

# 2024 RANGE-WIDE STATUS OF BLACK-TAILED AND MULE DEER

**Mule Deer Working Group Technical Committee. Western Association of Fish and Wildlife Agencies**

**Abstract:** The purpose of this document is to provide a general overview of the current black-tailed and mule deer (*Odocoileus hemionus*) population status and general abundance trends throughout their range in North America. The Mule Deer Working Group (MDWG) consists of representatives from the 24 state, territorial, and provincial agencies that comprise the Western Association of Fish and Wildlife Agencies (WAFWA). The purpose of the MDWG is to provide a collaborative approach to finding solutions to improve black-tailed and mule deer conservation and management. One of the most common types of information requested of the MDWG is regarding the general population status and trajectory of black-tailed and mule deer populations. Stakeholders are interested in whether mule deer are still declining or in the process of recovering. To provide a quick snapshot of the status of this species, we assembled this information by having each agency MDWG representative provide a current population status, as well as general survey and harvest information for their respective jurisdiction. All states and provinces use very different methods to survey and estimate population parameters and harvest. Some have more rigorous processes than others, based on their resources and management needs. Black-tailed and mule deer populations are below agency goals in most jurisdictions but have been recovering to various degrees for the last 2 decades. Of the 24 WAFWA member agencies, black-tailed and mule deer populations are increasing in 2, stable in 12, and declining in 8 jurisdictions.



Mule Deer  
Working Group



Table 1. Range-wide estimation of mule deer population size, harvest, and hunter numbers provided by member agencies of WAFWA. **Click on a state/province/territory name to go directly to that jurisdiction.**

	Estimated Population <sup>1</sup>	Total Harvest	% Males in Harvest	Hunter Numbers
<a href="#">Alberta</a>	168,942	11,179	47%	34,201
<a href="#">Arizona<sup>2</sup></a>	80,000 – 90,000	7,780	99%	30,177
<a href="#">British Columbia<sup>3</sup></a>	100,000 - 170,000	8,902	94%	46,232
<a href="#">California<sup>4</sup></a>	450,000-500,000 <sup>4</sup>	28,637	99%	185,998
<a href="#">Colorado<sup>5</sup></a>	375,700	31,590	81%	77,692
<a href="#">Idaho</a>	230,300	18,329	83%	74,503
<a href="#">Kansas</a>	36,600	1,238	86%	18,241
<a href="#">Montana<sup>6</sup></a>	255,989	41,233	82%	144,351
<a href="#">Nebraska<sup>7</sup></a>	60,000-80,000	5,400	86%	85,902
<a href="#">Nevada</a>	68,000	3,450	94%	10,840
<a href="#">New Mexico<sup>5</sup></a>	80,000 - 100,000	9,399	98%	30,762
<a href="#">North Dakota<sup>8</sup></a>	16,700 (Badlands)	6,015	63%	7,891
<a href="#">Oklahoma<sup>9</sup></a>	2,000-4,000	242	97%	No Estimate
<a href="#">Oregon</a>	155,000	11,643	97%	49,071
<a href="#">Saskatchewan<sup>10</sup></a>	65,000 – 85,000	10,175	43%	15,663
<a href="#">South Dakota<sup>7</sup></a>	90,500	6,071	82%	70,022
<a href="#">Texas<sup>2</sup></a>	183,259	11,656	84%	30,692
<a href="#">Utah</a>	279,000	20,366	94%	72,840
<a href="#">Washington<sup>11</sup></a>	90,000 - 110,000	8,459	96%	90,690
<a href="#">Wyoming</a>	216,000	13,572	93%	32,633
<a href="#">Yukon</a>	1,000	7	100%	12

<sup>1</sup> Estimated population may be presented as ranges to denote the difficulty and levels of uncertainty in gathering an estimate over a large spatial scale.

<sup>2</sup> Totals for mule deer hunting only.

<sup>3</sup> All data presented are from the most recent year available.

<sup>4</sup> Black-tailed and mule deer numbers combined. “Hunter Numbers” is “number of tags issued,” actual number of hunters will be less. Population estimate from 2021.

<sup>5</sup> Estimated population, harvest, and hunters include mule deer and white-tailed deer. These estimates cannot be easily separated because most deer licenses are for either species (In Colorado, approximately 5% of the estimates are white-tailed deer. White-tailed deer comprise approximately 3% of the total harvest in New Mexico).

<sup>6</sup> Hunter Numbers is based on the proportion of all hunters who reported hunting mule deer.

<sup>7</sup> Hunter Numbers reflects total deer hunters including both mule deer and white-tailed deer hunters.

<sup>8</sup> Population estimate is determined for the Badlands, total harvest includes statewide gun and archery harvest, and number of hunters is based on mule deer licenses and any deer gun licenses within mule deer range.

<sup>9</sup> Numbers are difficult to estimate as many permits allow the take of mule deer or white-tailed deer.

<sup>10</sup> Estimates are from 2022 Report.

<sup>11</sup> General season only. Estimate of Hunter Numbers reflects all deer hunters; WA does not estimate hunters by species or subspecies.

Table 2. Range-wide estimation of black-tailed deer population size, harvest and hunter numbers provided by WAFWA member agencies. **Click on a state/province/territory name to go directly to that jurisdiction.**

	Estimated Population <sup>1</sup>	Total Harvest	% Males in Harvest	Hunter Numbers
<a href="#">Alaska<sup>2</sup></a>	326,200–335,200	12,635	83%	12,050
<a href="#">British Columbia<sup>3</sup></a>	98,000 - 155,000	3,997	87%	10,563
<a href="#">Hawaii<sup>4</sup></a>	No Estimate	30-50	50-60%	No Estimate
<a href="#">Oregon</a>	No Estimate	42,219	90%	132,954
<a href="#">Washington<sup>5</sup></a>	No Estimate	11,954	92%	90,690

<sup>1</sup> Estimated populations may be presented as ranges to denote the difficulty and levels of uncertainty in gathering an estimate over a large spatial scale.

<sup>2</sup> Deer population size in Alaska is provided from our population objectives, rounded up to the closest thousand. Objectives were derived based on a combination of habitat capability modeling and expert opinion panels. This estimate is not re-calculated from year to year, it is rather a general ball-park figure. Harvest data is for the 2021 regulatory year.

<sup>3</sup> All data presented are from the most recent year available.

<sup>4</sup> Estimates are reported for the 2022 hunting season.

<sup>5</sup> General Season only. Estimate of Hunter Numbers reflects all deer hunters; WA does not estimate hunters by species or subspecies.

## **Alaska**

Sitka black-tailed (SBT; *Odocoileus hemionus sitkensis*) deer are native to Southeast Alaska's temperate rainforests. Due to historic transplants during 1916–1934, SBT deer are established in Prince William Sound and Kodiak Island archipelago. Mule deer and white-tailed deer are not native to Alaska; however, mule deer sightings have been recorded in Alaska and white-tailed deer sightings have been reported just beyond the Canadian border in recent years.

Deer monitoring is difficult in Alaska due to densely vegetated habitat and remoteness. Deer densities differ across their range largely related to geography (e.g., differences in weather, habitat availability, predator populations, hunter harvest). Population objectives for Game Management Units (GMU) were established in 2000 by the Alaska Board of Game. These objectives were based on expert opinion and constitute the best estimate of population levels. Based on these objectives, Alaska's SBT deer population ranges 326,200–335,200.

Alaska Department of Fish and Game (ADF&G) historically used deer pellet count surveys within key watersheds and aerial alpine surveys to assess population trends. These activities were discontinued within most GMUs in 2020. Current monitoring techniques vary by GMU but include deer pellet surveys, post-winter mortality beach surveys, and spring body condition surveys. New projects are assessing buck: doe ratios, recruitment, and survival rates within a few GMUS with camera monitoring methods and there is an intensive project in one GMU that is combining movement data, camera grids, and fecal DNA.

SBT deer are an important big game species in Alaska. ADF&G relies on hunters to submit accurate hunt reports to analyze annual harvest and hunter effort, which may be used as coarse indicators of population trends. Harvest and hunter effort varies by location and among years (Fig. 1). Federal and state hunting regulations vary by GMU based on perceived local SBT deer abundance. In some GMUS, federal regulations allow rural residents more liberal hunting regulations than nonrural resident counterparts. Mule deer can be harvested in Alaska year-round, but harvesters must submit samples for disease monitoring.

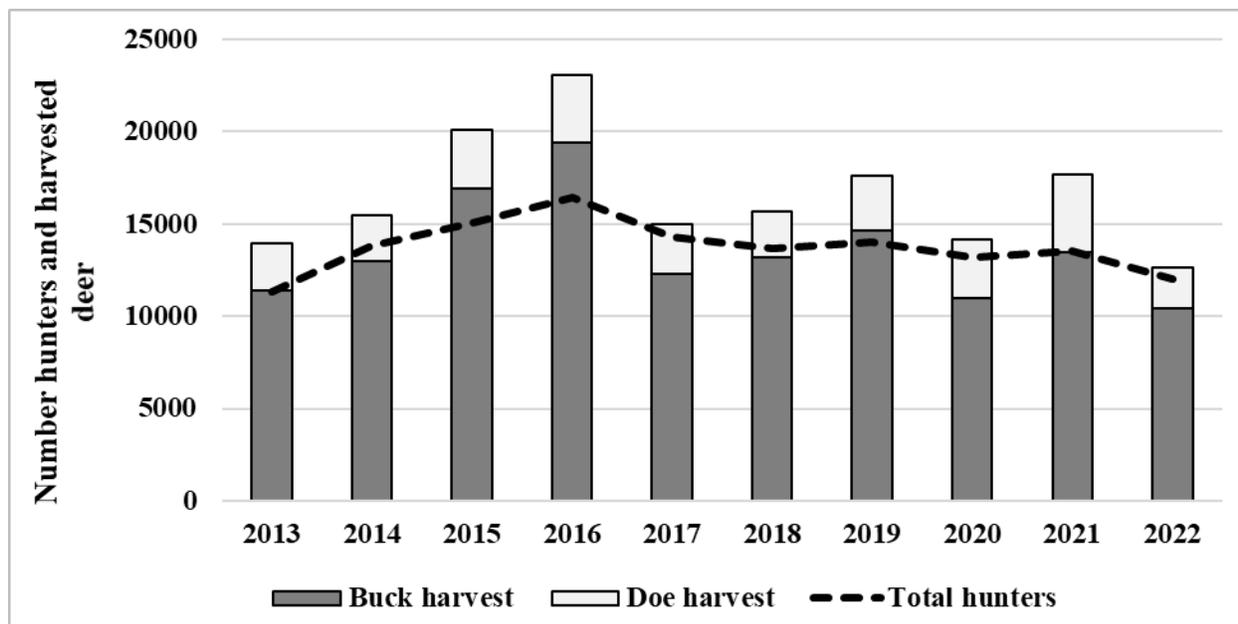


Fig. 1. Statewide Sitka black-tailed deer harvest for regulatory years 2013–2022, Alaska. 2023 harvest data was not available at the time of publishing.

-Tessa Hasbrouck, Alaska Department of Fish and Game

## Alberta

The 2023 pre-hunting season population estimate of mule deer in Alberta was 168,942. This represents a continued decrease since the 2021 estimate of 193,000. The population goal for mule deer in Alberta's current management plan (1989) is 97,000. However, a new provincial management plan for mule deer is currently in development and the next iteration will see a change in the provincial population goal that reflects the current state of mule deer management.

