, hunters will likely need private land access in order to be successful on this license. Landowners that have been instrumental in providing late-season hunter access have expressed that current antlerless elk license quotas are sufficient and are concerned about significant increases in hunter access requests.

High success on all license types in 2023 was attributed to improved private land access for antlerless elk hunters and dry conditions throughout the hunting season. We would like to maintain high antlerless elk hunter success, while also fulfilling the expectations of hunters who hold the hard to draw type 1 and 2 licenses. The 2024 hunting seasons were prescribed with the objective of maintaining bull to cow ratios that meet the special management parameters and reducing elk numbers.

2.) Management Objective Review: The management objective was reviewed in 2020 and will be reviewed again in 2025.

3.) Weather/Habitat: Precipitation levels were above normal for the 2023 biological year. Winter snow depths were higher than normal in many parts of the Shirley Basin, and conditions were tough for pronghorn and likely impacted survival. February was filled with numerous snowstorm events and very cold temperatures. A major snowfall event was recorded on April 4, 2023, with accumulations exceeding 20” in the upper elevation portions of Area 42 in the foothills of the Laramie Range. Cool spring weather resulted in delayed snowmelt and greenup. Once temperatures increased in June, forage production was excellent. Precipitation events throughout the remainder of the summer, as is typical for much of this herd unit, were sporadic and covered very small geographic areas. However, due to mild summer temperatures, forage maintained greenness throughout the summer months. NOAA weather stations in Laramie and Rawlins recorded drastic differences in average annual precipitation. Laramie saw a decrease of 12% from average, while Rawlins was nearly 49% above average for 2023. Winter snowfall totals were a huge driver in this drastic difference.

4.) Chronic Wasting Disease (CWD) Management: CWD was first detected in this herd unit in 2006. To date, no meaningful CWD prevalence data has been collected within this herd unit and no CWD management actions have occurred. This is not a targeted surveillance herd because of the challenges associated with collecting a statistically valid sample of hunter-harvested elk.

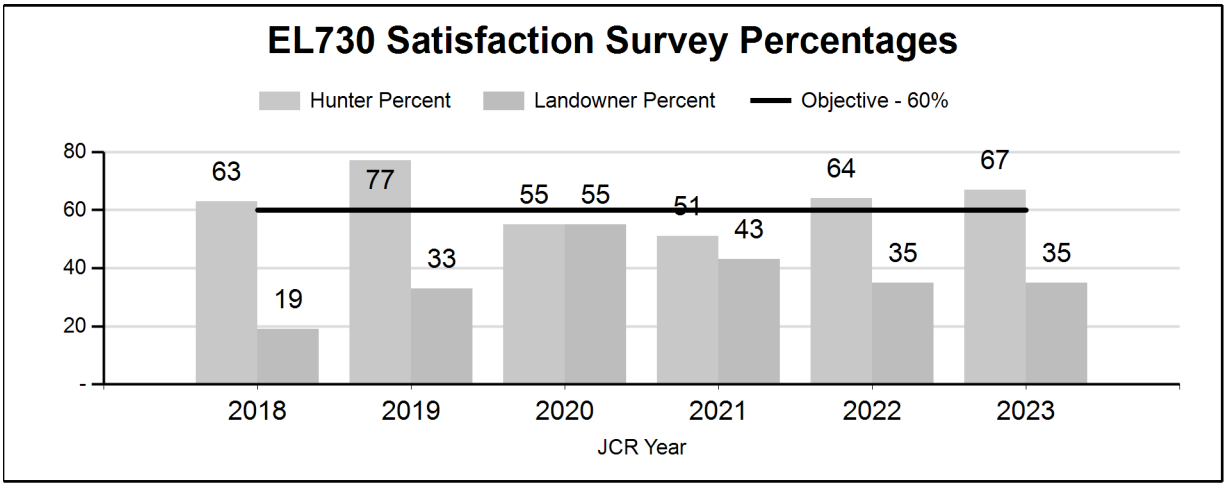
2023 - JCR Evaluation Form

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

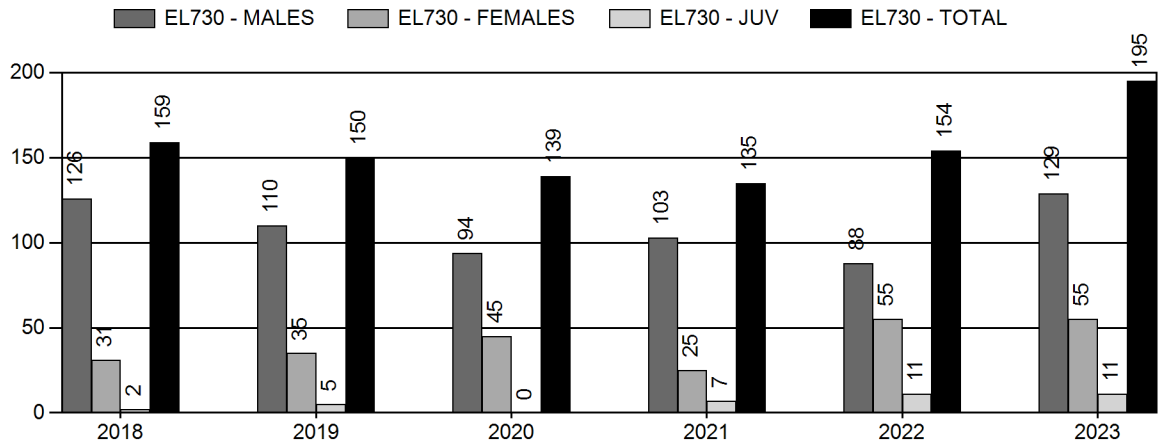
PERIOD: 6/1/2023 - 5/31/2024
PREPARED BY: KEATON WEBER

	2018 - 2022 Average	2023	2024 Proposed
Hunter Satisfaction Percent	62%	67%	60%
Landowner Satisfaction Percent	36%	35%	40%
Harvest:	147	195	250
Hunters:	361	421	600
Hunter Success:	41%	46%	42%
Active Licenses:	380	441	500
Active License Success:	39%	44%	50%
Recreation Days:	2,517	2,174	2,500
Days Per Animal:	17.1	11.1	10
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

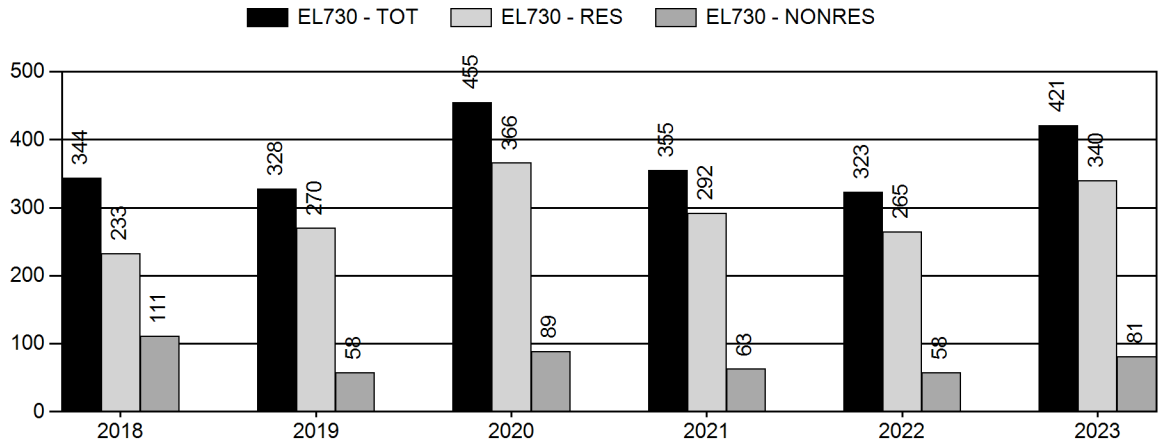
Satisfaction Based Objective	60%
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-9%
Number of years population has been + or - objective in recent trend:	0



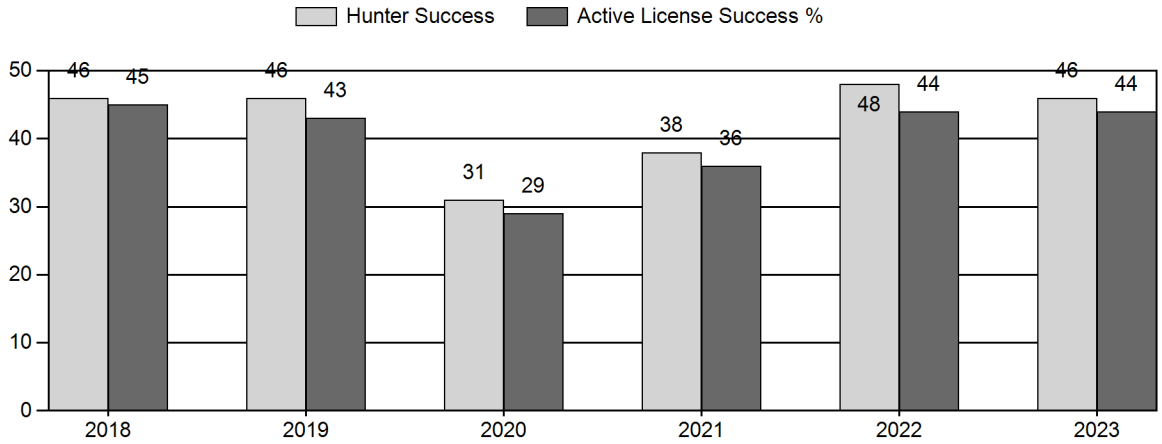
Harvest



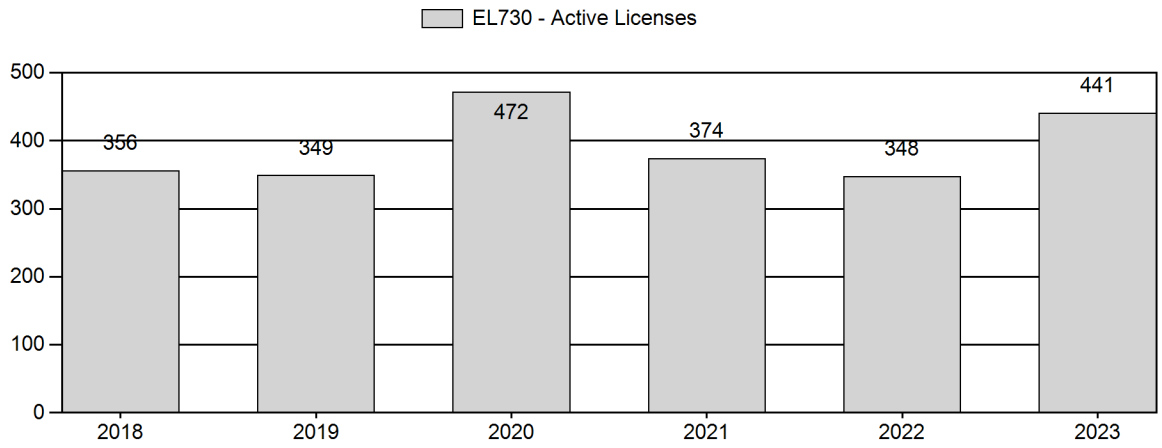
Number of Hunters



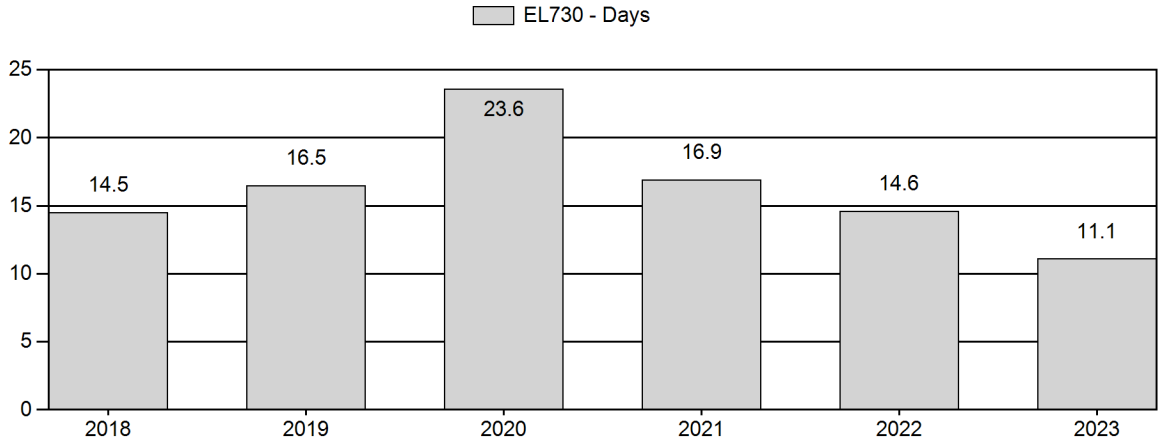
Harvest Success



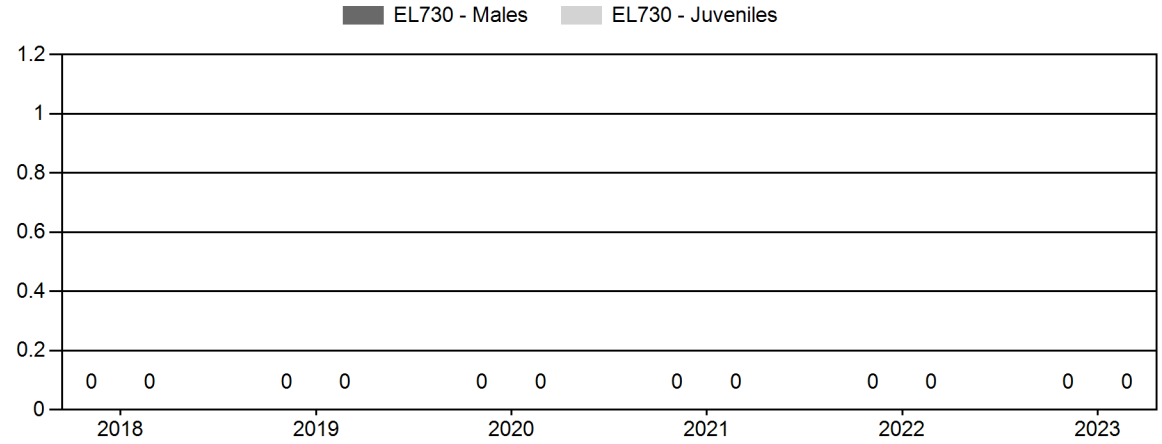
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2024 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	Nov. 30		Any elk
3	Gen			Dec. 1	Jan. 31		Antlerless elk
3	8			Aug. 15	Jan. 31	Unlimited	Cow or calf

2024 Region E Nonresident elk quota: 600 licenses

2024 Hunter Satisfaction: 67% Satisfied, 23% Neutral, 10% Dissatisfied
2023 Landowner Satisfaction: 42% Above Desired Levels, 35% At Desired Levels, 23% Below Desired Levels

2024 Management Summary
1.) Hunting Season Evaluation: The 2023 season is designed to maximize harvest in order to address damage situations and a growing population in a landscape that is dominated by private land. Over the course of the previous two years, there has been an increasing amount of elk damage North of Highway 26. Opening the season through the late fall and winter months hunt area wide allows for these damage situations to be addressed through hunting opportunity. In the winter of 2023-2024, the Wyoming Game and Fish Department sent out a landowner survey to gauge support of extending the season length North of Highway 26. Out of 30 responses, 73% indicated support for extending the season length and 26% were opposed. In order to increase harvest pressure on the female portion of the population, the General any elk season will close on November 30th herd unit wide and the General licenses are valid for antlerless elk through December and January. The General any elk (bull) season will close November 30th in order to focus harvest on the female portion of the population in an effort to decrease the population. The Department will prescribe a new version of the Type 8 license, which will replace the Type 6 license. This license will be unlimited to maximize harvest on cow/calf elk to meet population objectives and address damage concerns.

During the 2024 hunting season, there was one authorization for auxiliary elk harvest in this herd unit under the Chapter 34 Regulation. In total, 2 cow elk were harvested under these authorizations in addition to totals reported in the harvest survey. Details are as follows:

- **Auxiliary Hunt – Elk Hunt Area 3**
  - Niobrara County – 5 participating landowners
  - Season Dates: December 22, 2023 – March 15, 2024
  - 18 Auxiliary licenses issued
  - 2 cow elk harvested

2.) Management Objective Review: The Rawhide Elk Herd Unit's landowner and sportsmen satisfaction objective was last reviewed in 2022 and will be up for objective review in 2027. Managers are considering changing the management strategy from a landowner/sportsmen satisfaction objective to a harvest objective using a population estimate in 2025. Due to population increase and landowner satisfaction levels, managers plan to implement a decreasing population harvest objective. With a decreasing population objective, managers would strive to harvest 110% to 150% of the average, estimated annual recruitment into the population.

3.) Ongoing Research: The WGFD partnered with the Wyoming Military Department (Camp Guernsey) and captured 42 female elk from 2018-2022. All 42 cow elk from the Rawhide Herd were fitted with GPS collars. Animals were captured on Camp Guernsey and lands adjacent to Camp Guernsey. Collars were programmed to collect a GPS location every two (2) hours and to drop off after three (3) years. As elk died, collars were collected and redeployed the following January. Western EcoSystems Technology, Inc (WEST) was contracted to evaluate and summarize all of the collar data and results. This projected was finalized in 2022 and the final report was completed in June of 2022.

The goal of this project was to identify 1) key winter, summer, and parturition ranges, 2) potential movement barriers, 3) important habitat components that elk select or avoid, and 4) assess whether elk are effected by military training activities or hunter activity.

Spatial location data indicated that this herd of elk are very nomadic and do not select for seasonal winter range or summer range habitats. However, data suggests most elk within this herd do have distinct parturition areas. This herd was thought to have potential movement barriers from Interstate 25 and the North Platte River. Collar data confirmed that Interstate 25 does limit natural elk movements westward across the interstate; however, it was common for elk to cross the interstate occasionally. It was also found that the North Platte River did not inhibit elk movements whatsoever. Results clearly indicated that elk were being displaced from various military training (aerial activities, range fire, personnel on site etc.) disturbance events and the elk selected for more rugged terrain during these disturbance events. There was no detection of elk being displaced due to hunter activity; however, this was likely due to the lack of fine scale hunter activity data. Managers will ultimately use these results to help minimize disturbances to the elk during military activities, identify and maintain critical habitat areas, and assist in making informative environmental comments for proposed industrial development in the area. The final report for this research can be found in Appendix A.

4.) Weather and Habitat: Annual precipitation was above normal in the Rawhide herd unit in 2023. NOAA weather stations in Cheyenne, Torrington, Fort Laramie, and Douglas showed increases of 32%, 13%, 24%, and 26% respectively from average. Native rangeland habitats in the herd unit largely remain in late seral stages due to a lack of natural or managed disturbances on this landscape. Due to the close proximity of perennial and annual agricultural crops to security cover provided by steep canyons and timber stands, elk are likely to shift their diets and utilize these forage resources in this intensive agricultural environment, when native rangeland forage resources may lack in productivity or forage quality. Cheatgrass remains a large threat in native rangeland plant communities, and also in cropland environments. In 2023, 1,693 acres of native rangelands were treated with Rejuvra and Plateau herbicides in foothill mountain habitats

north of Hartville. Some of the acres treated were burned in the 2006 Tracer wildfire. Over time, we have witnessed cheatgrass become well established in disturbed areas, often times as a delayed response following disturbance.

5.) Chronic Wasting Disease: Table 1. CWD prevalence for hunter-harvested elk in the Rawhide elk herd unit, 2021-2023.

Year(s)	Percent CWD-Positive and (*n*) – *Hunter Harvest Only*
	Adult Males
2021-2023	**5%, n=20**

Appendix A. Final Report, Guernsey elk research project.

Spatial Data Analysis of the Rawhide Elk Herd Using Camp Guernsey

Prepared for:
Wyoming Military Department

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May 2022

WEST

Privileged and Confidential – Not for Distribution

PROJECT HIGHLIGHTS

The Wyoming Military Department contracted Western EcoSystems Technology, Inc. to evaluate location data collected from 2018–2022, from 42 female elk in the Rawhide Herd that use the Camp Guernsey Joint Training Center, Guernsey, Wyoming.

Findings included:

1) Winter, summer, and parturition ranges:
    a. Only five of 37 elk (14%) had distinct summer and winter ranges.
    b. The Rawhide Herd may be characterized as a resident herd with overlapping summer and winter ranges.
    c. We found evidence for distinct parturition areas for most elk, with mean dates of parturition beginning around 2 June each year.
2) Potential movement barriers:
    a. We did not visually detect barriers to elk movement.
        i. Elk frequently crossed the North Platte River.
        ii. Elk crossed Interstate 25 at multiple locations, but crossings were not isolated to particular locations.
3) Habitats that elk selected for or avoided:
    a. The North Training area had relatively high probability of selection during both summer and winter.
    b. The South Training Area received little use by elk over the study period so this area was not a focal point of our assessment.
4) Elk distribution patterns during military training or hunter activities:
    a. All training activities appeared to displace elk during both summer and winter (Figure i).
    b. Across all summer training activities, elk were displaced on average 0.14 km during a training activity and 0.54 km after the activity.
    c. During winter, elk were displaced on average 0.22 km during a training activity and 0.70 km after the activity.
    d. Elk tended to move to more topographically rugged areas during training activities in both seasons.
    e. We failed to detect a response by elk to hunter activity. Additional data would be necessary to uncover any potential responses.