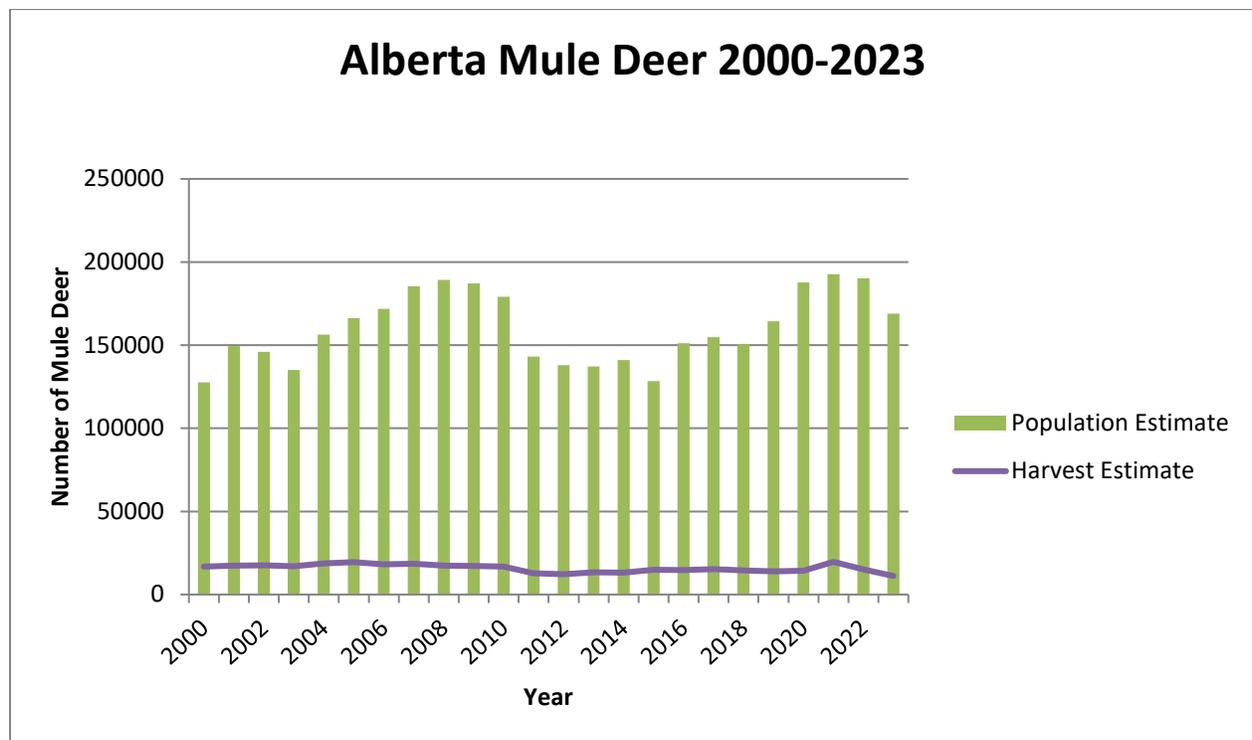
The number of antlered mule deer special license applicants decreased in 2023 to 93,000, down from the past 6 years, range of 97,000 to 102,000. Antlerless mule deer special license applicants also decreased in 2023 to 41,078 from 56,000 in 2022. Based on voluntary hunter harvest surveys for the 2023 hunting season 34,201 mule deer hunters in Alberta directed an estimated 223,155 days hunting mule deer, producing an estimated harvest of 11,179 mule deer (~47% antlered deer), down from 15,117 in 2022.

In 2022 Alberta confirmed the intent to manage mule deer for in support of maintaining a broader age-class distribution. Informed by discussions with the provincial stakeholder groups, Alberta adjusted the permit setting process to emphasize hunter harvest success as the primary tool used to adjust resident antlered mule deer permits. This led to a ~37% decrease of total harvested antlered mule deer from over 8,200 in 2021 to over 5,200 in 2023. Additionally, certain Wildlife Management Units (WMUs) provide unlimited licenses to harvest mule deer where participation, success, and overall harvest is typically low (i.e. remote units and/or low-density mule deer units). Alberta also supports a healthy commercial hunting industry, with approximately 1,500 antlered mule deer licenses available for non-residents through outfitter-guide allocations. There is an unknown number of rights-based hunters in Alberta that do not require a license to hunt for sustenance and thus information on effort and harvest by these groups are unknown.

Alberta implements a big game population monitoring program that aims to survey ungulates on five-year intervals at the WMU scale, although many WMUs undergo longer survey intervals based on funding availability, habitat, and prioritization. There are no long-term intensive monitoring programs for mule deer in Alberta (i.e. collaring programs).

Based on the most recent assessment (2021), average buck to doe and fawn to doe ratios were calculated from surveys flown roughly in Alberta’s Great Plains Ecoregion (2015-2020, excluding 2016; n=23). This includes those units in which surveys and estimates for mule deer are prioritized. The five-year average is 50:100 bucks to does (min. 16:100, max. 106:100) and 68:100 fawns to does (min. 42:100, max. 105:100).

Chronic wasting disease is present in Alberta. Originating along the eastern border, the disease has spread westward and northward and has now been found west of Calgary (in the Great Plains ecoregion), and North of Edmonton (in the Northern Forest Ecoregion). The CWD surveillance program has adapted in recent years resulting in fewer tested heads. The 2023 results are 18.8% positives (n=3,758) and the discovery of CWD in one additional WMU. In 2023/24, 30.5% of mule deer tested were positive, 7.9% of white-tailed deer, 5.8% of elk, and 3.1% of moose. Elk and moose submitted for testing were primarily from hunter check stations on Canadian Forces Base hunts. In Alberta CWD occurs primarily in mule deer and males. More information on CWD in Alberta is found at <http://alberta.ca/cwd>



-Justin Gilligan and Cassandra Hardie, Alberta Forestry and Parks– Hunting and Fishing Branch

## Arizona

In 2023, 7,780 mule deer were harvested (all methods of take). Population parameters indicate the statewide populations are declining in most game management units; drought conditions are impacting recruitment. Most deer populations within the state are surveyed every other year using helicopter or fixed-wing aircraft; however, due to the severe environmental conditions that Arizona is experiencing, supplemental ground and aerial surveys are being conducted in off-cycle years to monitor population ratios and general population health. Mule deer are surveyed during the breeding season to estimate buck:doe and fawn:doe ratios.

The Arizona Hunter Harvest Questionnaire is back on track after experiencing declining response rates from 2016-2018 when the questionnaire changed to an online only response option. In 2018, the questionnaire was provided on the back of the hunt permit-tag and response rates dropped from a historic 40-45% voluntary response to less than 5% response. The 2018 mule deer harvest data was unusable because of wide confidence intervals. For 2023, hunter response rates were at 47.1%, and hunter harvest was estimated using the voluntary mail questionnaire that allowed for an online response option or a mail-in option. Hunters that provided an email address also received a reminder email to submit their questionnaire. For the first time in 2023, hunters were able to opt-in to receive text message reminders for their hunter questionnaire; hunters who opted in to receive text messages also received their hunter questionnaire by text.

Buck:doe ratios for mule deer were managed at 20–30 per 100 and currently the statewide average is 27. Alternative management units were managed at higher buck:doe ratios with added guidelines regarding the age structure of the harvest or hunter density. These units equal about 5% of the opportunity offered annually. The statewide number of fawns per 100 does is 37 which is just below management guidelines (40-50).

Significant harvest reductions have been recommended for the last four years (2021 – 2024); limited draw permits were reduced by 8,550 across the state, a 21% reduction over 3 years. Over-the-counter archery deer hunt opportunity also changed with (1) the establishment of harvest limits by unit and species for the 2022-2023 season and (2) the sale of non-resident over-the-counter archery deer tags was limited to 2,890 for the 2023 calendar year. Both of these implemented changes will continue for the 2024 and 2025 seasons.

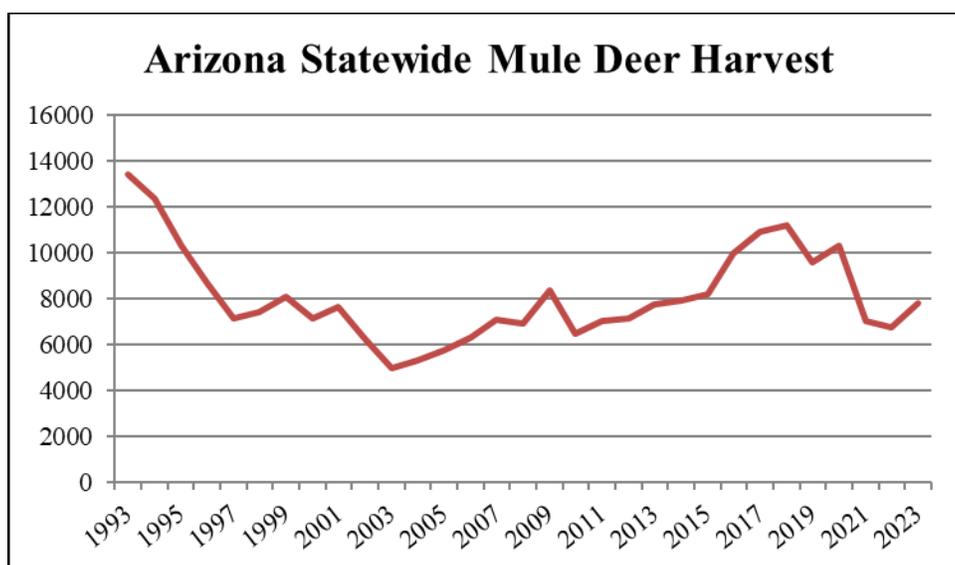


Figure 1. Statewide Mule deer harvest estimates in Arizona from 1993-2023.

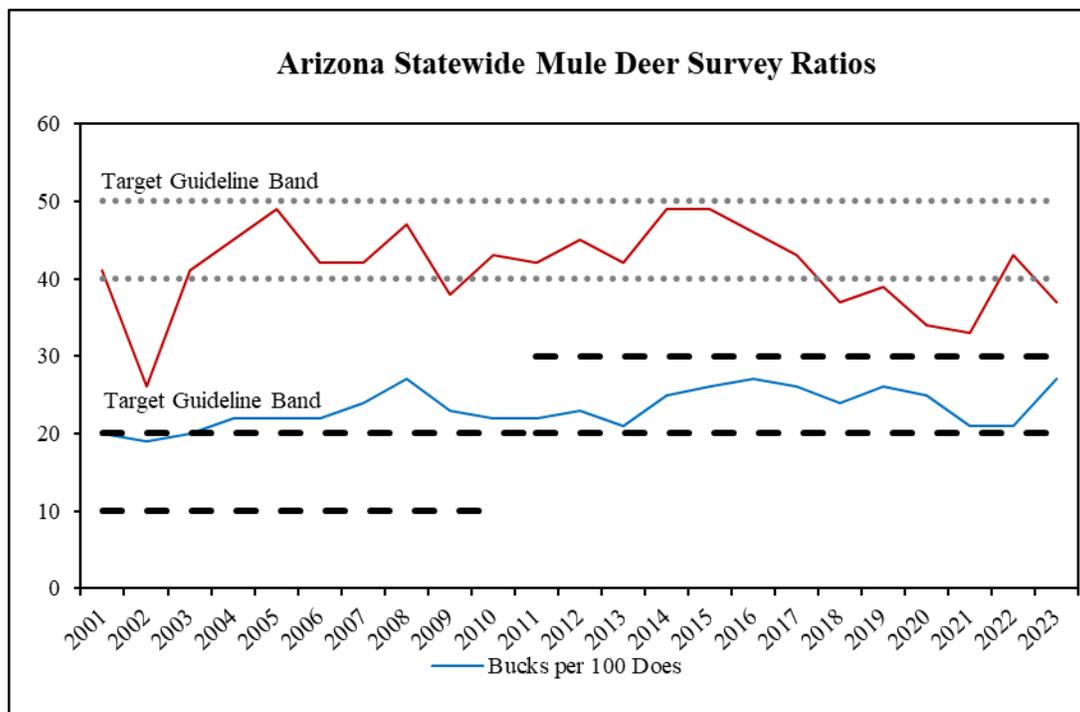


Figure 1. Statewide Mule deer buck to doe and fawn to doe ratios in Arizona from 2001-2023. Guidelines for buck to doe ratios target between 20-30 bucks per 100 does. Guidelines for fawn to doe ratios target between 40-50 fawns per 100 does.

-Callie Cavalcant, Arizona Game and Fish Department

### **British Columbia**

Mule deer abundance varies throughout the province due to localized differences in habitat quality, predation, winter conditions, and historical and contemporary land use. Extensive wildfires throughout central British Columbia in 2017, 2018, 2021 and 2023 had both positive and negative impacts on mule deer; forage availability increased in many areas especially on summer ranges, but the removal of forest canopies reduced the quality of some winter ranges due to the loss of snow interception and thermal cover. There are concerns that high road densities in some burned areas could also facilitate increased hunter harvest and disturbance. Mule deer hunter numbers and buck harvest have been dropping since a fifteen-year high in 2015. The province continues to manage buck harvest through general open seasons using a combination of antler point restrictions (i.e., 4-point or greater) and any-buck seasons in most areas, while other areas have exclusive 4-point or greater seasons. There are also restricted opportunities for antlerless harvest through a draw system.

A research project initiated in 2018 is entering its sixth year in the southern interior of British Columbia. The project is examining mule deer response to landscape changes. There are three study areas in two regional jurisdictions (Thompson, Okanagan, and Boundary study areas) with relatively large populations of mule deer that exist under different ecological conditions. Mule deer survival over the past four years has been highest in the Thompson and Okanagan study areas, which are characterized by the highest proportions of burned areas due to wildfire; adult doe

survival estimates were ~85%, and overwinter fawn survival estimates of ~60% for the respective study areas over the study period. The Boundary study area has experienced the least amount of wildfire and also has the greatest number and diversity of ungulates and predators (e.g., cougar, wolves, black bears, grizzly bears, coyotes). Increases in hunter effort and poor adult and juvenile survival in the Boundary suggest overall declines in populations. Data suggests that deep snow and cold spring temperatures coupled with increasing access negatively affect mule deer survival. Association with early seral habitat afforded by young burns and new cutblocks in the summer improved mule deer survival in British Columbia.

Chronic Wasting Disease has now been confirmed in British Columbia from two deer (one mule deer) in the Kootenay Region. New orders on mandatory head submissions and transportation restrictions have been implemented in the areas around the detections. These areas border the northwest corner of Montana and northern Idaho.

The winter 2023/2024 was considered relatively mild with below average snow depths and temperatures and likely contributed to improved winter survival for all age classes of mule deer observed during these years. Data in northern British Columbia suggest that fawn survival in the spring of 2021 was lower than previous years. Recent composition surveys also indicate that buck to doe ratios are generally close to provincial objective of 20 bucks per 100 does post hunt. Continued monitoring of mule deer relative to habitat selection, nutrition, relative competition, and risk of predation is intended to provide evidence of landscape-scale issues limiting mule deer populations in British Columbia.

Trends in the provincial abundance of black-tailed deer vary regionally with recent decreases in southern portions of Vancouver Island and stable to decreasing populations elsewhere. Adeno Hemorrhagic Disease (AHD) on Vancouver Island has reduced local resident populations in recent years. AHD, coupled with heavy snow and abnormally cold winters have impacted overwinter survival, particularly of juveniles since 2022. Predation from wolves and cougars on black-tailed deer continues to be a factor affecting populations in many areas as well as the need for effective measures to conserve high quality habitat. Columbian black-tailed deer buck harvest has dropped by approximately 50% since the early 1990s despite a >30% increase in hunter effort. There is some opportunity for antlerless harvest, which is mostly limited to youth hunting on Southern Vancouver Island and the rural and agricultural areas. Harvest is relatively low. In general, Columbian black-tailed deer numbers are thought to be most impacted by increased predation and reduced habitat quality. The latter being a major influence during years of high snow fall. Areas of intensive forestry activity have increased road densities and young successional forests. These are assumed to result in increased mortality rates on deer due to the creation of travel corridors for predators (including hunters) and fragmenting or removing important habitat. A study initiated on Vancouver Island in 2023 aims to look at habitat use and mortality factors affecting deer survival. This is expected to be a five-year project with the aim at directing management decisions affecting populations. Maintaining or increasing deer populations will remain challenging given current predator densities and lack of measures available to mitigate disturbance and improve seasonal ranges however this research may identify areas with the most benefit.

Sitka black-tailed deer were introduced to Haida Gwaii, an archipelago off British Columbia's west coast, in the late 1800's and early 1900's as a source of sustenance and sport. The islands are remote and immigration and emigration of deer with the mainland does not occur. The only terrestrial predators are black bears and the density of deer is high to very high, relative to most black-tailed deer populations in British Columbia. This has reduced both the biomass of

understory plants and diversity of vegetation on most of the islands. Attempts to reduce numbers through controlled removals have been met with limited success. Hunters living on the islands or that are willing to travel to the islands are offered liberal bag limits and long seasons for bucks and antlerless deer to help manage the population.

British Columbia uses a harvest questionnaire to determine combined general open season, limited entry harvest and hunter effort for mule deer and black-tailed deer. Estimates of harvest and effort are generated for each Wildlife Management Unit.

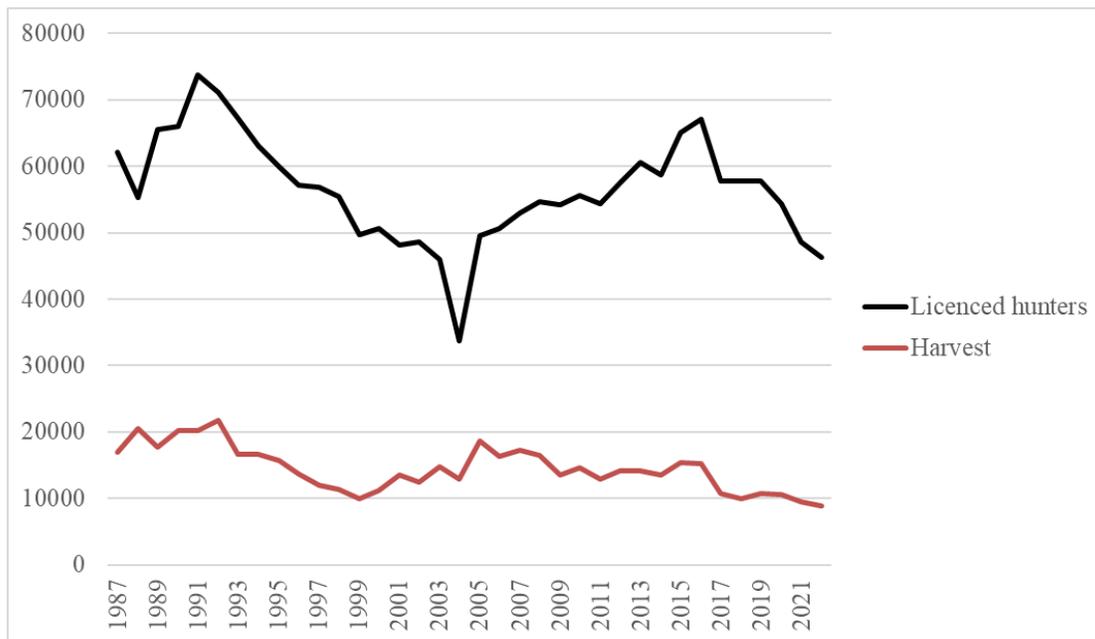


Figure 1. Mule deer hunter and harvest estimates in British Columbia from 1987-2021.

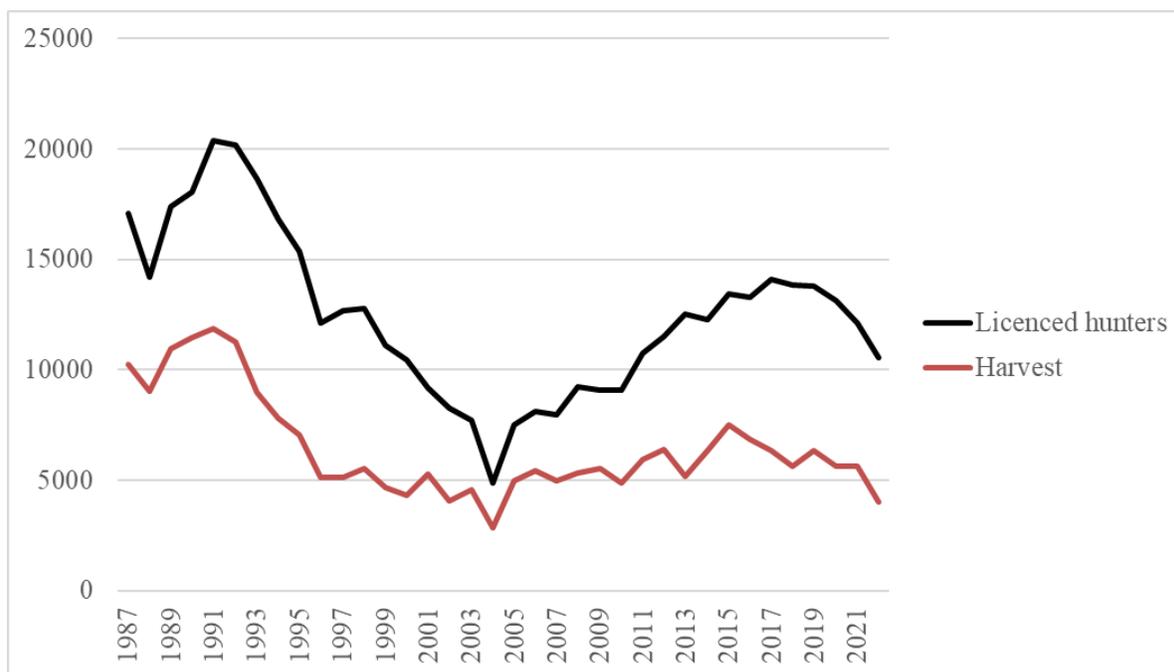


Figure 2. Black-tailed deer hunter and harvest estimates in British Columbia from 1987-2021.