Findings from this study may be useful for those tasked with managing the Rawhide Herd and their habitat.

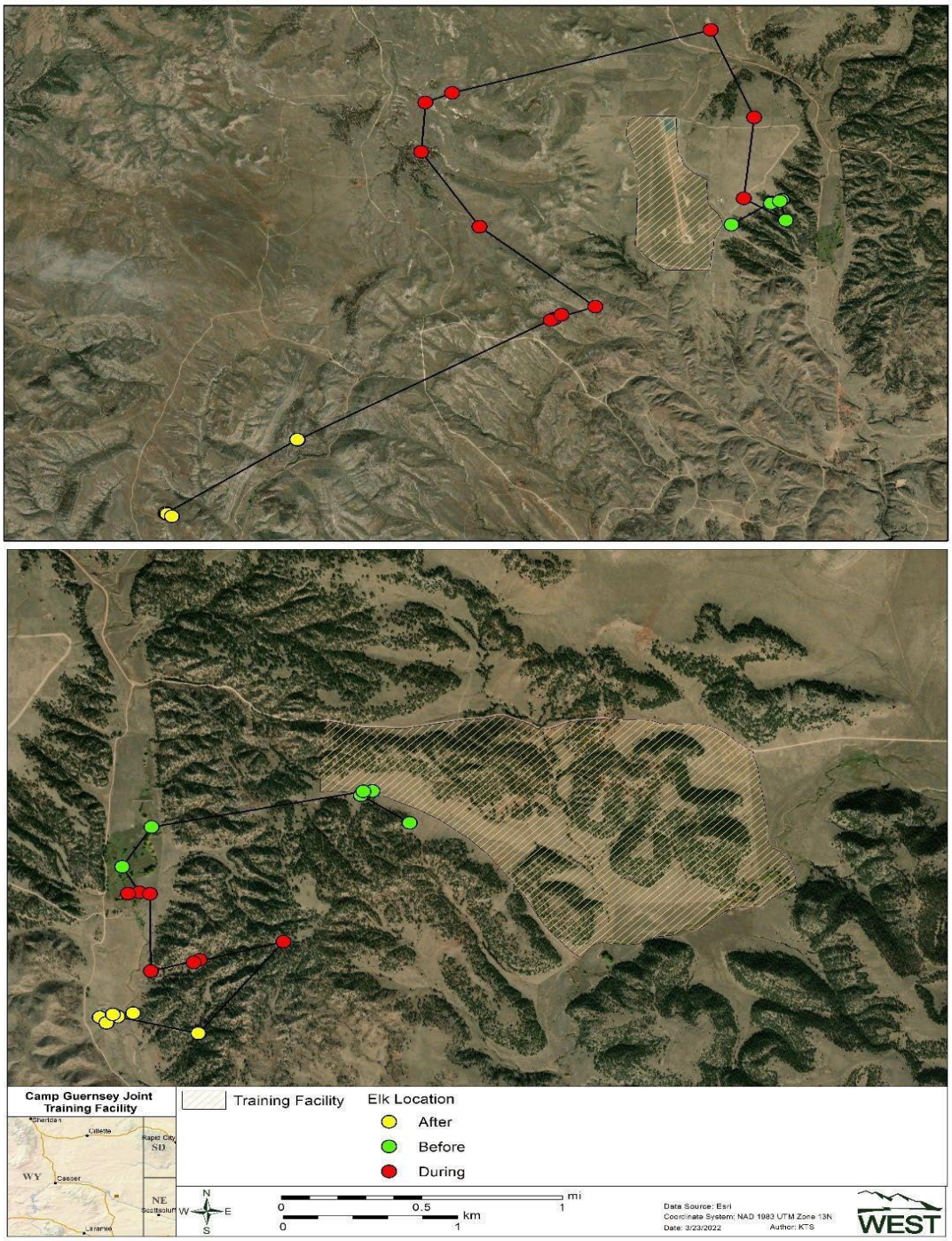

Figure i. Two examples of female elk before (green circles), during (red circles), and after (yellow circles) a military training activity (personnel on site) at the Camp Guernsey Joint Training Facility, Platte County, Wyoming. Elk were displaced on average 0.14 kilometer (km) during a training activity and 0.54 km after the activity in summer. Elk were displaced on average 0.22 km during a training activity and 0.70 km after the activity in the winter.

EXECUTIVE SUMMARY

The Wyoming Military Department contracted Western EcoSystems Technology, Inc. (WEST) to evaluate female elk in the Rawhide Herd that used areas within and adjacent to the Camp Guernsey Joint Training Center, Platte County, Wyoming. WEST worked with the Wyoming Military Department and the Wyoming Game and Fish Department (WGFD) to identify 1) key winter, summer, and parturition ranges, 2) potential movement barriers to the Rawhide Herd, 3) important habitat components elk select or avoid, and 4) assess whether elk shift their distribution patterns during military training or hunter activity. We used location data from 42 female elk collected during 2018–2020 to assess these objectives.

We used two novel approaches that generated spatio-temporal clustering of elk locations to identify seasonal ranges and parturition areas. We determined that only five of 37 individuals (14%) had distinct summer and winter ranges, suggesting that the Rawhide Herd may generally be characterized as a resident herd with overlapping summer and winter ranges. We found evidence for distinct parturition areas for most elk, with mean dates of parturition beginning on 3 June in 2018, 4 June in 2019, and 31 May in 2020. Elk spent an average of 22 days in potential parturition areas.

To identify potential movement barriers, we coupled visual inspection of elk locations with an algorithm that used speed and turning angle between successive elk locations to differentiate between locations identified as resting, foraging, or travelling. Locations identified as travelling were used to visually assess areas of high use when elk were travelling. We did not visually detect barriers to elk movement, and elk appeared to cross the North Platte River without restriction, with multiple crossings occurring repeatedly in two general areas. Elk also crossed Interstate 25 at multiple locations, but crossings were not isolated to specific locations.

We estimated Resource Selection Functions based on elk locations to predict summer and winter habitat selection for the Rawhide Herd. Locations were assigned to summer or winter based on WGFD seasonal definitions (summer: 1 May–14 November; winter: 15 November-30 April). We employed a use-availability design, where locations used by elk were contrasted with a random sample of available locations within the study area, defined by the extent of elk locations. During summer, elk selected areas that had a greater proportion of agriculture, a greater proportion of forest, a lower proportion of herbaceous cover, and areas closer to recent (occurring since 2005) fires, but farther from older fires. Elk also selected areas with greater topographic ruggedness that were farther from anthropogenic development and intermediate (~four km) distances from county roads. During winter, elk selected areas with a greater proportion of agriculture, and a lower proportion of herbaceous and shrub cover that were near recent fires. Elk also

selected areas with greater topographic ruggedness that were farther from anthropogenic development and intermediate distances from county roads and highways. The South Training Area of the Camp Guernsey Joint Training Center received little use by elk over the study period. However, the North Training area was predicted to have relatively high probability of selection during both summer and winter.

To assess whether elk were displaced by military training or hunter activity, we used integrated step-selection functions (ISSF). ISSFs account for changes in resource selection as well as movement between locations. Military training activity models included an assessment of all training activities combined, aerial activities (i.e., any activity involving helicopter or plane training), aerial fire (i.e., any aerial gunnery), personnel on site (i.e., human activity without gun fire), range fire (i.e., activity involving gun fire), large range fire (i.e., mortar, grenade or other fire larger than standard gun fire), and vehicle activity. We developed two separate models to evaluate hunter activity by including predictors that described the total number of hunters at the facility and the total harvest each day. During summer and winter, all training activities appeared to displace elk. Across all activity types during summer, elk were displaced on average 0.14 km during a training activity and 0.54 km after the activity. During winter, elk were displaced on average 0.22 km during a training activity and 0.70 km after the activity. During both seasons, displacement varied by training activity type. Elk also tended to move to more topographically rugged areas during training activities in both seasons. We failed to detect a response by elk to hunter activity, but this could have been due to a lack of fine scale hunter activity data.

REPORT REFERENCE

K. Smith and Telander, A., 2022. Spatial Data Analysis of the Rawhide Elk Herd Using Camp Guernsey. Prepared by Western EcoSystems Technology, Inc., Laramie, Wyoming. May 2022.

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Camp Guernsey Elk Spatial Analysis

INTRODUCTION

The Wyoming Military Department contracted Western EcoSystems Technology, Inc. (WEST) to evaluate habitat selection patterns of female elk in the Rawhide Herd using resource selection functions (RSFs). The overall goal for this spatial analysis was to determine whether, and to what extent, elk are displaced by military training or hunter presence on and adjacent to the Camp Guernsey Joint Training Center, Platte County, Wyoming. In addition, seasonal ranges (i.e., parturition, winter, and summer), migratory corridors, and potential movement barriers (e.g., North Platte River, Interstate 25) were assessed from location data.

Objectives

WEST worked with the Wyoming Military Department (WYMD) and the Wyoming Game and Fish Department (WGFD) to address the following research questions:

1. Where are the key winter, summer, and parturition ranges located for the Rawhide Herd and do they vary from year to year?
2. Are there any clear movement barriers to the Rawhide Herd?
3. What habitat variables are elk selecting for or avoiding (e.g., irrigated crops, rural residential development, burned woodland, and livestock grazing) and where are the best habitats located?
4. Do elk shift their distribution patterns during military training or hunter presence, and if so, what are the habitat characteristics of their security habitats and how long do they remain there?

METHODS

Forty-two female elk were captured using helicopter net gunning (Native Range Capture Services, Elko, Nevada) in late January and early February 2018 (n = 29), late January 2019 (n = 6), and mid-February 2020 (n = 7). All elk were captured on or adjacent to Camp Guernsey Joint Training Center, Platte County, Wyoming. Each captured animal was fitted with a Lotek GlobalStar Track M GPS neck collar. Collars were programmed to fix locations every two hours and were equipped with a release mechanism causing collars to release after a specified period of time. We censored locations recorded within the first week of capture to avoid capture influence on movement behavior (Northrup et al. 2014).

GPS Data Cleaning

We cleaned and filtered collar data by removing locations collected when collars were not on elk, accurately attributed location data to the correct animal (for collars that were affixed to more than one elk), and filtered data by removing any duplicates or erroneous location fixes. To remove erroneous locations, we calculated distance and time between successive locations to estimate speed, and removed any locations that were unreasonable based on visual inspection and maximum

sustained speeds exceeding 3.5 meters/second (11.5 feet/second). Cleaned data were uploaded to movebank.org (Figure 1).

May 2022

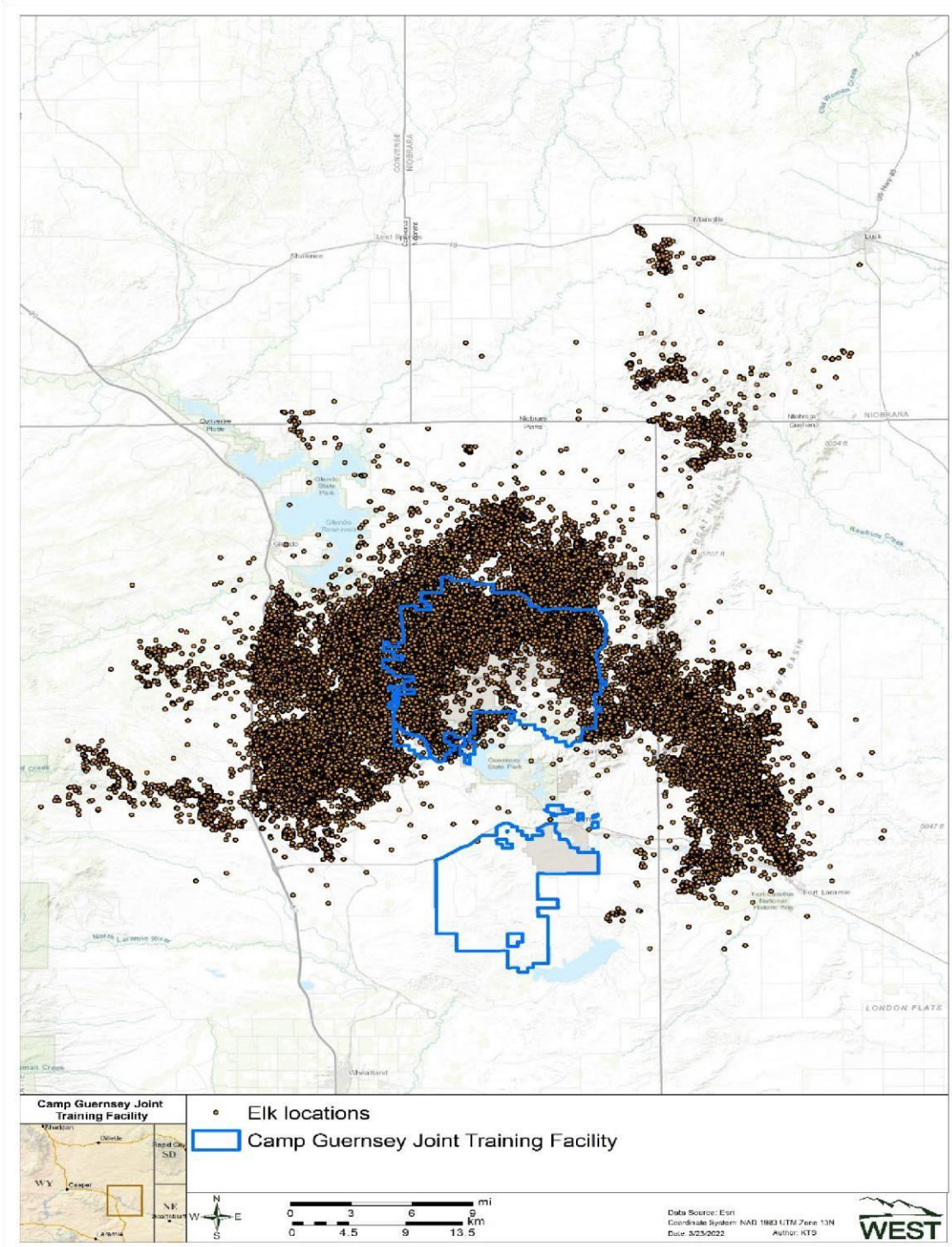

Figure 1. All locations obtained from GPS collared female elk near the Camp Guernsey Joint Training Center, Platte County, Wyoming, between January 2018 and February 2021.

Seasonal Ranges

To identify seasonal ranges, parturition areas, and potential movement corridors, we used two complimentary approaches: net-squared displacement (NSD; Bunnefeld et al. 2011) and a segmentation algorithm with the *segclust2d* R package (Patin et al. 2019). NSD calculates the squared distance between subsequent GPS locations and is used to evaluate annual movement patterns and seasonal ranges (Papworth et al. 2012). The segmentation algorithm approach followed a modified version of Lavielle's method (Lavielle 1999) to detect change points in a time series of GPS locations (x- and ycoordinates) for each individual (Ducros et al. 2020, Patin et al. 2020). We set the minimum number of locations to 150 (~12 days) for a segment of elk GPS locations to be considered in a seasonal range. Once seasonal range dates were identified, we generated 95% fixed kernels around elk locations to identify individual seasonal ranges (default bivariate kernel smoothing parameter; Worton 1989). For individuals with nondistinct seasonal ranges, we used dates for summer (1 May–14 November) and winter (15 November–30 April) defined by WGFD (WGFD 2015) to assign seasonal ranges. We only identified seasonal ranges for an individual if there were at least 1,000 locations during the season of interest (approximately 83 days of data).

Parturition Areas

We used the *segclust2d* R package with a segmentation clustering algorithm to identify potential parturition areas. For each elk, we subset locations to the parturition period (15 May–30 June; WGFD 2015) and used x- and y-coordinates between successive relocations to differentiate space use by each elk. This method identified distinct areas of use during the parturition period, allowing us to identify distinct clusters of locations that could signify a potential parturition area. The minimum number of locations for each segment was set to 10 (~20 hour period).

Movement Barriers and Corridors

We used a simple mapping approach to investigate potential barriers to movement. We focused specifically on Interstate 25, the North Platte River, as well as generic linear features such as railways and roads. We coupled our visual investigation with the same segmentation clustering method, as described above, to identify travel versus foraging and resting, or stationary behavior by elk. This method also allowed us to identify potential movement corridors. We used speed and relative turning angle between successive locations to differentiate behavioral states. We considered three behavioral states, or clusters, in our models that we defined as resting, foraging, and travelling. Locations identified as travelling were segmented into unique events for each individual, connected by subsequent GPS time stamps, and then buffered by 200 m to visually assess areas of high use when elk were travelling.

Seasonal Resource Selection

We explored a suite of environmental predictor variables to explain both summer and winter resource selection by elk. Land cover covariates were derived from the National Land Cover Database (NLCD 2019) and the LANDFIRE Existing Vegetation Type raster dataset (LANDFIRE 2016). We estimated the proportion of forest (land cover class: deciduous, evergreen, and mixed forest), shrub (land cover class: shrub/scrub), and herbaceous (land cover class: herbaceous) land cover types, and calculated Euclidean distance to water using NLCD data. We used LANDFIRE to estimate the proportion of and

distance to agriculture (EVT Name: Western Cool Temperate Row Crop – Close Grown Crop, Western Cool Temperate Row Crop, Western Cool Temperate Close Grown Crop, Western Cool Temperate Fallow/Idle Cropland, and Western Cool Temperate Pasture and Hayland).

We used the Monitoring Trends in Burn Severity (MTBS 2019) dataset to calculate distance to wildfires. We separated wildfires into old (occurring before 2005) and recent (occurring after 2005) fires based on date of incident. Five wildfires in the region have occurred since 2005 (Incident Name = Guernsey State Park, Fish Creek #2, Sawmill Canyon, Table Mountain, and Old Chicago) and two occurred before 1997 (Incident Name = Haystack, Spring Creek). Covariates describing topography were derived from a digital elevation model (DEM: US Geological Survey [USGS] 2011). We calculated slope, roughness, terrain ruggedness index (TRI), and topographic position index (TPI). Roughness was calculated as the difference between maximum and minimum elevation of the raster cell and eight surrounding cells (Wilson et al. 2007). TRI was calculated as the mean of the absolute difference between the elevation at the raster cell and each of the eight surrounding cells (Wilson et al. 2007). TPI compared the difference in elevation at each cell to the mean elevation of the eight surrounding cells (Guisan et al.
1999). We used Wyoming Department of Transportation (WYDOT) GIS data (WYDOT 2016) to calculate distance to county roads and highways. We assessed the amount of anthropogenic disturbance and distance to anthropogenic disturbance, including rural residential development, using an urban impervious surfaces dataset (USGS 2019). We assessed all non-distance based predictors within five circular regions: 0.5-km radii (0.8 km^2), 1.0-km radii (3.1 km^2), 1.5-km radii (7.1 km^2), 2.0-km radii (12.6 km^2), and 2.5-km radii (19.6 km^2).

We estimated RSFs (Manly et al. 2002) based on the locations of GPS-collared elk to create datadriven predictions of summer and winter habitat selection for elk in the region. Locations were assigned to summer or winter based on WGFD seasonal definitions (winter: 15 November–30 April; Summer: 1 May–14 November; WGFD 2015). We employed a use-availability framework for each RSF analysis (Johnson et al. 2006, McDonald 2013), where used elk locations were contrasted with a random sample of 10 times the number of used points to serve as available locations. Available points were randomly drawn from the study area, which was demarcated by generating a 95% fixed kernel around all elk locations (default bivariate kernel smoothing parameter; Worton 1989). To estimate each RSF, we used binomial generalized mixed models with the lme4 R package (Bates et al. 2015). We used an individual elk intercept term nested within year to account for individual variation and possible variation in individuals across years (Gillies et al. 2006). We centered and scaled variables to ensure model convergence prior to modelling (Becker et al. 1988). The RSF took the following form:

$$w(x) = exp(\beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n)$$

where w(x) was proportional to the probability of elk resource selection and β_1 represented the coefficient describing selection strength for covariate x_1, and n represented the number of covariates in the model.

We used a variable sub-setting approach (Arnold 2010) to develop nested candidate models and determined the most parsimonious set of covariates to describe selection by elk during each season. We started by exploring all variable combinations within land cover, topography, and anthropogenic variable groups separately. We did not allow variables in the same model when they were highly correlated ($|r| > 0.7$) and set the maximum number of variables in any model at three. We retained variables in the most predictive models from each subset, and assessed all combinations of remaining variables. We again ensured that correlated variables were not included in the same model. Candidate models were fit with the *MuMIn* R package (Barton 2020). We used Akaike's Information Criterion (AIC) to assess support for all models (Burnham and Anderson 2002) and considered models within two AIC of the best model to be competitive. If AIC scores were nearly equivalent (i.e., within two AIC), we evaluated support of individual covariates by evaluating whether coefficients had 95% confidence intervals that did not overlap zero (Burnham and Anderson 2002, Arnold 2010).

We used 5-fold cross validation to evaluate the most-supported summer and winter RSF models by randomly partitioning data by individual elk-years. We estimated predictions based on four of the five groups (training data) and compared them to the withheld group, and repeated this until the five withheld groups were evaluated (Johnson et al. 2006). By using this cross-validation method, we avoided holding back any of the data for validation and were able to use the entire dataset for modelling. We binned predictions into five equal-area (quartile) intervals (Wiens et al. 2008). Validations were performed by running simple linear regression models on the number of observed locations from the test group compared to expected locations generated from each RSF bin (Johnson et al. 2006). We considered models to be good predictors when linear regression models had high coefficients of determination ($r^2 > 0.9$) and 95% confidence intervals of slope estimates excluded zero and included one (Howlin et al. 2004). We mapped the most predictive RSF model across the study area by using coefficients from the top model and distributed predictions into five equal area binds corresponding to increasing relative probability of selection.

Displacement by Military Training Activities

To evaluate if elk were displaced by military training activities, we use an integrated step-selection function (ISSF; Avgar et al. 2016, Ladle et al. 2018). ISSFs differ from traditional step-selection function (SSF) models in that ISSFs account for changes in resource selection as well as movement between locations by including step length as a model covariate. To estimate the ISSF, elk locations were paired with 10 available locations, or endpoints, generated from the distribution of step length and turning angles from the population of marked elk (Fortin et al. 2005, Thurfjell et al. 2014). We applied conditional logistic regression to compare characteristics of used to available locations, with each stratum consisting of a used point and 10 paired available points. We assigned each individual to a cluster to calculate robust standard errors and 95% confidence intervals by accounting for potential correlation in individual responses (Craiu et al. 2008) using the *survival* R package (Therneau 2015).

We evaluated potential displacement of elk by military training by constructing nested candidate models for summer and winter seasons (described above). For each season, the base model included the same covariates that were in the most predictive seasonal RSF models, and were used for

comparison with more complex models used to identify potential displacement behaviors (displacement model). In addition to covariates in the base model, the displacement model contained distance to training activity, period (before, during, and after; described below), step length, and distance to training activity by period and distance to training activity by step length interaction terms. A significant interaction indicated that either distance to training activity or step length varied with period.

Each training activity that occurred at the Camp Guernsey Joint Training Facility contained a spatial location, a training activity type, and a start and stop time of the activity. We filtered each individual elk location that corresponded to a training activity based on the location time stamp. We then assigned the training activity type and distance to the activity. We paired available locations during the duration of the activity. If multiple activities occurred simultaneously, we assigned the elk and paired available locations to the nearest activity. For elk locations associated with an activity, the period term was set to equal 'during', which indicate that the location corresponded to when the activity was occurring. For each elk location(s) assigned to a training activity, we identified the six locations immediately preceding the training activity and the six locations occurring after the training activity (an approximate 12 hour period before and after the event). These locations were assigned as 'before' and 'after' the event, respectively. Training type and distance to the same training activity as assigned to locations during the event, was calculated for these locations and their paired available locations. For each group of elk locations assigned to a training activity (UID), we calculated the mean distance to the training activity for locations before the activity and subset data such that the mean location before any activity was within 2.5 km of the activity location. This was to ensure that elk were exposed to the training activity and available to respond to it. We repeated this in a *post hoc* analysis by sub setting UIDs with locations occurring before the event that were greater than 10 km from the activity as model validation. For each seasonal model, we ran seven separate models that compared different training activities. Models included an assessment of: all training activities combined, aerial activities (i.e., any activity involving helicopter or plane training), aerial fire (i.e., any aerial gunnery), human activity without gun fire (i.e., personnel on site), range fire (i.e., activity involving live gun fire), large range fire (i.e., mortar, grenade or other live fire larger than standard gun fire), and vehicle activity. We used AIC to assess model support between displacement and base models.

Hunter Analysis

We used ISSFs to assess whether elk were displaced by hunter activity, similar to the models used to assess military training activities. Location data were subset between 1 August and 1 March, to encompass a range of hunter activity levels before, during, and after the elk hunting season (1 September to 31 January). We developed two separate models, each with interaction terms that included either distance to the center of the training area by number of a hunters or distance to the center of the training area x total harvest interactions. A significant interaction would indicate that either distance to the training area varied by the number of hunters or the total harvest.

RESULTS

We used data collected from 37 of 42 elk (88%) in subsequent analyses (average locations per elk = 7,524 locations; range: 1,460–13,007 locations). Five individuals were equipped with transmitters that

did not deploy properly or failed to transmit, resulting in the collection of only one data point every two days. The mean duration a transmitter was affixed to an elk was 634 days (range: 122–1,095 days). During the study, 16 (38%) mortalities were documented. Of the 16 mortalities, seven elk were harvested by hunters (44%), three were identified as lion kills (19%; one of the three died from a possible infection from a failed lion attack), and six mortalities were due to unknown causes (37%). The mean number of days between capture and date of morality was 573 days (range: 126–1,002 days).

Seasonal Ranges

Based on visual inspection of net-squared displacement plots and the segmentation algorithm applied to each individual, we determined that only five of 37 individuals (14%) had distinct summer and winter ranges. The mean date of arrival on summer range for these individuals was 19 May, and the mean date of departure was 6 September, which were outside of the dates commonly used to identify the summer season (WGFD 2015). For these reasons, we used seasonal dates identified by WGFD (WGFD 2015) to demarcate seasonal ranges. We identified 65 summer ranges (Figure 2). Fourteen elk had location data during one summer, nine elk had location data during two summers, and 11 elk had location data during three summers. Mean summer range size was 270.5 km^2 (median: 262.5 km^2, range: 52.9–1,089.8 km^2). We identified 68 winter ranges (Figure 3). Fourteen elk had location data during one winter, 12 elk had location data during two winters, and 10 elk had location data during three winters.
Mean winter range size was 299.6 km^2 (median: 266.7 km^2, range: 69.6–672.5 km^2).

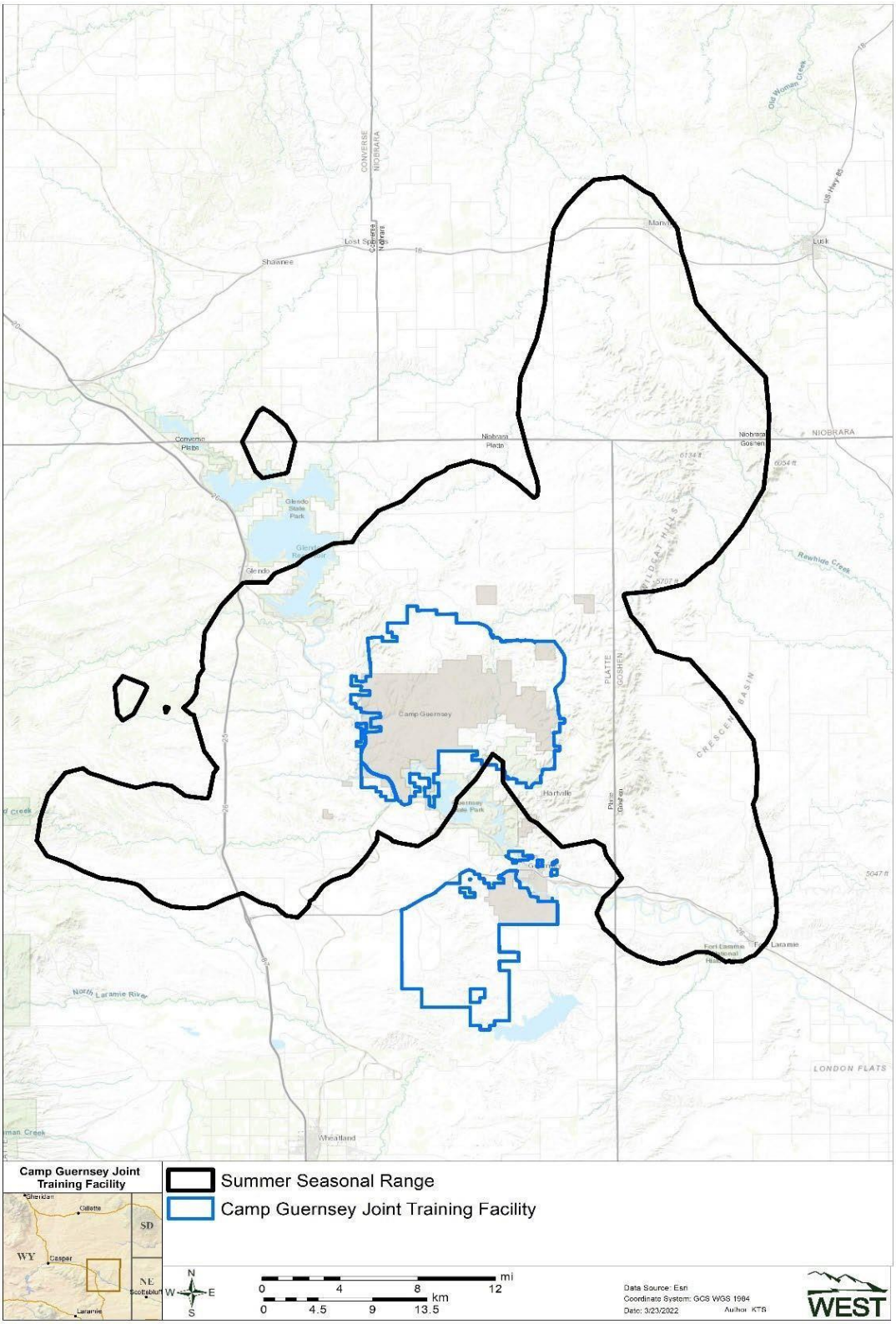

Figure 2. Summer ranges of GPS collared female elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

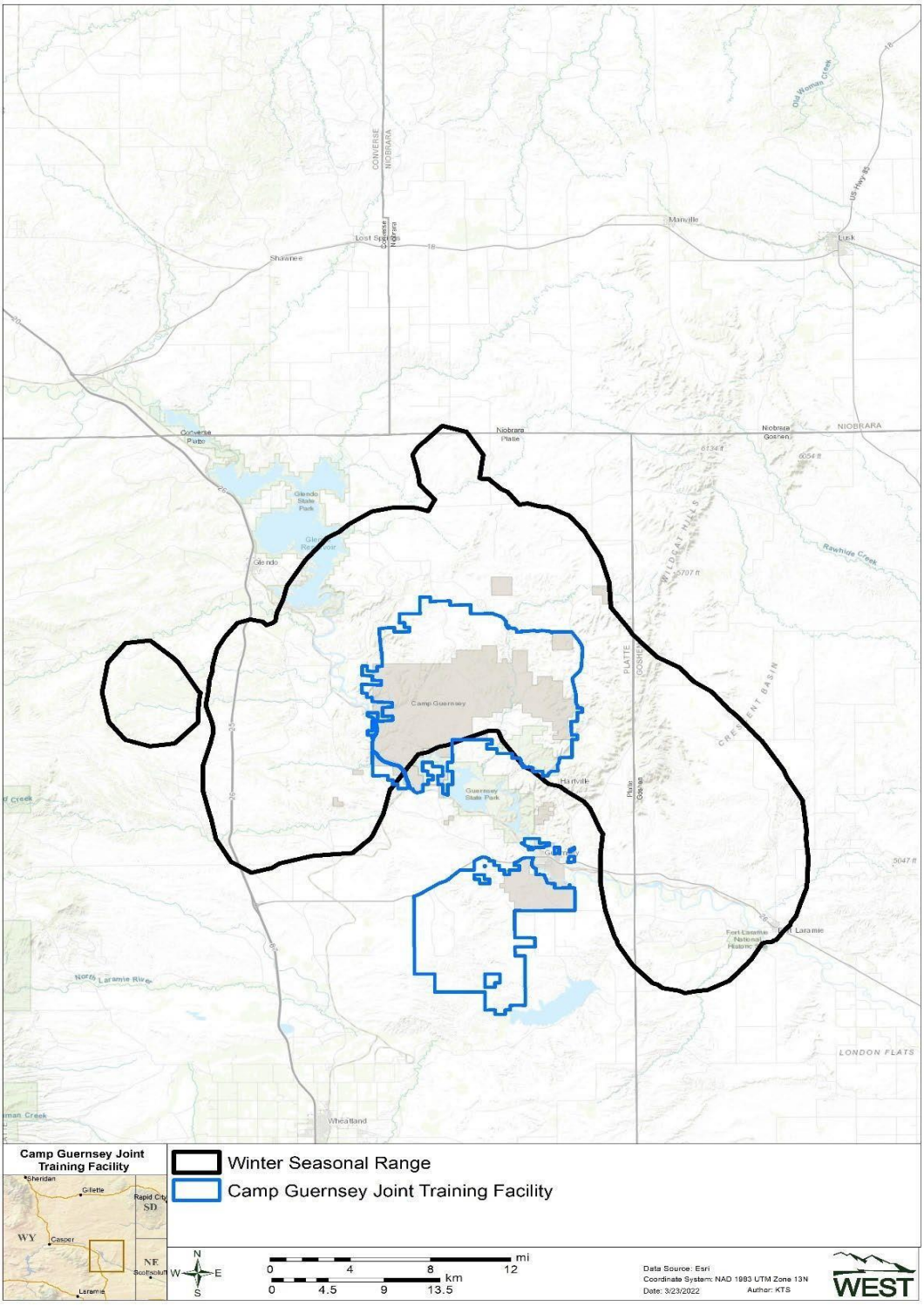

Figure 3. Winter ranges of GPS collared female elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

Parturition Areas

We evaluated potential parturition areas from 72 elk-years with location data during the WGFD defined parturition period (15 elk with one year of location data, nine elk with two years of location data, and 13 elk with three years of location data). We found evidence for 54 distinct parturition areas from 31 elk (Figure 4). The mean estimated date of parturition began on 3 June in 2018, 4 June in 2019, and 31 May in 2020. Elk spent an average of 22 days in potential parturition areas.

Movement Corridor Barriers

We did not visually detect barriers to elk movement; however our approach appeared to accurately differentiate elk locations into resting, foraging, and travelling behaviors (Table 1) and to identify potential movement corridors (Figure 5). Elk appeared to cross the North Platte River without restriction, with multiple crossing occurring in two general areas (Figure 6). Elk also crossed Interstate 25 at multiple locations, but there was little evidence to identify a particular location where crossing occurred multiple times (Figure 7).

Table 1. Mean step length (meter [m]) and turning angles (standard error in parenthesis) between successive 2 hour relocations for each behavioral state identified by the segmentation clustering algorithm used to identify potential movement corridors by elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

Behavior	Step length (m)	Turning angle
Resting	263.8 (1.3)	178.5 (0.4)
Foraging	479.3 (1.9)	179.3 (0.3)
Travelling	1015.8 (8.2)	178.1 (0.6)

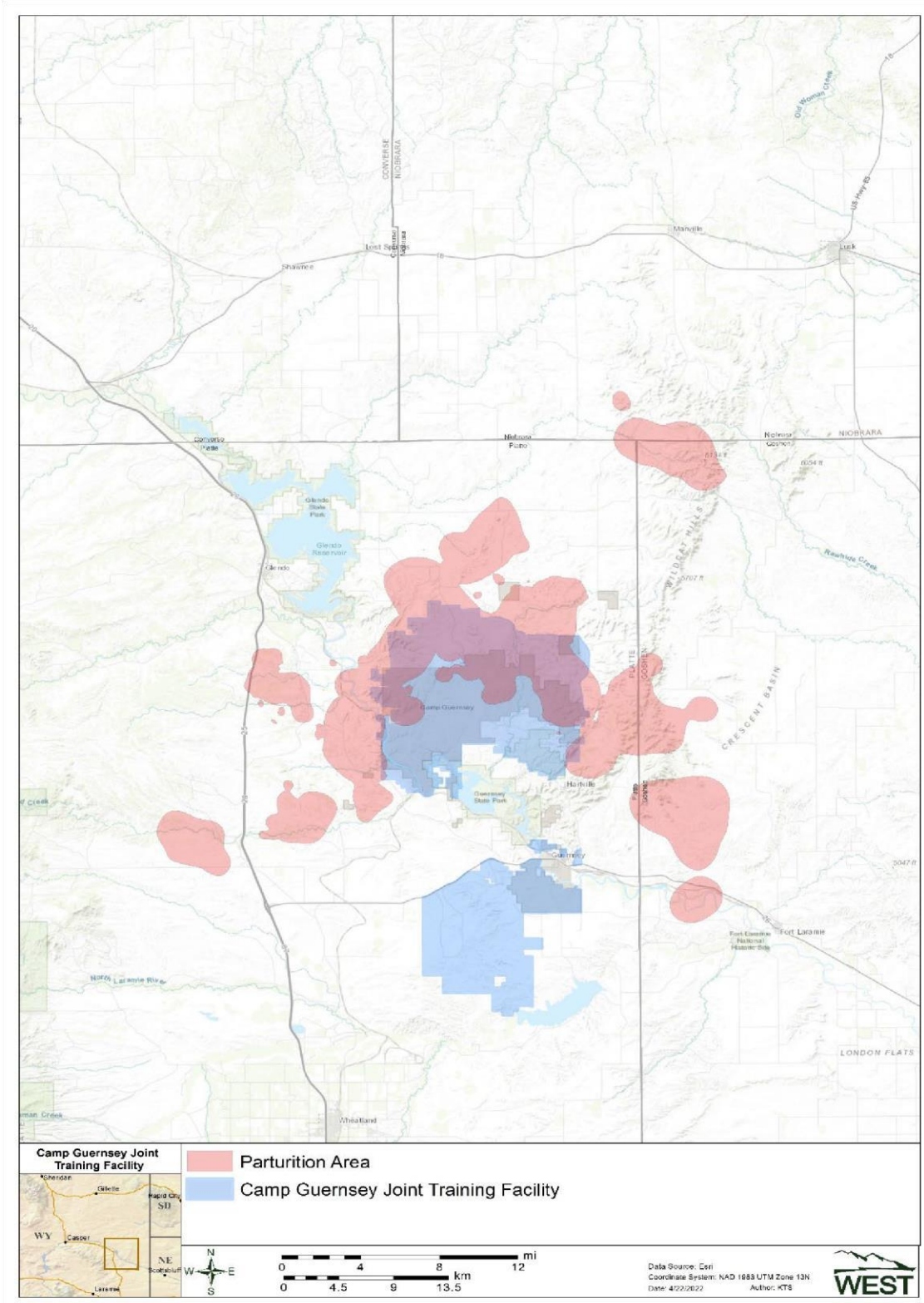

Figure 4. Potential parturition areas of GPS collared female elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

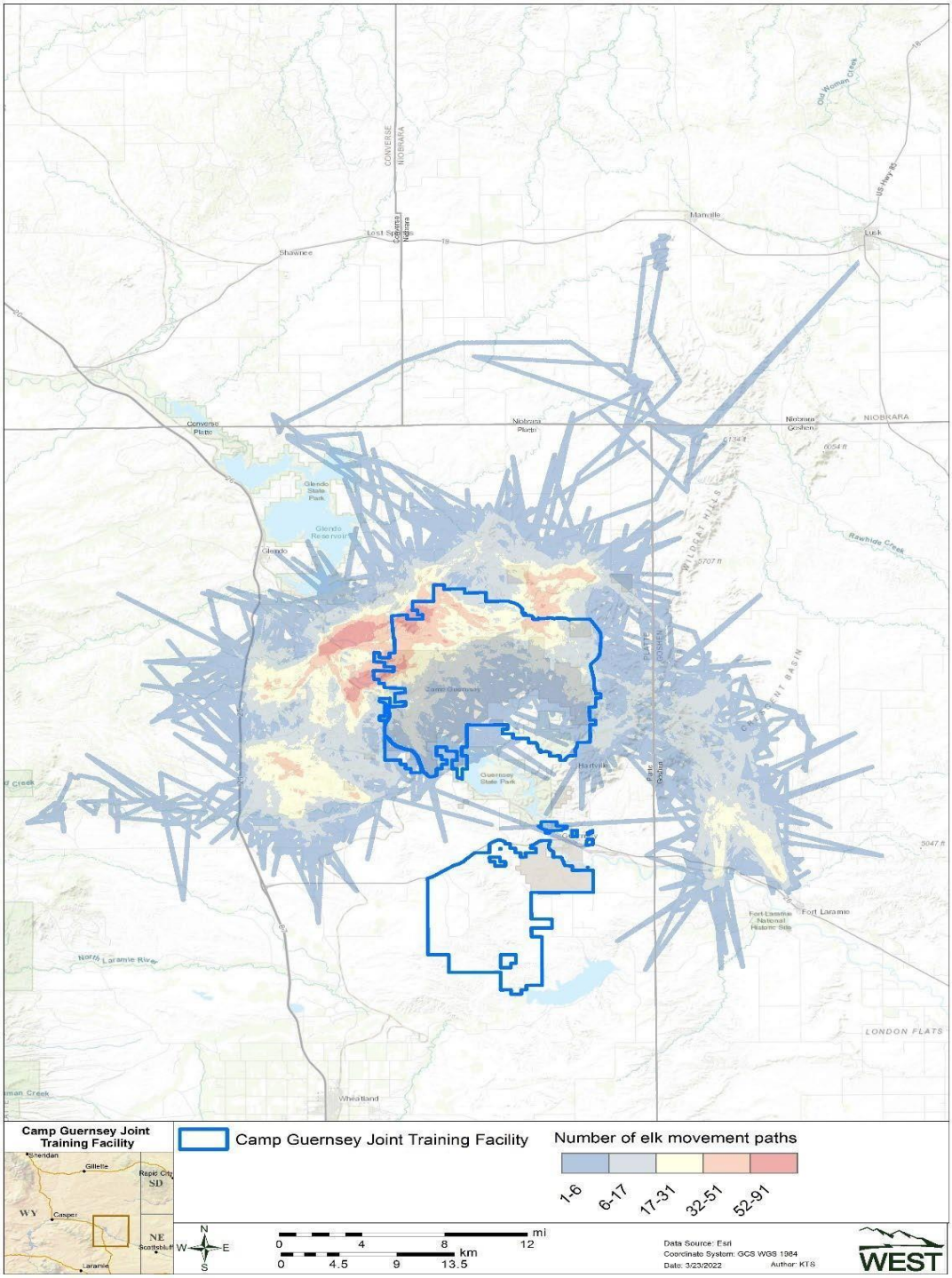

Figure 5. Movement paths of female elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming between January 2018 and February 2021. Individual paths were overlaid to identify areas where one or multiple paths occurred in the same areas (warmer colors indicate a greater number of overlapping paths when compared to cooler colors).