- Andrew Walker, British Columbia Ministry of Water, Land and Resource Stewardship

### **California**

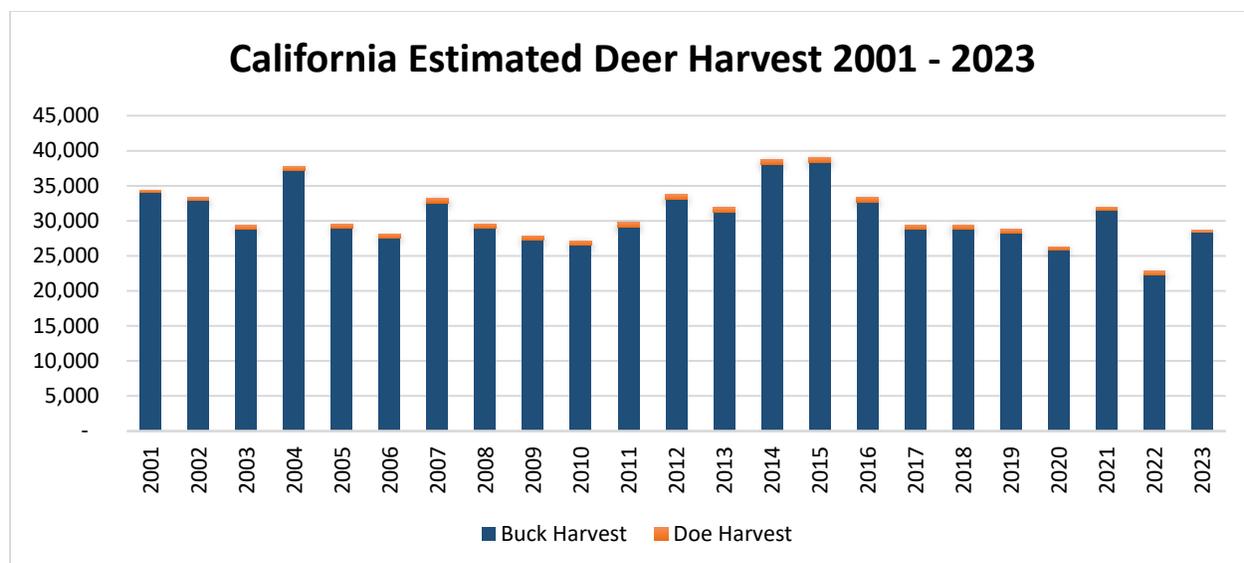
California's deer population appears to be relatively stable following the declines of the 1990s. This generalized trend may not apply to individual populations subject to unique conditions within the diversity of deer ranges in California. The California Department of Fish and Wildlife (CDFW) continues to reevaluate and update deer survey methods and schedules to provide ongoing short- and long-term estimates of deer populations within the state.

For the past several decades, CDFW has used a deterministic spreadsheet model to estimate deer population sizes by hunt zone. Input data for this model include previous year population estimates, current year harvest mortality from hunter harvest reports, estimated crippling loss, and demographic ratios (fawns per doe and bucks per doe) from fecal DNA (fDNA) mark-recapture, camera trapping, road surveys, and helicopter-based aerial surveys.

To improve the accuracy of deer population estimates and monitoring, CDFW is transitioning to integrated population modeling approaches that combine data from a variety of sources to generate population estimates. From 2015-2020, CDFW conducted several large-scale comprehensive deer abundance studies. Five studies from separate regions were selected to demonstrate proposed statewide modeling methods. Each study estimated deer population density using spatial capture-recapture modeling (SCR) of fDNA transect data and covariate predictors. In each study, age-sex composition was also estimated (adult female, adult male, and juvenile) using N-mixture modeling of camera surveys that were conducted concurrently with fDNA transects. Using these models, deer density was predicted at each point in a statewide random 20-km grid that fell into one of the five study areas. To estimate population density outside of the study areas, trail camera monitoring data was used from six CDFW wildlife camera monitoring surveys. The Royle-Nichols (RN) model was used to analyze how local abundance of deer at camera stations varied with habitat conditions. The local abundances were then calibrated from the RN model to deer density at the statewide grid points using the fDNA population studies. Density estimates were mapped on the statewide grid and averaged for mean density within each hunt zone, which were summed for a statewide population estimate. Though preliminary population estimates are available, we do not provide them here because the model is still in development. Data from other regions of the state are also needed before a more reliable abundance estimate can be generated.

CDFW is currently developing long term monitoring plans that leverage limited personnel resources by combining intensive surveys on a three to five-year rotation, with less-intensive surveys for key demographic parameters (e.g., survival, recruitment, sex and age composition) in intervening years. Models will be validated by comparing population projections to empirical estimates from intensive surveys, enabling adjustments to the frequency of surveys, as well as adjustments of effort in interim years.

The estimated statewide deer harvest in California has ranged from roughly 26,000 – 40,000 since 2001 (Figure 1). Variations between years is attributed to variable hunter success, which is affected by actual changes in the deer population, weather conditions leading up to and during the deer season (e.g., early snowstorms that force migrants out of the high country, arid conditions that concentrates deer at water sources), wildfires leading up to and during the deer season limiting access, and the inherent variation in estimating populations.



**Figure 1. Harvest estimates of California deer 2001 - 2023.**

- Brian Leo, California Department of Fish and Wildlife

## Colorado

The Colorado mule deer population declined in 2023 (Figure 1). The winter of 2022-2023 was above average in severity on the entire Western Slope and was extremely severe in the Severe Winter Zone in the northwestern portion of the state. The Colorado statewide post-hunt 2023 deer population estimate is 376,000, down from 392,000 last year (Figure 1). Over the last 3 years, even prior to the severe winter, the statewide population estimate for mule deer was on a declining trend.

Over the last 10 years the population has averaged 415,000 (Figure 1). The decade prior to that was marked by significant declines in some of the large westernmost herds in the state. The sum of statewide population objective ranges is 389,000-494,000 for all 54 deer herds combined. In 2023, only 18 of 54 (33%) deer herds are within their population objective ranges. Population objectives that are appreciably higher than population estimates reflect Colorado Parks and Wildlife's (CPW) desire to stabilize, sustain, and increase mule deer populations.

Diverse habitat types and environmental conditions around the state create considerable geographic variability in population performance. Many deer herds on the plains and central mountains are performing well. There is reason for concern about declines, particularly in many of the large westernmost herds in Colorado.

CPW uses spreadsheet models to estimate population size. These models rely on data from age and sex classification, harvest surveys, and survival monitoring. Annual population and sex ratio estimates are compared to long-term Herd Management Plan population and sex ratio objectives for each herd to establish harvest quota recommendations for the next hunting season.

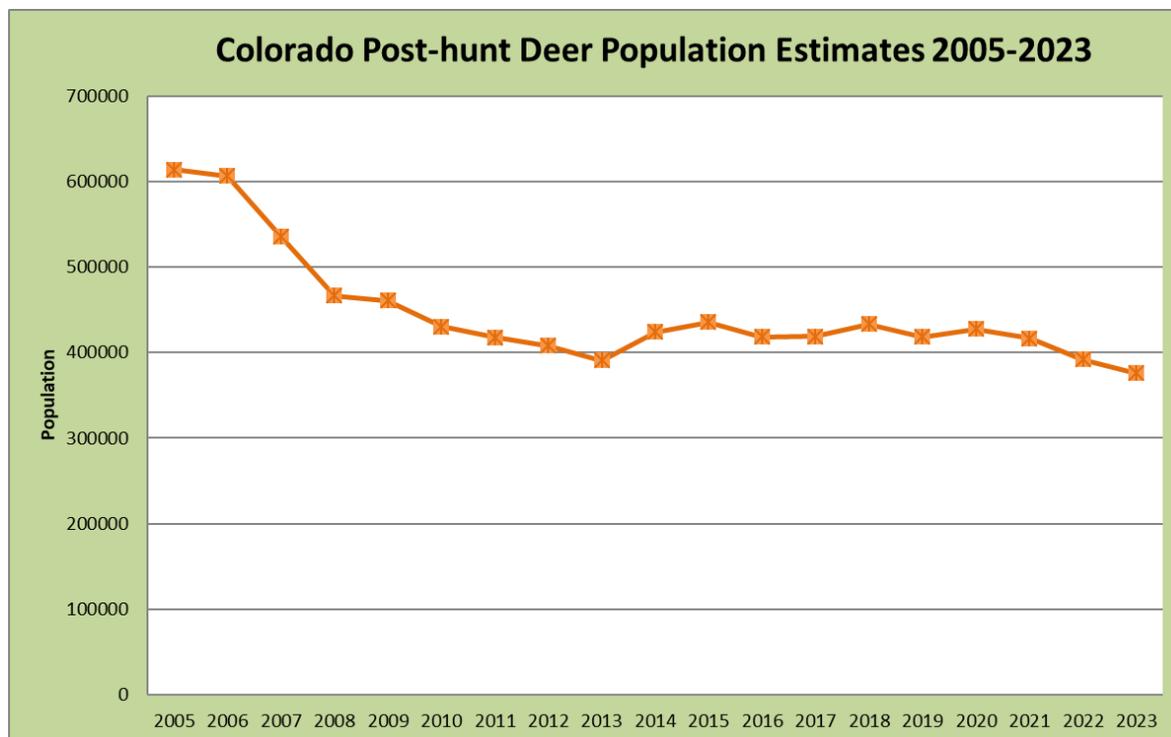


Figure 1. Colorado post-hunt deer population estimates from 2005-2023.

CPW intensively monitors annual adult doe survival and winter fawn survival in five mule deer sentinel herds. We also monitor buck survival in two of these herds. These herds were selected to ecologically and geographically represent mule deer west of Interstate I-25. CPW annually monitors well over 1,000 GPS-collared mule deer in the five intensive monitoring areas and other herds. Survival rates from these sentinel herds are used in deer population models for the rest of the herds west of I-25. Since 1997, annual adult doe survival has averaged 82% and over-winter fawn survival has averaged 68%. Since 2008, annual buck survival in two of the five monitoring areas has averaged 78%.

CPW conducts post-hunt herd inventories primarily with helicopters to estimate the sex ratios of males/100 females and the age ratios of young/100 females. In addition to survival rates, these ratios are necessary to estimate population size using population models.

The average of Herd Management Plan sex ratio objectives for deer herds statewide is approximately 30 bucks/100 does. During the post-hunt herd inventories in 2023, CPW staff classified 60,800 deer and observed an average sex ratio of 30 bucks/100 does weighted by population size (Figure 2). The statewide average observed age ratio from helicopter inventory was 60 fawns/100 does, the same as observed in 2022 and 2021.

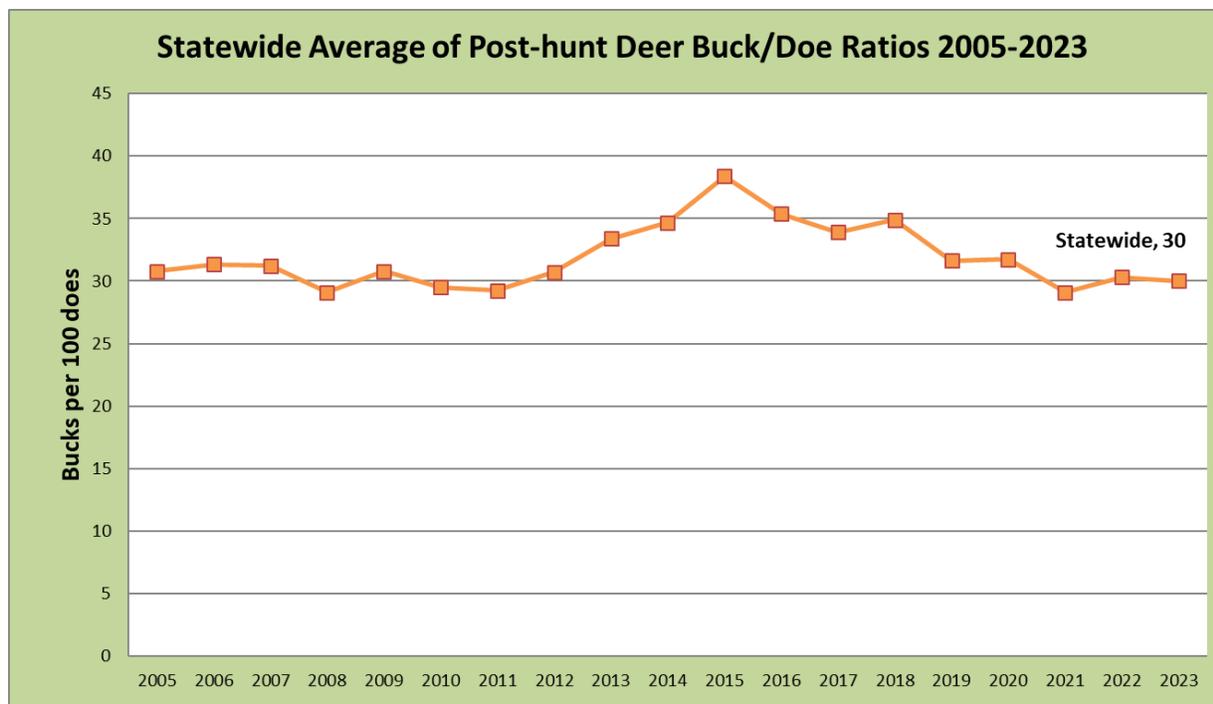


Figure 2. Colorado statewide average of observed post-hunt bucks/100 does for 2005-2023 weighted by herd population size.