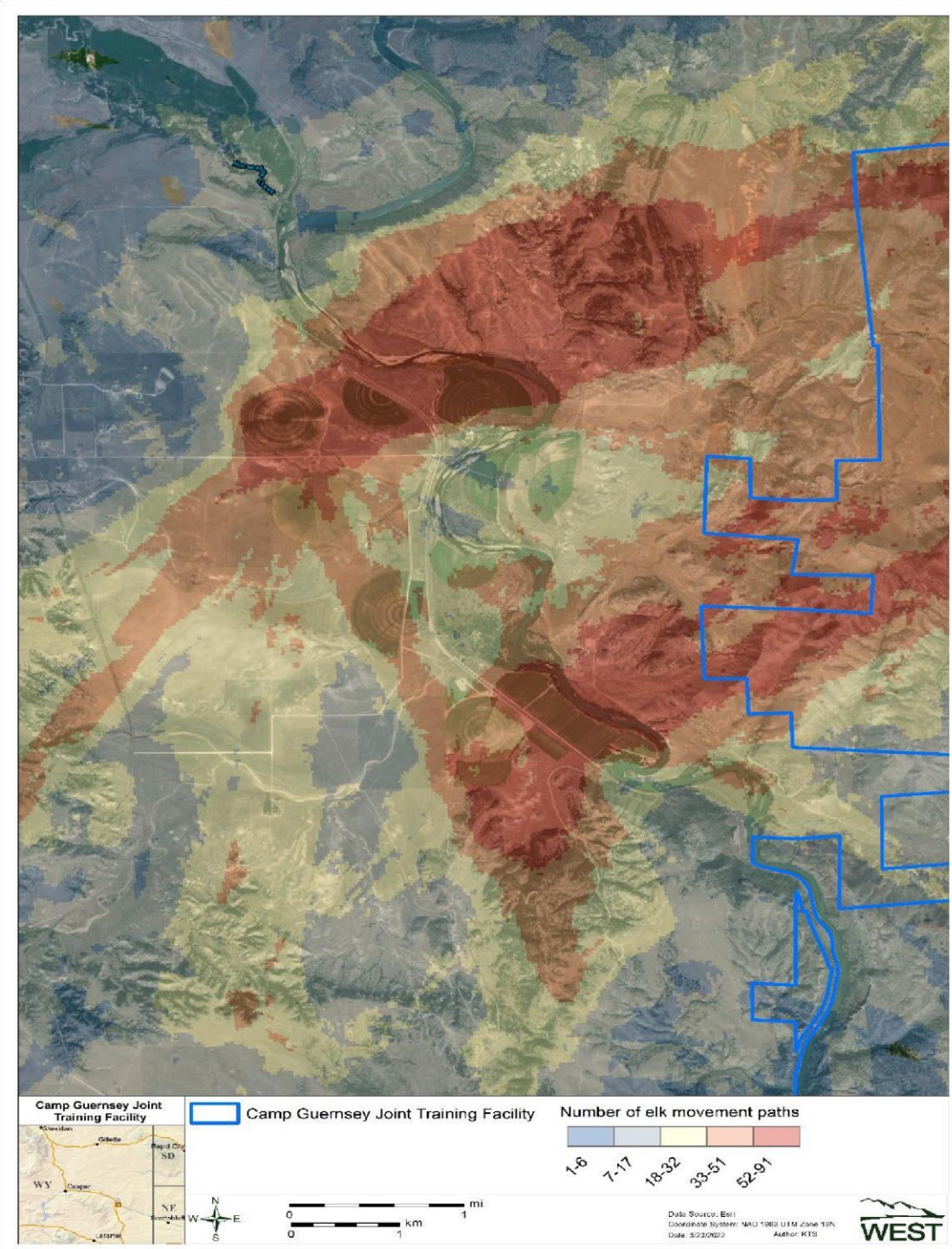

Figure 6. Movement paths of female elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming. The focus of the map is an area where elk appear to frequently cross the North Platte River. Individual paths were overlaid to identify areas where one or multiple paths occurred in the same areas (warmer colors indicate a greater number of overlapping paths when compared to cooler colors)

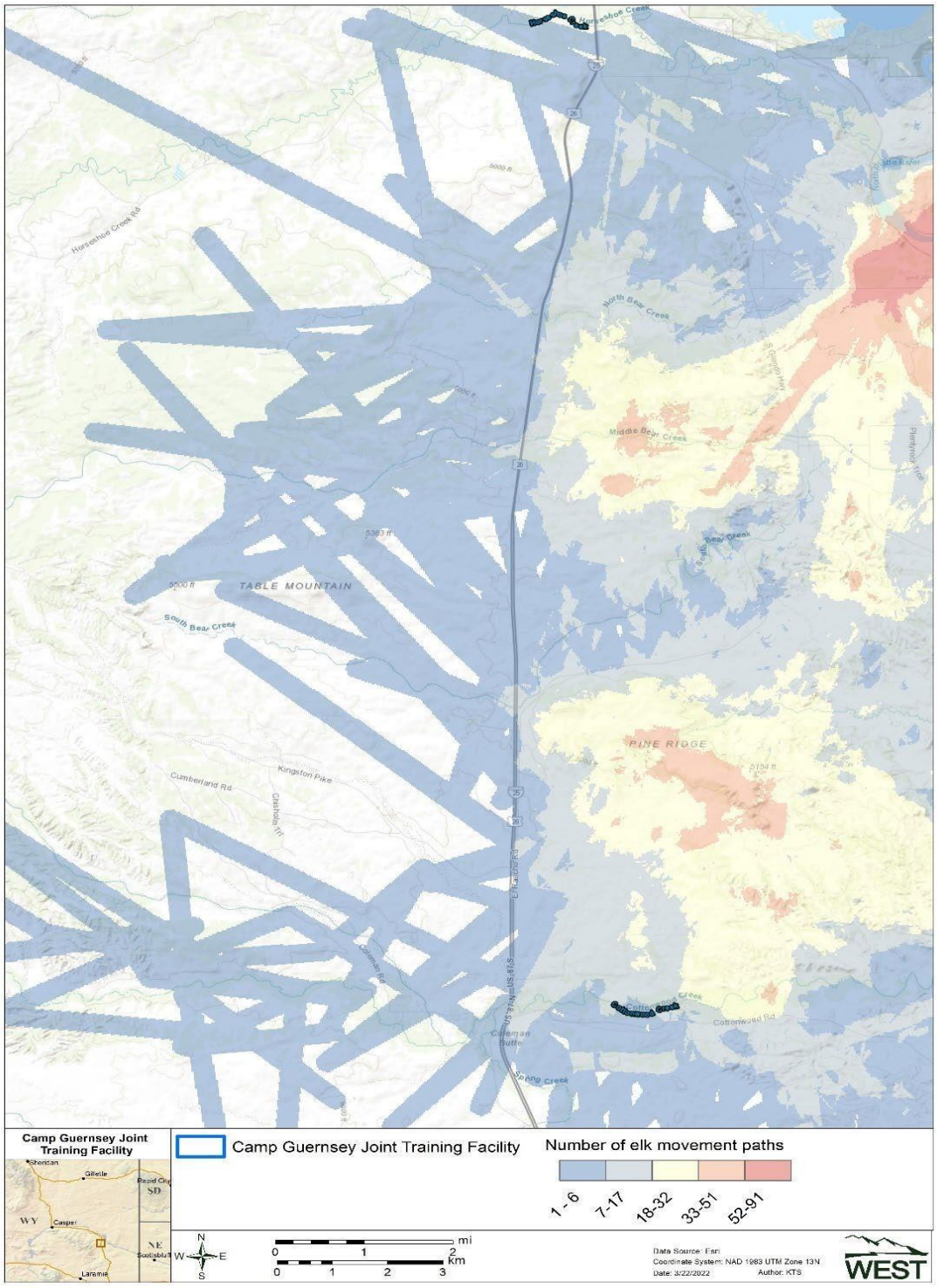

Figure 7. Movement paths of female elk near Interstate 25, Platte County, WY. Individual paths were overlaid to identify areas where one or multiple paths occurred in the same areas (warmer colors indicate a greater number of overlapping paths when compared to cooler colors).

Seasonal Resource Selection Analyses

Summer

The best model explaining elk resource selection during summer included 10 predictor variables (Table 2; Figure 8). No other models were within two AIC points of this model. During summer, elk selected areas with a greater proportion of agriculture within 0.5 km, a greater proportion of forest within 2.5 km, a lower proportion of herbaceous cover within 2.0 km, areas closer to recent fires, and areas farther from old fires. Elk also selected areas with greater terrain roughness at lower elevations and intermediate distances to county roads. Relative probability of selection was greatest at approximately 4.0 km from a county road. Elk avoided areas with a greater proportion of anthropogenic disturbance within 1.5 km and selected areas farther from anthropogenic disturbance.

The spatial prediction of the RSF was a strong positive predictor of elk resource selection during summer (Figure 9). When we partitioned validation testing and training groups by individual elk, we saw an average r^2 = 0.93 ± 0.001 (standard error [SE]) and confidence intervals of slope estimates which included one and excluded zero in all folds.

Table 2. Parameter estimates, standard errors (SE), and 95% confidence intervals (CI) for predictor variables describing female elk resource selection during summer near the Platte County, Wyoming.

Parameter	Estimate	SE	95% CI	
			Lower	Upper
Agriculture $_{0.5\ km}$ (%)	0.34	0.002	0.34	0.35
Forest $_{2.5\ km}$ (%)	0.24	0.003	0.24	0.25
Herb $_{2.0\ km}$ (%)	-0.33	0.004	-0.34	-0.33
Elevation (meter)	-0.09	0.004	-0.09	-0.08
Roughness	0.08	0.002	0.08	0.09
Distance to recent fire (km)	-0.51	0.004	-0.51	-0.49
Distance to old fire (km)	0.25	0.004	0.24	0.25
Distance to county road (km)	0.31	0.003	0.30	0.31
Distance to county road^2 (km)	-0.17	0.002	-0.17	-0.16
Anthropogenic $_{1.5\ km}$ (%)	-0.26	0.010	-0.28	-0.23
Distance to anthropogenic (km)	0.25	0.003	0.24	0.26

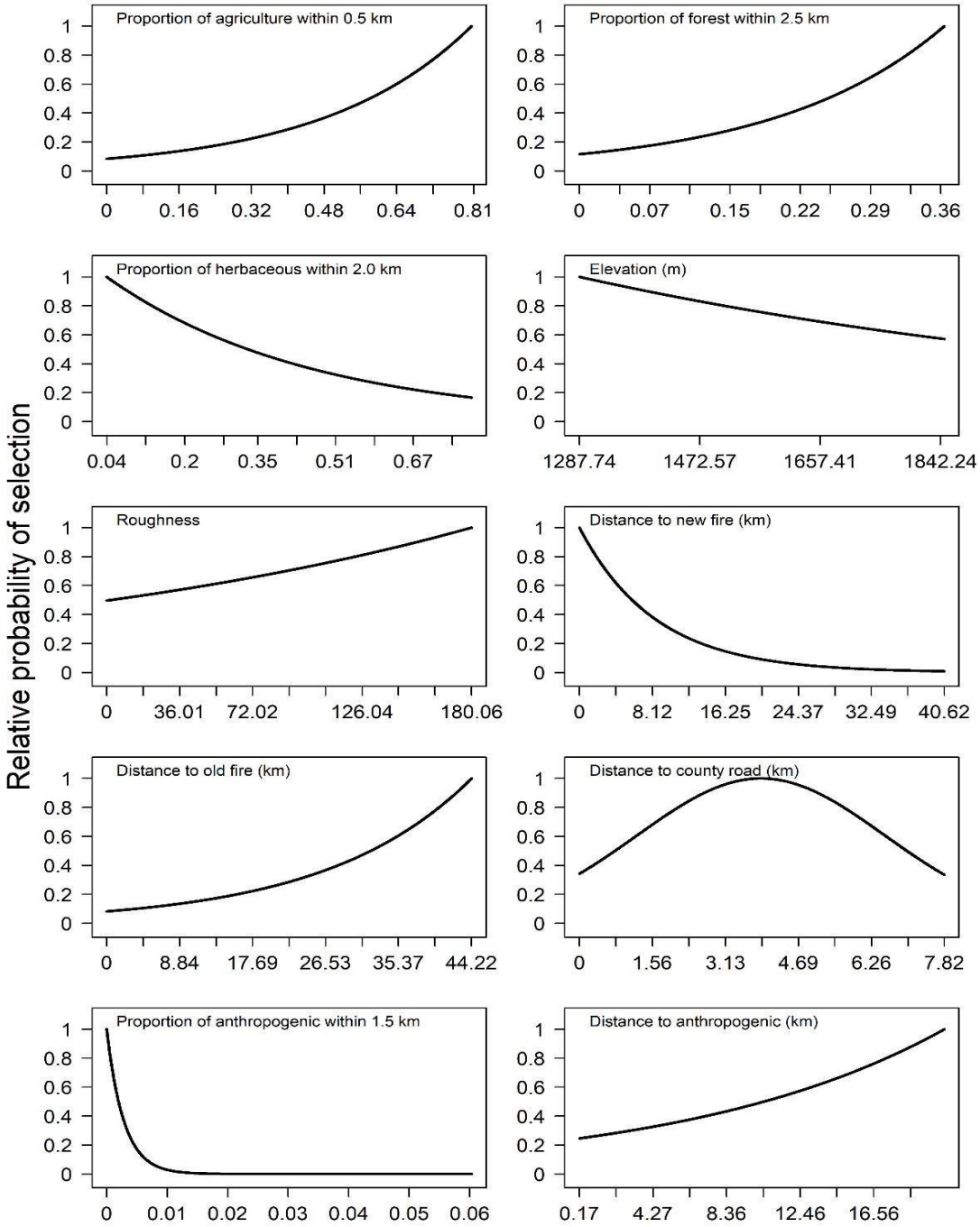

Figure 8. Relative probability of selection as a function of predictor variable in the most parsimonious summer (1 May–14 November) resource selection model for elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming. Relative probability of selection was standardized for each predictor variable by dividing predicted values by their maximum.

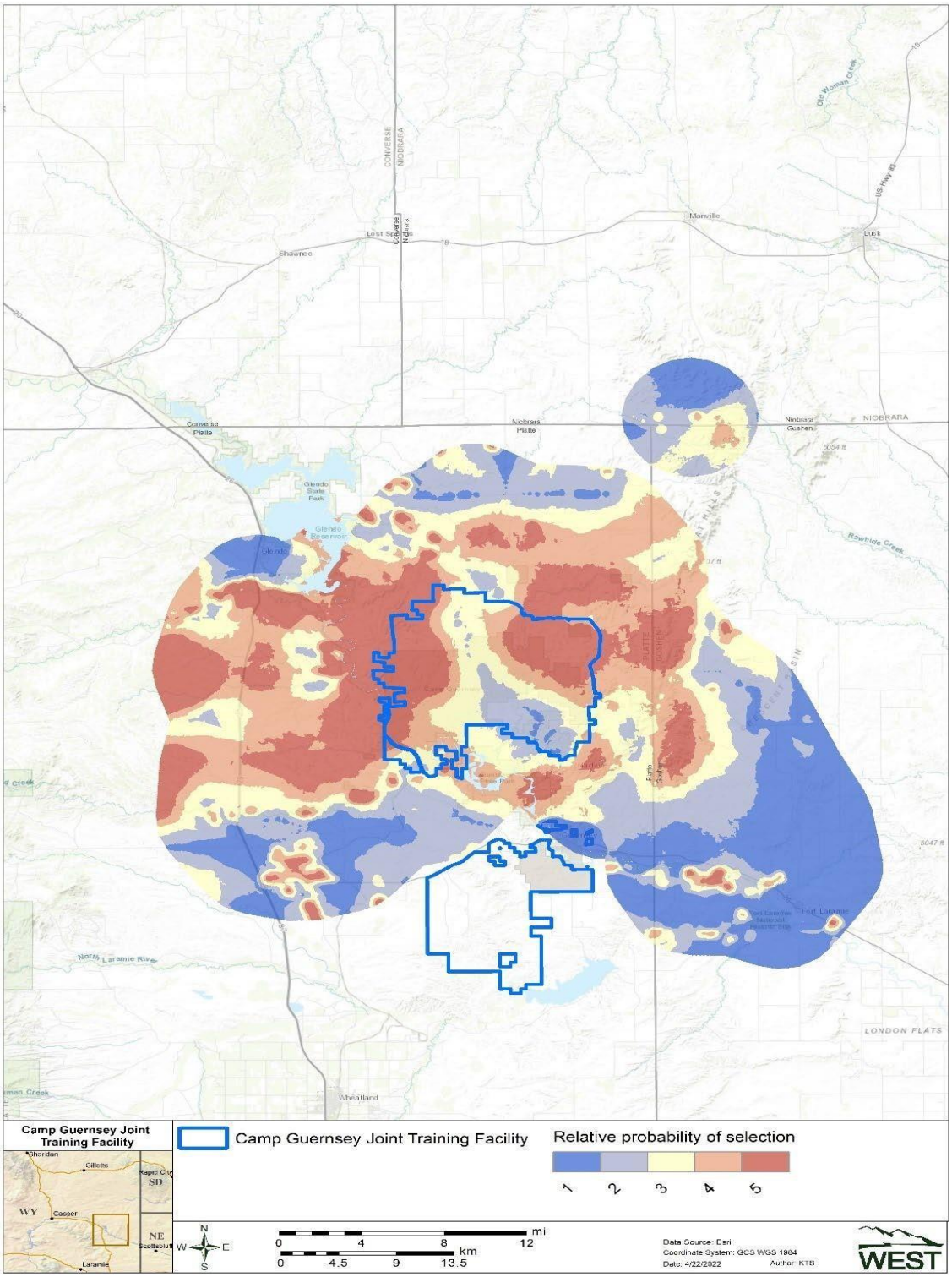

Figure 9. Predicted relative probability of selection by elk during summer (1 May–14 November) using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

Winter

The best model explaining elk resource selection during winter included 10 predictor variables (Table 3; Figure 10). No other models were within two AIC points of this model. During winter, elk selected areas with a greater proportion of agriculture within 0.5 km, a lower proportion of herbaceous cover within 0.5 km, a lower proportion of shrub cover within 0.5 km, and areas closer to recent fires. Elk also selected areas with greater terrain roughness, higher elevations, and intermediate distances to county roads and highways. While elk selected areas with a greater proportion of anthropogenic disturbance within 2.5 km, the maximum proportion of anthropogenic disturbance within 2.5 km of an elk location was low (0.03). Elk selected areas farther from anthropogenic disturbance as indicated by a moderate relationship between anthropogenic disturbance and selection (Figure 10).

The spatial prediction of the RSF was a strong positive predictor of elk resource selection during winter (Figure 11). When we partitioned validation testing and training groups by individual elk, we saw average r^2 = 0.98 ± 0.001 (SE), and confidence intervals of slope estimates which included one and excluded zero in all folds.

Table 3. Parameter estimates, standard errors (SE), and 95% confidence intervals (CI) for predictor variables describing female elk resource selection during winter near the Camp Guernsey Joint Training Facility, Platte County, Wyoming.

Parameter	Estimate	SE	95% CI Lower	95% CI Upper
$Agriculture_{0.5km}$ (%)	0.31	0.002	0.30	0.31
$Herb_{0.5km}$ (%)	-0.51	0.003	-0.51	-0.50
$Shrub_{0.5km}$ (%)	-0.30	0.003	-0.31	-0.30
Elevation (meter)	0.23	0.004	0.22	0.24
Roughness	0.02	0.003	0.01	0.02
Distance to recent fire (km)	-0.19	0.003	-0.19	-0.18
Distance to county road (km)	0.31	0.003	0.30	0.32
Distance to county $road^2$ (km)	-0.30	0.003	-0.31	-0.30
Distance to highway (km)	0.06	0.003	0.05	0.06
Distance to $highway^2$ (km)	-0.08	0.003	-0.09	-0.08
$Anthropogenic_{2.5km}$ (%)	0.26	0.005	0.25	0.27
Distance to anthropogenic (km)	0.008	0.003	0.002	0.01

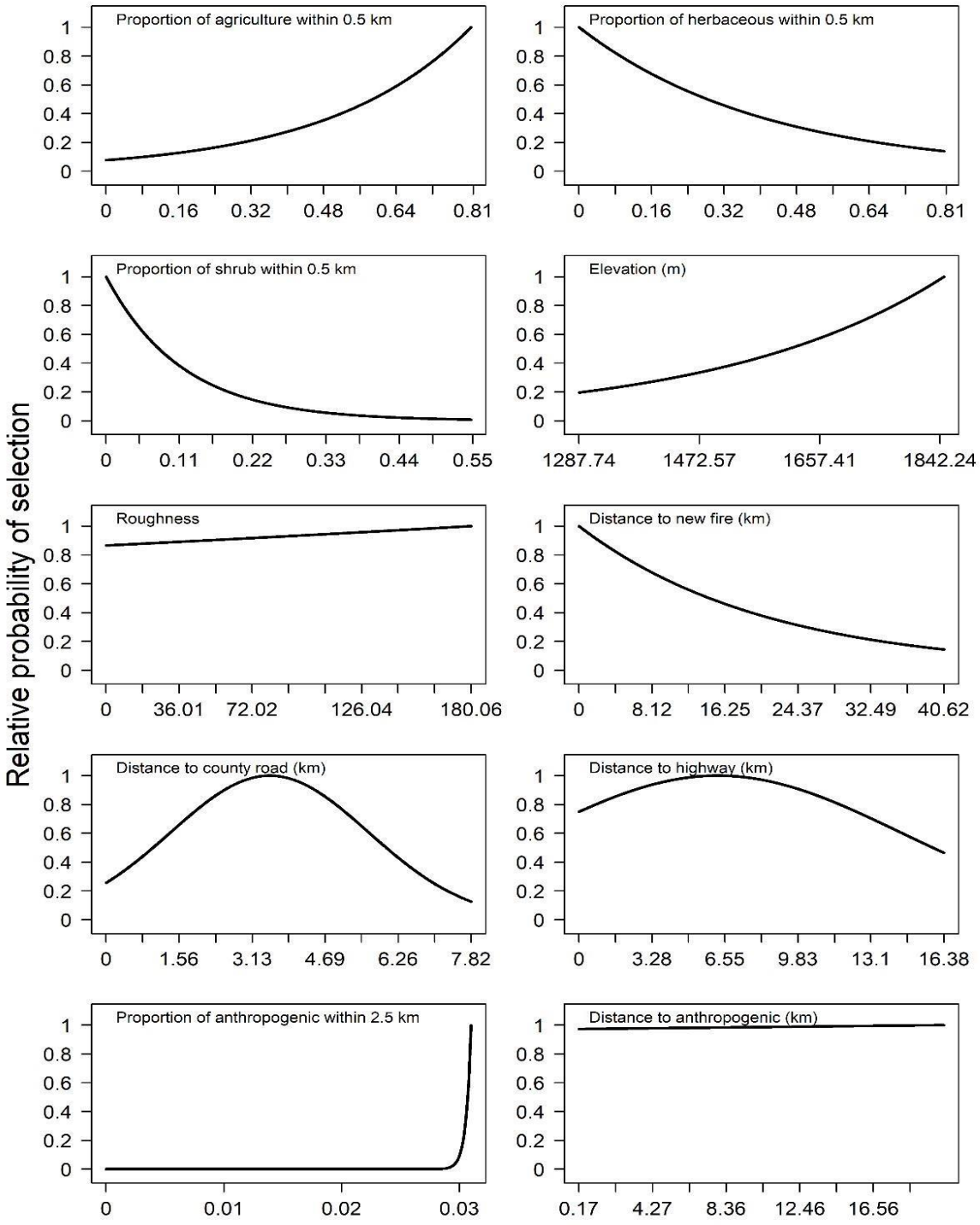

Figure 10. Relative probability of selection as a function of predictor variable in the most parsimonious winter (15 November–30 April) resource selection model for elk using the Camp Guernsey Joint Training Center, Platte County, Wyoming. Relative probability of selection was standardized for each predictor variable by dividing predicted values by their maximum.

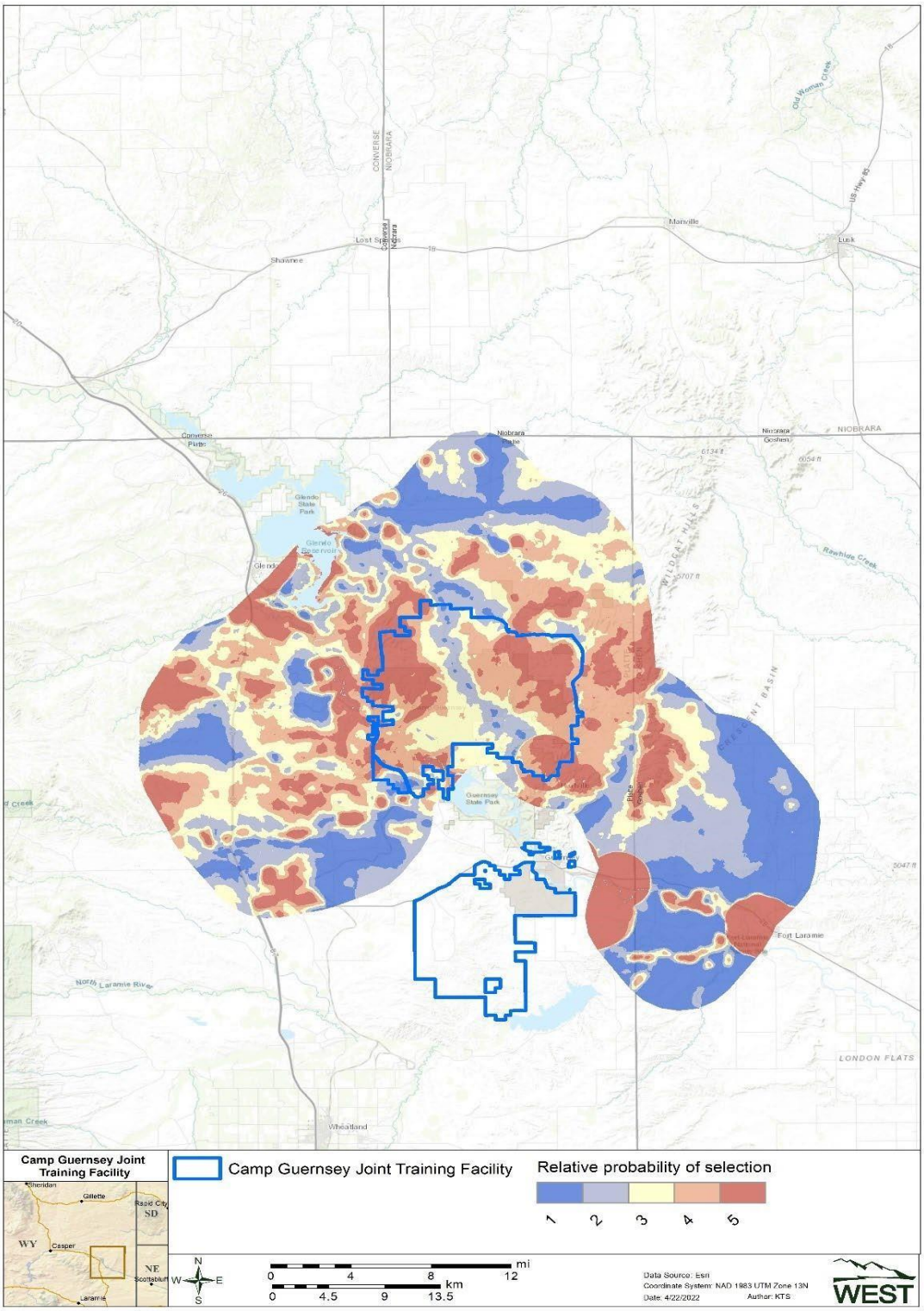

Figure 11. Predicted relative probability of selection by elk during winter (15 November–30 April) using the Camp Guernsey Joint Training Center, Platte County, Wyoming.

Displacement by Military Training Activities

The number of training activities and type of activity varied, but activities were more prevalent during the summer (Table 4). During summer, all models that included a distance to training activity by period interaction term were more informative than base models, suggesting that all activity types led to displacement of elk. Elk response varied by type of activity (Figure 12). However, elk generally selected areas farther from military training during and after the occurrence of the activity when compared to their location before the activity (Figure 13). Across all activity types, on average, elk moved 0.14 km and 0.54 km from the training activity during and after the activity, respectively (Table 4; Figure 13). Elk also tended to decrease their step lengths and selected more rugged areas during the activity.

Similar to summer models, all training activities during winter appear to displace elk (Figure 14). During winter, elk selected areas farther from training activities during and after their occurrence (Figure 15). Elk on average moved 0.22 km and 0.70 km away during and after the activity, but this varied by activity type (Table 4). Elk also tended to select more rugged areas during the training activity (Figure 15). Similar responses were not observed in models for individuals that were >10.0 km from a training activity during summer or winter.

Table 4. Mean displacement distance during and after training actives and the total number of activities used to assess displacement of elk near the Camp Guernsey Joint Training Facility, Platte County, Wyoming.

Parameter	Mean displacement–During (kilometer)	Mean displacement–After (kilometer)	Number of events
Summer			
Aerial	0.39	0.75	79
Aerial fire	0.06	0.64	71
Large range fire	0.21	0.58	51
Range fire	0.20	1.11	25
Personnel	0.11	0.51	1,583
Vehicle	0.34	0.46	22
All activities	0.14	0.54	1,831
Winter			
Aerial	0.61	1.53	50
Aerial fire	0.16	1.01	96
Large range fire	0.38	0.64	4
Range fire	1.51	2.95	17
Personnel	0.14	0.46	478
Vehicle	--	--	0
All activities	**0.22**	**0.70**	**645**

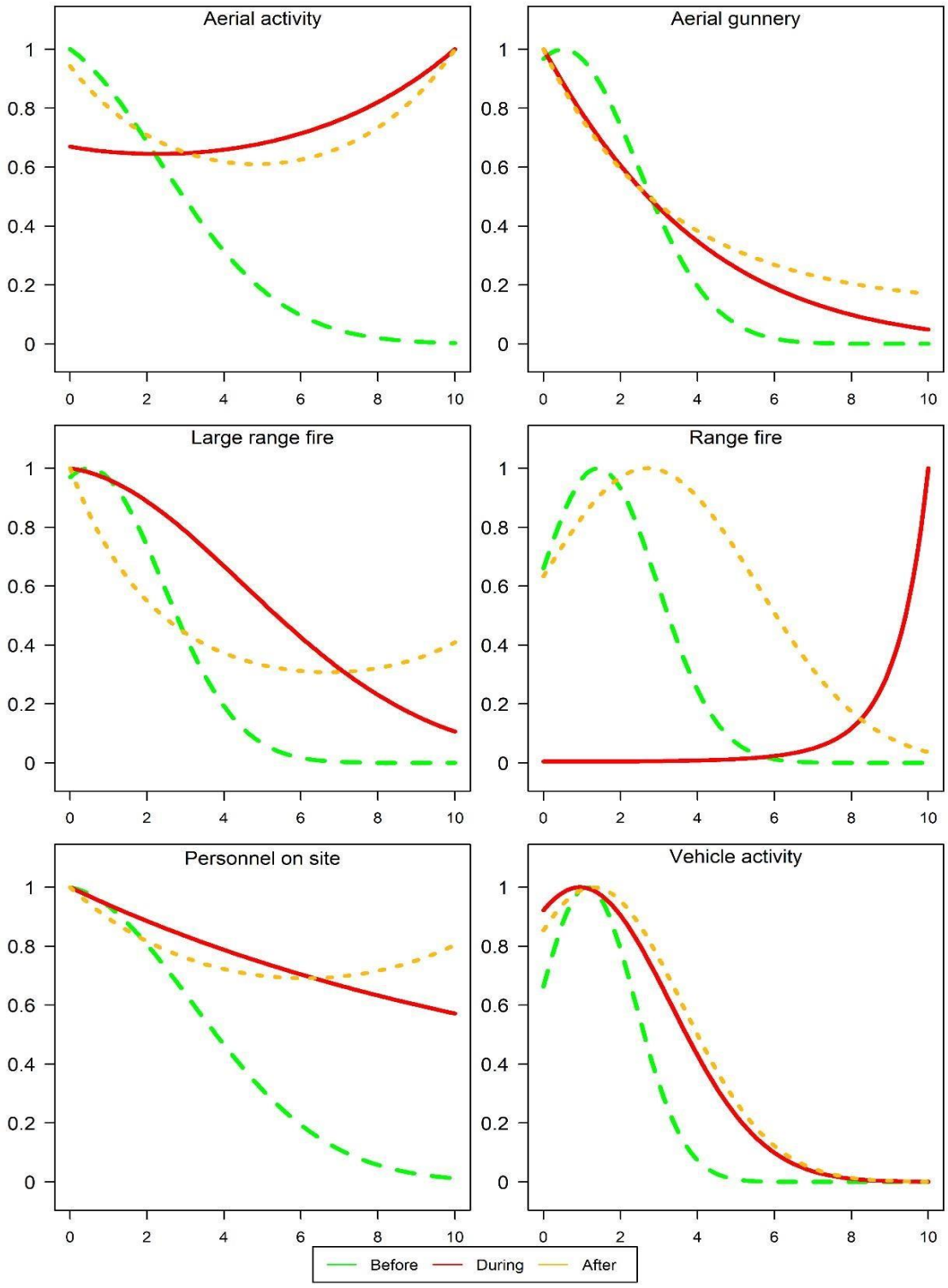

Figure 12. Relative probability of elk summer resource selection as a function of distance to aerial activity, aerial gunnery, large range fire, range fire, personnel on site, and

vehicle activity before, during, and after the activity at the Camp Guernsey Joint Training Center, Platte County, Wyoming.

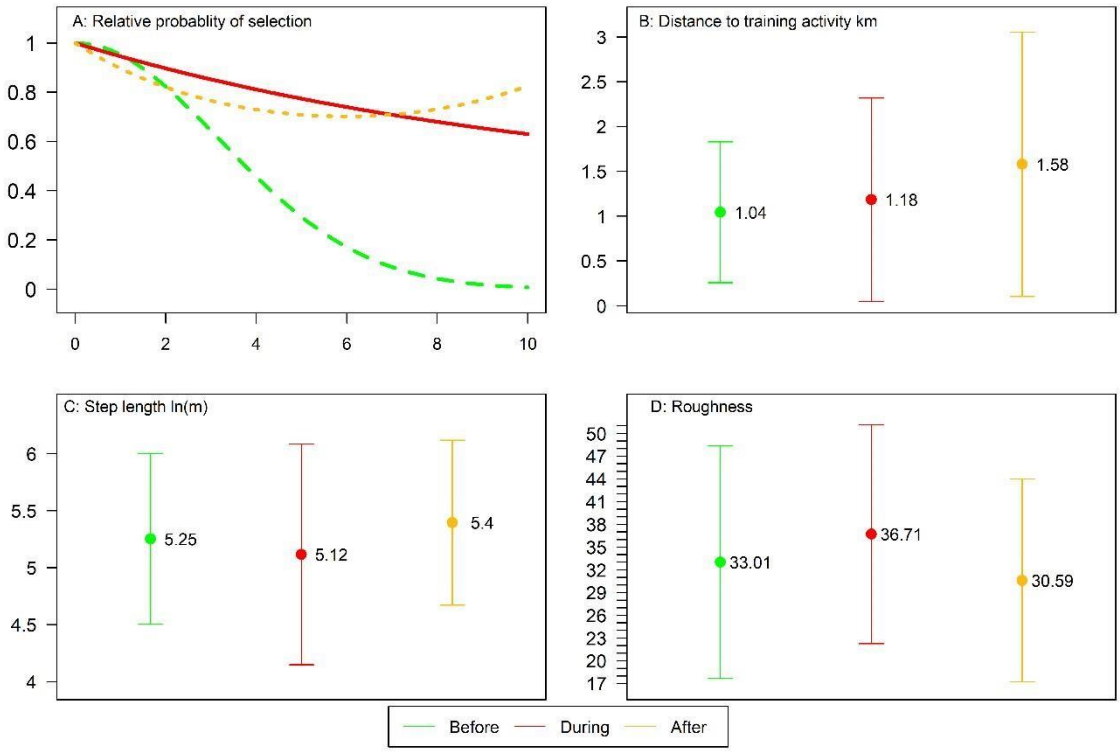

Figure 13. Relative probability of elk resource selection as a function of distance to training activity (A), mean (± range) distance to training activity (B), mean (± range) natural log of step length (C), and mean (± range) roughness (D), before, during, and after all summer training activities at the Camp Guernsey Joint Training Center, Platte County, Wyoming.

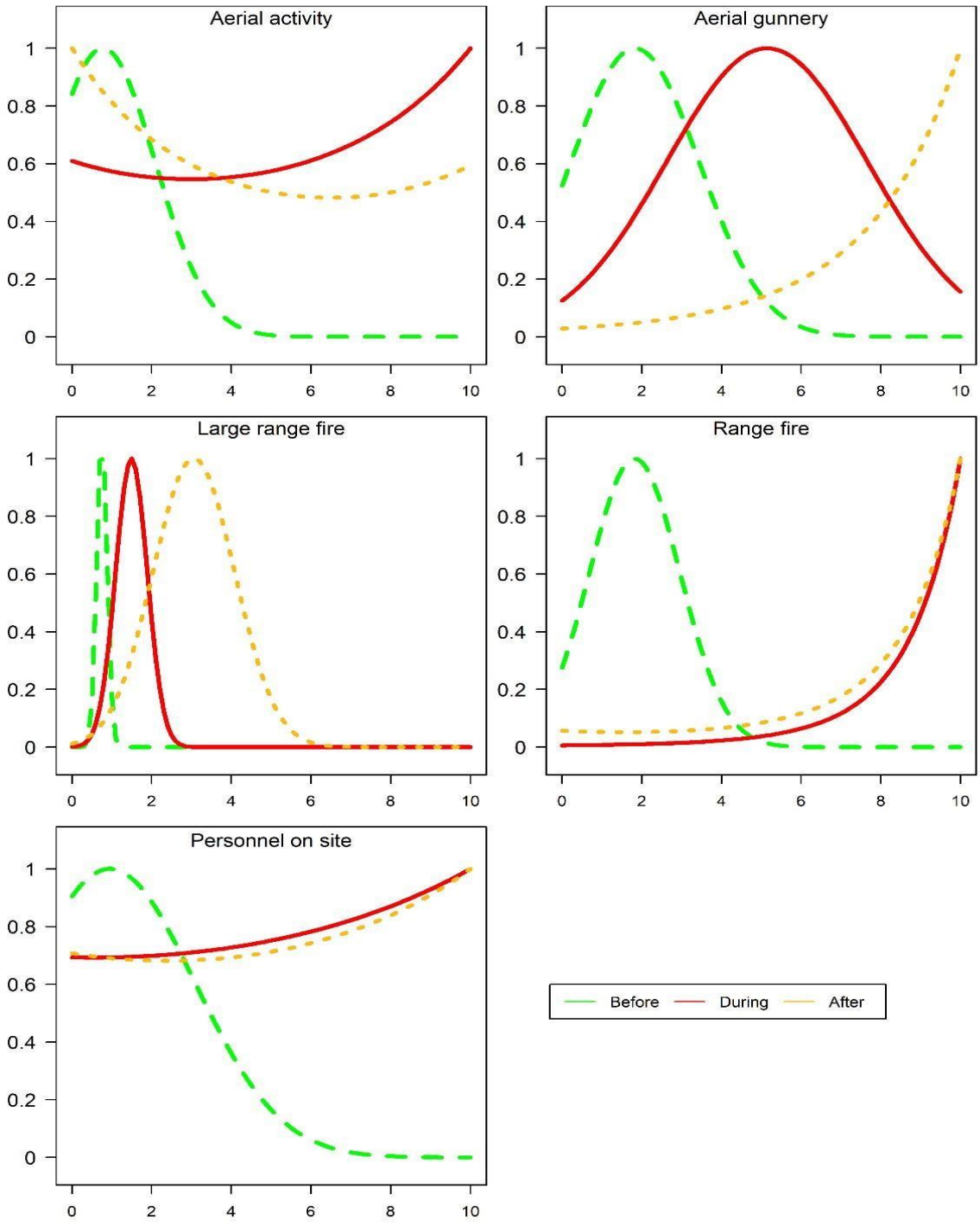

Figure 14. Relative probability of elk winter resource selection as a function of distance to aerial activity, aerial gunnery, large range fire, range fire, personnel on site, and vehicle activity before, during, and after the activity at the Camp Guernsey Joint Training Center, Platte County, Wyoming.