Since 1999, all mule deer hunting in Colorado is by limited license only. Based on observed post-hunt sex ratios and an average hunter success rate of 46% for all rifle seasons in 2023, deer hunting continues to be good and Colorado remains a premier destination for mule deer hunters.

-Andy Holland, Colorado Parks and Wildlife

### **Hawaii (Kauai Island: Introduced Black-tailed Deer)**

Since the introduction of the Oregon black-tailed deer to west Kauai in 1961, its range has expanded to the south and east sections of the island. The deer population on Kauai's public hunting areas is estimated to be between 950 to 1050 animals. Population estimates on private lands are not known at this time. Kauai uses the Aldous (1944) browse survey method which was modified to better fit Hawaiian environments.

Kauai experienced 2 major wildfires in 2012, the Kokee forest fires consumed just over 1000 acres of State Forest Reserves and severely impacted much of the deer hunting range. The 2013 deer hunting season was restricted to portions of the range not impacted by the wildfires. In 2014, all black-tailed deer hunting units were re-opened.

In July 2015, two hunting units underwent changes to include year-round hunting and increased bag limits. The changes were needed to address ungulate damage to native forest watershed and to protect threatened and endangered plants. Six deer hunting units remain seasonal during the fall months.

In 2003, the U.S. Fish and Wildlife Service designated Critical Habitat for over 80 species of endangered plant species on Kauai. Between 2007 and 2016, three large watershed ungulate exclusion fences were constructed totaling thousands of acres of the Alakai Wilderness Preserve, Hono O Na Pali Natural Area, and Kuia Natural Area to protect endangered Hawaiian plant species from ungulate damage. Animals within the fences including feral pigs, feral goats, and black-tailed deer were removed through intensive hunting, trapping, and snaring.

Trends in harvest of black-tailed deer from 2003 to 2019 on Kauai public hunting areas.

<b>Year</b>	<b>Buck</b>	<b>Doe</b>	<b>Total</b>
2003	45	19	64
2004	39	12	51
2005	32	8	40
2006	32	2	34
2007	32	4	36
2008	51	2	53
2009	29	0	29
2010	26	0	26
2011	30	0	30
2012 <sup>1</sup>	4	0	4
2013 <sup>1</sup>	5	0	5
2014 <sup>2</sup>	36	0	36
2015 <sup>3</sup>	36	15	51
2016	37	33	70
2017	31	24	55
2018	25	7	32
2019	22	15	37

<sup>1</sup> Two units closed to deer hunting due to wildfires

<sup>2</sup> All units reopened to deer hunting

<sup>3</sup> Two units open to year-round deer hunting

-Thomas Ka'iakapu, Hawaii Division of Forestry and Wildlife

### **Idaho**

Mule deer populations in Idaho had been trending upward for the previous several years, until the winter of 2022/2023 which was severe in some locations and decreased both adult and fawn survival. Reductions in antlerless hunting opportunities beginning after the last severe winter in 2016/2017 have maintained and the commission extended those reductions after the winter of 2022/2023 across several regions in southern Idaho. Mule deer overwinter fawn survival for the 2022-2023 winter was 30% statewide which is well below the long-term average (57%) and similar to the 2010/2011 and 2016/2017 winters, which also had severe winter weather conditions characterized with early persistent snow and extended periods of colder than normal temperatures. The 2023 Summer weather conditions throughout southern Idaho were wetter than average, including late summer moisture that maintained optimal summer range conditions into fall.

The state continues the process of converting population monitoring techniques to allow total population estimates through a combination of aerial sightability surveys, survival estimates, composition surveys, and modeling. Annual mule deer abundance is estimated using an integrated population model that can incorporate data from different population monitoring techniques. Winter 2023 population levels decreased to approximately 230,300 mule deer south of the Salmon River drainage compared to the estimated 264,711 mule deer of January 1, 2022, which is an 13% decline. Overall survival of radio-collared fawns from December 2023 through March 2024 has been high, fawn survival is measured through May 31st.

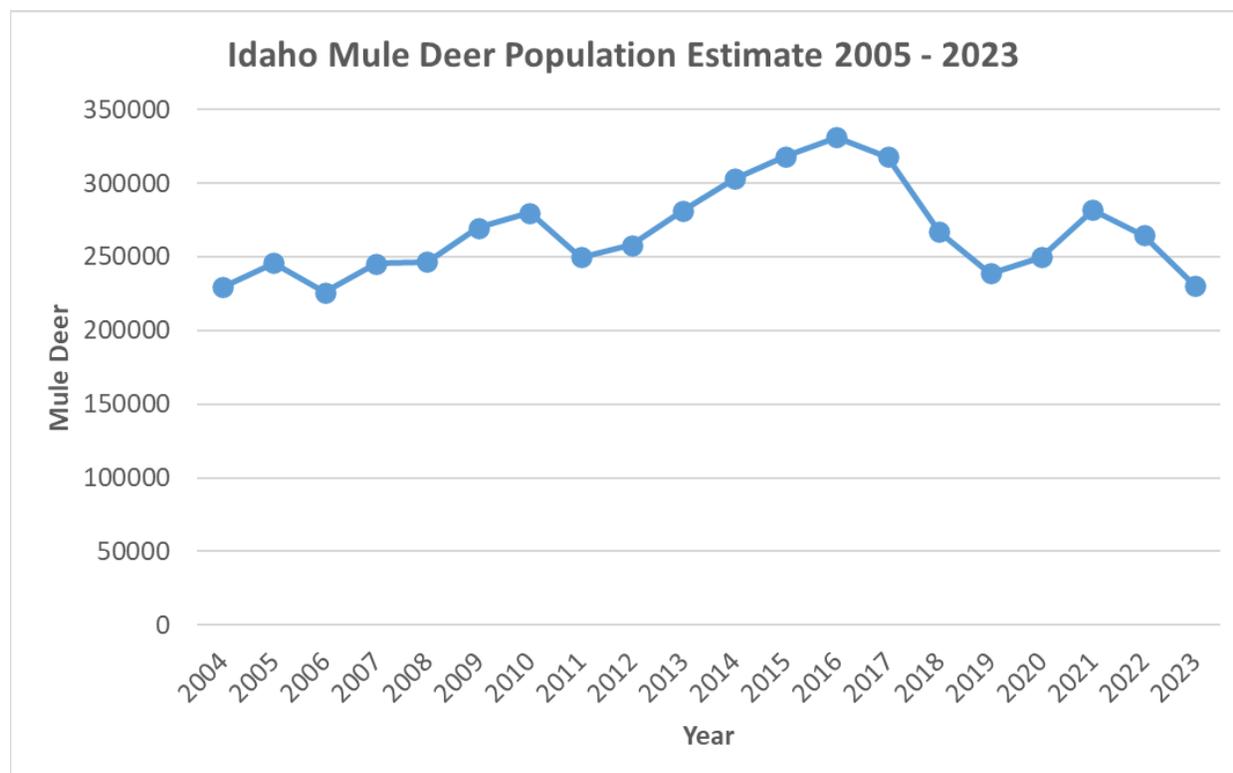
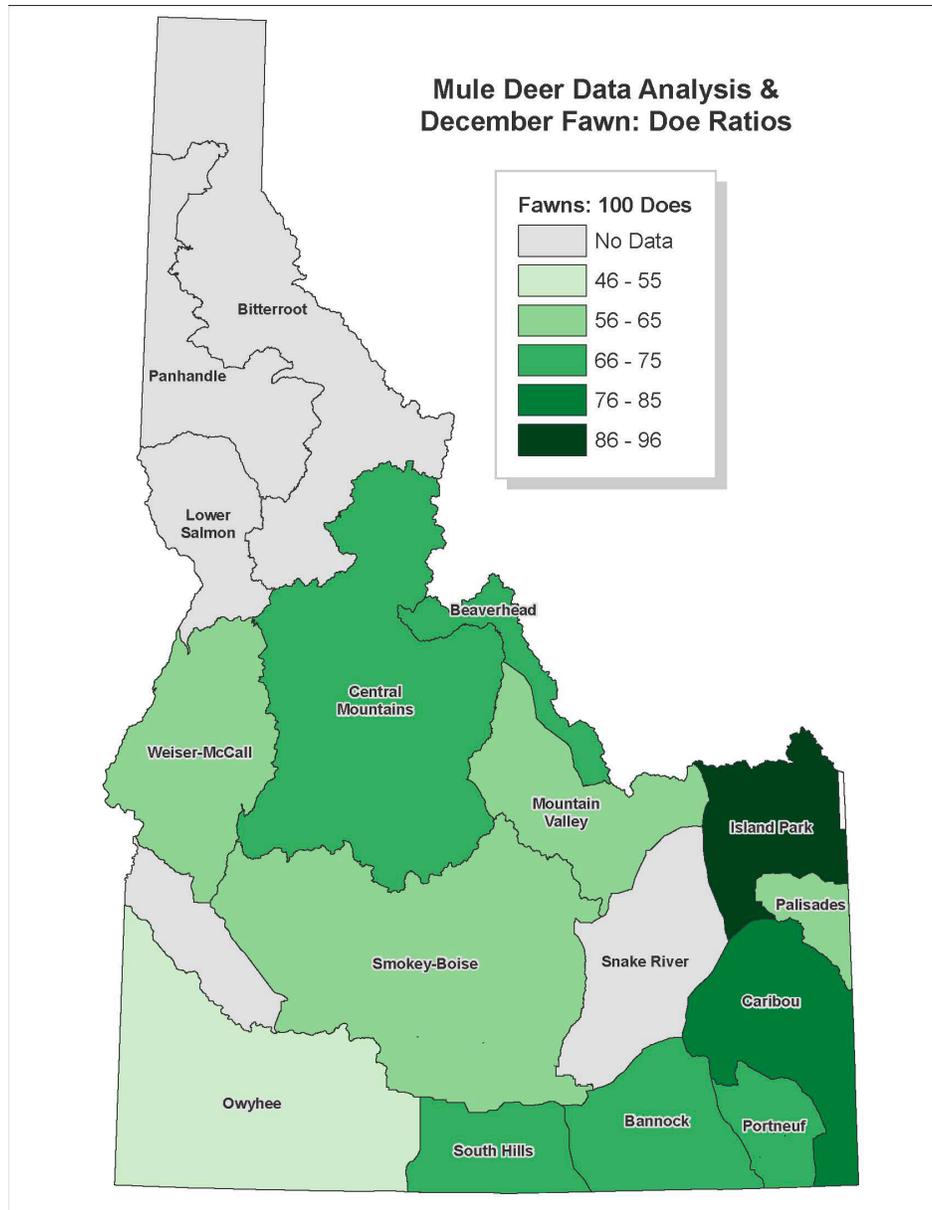


Figure 1. Mule deer population estimates from the Salmon River drainage south. Estimates are midpoint of confidence limits based on an integrated population model.

Short- and long-term objectives are to increase mule deer numbers. Post-season buck ratios in most areas exceed 15:100 does. Over the last several years, December fawn:doe ratios have generally shown increases over the typical mid-50s to mid-60s. Herd composition flights are conducted over most portions of Idaho south of the Salmon River, but fawn:doe ratios in all areas surveyed were above average during fall 2023 surveys.



*Figure 2. Most recent fawns:100 does by mule deer data analysis unit (2022-2023)*

Mule deer harvest in Idaho has been stable to increasing since the mid-1990s following a steep decline in harvest in the early 1990s. Recent sales data indicate increased demand for mule deer tags from nonresident hunters coming to Idaho. Percent bucks with 4-point-or-better antlers harvested in the rifle-controlled hunts have remained at or above 40% since 2010 and were 62% in 2023.

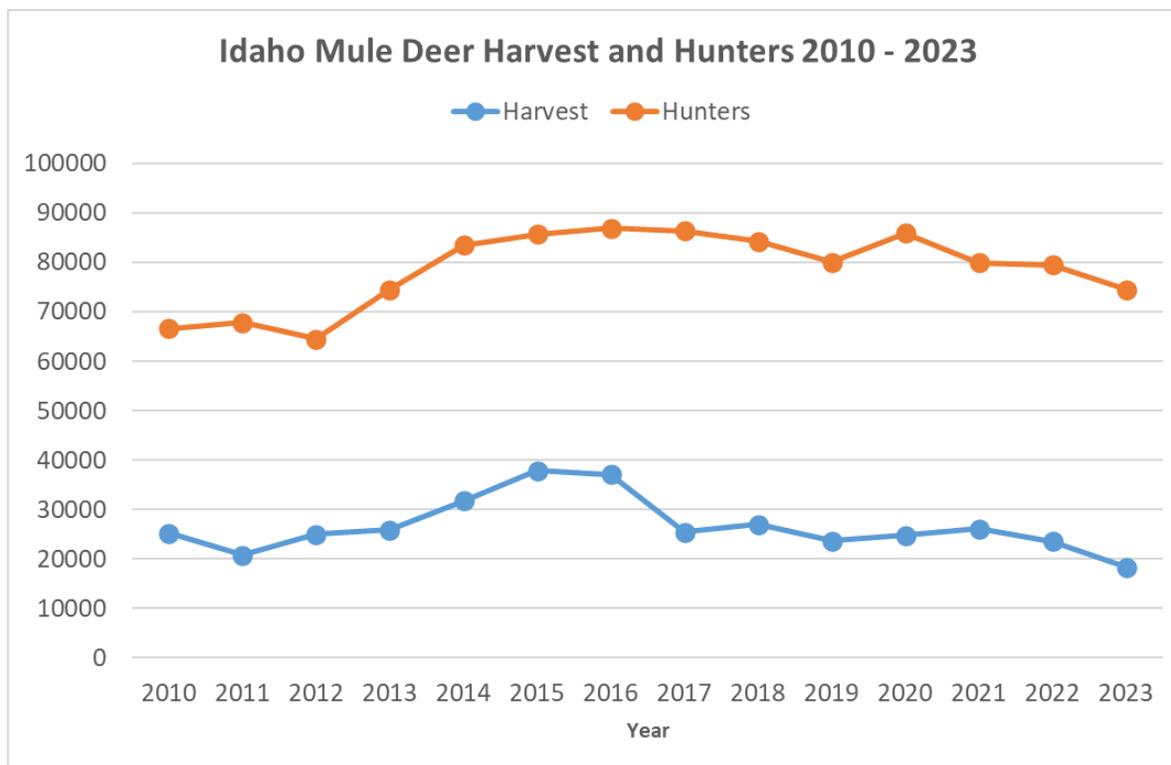


Figure 3. Total Idaho Mule Deer Harvest and Mule Deer Hunters, 2010 – 2023

Idaho detected its first CWD-positive case in November 2021. It was found during one of Fish and Game’s random rotational sampling areas of the state, not in the two sampling areas that have been prioritized due to their proximity to known CWD cases in Wyoming and Montana. Since 2021, the department has taken several steps to increase harvest in the area of detection to obtain more samples, including increasing tag numbers and conducting two agency removal efforts in March 2023 and February 2024.

So far, the Department has detected CWD in mule deer, white-tailed deer and two elk. During the 2023 hunting season sample prevalence was zero for mule deer and 1.4% for white-tailed deer in all GMU 14. Beyond the border of GMU 14, where staff first detected CWD, we have detected two more positive mule deer, one during the hunting season in Unit 23 (south of GMU 14) and a second mule deer in GMU 18 (adjacent to GMU 14 across the Salmon River).

After the hunting season, the Department conducted a control action in the portion of GMU 14, where prevalence has been highest. Staff collected 157 samples consisting of 1 suspect elk, 72 mule deer and 83 white-tailed deer with prevalence of 4.2 % in mule deer and 13.3% in white-tailed deer samples and one detection in a suspect elk tested during the control action.

The Commission expanded the mandatory sampling areas during their March meeting in reaction to the two new detections outside of GMU 14. While our efforts continue to be focused on northern and eastern Idaho due to CWD-positive ungulates in neighboring Wyoming and Montana, additional geographic areas in Idaho for focused sampling are on a rotational basis. Idaho will continue surveillance and adaptively manage ungulate populations in the affected areas to reduce and maintain low prevalence and reduce the spread of the disease from the positive areas. Since July 1, 2023, 4137 total CWD samples were taken statewide.

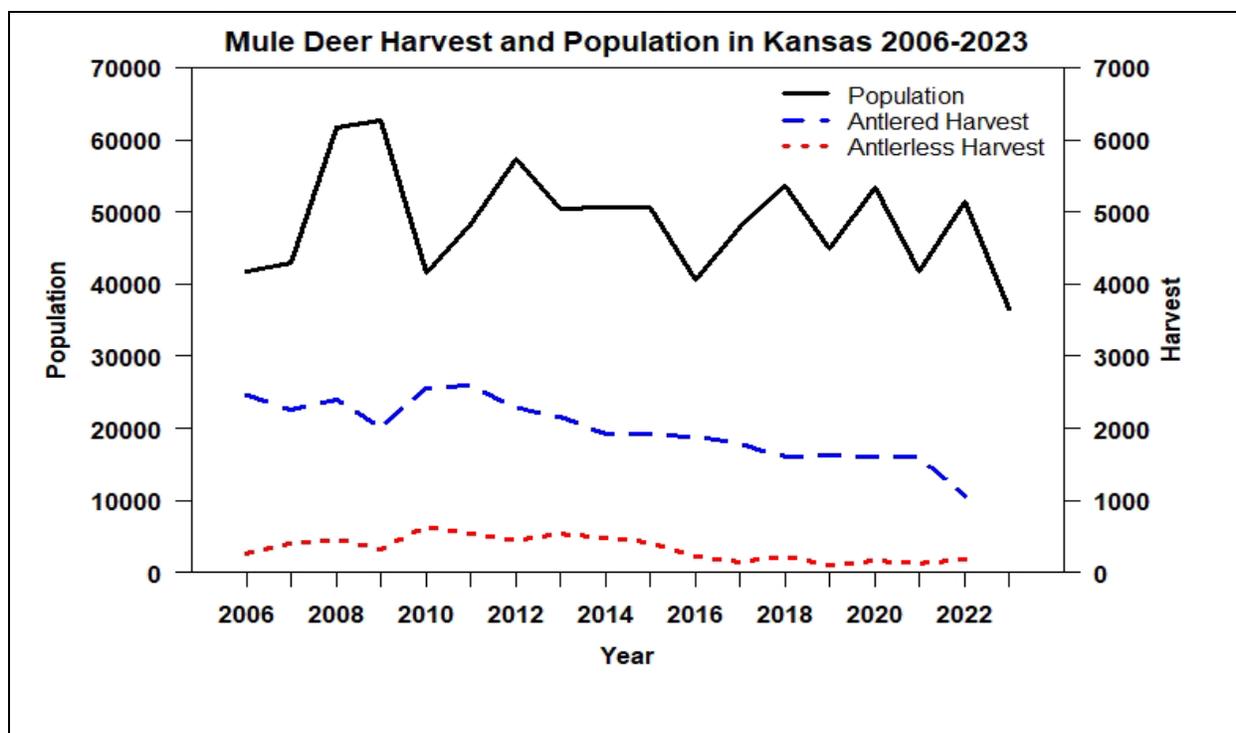
-Toby Boudreau, Idaho Department of Fish and Game

## **Kansas**

Mule deer populations continue to decline along the eastern tier of counties where mule deer occur in Kansas. A spotlight distance sampling survey was implemented in October - November to estimate density and population size of mule deer in the east and west mule deer hunting zones. The mule deer population in the west zone of Kansas in 2023 was estimated to be 1.4 mule deer/mile<sup>2</sup> (95% CI: 0.8 – 2.4) while the density in the eastern zone was unable to be estimated due to lack of mule deer observations, resulting in a pre-firearm season total population estimate of 36,600 ± 10,400 mule deer. In the west zone, the mule deer buck:doe ratio was 34.1B:100D. Fawn:doe ratio in the west zone was 32.9F:100D. Mule Deer abundance below observable levels along with poor reproductive rates of mule deer in Kansas is a critical concern of KDWP.

The major goal of deer management in Kansas is to maintain herd size at socially acceptable levels. This largely means minimizing landowner damage complaints and deer/vehicle accidents, while maintaining quality hunting opportunities in regard to hunter observations of deer and harvest opportunities. Currently, both hunters and landowners are expressing concern about the declining mule deer population in both zones, thus the current management goal is “more” mule deer and current population levels are below goals.

Management for mule deer receives enthusiastic support from deer hunters. Hunters want more mule deer and fewer hunters competing for permits and hunting locations. Hunting regulations in Kansas have been liberal for white-tailed deer while being restrictive for mule deer. Mule deer could be taken on 17.1% of the either sex deer permits issued in Kansas last year. Landowners received 55.1% of those permits. Each of those permits allowed only one deer to be taken but it could be either a mule deer or a white-tailed deer. By allowing either species to be taken, the permit system generally takes hunters out of the field earlier in the season as compared to a mule deer only permit system and takes pressure off mule deer while allowing approximately 17,000 people on average to have the potential to pursue mule deer each year while keeping these hunters' satisfaction higher. Hunters have taken an average of 1,977 mule deer/year during the last 10 years. In an effort to expand and increase the mule deer population, reductions in the permit quotas have been made in recent years. In 2023, for the seventh consecutive year, no antlerless permits allowing the take of mule deer were issued.



Little information is available on survival, reproductive rates and habitat use of mule deer in Kansas, and much has been inferred from studies conducted in other locales. In February 2018, Kansas Department of Wildlife and Parks initiated a three-year study to investigate adult and fawn survival rates, reproductive rates, home range size, habitat use, harvest vulnerability, and inter-species interactions of mule deer and white-tailed deer in western Kansas. This study was completed in 2021. Adult male annual survival was  $0.54 \pm 0.05$  and firearms hunting was the main source of mortality. Adult female survival was  $0.78 \pm 0.03$ . Mule deer fawn 10 week survival was  $0.28 \pm 0.06$  with predation and exposure being the leading mortality factors. Habitat use preferences indicate that mule deer rely heavily on Conservation Reserve Program (CRP) grasslands in all life stages and that higher than average landscape roughness and elevation were preferred. In the absence of the ability to increase landscape roughness and elevation conservation of mule deer will likely focus on providing high quality grasslands. In 2022 and in 2023, in response to severe drought, CRP grasslands in were opened to haying and grazing. The widespread haying and grazing that then occurred is likely to have drastically and negatively altered important mule deer habitat in Kansas. Additional genetic analyses indicate that mule deer in western Kansas suffer from low genetic diversity and that there is some hybridization between mule deer and white-tail deer occurring.