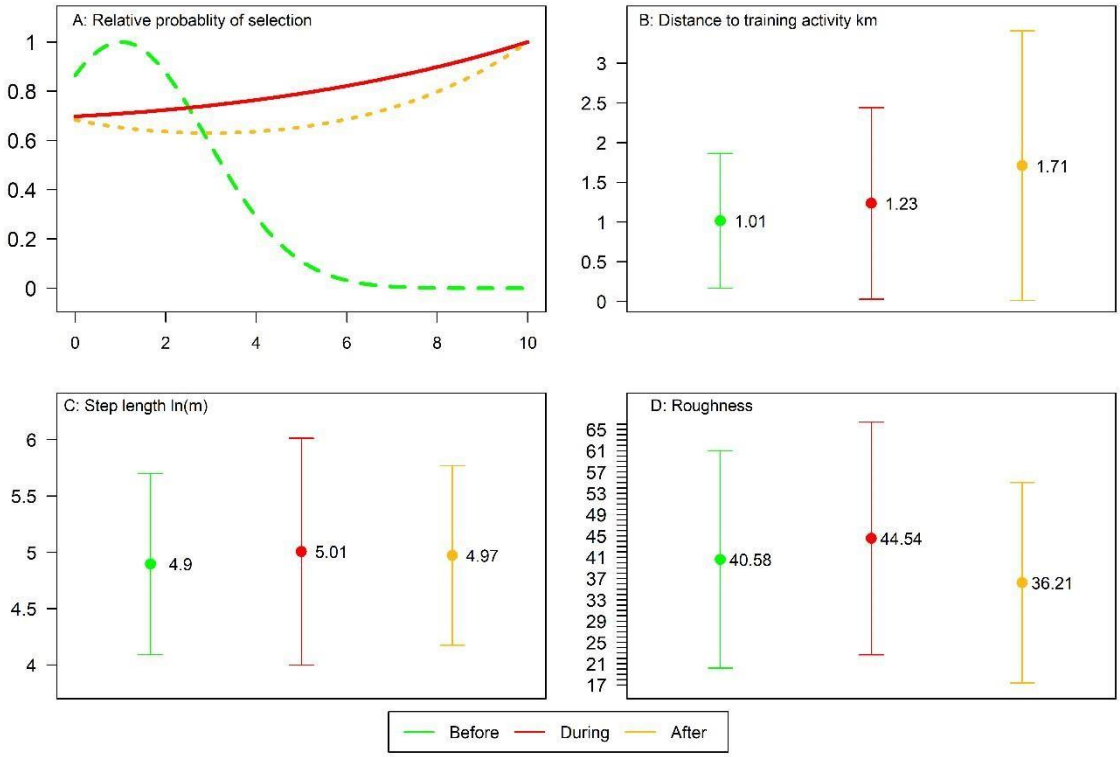

Figure 15. Relative probability of elk resource selection as a function of distance to training activity (A), mean (± range) distance to training activity (B), mean (± range) natural log of step length (C), and mean (± range) roughness (D), before, during, and after all summer training activities at the Camp Guernsey Joint Training Center, Platte County, Wyoming.

Displacement by Hunting Activities

We failed to detect a meaningful relationship between the distance of elk from the center of the training facility and the number of hunters on Camp Guernsey or the total harvest reported from Camp Guernsey each day.

DISCUSSION

The purpose of this study was to determine, and to what extent, habitat selection and movement of elk from the Rawhide Herd was impacted by a variety of external factors. Using location data from GPS collared female elk, we assessed location and timing of elk seasonal ranges, location and timing of elk parturition areas, movement barriers, seasonal resource selection, and elk displacement by military training and hunting activities. We were able to determine some seasonal ranges for individual elk, but temporal and spatial trends were lacking across the herd, suggesting that the Rawhide elk herd is likely a resident population that utilizes similar yearlong habitats. We were able to identify spatial and temporal bounds for parturition areas. These findings can be used by Camp Guernsey staff, particularly

if they want to consider parturition areas when planning timing and location of training exercises. We did not find any obvious barriers to movement when considering major potential barriers (i.e., the North Platte River and Interstate 25) and more diffuse barriers (i.e., roadways and railways). We found many relationships using the RSF models to explain elk resource selection. A few trends were evident in both summer and winter models, including elk avoidance of anthropogenic features, selection for areas farther away from old fires, selection for areas close to recent fires, and selection for areas with higher agricultural density. Elk appeared to respond to military training activities by selecting habitats farther from the activity, though the degree of response varied depending on the type of training and seasonality. We did not find any meaningful relationships between hunter activity and elk movement or resource selection.

The elk location dataset available for this study was robust and enabled us to adequately address most of the research questions. The same was true for the military training exercise data. One limitation of the elk location data was the fix rate of the dataset when compared to the military training data. Some of the military training exercises were short in duration and it was difficult to detect responses by elk to these short duration exercises with the two hour fix rate. Another limitation was the hunting activity data. We did not have hunter location data to pair with elk location data, only the number of hunters in the facility on a given day. The coarseness of the data led to inconclusive model results.

There were a few unexpected results, particularly with the RSF models. Elk selected for higher elevation in winter. Elk also selected more strongly for rougher terrain in both summer and winter. These relationships were contrary to our expectations. We also saw a unimodal relationship between distance to roads (highway and county roads) and relative selection. We assume that this relationship is due to the inability of elk to move far away from roads due to road density and not due to selection for a certain proximity to roads.

There are opportunities for future research of the Rawhide Herd to better address the research questions of this project. Most of the research questions could be better addressed with shorter fix rate location data. This is particularly true for determining the impact of military training exercises on elk resource selection and movement. More fine scale temporal data would allow for better comparisons with the training data. Fine scale temporal data would also be useful to determine relationships between hunting pressure and elk responses. Additional hunter use data, including hunter location (i.e., hunter GPS location) would also be helpful including hunter location data (i.e., hunter GPS location data), as well as specific coordinates of elk harvest and failed harvest attempts.

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2023 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2023 - 5/31/2024
HERD: BS516 - DOUGLAS CREEK
HUNT AREAS: 18
PREPARED BY: LEE KNOX

	2018 - 2022 Average	2023	2024 Proposed
Population:		N/A	N/A
Harvest:	1	3	3
Hunters:	1	3	3
Hunter Success:	100%	100%	100 %
Active Licenses:	1	3	3
Active License Success:	100%	100%	100 %
Recreation Days:	3	97	90
Days Per Animal:	3	32.3	30

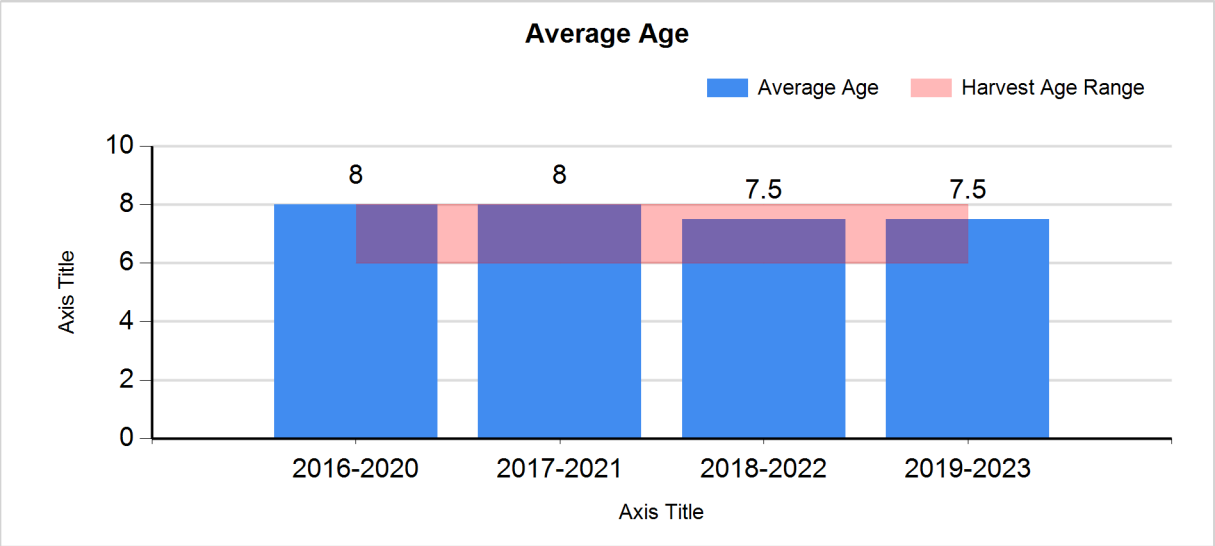
Limited Opportunity Objective:

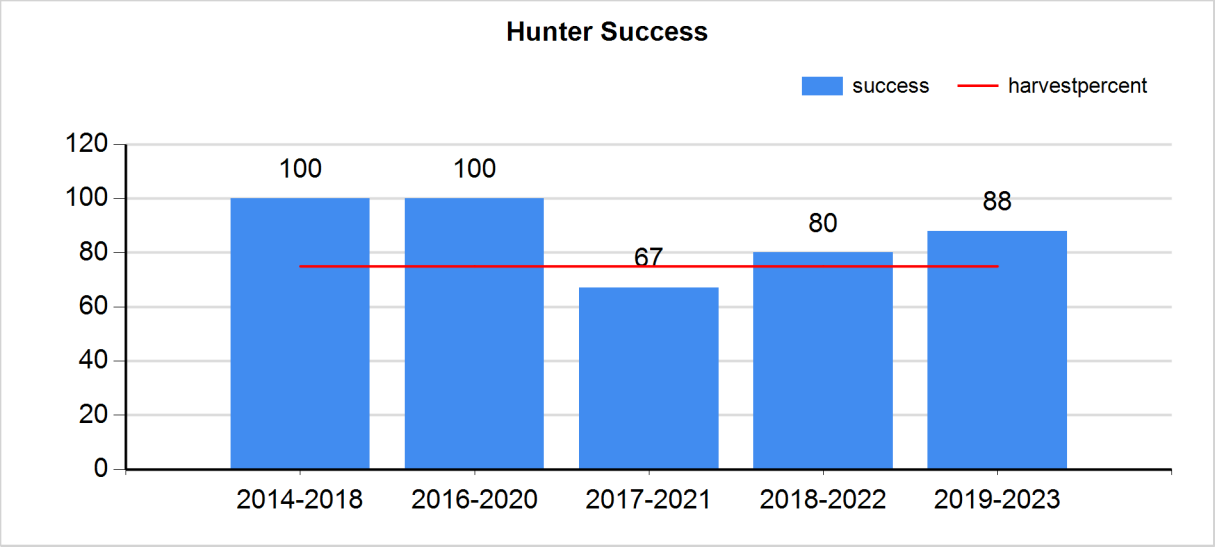
5-year average of > 75% hunter success

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
67
80
88
2014-2018
2016-2020
2017-2021
2018-2022
2019-2023

2024 Hunting Seasons
Douglas Creek Bighorn Sheep Herd Unit (BS 516)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
18	1	Aug. 15	Aug. 31	Sep. 1	Nov.30	3	Any ram (2 resident, 1 nonresident)

Current Management Objective: Bighorn Sheep Limited Opportunity

1) 5-year running average of >75% hunter success
   - Currently Met: 2019-2023 Hunter Success- 88%
2) 5-year running average age of harvested rams between 6 and 8 years of age
   - Currently Met: 2019-2023 Harvest Mean Age- 7.5 years of age
3) Documented occurrence of adult rams in the population
   - Currently Met: > 16 adult rams observed in 2023

2024 Management Summary

1.) Hunting Season Evaluation The 2023 hunting season structure provided three resident hunters the opportunity to harvest mature rams in hunt areas 18. Based on frequent observations of mature rams in Douglas Creek (hunt area 18) and Encampment River (hunt area 21), managers continued to forgo the traditional season structure and provide more opportunity by allocating separate license quotas for each hunt area. There will be 2 residents and 1 nonresident for the 2024 season in hunt area 18. We expect hunters will have a high likelihood of success and this herd will continue to meet the bighorn sheep limited opportunity management objectives

2.) Management Objective Review: The management objective for the Douglas Creek Herd Unit is a limited opportunity. The herd management objective was reviewed in 2021 and will be reviewed again in 2026.

3.) Research: We collared 19 adult ewes, including 6 recaptures, from the Douglas Creek Herd Unit on February 12, 2022. The median age was 4.5, with the oldest being 9.5, and the youngest 3.5. An additional 5 adult ewes were collared in March 2023 to maintain sample size. There were no post capture mortalities during either captures. Tonsil and nasal swabs were sampled on all captured sheep, and Mannheima haemolytica and M. ovipneumoniae were found in the majority of the sheep sampled. This herd was previously sampled in 2019 and M. ovipneumoniae was not detected at that time. However survival still remains high with only three mortalities in 2022 and one in 2023. The collars will remain on sheep until December first of 2024. The data gathered from these capture efforts will be used in habitat selection and movement analyses to prioritize future habitat projects and bighorn sheep conservation

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4.) Habitat Annual precipitation in Hunt Area 18 was average to above average in 2023. Winter conditions on the western slopes of the Snowy Range were severe. SNOTEL sites in the Snowy Range reported above-average (104-155%) snowpack from January through March 2023. Movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality. Precipitation in critical growing months for herbaceous and woody vegetation (April-July) fluctuated around the 30-year average, with well above-average precipitation in June and August and near-average precipitation in April, May, and July. While no NOAA weather stations are close to the vicinity of occupied bighorn sheep habitats in Hunt Area 18, weather stations in Laramie reported a 10% decline in annual precipitation while weather stations in Rawlins reported a 59% increase in annual precipitation.

In September 2020, the Mullen Fire burned approximately 176,800 acres in the Snowy Range, including two wilderness areas. The western third of the burn area encompasses occupied bighorn sheep habitat. The wildfire likely increased line of sight visibility and created more open travel corridors for bighorn sheep, aiding their movements to escape terrain and lambing habitats. High fire severity in places is a continued cause for concern for cheatgrass invasion in Savage Run and Platte River wilderness areas, as well as other areas adjacent to North Platte River. In 2021, 10,334 acres on the western slope of the Snowy Range were aerially treated with the herbicide Rejuvra. Large-scale monitoring has taken place each year since 2021 to evaluate herbicide efficacy post-treatment. Recovery of native, perennial grasses looks promising thus far. Plant species diversity was comparable pre- and post-treatment. Cheatgrass was documented in areas where soil movement had occurred. Additionally, high densities of cheatgrass were documented within the no-spray buffer around the North Platte River. We will continue to monitor herbicide efficacy in 2024 and evaluate the need for retreatment.

Antelope bitterbrush, serviceberry, and big sagebrush seedlings were observed throughout the burn scar, which is a promising sign for shrub recovery. Several thousand mixed mountain shrub seedlings were planted west of the North Platte River in the fall of 2021, 2022, and 2023 by USFS, WGFD, MDF, and volunteers to aid in recovery. Collars affixed to bighorn sheep in Hunt Area 18 will provide useful information on resource use and habitat selection pre- and post-fire.

2023 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2023 - 5/31/2024

HERD: BS517 - LARAMIE PEAK

HUNT AREAS: 19
PREPARED BY: KEATON WEBER

	2018 - 2022 Average	2023	2024 Proposed
Population:		N/A	N/A
Harvest:	7	9	8
Hunters:	8	10	10
Hunter Success:	88%	90%	80 %
Active Licenses:	8	10	10
Active License Success:	88%	90%	80 %
Recreation Days:	98	105	100
Days Per Animal:	14	11.7	12.5

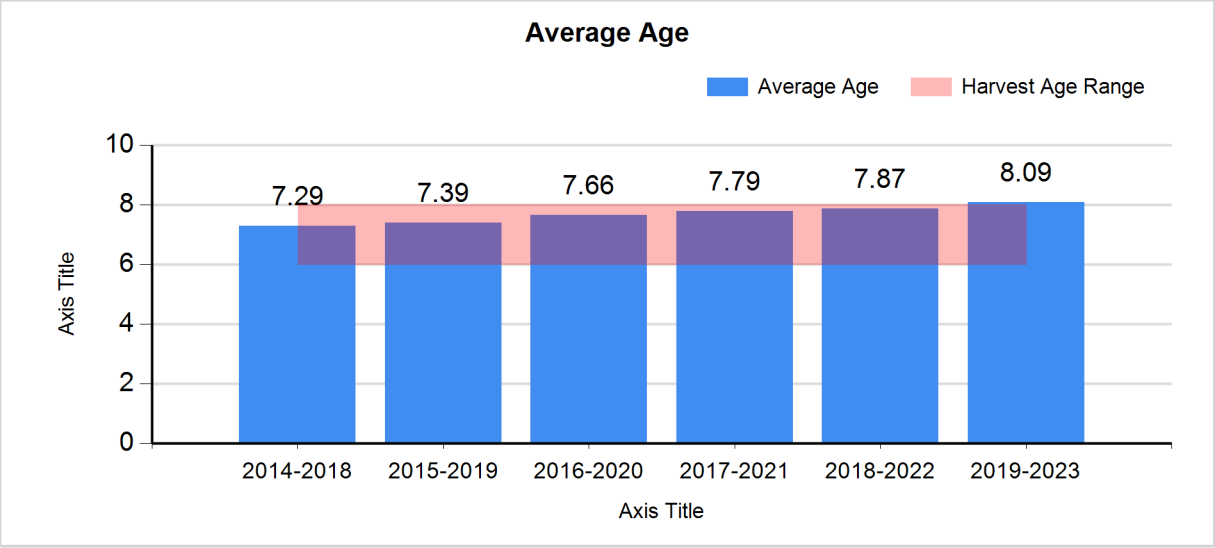
Limited Opportunity Objective:

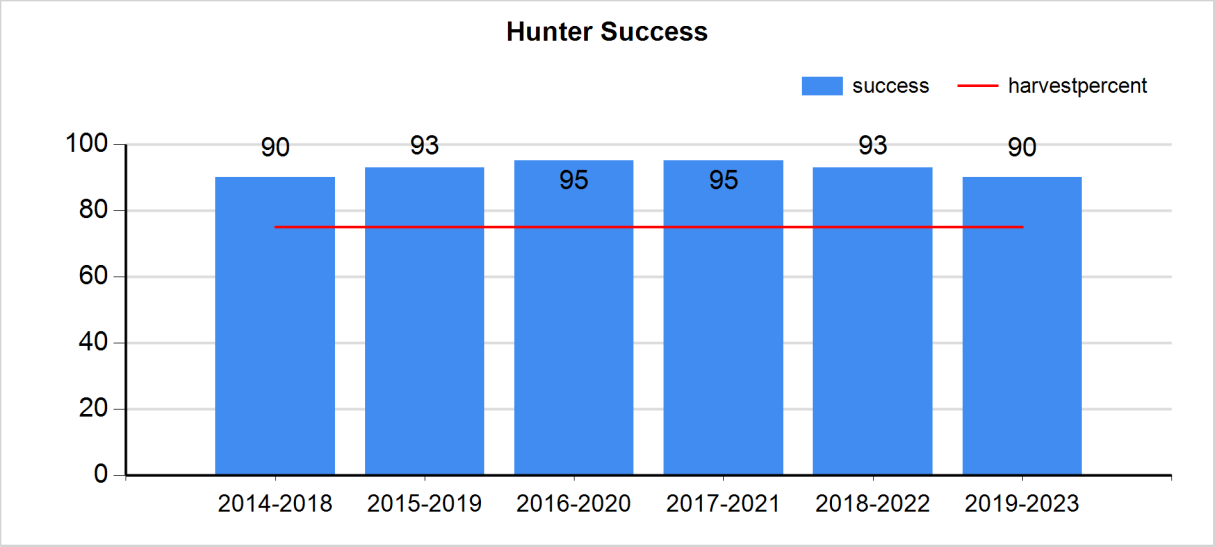
5-year average of > 75% hunter success

5-year average harvest age of 6-8 years

Secondary Objective:

Management Strategy: Special




Hunter Success
success
harvestpercent
100
80
60
40
20
0
90
93
95
95
93
90
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022
2019-2023

2024 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	10	Any ram (9 residents, 1 nonresident)

Current Management Objective:

1) **5-year running average of >75% hunter success**
   - **Currently Met:** 2019 – 2023 Hunter Success = 90%
2) **5-year running average age of harvested rams between 6 and 8 years of age**
   - **Currently Met:** 2019-2023 Harvest Mean Age - 8
3) **Documented occurrence of adult rams in the population**
   - **Currently Met:** >30 adult rams observed in 2023 (34 adult rams observed)

2024 Management Summary

1) Hunting Season Evaluation: New in 2023, 90% of bighorn sheep licenses in the state are allocated to residents and 10% will be allocated to nonresidents. To meet the requirement of this 90/10 split in license allocation for residents and nonresidents, the quota was increased to 10 licenses (9 resident, 1 nonresident) in 2023. There are still a healthy number of older age rams within the population to maintain the management objectives and absorb the increase by two licenses. Hunter success was 90% in 2023. Access to the wild sheep remains difficult due to large tracts of private land within occupied sheep habitat. In recent years, wild sheep have begun to increasingly utilize the fire scar of the 2018 Britania fire and continue to utilize the fire scar of the 2012 Arapahoe wildfire. Hunter success will be closely monitored in the coming years to see if the increase in licenses causes overcrowding on the limited public lands and consequently a decrease in hunter success.