Public interest and concern about chronic wasting disease (CWD) has been renewed recently. CWD prevalence is highest in the western portion of Kansas where mule deer are endemic. To reduce CWD prevalence, KDWP has maintained elevated white-tailed deer antlerless only permits in deer management units (DMUs) around core CWD areas. Mule deer populations in these DMUs may be indirectly affected by increase whitetail deer harvest pressure or directly through accidental harvest of mule deer.

-Levi Jaster, Kansas Department of Wildlife and Parks

## Montana

Montana Fish, Wildlife & Parks relies on harvest and population survey data for making mule deer management recommendations and decisions. Harvest data is collected through annual post hunting season phone surveys that randomly survey a sample of deer hunters that self-report success and effort. The survey provides an estimate of harvest within an 80% confidence interval. Population trend data are collected through aerial surveys of 76 trend survey areas across the state that represent deer across a diversity of habitat types. Additionally, the department estimates the statewide mule deer population annually because of a statutory requirement. However, the estimate is based on a crude model and is not used for making management recommendations.

Mule deer hunting regulations for many years have included one antlered deer per resident hunter and about 25,000 non-resident opportunities valid across most of the state during a 6-week archery season followed by a 5-week rifle season. Antlered mule deer harvest has been viewed as an index of population size and trend. Statewide antlered mule deer harvest increased annually from 2010 through 2016 to a 22 year high of 45,564. In 2023, the statewide mule deer buck harvest estimate was 33,959; this was below the 1960–2021 average of 44,910 although slightly above the harvest estimate of 33,260 in 2022 (Figure 1).

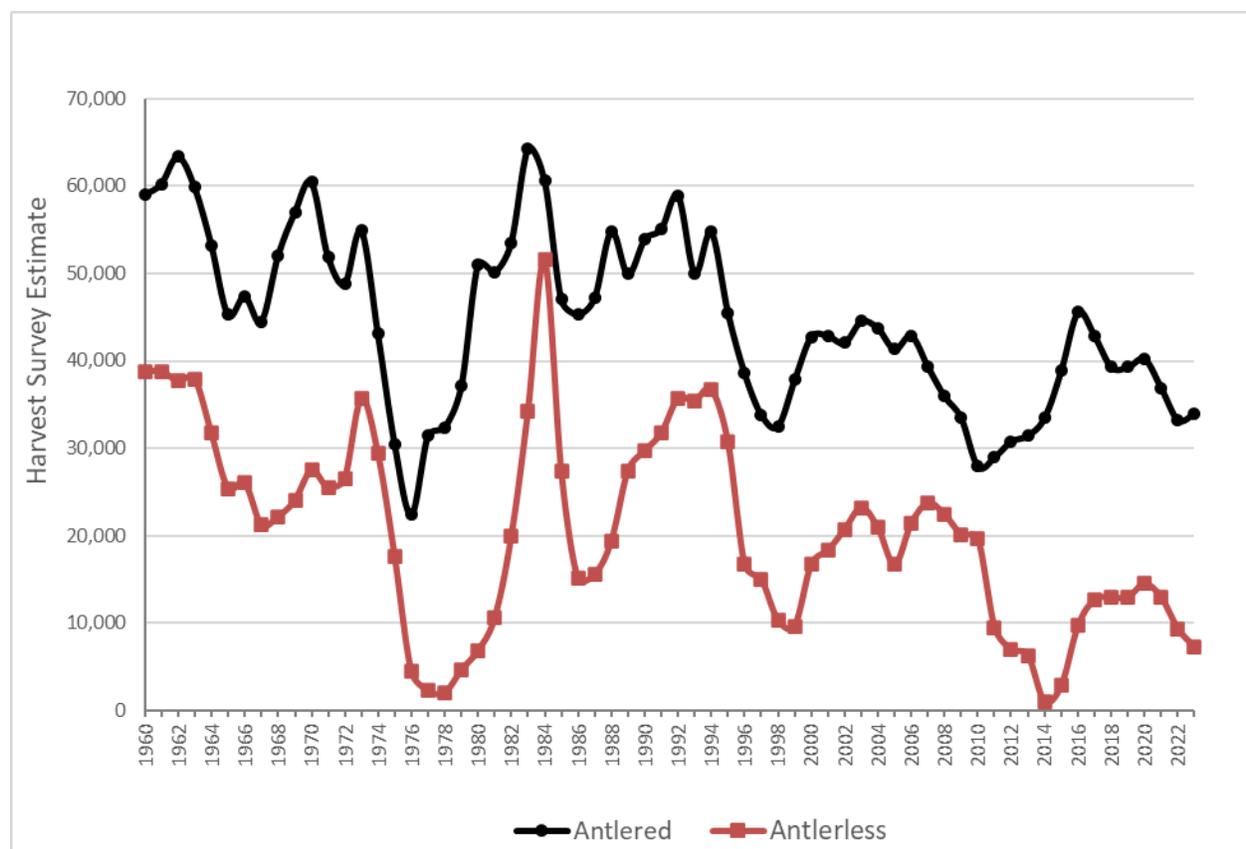


Figure 1. Montana statewide mule deer harvest, 1960–2023.

The antlered mule deer harvest (Figure 1) and statewide population estimate (Figure 2) suggest that the statewide mule deer population experienced a modern low within years 2010–

2012. This low was influenced by severe conditions (extended cold temperatures and deep snow) across the eastern half of the state during winter periods 2009–2010 and 2010–2011. From 2011 through 2017, the statewide population estimate increased from 211,361 to 386,175 (Figure 2) and statewide antlered mule deer harvest increased from 28,985 to 42,851 (Figure 1), suggesting a population increase during that period. Survey and harvest data suggest a slight decline in mule deer statewide since 2017. This decline was likely the result of severe winter conditions across the state during 2018–2019 and from severe widespread drought conditions more recently. Following the 2023 hunting season, the statewide mean buck:doe and fawn:doe ratios were 21:100 and 54:100, respectively.

Within the state, long-term mule deer populations have varied. Those across the western third of the state, in the mountain-foothill environments, have generally trended down and remain below historical highs and means. Habitat changes facilitated by conifer forest succession, overuse of browse resources by mule deer, and increased resource competition from growing populations of elk and white-tailed deer are believed to be primary influencers of mule deer trend across the mountain-foothill environments. Populations across the eastern two thirds of the state, in the prairie-breaks environments, have generally remained stable or decreased in response to drought and poor forage conditions.

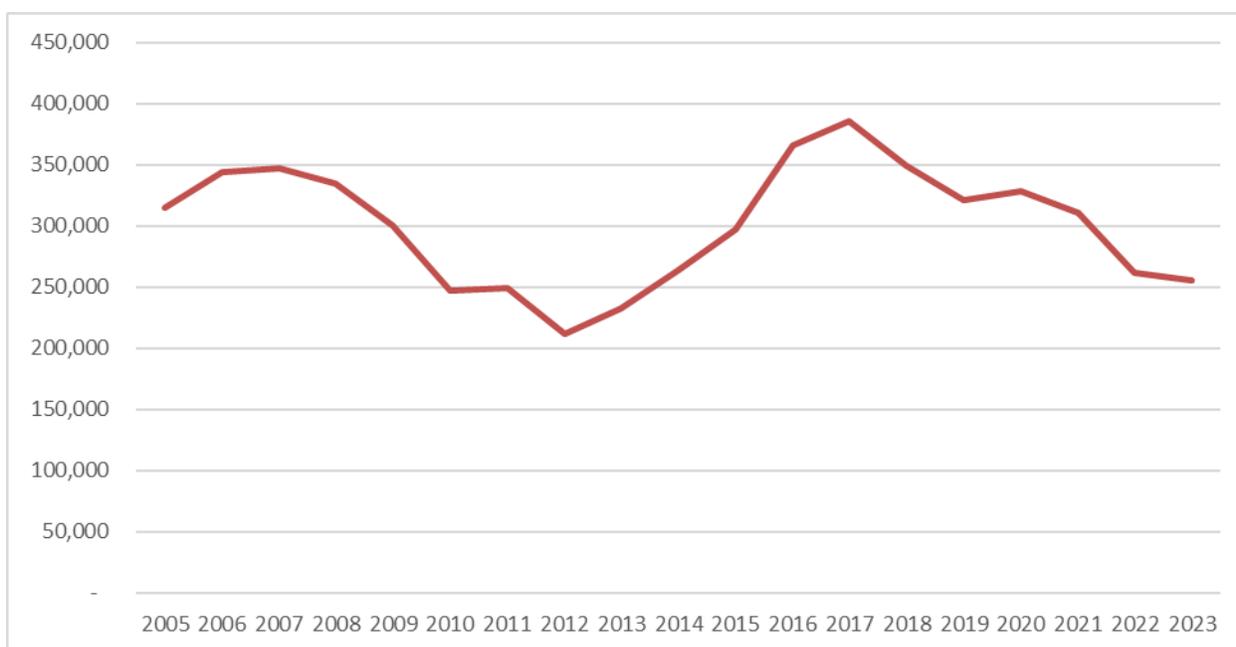


Figure 2. Montana statewide mule deer population estimate, 2006–2023.

The statewide estimate for deer (mule and white-tailed) hunters was 144,351 in 2023, which is the lowest number since 2014 (144,638). The average hunter spent 8 days afield. The number of deer hunters in Montana peaked at 201,576 in 1994, decreased to 148,461 in 1999, and has remained relatively stable since that time.

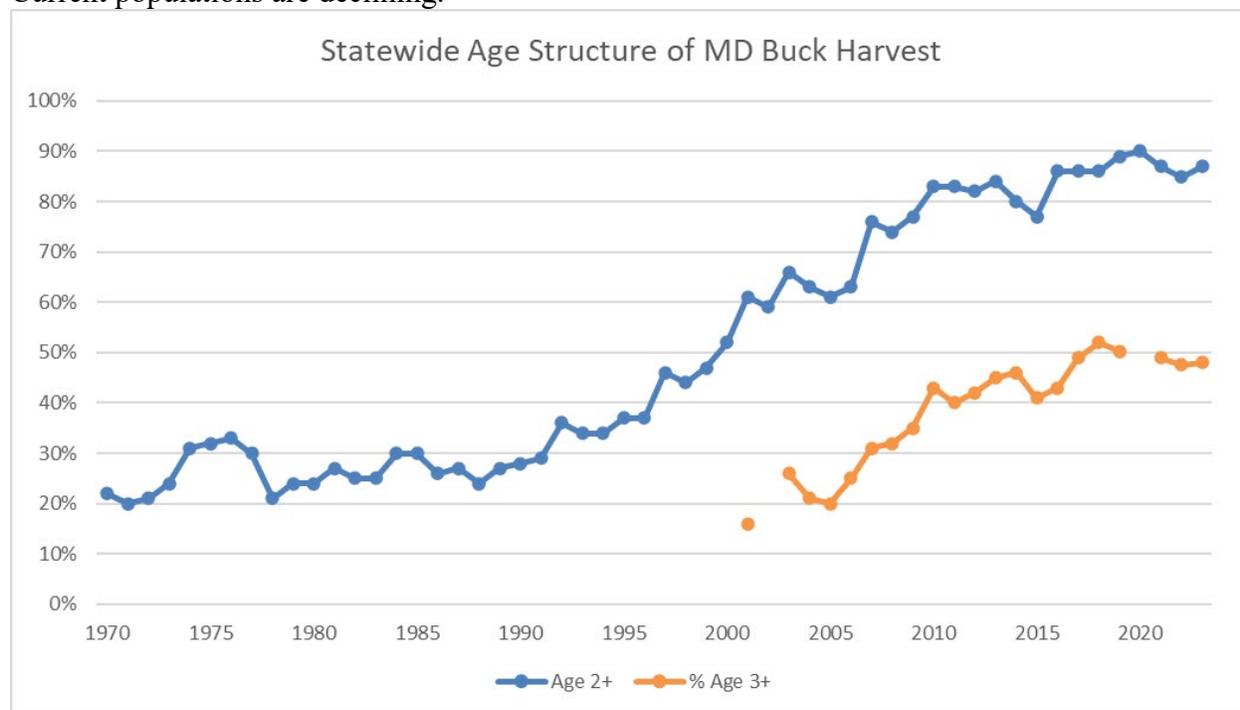
Since 2001, mule deer harvest regulations across Montana have been guided by the state's Adaptive Harvest Management (AHM) plan. This plan provides harvest regulation guidelines for antlered and antlerless mule deer based on recruitment, population surveys, and hunter harvest data for five population management units which were developed based on ecotype. Working

within these guidelines, biologists have reduced antlerless harvest opportunity as modern populations have trended down (Figure 1).