2.) Management Objective Review: In 2024, the Laramie Peak bighorn sheep herd unit was up for objective review. Managers reviewed the past five year's population metrics, hunter satisfaction results, weather, and habitat data and determined the current management strategy of Limited Opportunity Objective is still the best management strategy for this bighorn sheep herd. This herd unit will be up for objective review again in 2029.

3.) Ongoing Research: This collaring project is part of the statewide bighorn sheep disease surveillance effort, to garner baseline information on the various respiratory pathogens within Wyoming's wild sheep populations. For the Laramie Peak herd unit (hunt area 19), the primarily goal is to monitor respiratory disease outbreaks that could potentially cause large or small scale die-offs. Additionally, this collar data will assist in identifying seasonal movement patterns, crucial winter ranges, habitat selection, lambing areas, and cause specific mortality and survival estimates.

The following captures have taken place within the Laramie Peak Herd Unit:

- **2017:** 6 ewes in the Iron Mountain sub-herd
- **2019**: 16 ewes, only 15 collared, 5 from the Sybille Canyon sub-herd and 10 from the Duck Creek sub-herd

- **2021:** 7 ewes, 3 from Sybille Canyon sub-herd and 4 from the Duck Creek sub-herd
- **2022:** 10 ewes, 3 from Sybille Canyon sub-herd and 7 from the Duck Creek sub-herd
- **2023:** 10 new collars and 2 redeployments, 4 from Sybille Canyon sub-herd and 8 from Duck Creek sub-herd

There were 6 collared mortalities throughout 2023. Cause of mortalities included: pneumonia (1), mountain lion predation (1), complications during birth (1), and unknown (3).
The primary concern with this herd unit is small or large scale die-off events due to outbreaks of respiratory pathogens. In 2019, there was a small scale die-off due to a Pneumonia outbreak within the Sybille Canyon sub-herd and these collars will aid in monitoring future disease outbreaks and mortalities. Mortality notifications from collars will assure managers if there are any major die-offs occurring. As of February 2024, there are 21 collars online.

4) Weather and Habitat: Precipitation in this herd unit was above normal in 2023. While no NOAA weather stations are close to the vicinity of occupied bighorn habitats in Area 19, weather stations in Laramie reported a 12% decrease, while Cheyenne and Douglas stations reported increases of 32% and 26% respectively above average annual precipitation.

Winter severity and snow loading in the higher elevations of this herd unit were above normal. As is commonly observed in this area, large snow drifts were observed as well as areas of scouring due to high winds. February temperatures were below normal and numerous snow storm events occurred throughout the month. This left some areas blown free of snow so bighorn sheep and other wild ungulates were still able to get to forage most of the time. Snow loading likely made travel by bighorn sheep more challenging when making small migrations within the herd unit. One snowstorm event on April 4th brought more than 20" to the higher elevations in this herd unit. Historic springs and seeps found in the Laramie Range had the opportunity to recharge in 2023, providing water sources and snow melt was slow in higher elevations this spring due to cool spring temperatures. With mild summer temperatures and continued precipitation events, forage on the landscape generally maintained some level of greenness all the way into the fall.

Cheatgrass control efforts completed in the last 4 years in Sybille Canyon and other areas directly west of Wheatland, continue to show promise in recovery of native vegetation in areas burned by wildfire. Over 2,300 acres were treated on Poe Mountain in fall 2023. Many areas impacted by the Britania wildfire are now dominated or co-dominated by cheatgrass. This is cause for concern and future monitoring and surveillance is necessary. Future treatments will be planned where necessary and funding and time allows for proper project planning and implementation.
Fence conversion efforts continue in occupied bighorn sheep habitats on the Thorne/Williams and Laramie Peak WHMA's. In total, 1 ½ miles of fence was completely removed and 2 ½ miles were converted in 2023. An additional 7 ½ miles are slated for conversion in 2024 on the two WHMA's. Conversions from woven wire / barbed combination fences to 4 wire barbed/smooth wire will result in improved movement ability for all wild ungulates, including bighorn sheep in the Laramie Range.

2023 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2023 - 5/31/2024

HERD: BS519 - ENCAMPMENT RIVER

HUNT AREAS: 21
PREPARED BY: TEAL CUFAUDE

	2018 - 2022 Average	2023	2024 Proposed
Population:		N/A	N/A
Harvest:	1	2	2
Hunters:	1	2	2
Hunter Success:	100%	100%	100 %
Active Licenses:	1	2	2
Active License Success:	100%	100%	100 %
Recreation Days:	4	24	24
Days Per Animal:	4	12	12

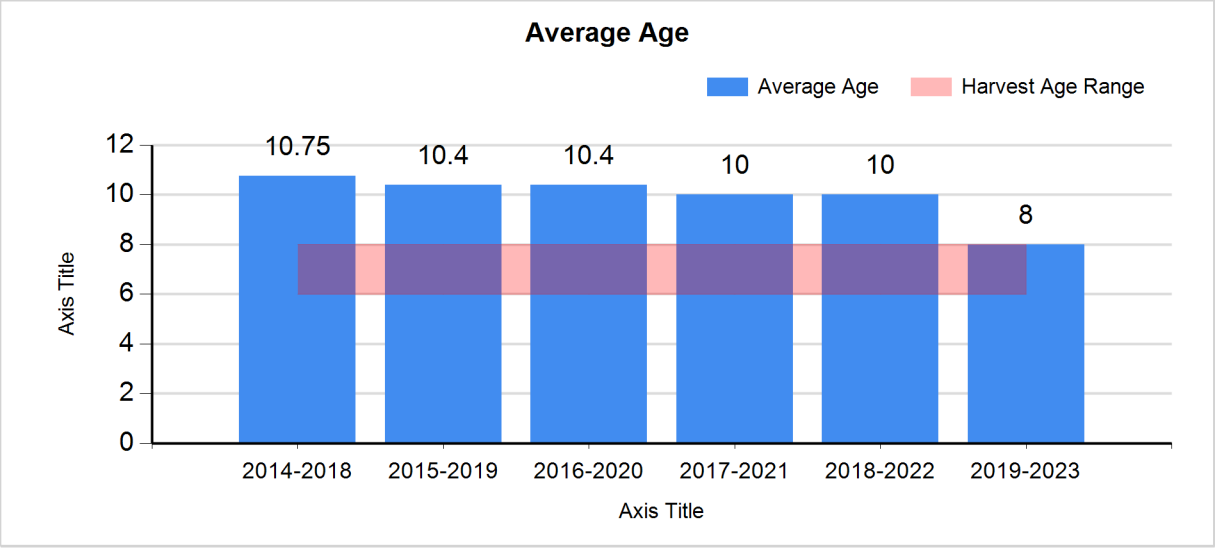
Limited Opportunity Objective:

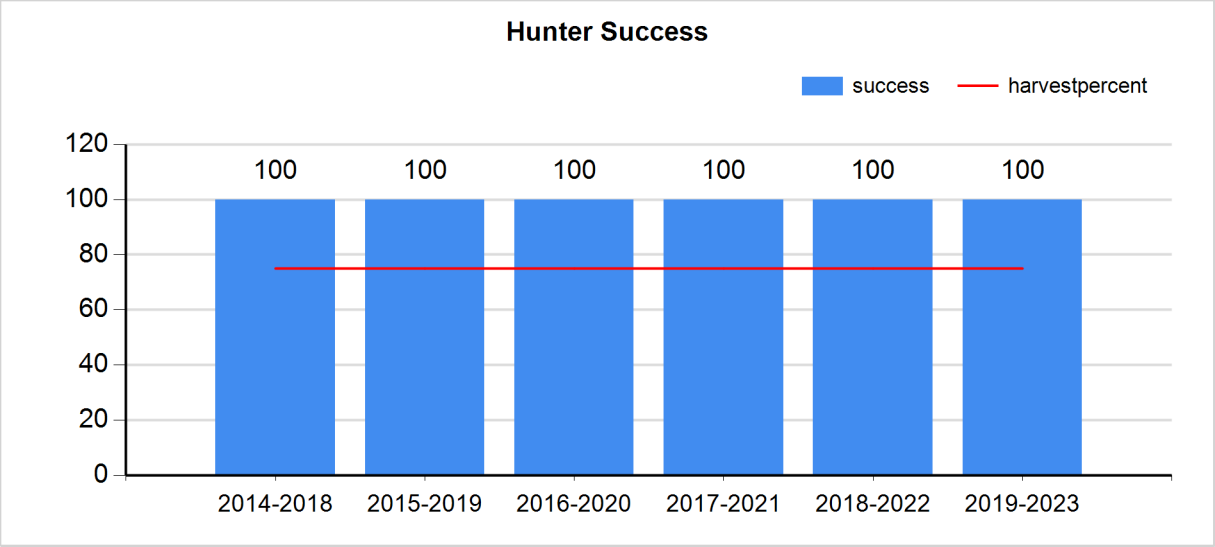
5-year average of > 75% hunter success

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
2014-2018
2015-2019
2016-2020
2017-2021
2018-2022
2019-2023

2024 Hunting Seasons
Encampment River Bighorn Sheep (BS519)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
21	1	Aug. 15	Aug. 31	Sep. 1	Oct. 31	2	Any ram (2 residents)

Current Management Objective: Bighorn Sheep Limited Opportunity

1) 5-year running average of >75% hunter success
   - Currently Met: 2019-2023 Hunter Success- 100%
2) 5-year running average age of harvested rams between 6 and 8 years of age
   - Currently Met: 2019-2023 Harvest Mean Age- 8 years of age
3) Documented occurrence of adult rams in the population
   - Currently Met: >10 adult rams observed in 2023

2024 Management Summary

1.) Hunting Season Evaluation: The 2024 hunting season structure provided two resident hunters the opportunity to harvest mature rams in hunt area 21. Based on frequent observations of mature rams in Douglas Creek (hunt area 18) and Encampment River (hunt area 21), managers continued to forgo the traditional season structure and provide more opportunity by allocating separate license quotas for each hunt area. We expect hunters will have a high likelihood of success and this herd will continue to meet the bighorn sheep limited opportunity management objectives.

2.) Management Objective: The herd management objective was reviewed in 2021 and will be reviewed again in 2026.

3.) Weather/Habitat: Annual precipitation in hunt area 21 was average to above average in 2023. Winter conditions throughout the Sierra Madres were severe. SNOTEL sites in the Sierra Madre mountain range reported above-average (121-206%) snowpack from January through mid-May 2023. Snow persisted at lower elevations much later in the spring than usual. Movement and foraging conditions were likely extremely difficult and may have led to increased winter mortality. Despite normal annual precipitation in the 2022-2023 water year, moisture events in the critical growing months for herbaceous and woody vegetation were below normal. Most of the annual precipitation can be attributed to the above-average snowpack that occurred throughout the hunt area during the 2022-2023 winter. While no NOAA weather stations are close to the vicinity of occupied bighorn sheep habitats in hunt area 21, the Rawlins weather station reported a 59% increase in annual precipitation.

No major disturbances were documented within the Encampment River bighorn sheep herd unit in 2023. The lack of natural disturbances within this bighorn sheep herd unit has resulted in shrub communities trending towards late seral stages with older, decadent age classes and conifer encroachment, which may be limiting habitat availability. Cheatgrass continues to be an issue on the southeast facing slopes at lower elevations within this herd unit. The WGFD, in conjunction with the USFS, BLM, and Carbon County Weed and Pest, continues to monitor cheatgrass

infestations and look for opportunities to conduct large-scale aerial treatments.

4.) Research: WGFD conducted several capture and collar events from 2018-2021 in this herd unit as part of a statewide disease assessment effort. Data gathered from 21 collared bighorn ewes will also be used for habitat selection analyses beginning in 2024.

5.) Disease: In 2023, there were several observations of bighorn sheep in close proximity to bands of domestic sheep west of the Continental Divide and in the Baggs area. Two adult ram bighorn sheep were euthanized given their proximity to domestic sheep operations. There remains a high risk of commingling with domestic sheep herds in this area, so we will continue to monitor and respond to any reports of bighorn sheep west of the Continental Divide.

2023 - JCR Evaluation Form

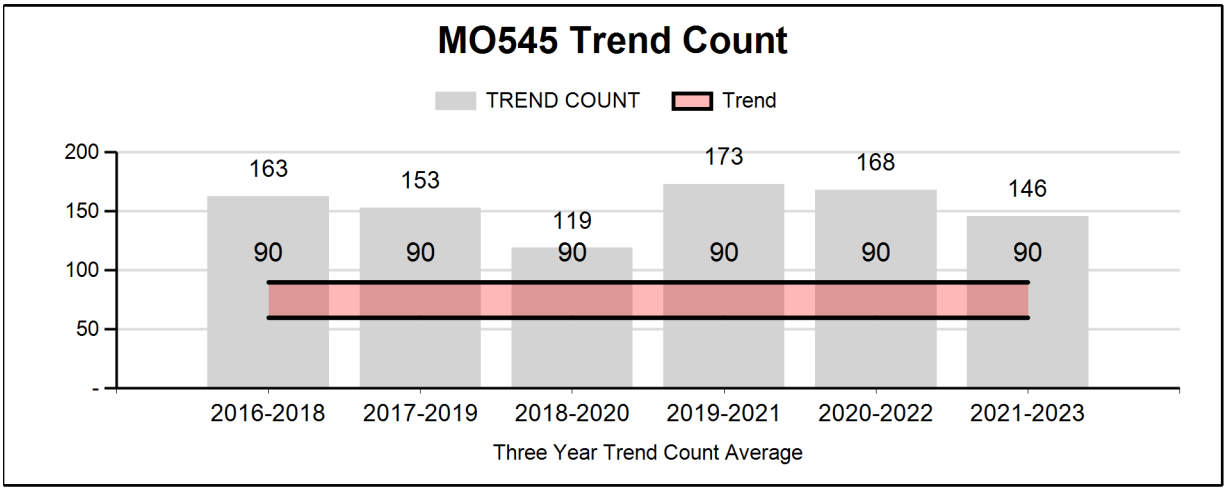
SPECIES: Moose
PERIOD: 6/1/2023 - 5/31/2024
HERD: MO545 - SNOWY RANGE
HUNT AREAS: 38, 41, 45
PREPARED BY: TEAL CUFAUDE

	2018 - 2022 Average	2023	2024 Proposed
Trend Count:	159	0	0
Harvest:	41	48	52
Hunters:	44	53	60
Hunter Success:	93%	91%	87%
Active Licenses:	44	53	60
Active License Success	93%	91%	87%
Recreation Days:	339	413	500
Days Per Animal:	8.3	8.6	9.6
Males per 100 Females:	81	109	
Juveniles per 100 Females	42	46	

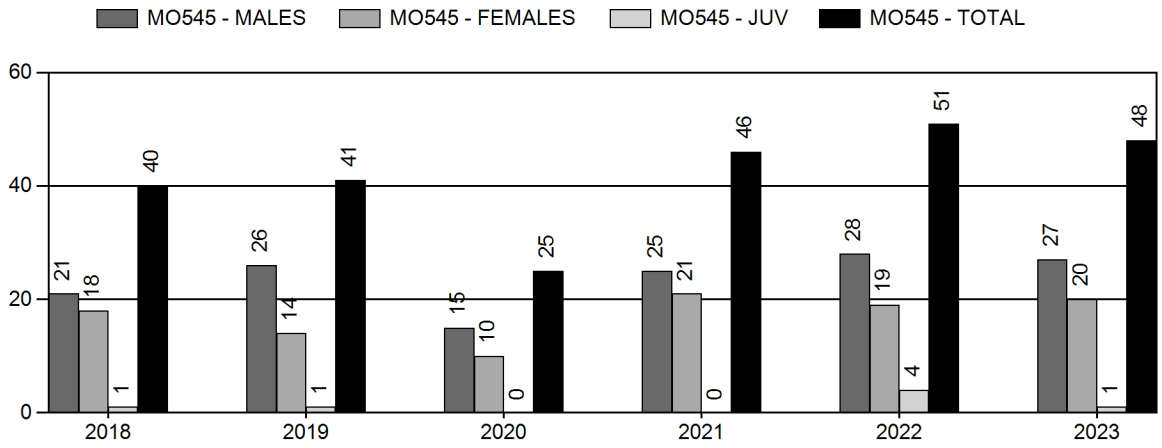
Trend Based Objective (± 20%)	75 (60 - 90)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	1

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

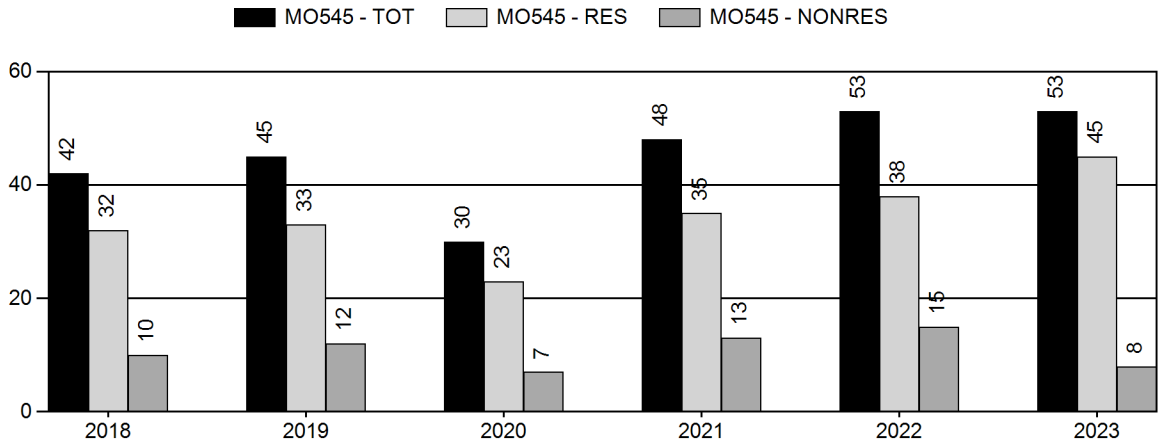
	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	8%	7%
Juveniles (< 1 year old):	N/A%	0%



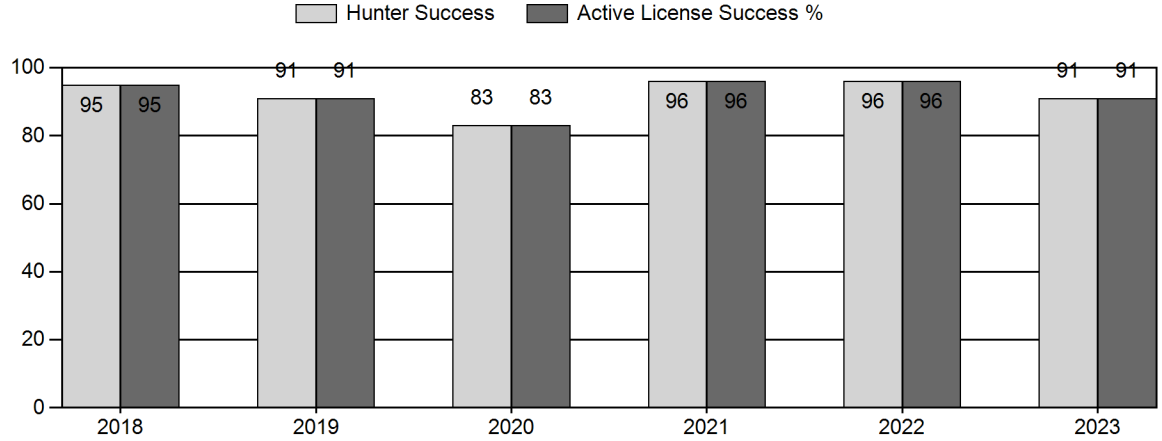
Harvest



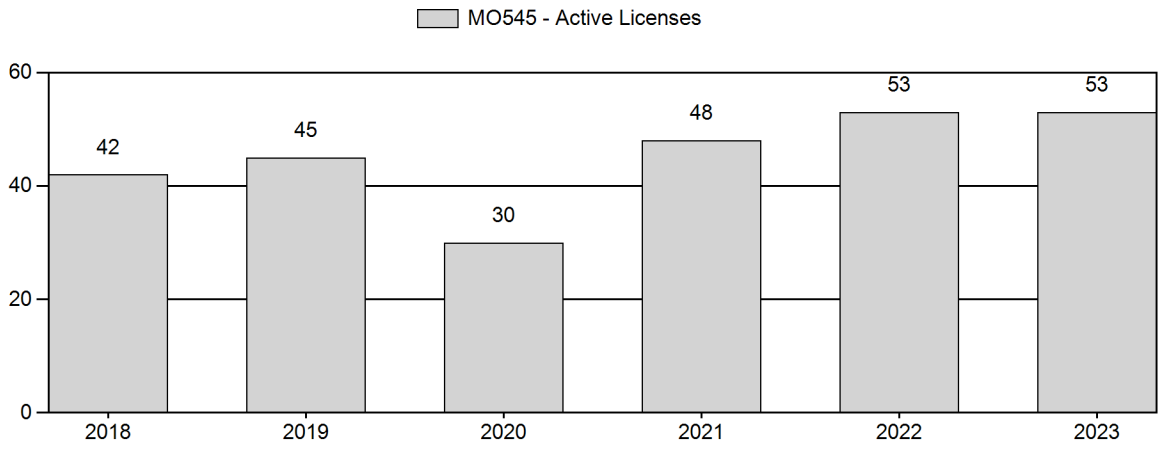
Number of Hunters



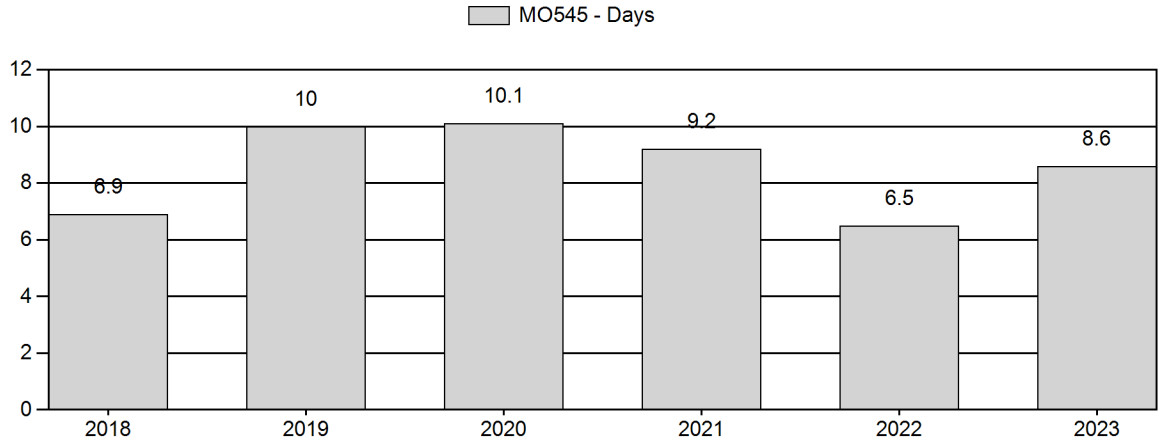
Harvest Success



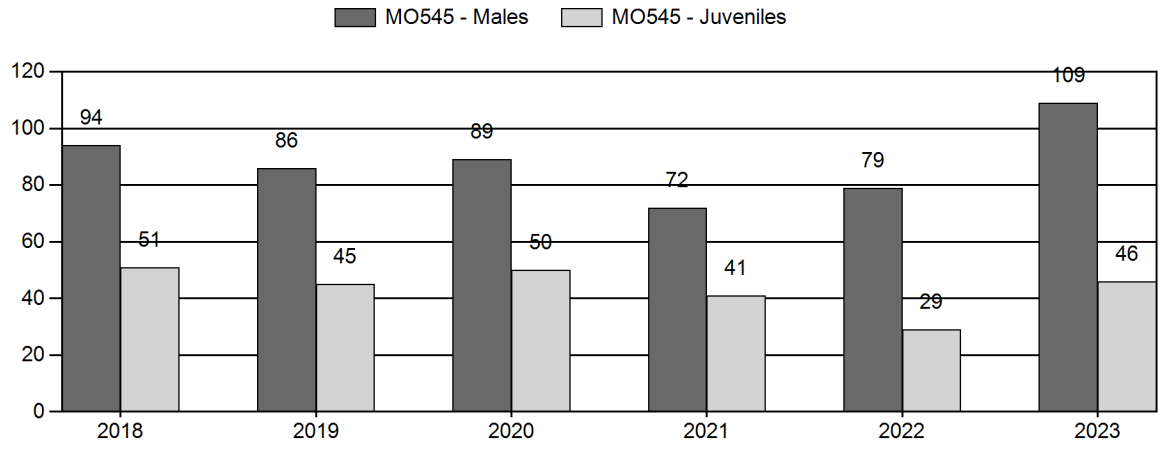
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2024 Hunting Seasons
Snowy Range Moose (MO545)

Hunt Area	Type	Archery Dates		Season Dates		Quota	Limitations
		Opens	Closes	Opens	Closes		
38	1	Sep. 1	Sep. 30	Oct. 1	Nov. 14	24	Any moose, except female moose with calf at side (22 residents, 2 nonresidents)
41	1	Sep. 1	Sep. 30	Oct. 1	Nov. 14	5	Any moose, except female moose with calf at side (4 residents, 1 nonresidents)
45	1	Sep. 1	Sep. 30	Oct. 1	Nov. 14	5	Any moose, except female moose with calf at side (5 residents)
38,41,45	4	Sep. 1	Sep. 30	Oct. 1	Nov. 14	30	Antlerless moose, except female moose with calf at side (27 residents, 3 nonresidents)

Secondary Management Objectives:

1) 3-year average of ≥ 4 years of age median for harvested males
   - Currently Met: 2021-2023 Median Age for Harvested males- 5 years of age
2) 3-year average of ≥ 40% of males in harvest = ≥ 5 years of age
   - Currently Met: 2021-2023 Percentage of males ≥ 5 years of age- 71%
3) Maintain sustainable communities of willow species preferred by moose
   - Reference Habitat Section

2024 Management Summary

1.) Hunting Season Evaluation: At the end of biological year 2023, we conducted a 60 hour moose sightability survey. A total of 345 moose were observed in selected subunits. The abundance estimate from this survey was 1,068 (758-1,378) moose. Sex and age ratios from all moose classified (356) during the survey, yielded 46 calves/100 cows, 10 yearling bulls/100 cows, and 60 adult bulls/100 cows (Appendix A). Unknown males observed during the survey could be assumed to be adult males because adult males had shed their antlers. The adult bull (adult and unknown males) to cow ratio was 99/100.

From 2010-23, 673 total hunters have harvested 614 moose in this herd unit. During this time, 283 antlerless moose (256 females and 27 juveniles) have been harvested. Only one antlerless moose has been harvested on a type 1 “any moose” license since 2010. During the 2023 hunting season, 53 hunters harvested a total of 44 (25 males, 18 females, and 1 calf) moose in hunt area 38, two males in hunt area 41, and two females in hunt area 45. Total hunter success was 91%, which was slightly below the five-year average (92%).

In 2023, hunt area boundaries were changed within the Snowy Range Moose herd unit. We modified the hunt area 38 boundary and added a new Pole Mountain hunt area (hunt area 45). The Sierra Madre hunt area (hunt area 41) boundary remained unchanged. As this population has

expanded into available habitats across the herd unit, we believe hunter opportunities could be increased. In 2024, licenses were allocated across the three hunt areas to ensure appropriate distribution of moose hunters.

The 2024 license quotas are expected to maintain the population above the new postseason population objective and keep the age of harvested males within the secondary management objective ranges. In 2024, 24 type 1 licenses were allocated in hunt area 38, five (5) type 1 licenses were added to hunt area 41, and five (5) type 1 licenses were added to hunt area 45. High hunter success is expected on all type 1 licenses in 2024. The observed adult male to female ratio, tooth age data, and sightability survey estimate indicated even with increased bull harvest there would still be a high number of mature bulls in the population. Past hunter comments indicated there is a preference by some to maintain or increase the quality of males rather than see a significant increase in type 1 moose licenses so we continue to consider that when prescribing license quotas. Type 4 licenses were increased from 25 to 30 and were valid in all three hunt areas. Type 1 licenses have generally not been used by hunters to harvest antlerless moose, so antlerless moose licenses are necessary to keep the population within the objective range. The moose Super Tag and Super Tag Trifecta were awarded to two nonresidents in 2024. These Super Tag moose hunters could hunt in area 38 and we accounted for the 90 resident/10 nonresident split by adjusting the type 1 quota to 24 licenses. A nonresident moose license will also be available in hunt area 41 for the 2024 hunting season.

2.) Management Objective Review: We recommend changing the herd objective from the mid-winter trend count objective of 75 moose to a postseason population objective of 950 ±20% moose. We will use the IPM postseason population estimate to determine the annual status of the herd in relation to the postseason population objective. The IPM is performing okay with available data for this herd and estimated a 2023 postseason population of approximately 1,000 moose. Setting the postseason population to 950 moose necessitates a harvest regime that would stabilize the population at or slightly below its current level. This would possibly mean a short-term increase in hunting opportunity followed by a stable number of licenses issued each year to balance the annual population increase. Habitat data, especially in the Snowy Range portion of the herd unit, indicated the current moose herd is at or slightly above carrying capacity and localized overutilization may be occurring. Maintaining a moose population larger than the new objective could exceed carrying capacity and cause density dependence responses such as decreased calf survival, lower pregnancy rates, and decreased body and antler size. In order to carefully monitor this herd we plan to conduct an aerial survey each year, with an improved composition abundance survey design. During this survey, moose will be classified by sex and age and we will also obtain a low-precision abundance estimate. We plan to conduct a sightability survey once every 5 years, as funding permits. The secondary management objectives will be maintained to help ensure we are balancing the opportunity to hunt moose with the ability for hunters to harvest mature bulls.

3.) Habitat: PRISM data, extracted from the Derived Environmental Variability Indices Spatial Extractor (DEVISE) interface, for the Snowy Range moose herd unit was analyzed to estimate precipitation across the herd unit. Precipitation in critical growing months for herbaceous and woody vegetation (April-July) fluctuated around the 30-year average, with well above-average precipitation in June and August and near-average precipitation in April, May, and July. Snowpack and total annual precipitation were above the 30-year average for the majority of this herd unit in

the Snowy Range and Pole Mountain areas. SNOTEL sites in the Snowy Range reported above-average (104-155%) snowpack from January through March 2023. Snowpack and total annual precipitation were above the 30-year average for the majority of this herd unit in the Sierra Madre mountain range. SNOTEL sites in the Sierra Madre mountain range reported above-average (121-206%) snowpack from January through mid-May 2023. Snow persisted at lower elevations much later in the spring than usual.

The Mullen Fire (2020) burned approximately 176,800 acres in the Snowy Range, comprising the southern half of moose hunt area 38. Over 10,300 acres on the western half of moose hunt area 38 were aerially treated with the herbicide Rejuvra in 2021. Large-scale monitoring has taken place each year since 2021 to evaluate herbicide efficacy post-treatment. Recovery of native, perennial grasses looks promising thus far. Plant species diversity was comparable pre- and post-treatment with the exception of a few native annual forbs. Cheatgrass was documented in areas where soil movement had occurred. Additionally, high densities of cheatgrass were documented within the no-spray buffer around the North Platte River. We will continue to monitor herbicide efficacy in 2024 and evaluate the need for retreatment. Antelope bitterbrush, serviceberry, and big sagebrush seedlings were observed throughout the burn scar, which is a promising sign for shrub recovery. Several thousand mixed mountain shrub seedlings were planted west of the North Platte River in the fall of 2021, 2022, and 2023 by USFS, WGFD, MDF, and volunteers to aid in recovery. Additionally, MDF planted several thousand shrub seedlings within the Badger Creek burn scar to help aid in shrub recovery.

Past large-scale wildfires within the Sierra Madre Range (Snake fire – 2016, Beaver Creek fire – 2016, and Ryan fire – 2018) are recovering at varying rates. These fires have returned plant communities to earlier seral stages and increased the age-class diversity of mixed mountain shrubs and aspens. The resulting productivity and diversity should benefit moose, deer, and elk.

In 2023, 578 acres were aerially treated with Rejuvra herbicide to control cheatgrass on the eastern side of the Snowy Range. To control cheatgrass infestations in the Badger Creek burn scar, 3,927 acres were also aerially treated in 2023. In the eastern portion of moose hunt area 38, Pole Mountain, 5,710 acres were treated. Dalmatian toadflax and cheatgrass are both present in this area and treating them with the Rejuvra herbicide may aid in the control of both species. Approximately, 200 acres of mixed mountain shrub communities were mowed on USFS and private land in 2022 in the Troublesome Ridge area. Moose utilize these shrub species in the fall and winter months. Post-treatment monitoring in 2023 showed an increase in annual leader growth on all mixed mountain shrub species. Outside of the Troublesome shrub mowing, disturbances and enhancements to moose favored habitats in the northern half of the Snowy Range continue to be limited. Aspen habitat enhancement through conifer cutting in foothill areas within the Foote Creek and Wagonhound Creek drainages is planned for 2024. Prescribed burning will be scheduled two to three years post-mechanical cutting.

The Laramie biologist team established a long-term willow monitoring program in 2021 to monitor willow production and utilization within the Snowy Range and surrounding areas of available moose habitat. We evaluated willow community conditions using the Keigley Live-Dead Index (LD Index). The LD Index is a quantitative measure of browse intensity calculated by subtracting the height dead (H_D) from the height of the base of current year growth (*HBCYF*).

Positive values indicate the willow is escaping browsing pressure, values near zero indicate the current level of browsing is preventing vertical plant growth, and negative values indicate the willow is being suppressed by browsing. We completed 17 Live-Dead Index surveys from late July to early September. The majority of surveys in 2023 were completed on plane leaf and Booth willow.

4.) Research: The Snowy Range moose population has been monitored through several studies over the past 15 years (2005-2006, 2015-2017, 2018-2020), allowing us the unique opportunity to compare moose habitat use, movement, and behavior pre- and post- wildfire. Phase 1 of the Snowy Range Moose Post-Wildfire Monitoring Project began in March 2022 and phase 2 began in February 2023; 28 female moose were captured via helicopter darting on winter habitats within and surrounding the Mullen Creek Fire perimeter. Moose were fitted with GPS-enabled collars set to collect hourly fixes (locations). The fix-rate is identical to the previous Snowy Range moose studies, which will allow us to compare movement strategies and resource use of moose prior to and following the fire. These collars will be deployed for a period of three years, during which we will gather information on the status of each moose and their response to recently burned habitats. In addition, we will be able to track animals' survival and rate of juvenile recruitment. This research addresses five primary objectives. These objectives include 1) quantifying movement and distribution of female moose; 2) evaluating the effects of the Mullen Creek fire on habitat selection; 3) assessing changes in habitat quality post-burn; 4) measuring female moose survival; and 5) opportunistically assessing the health of captured moose. Appendix C describes the most recent Snowy Range moose project updates.

5.) Disease: In 2023, seven hunter harvested moose, two targeted/found dead moose, and three road-killed moose were tested for Chronic Wasting Disease (CWD). No sampled moose from this herd unit tested positive for CWD. In 2023, carotid artery worms were detected in one hunter harvested Snowy Range moose (n=12).

6.) Population Modeling: In 2023 WGFD managers began using PopR IPM to estimate population indices for Snowy Range moose. The biological year 2023 postseason population estimate for this herd unit was 1,009 (CL=738-1,317) moose. The projected population trajectory seems plausible.

2018 - 2023 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	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
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
2020	0	7	8	25	37%	28	42%	14	21%	67	0	25	29	89	± 0	50	± 0	26
2021	0	10	72	96	34%	133	47%	54	19%	283	0	8	54	72	± 0	41	± 0	24
2022	0	5	38	44	38%	56	48%	16	14%	116	0	9	68	79	± 0	29	± 0	16
2023	1,000	14	84	152	43%	140	39%	64	18%	356	0	10	60	109	± 13	46	± 7	22

The Effect of Fire on Habitat Selection of Female Moose in the Snowy Range Mountains

Project Description

In recent decades, moose (*Alces alces*) have declined across much of their range in Wyoming. Research has pointed towards a likely role of climatic conditions, habitat quality issues, and density dependence in causing population declines across much of their southern range. The Snowy Range moose herd, in south-central Wyoming, has remained productive, despite notable changes in these factors. Despite this herd's stable population performance, the landscape of the Snowy Range has been altered dramatically by the mountain pine beetle (*Dendroctonus ponderosae*) and most recently large-scale fires. In September 2020, the Mullen Creek Fire started in the Savage Run Wilderness Area, and burned more than 176,800 acres in the southern extent of the Snowy Range on the Medicine Bow National Forest. The burned acreage included a substantial portion of the Snowy Range moose herd unit. The public and wildlife managers are very interested in how these changes could impact the performance of this herd. Snowy Range moose have been monitored through several studies over the past 15 years, allowing us the unique opportunity to compare moose habitat selection, movement, and behavior pre- and post-wildfire. The information collected from these collared moose will allow us to better assess moose population performance and prioritize future habitat projects.

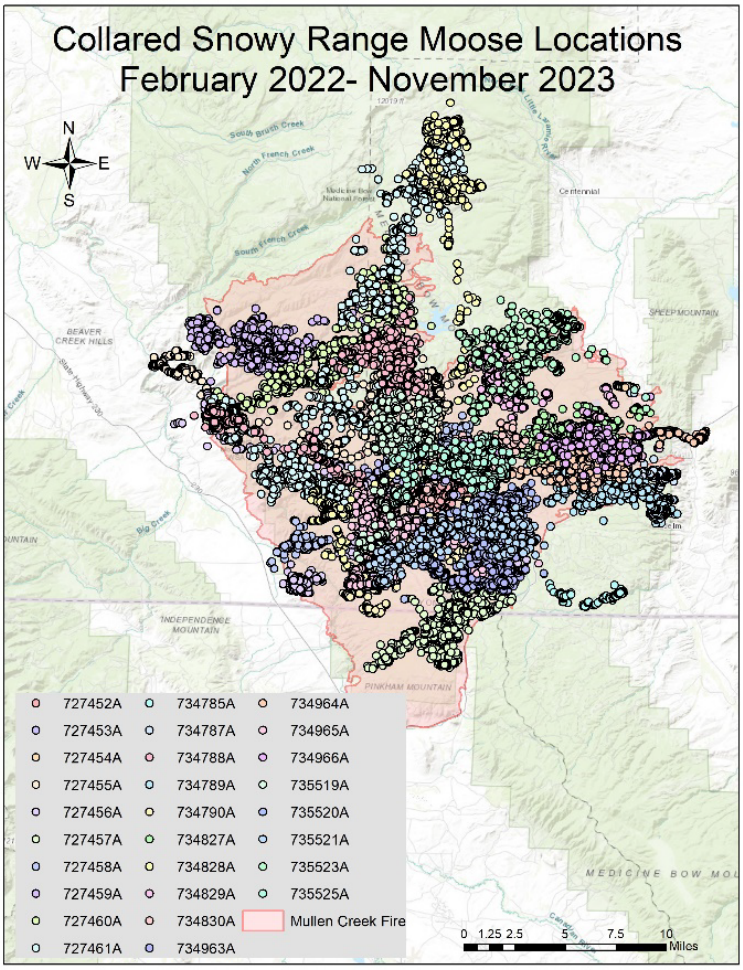
2023 Project Update

The field component of this project began in February 2022; nine female adult moose were captured via helicopter darting on winter habitats within and surrounding the Mullen Creek Fire scar. A subsequent capture of 19 female moose occurred in February 2023. Moose were fitted with Telonics GPS store-on-board collars set to collect hourly fixes (locations), which will allow us to compare movement and habitat use of moose prior to and following this large-scale fire. These collars will remain deployed for a period of four years.

Data collected during the initial capture was used in a manuscript titled "Butorphanol, azaperone and medetomidine for the chemical immobilization in free-ranging Shiras

(Alces alces shirasi) moose: ground and helicopter darting in Wyoming, USA." This manuscript was accepted for publication in the *Journal of Wildlife Diseases* and discusses how BAM was used to safely immobilize adult female Shiras moose, at fixed doses of 3 mL for helicopter darting.

The moose captured in 2023 appeared healthy and winter tick infestations were not considered high. Cropped ears, indicative of Elaeophora *schneideri*-infected moose, was not noted on any capture forms.



In 2023, three collared moose mortalities were investigated. The first mortality occurred in April 2023, two months post-capture. This collared moose was cached and scavenged by a mountain lion. The second collared moose mortality occurred in August 2023 and vehicle collision was the suspected cause of death. A hunter legally harvested a collared moose in October 2023. We also investigated one mortality collar that ended up being a slipped collar.

Blood collected from moose captured in 2023 was submitted to Herd Health Diagnostics. The BioPRYN assay detected pregnancy in 18 of the 19 captured moose. Calf survival was monitored during opportunistic ground survey efforts in late summer. We located 22 collared moose and verified that 15 had calves at side. Six collared moose had no calves, however, four of those cows still had yearlings with them. Collared females with calves will also be noted during upcoming aerial surveys.

Willow communities are important food sources for moose in the Snowy Range herd. Since 2022, 32 willow transects were surveyed using Kiegley Live-Dead Index with the intention of quantifying habitat quality trends. Habitat monitoring efforts will continue next summer.

Future Project Plans

A third capture will occur this winter to collar 16 female moose (four re-deployments, two 2023 collars, and ten new collars) in the study area. We plan to helicopter dart the majority of these moose, although we may attempt ground darting several moose starting December 1. The ten new moose will be collared through 2027 in order to improve study sample size and garner an understanding of longer-term impacts of fire on moose and moose habitats.

In winter 2023-24, we plan to conduct a Snowy Range moose sightability survey. This survey will allow us to determine moose abundance in the herd unit. We are considering using collared moose to verify survey habitat covariates and detection rates.

Acknowledgments

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