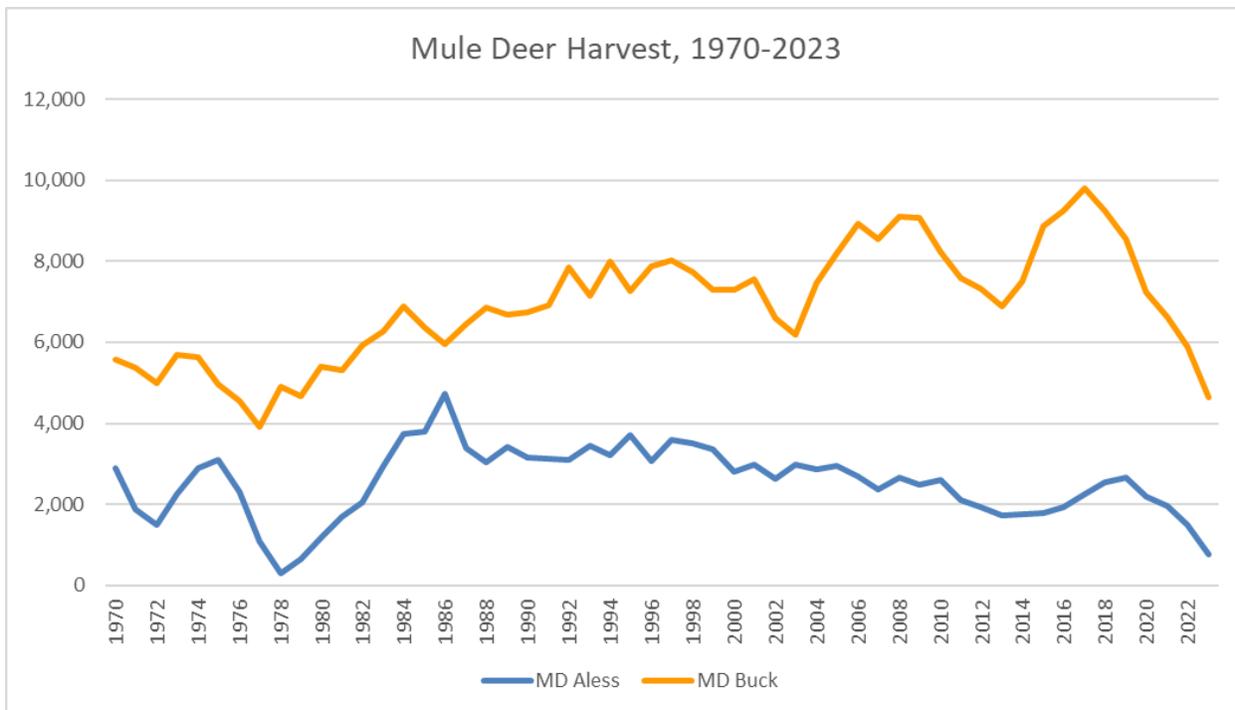
- Brian Wakeling, Montana Fish, Wildlife & Parks

### Nebraska

The Nebraska Game and Parks Commission's goal is "To manage big game populations at levels consistent with social and biological carrying capacities and provide opportunities for aesthetic enjoyment and hunting." Population estimates are not calculated or used at the Deer Management Unit (DMU) level. Staff has little confidence in the statewide estimate, which is generated via a basic model, which includes buck harvest, buck survival and herd composition dynamics. Staff bases management objectives and recommendations for each DMU on population trends, agricultural damage complaints, age of harvested bucks, buck harvest, permit demand, deer vehicle collisions, and public input. Mandatory check of all harvested deer is required. We typically collect age data on more than 4,500 mule deer annually. Population trends are based on total adult buck harvest at DMU level. Barring significant change in buck permit allocations these indices provide consistent indicators of annual population and age structure change at DMU level. Current populations are declining.

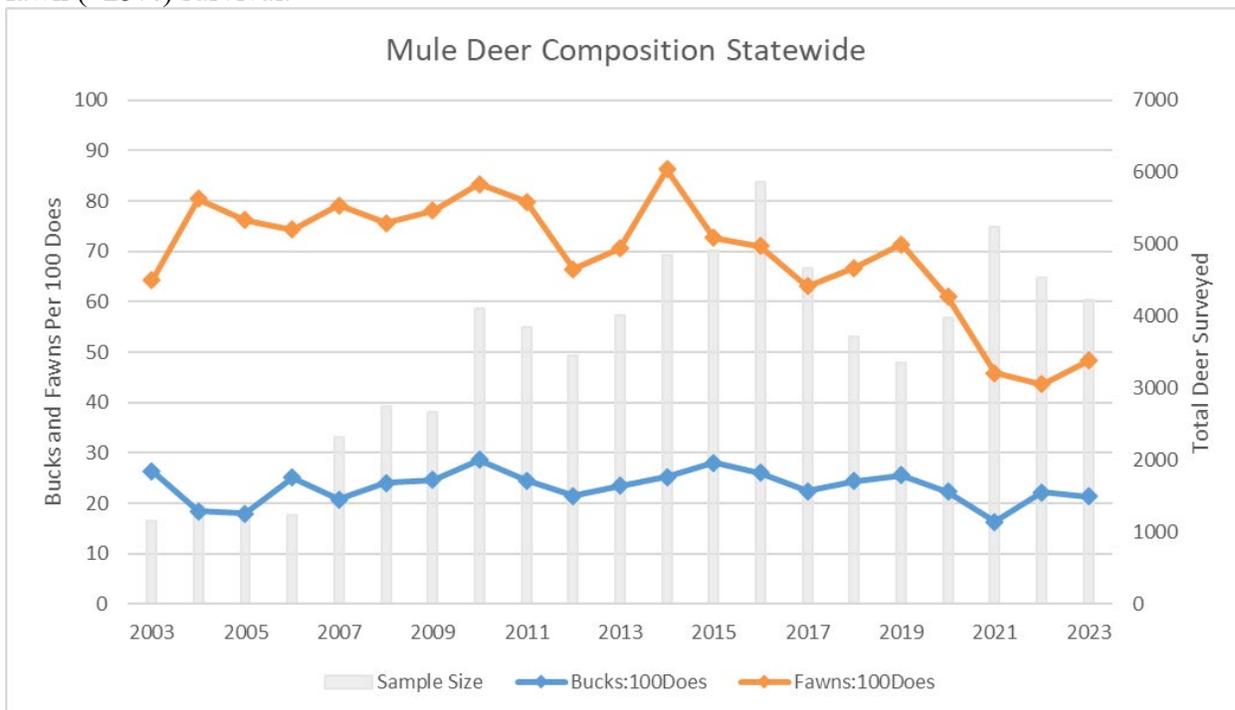


Harvest of mule deer bucks was 4,635 in 2023, an 21% decline from 2022 and 53% down from the high in 2017 and the lowest buck harvest since 1977. Antlerless mule deer harvest was 765 in 2023. Total deer harvest in 2023 was 39,779 in Nebraska, of which 14% were mule deer. Mule deer harvest exceeds white-tailed deer harvest in 4 of 18 DMUs and mule deer are abundant in 8 of 18 DMUs across Nebraska.



Historically, buck to doe ratios have remained within desired ranges (20-30 per 100) and fawn production has remained at or above 60%. However, fawn rates have declined over the past 5 years and the buck ratio dropped below 20 in 2021 and has rebounded slightly since. See graph below.

From 2018-2020, we collared 240 mule deer does and subsequently caught their fawns to study mule deer doe and fawn survival rates, mortality factors and habitat use in southwest and northwest Nebraska. Preliminary results have shown poorer than expected adult doe (58%) and fawn (~25%) survival.



-Luke Meduna, Nebraska Game and Parks Commission.

### **Nevada**

The Nevada Department of Wildlife (NDOW) issued approximately 10,840 mule deer tags for the 2023 hunting season. This was a substantial drop compared to previous years and was the lowest number of tags issued for mule deer since 1974. The overall success rate for Any Legal Weapon seasons was 33% statewide, which is well below the previous 3-year average of 38%. Muzzleloader and archery hunt success rates were 30% and 13% respectively, which were both below the previous 3-year averages of 35% and 16% for those weapon categories. Junior hunters realized a success rate of 47%, which was well below the previous 3-year average success rate of 56%. Additionally, junior tags were changed for many units in 2023 to allow for buck only harvest instead of either-sex tags, as they had been previously. Only management area's 6, 7, and 10 allowed for juniors to harvest either a buck or a doe in 2023. Starting in year 2024, all Junior mule deer tags will be buck only and all regular doe hunts were eliminated statewide. Overall, about 3,255 bucks and 195 does were harvested by all hunters and 42% of the bucks harvested were 4-point or greater, which is significantly higher than the previous year's average of 37%.

During 2023, biologists classified 16,683 mule deer during the fall survey. Statewide fawn production was 60 fawns per 100 does observed during post-season surveys, compared to 54 fawns per 100 does during fall 2022. The observed post-season buck ratio was 30 bucks per 100 does for 2023 which is equal to the previous 3-year average. The observed spring fawn ratio of 37 fawns per 100 adults was well above the 5-year average of 31 fawns per 100 adults. The moisture received during the previous winter and timely moisture throughout the year likely contributed to the above average fawn recruitment for 2024 and should yield a positive outlook for mule deer populations into the 2024-2025 hunting season.

The primary driver of mule deer populations is the numbers of fawns recruited into the population each year, in addition to the body condition and productivity of adult females. Nevada had observed widespread drought conditions until the fall and winter of 2023, when record snowfall was observed throughout most of the state. As of April 11, 2024, the Natural Resources Conservation Services (NRCS) Snotel sites for Nevada ranged from 120% to 156% of median snow water equivalent in the Northern Great Basin. The above average snowpack and mild winter conditions are expected to greatly contribute to high quality forage and growth for many mule deer populations throughout the state.

In Nevada, the Mule Deer Enhancement Program (MDEP) was initiated in 2020 and since that time over 25 mule deer related habitat projects, 10 radio-collar or investigation projects, and 5 predator removal projects have been approved by the oversight committee. However, not all these projects have been fully funded or implemented due to limited capacity and funding by the Department. Many of the habitat improvement projects that were approved, which totaled over \$3 million dollars, between 2021 and 2023, may not realize their full potential in population level responses by mule deer for several years. However, given current moisture patterns across the Northern Great Basin, Columbia Plateau, and Southern Mojave regions, we expect favorable habitat conditions for mule deer in next few years.

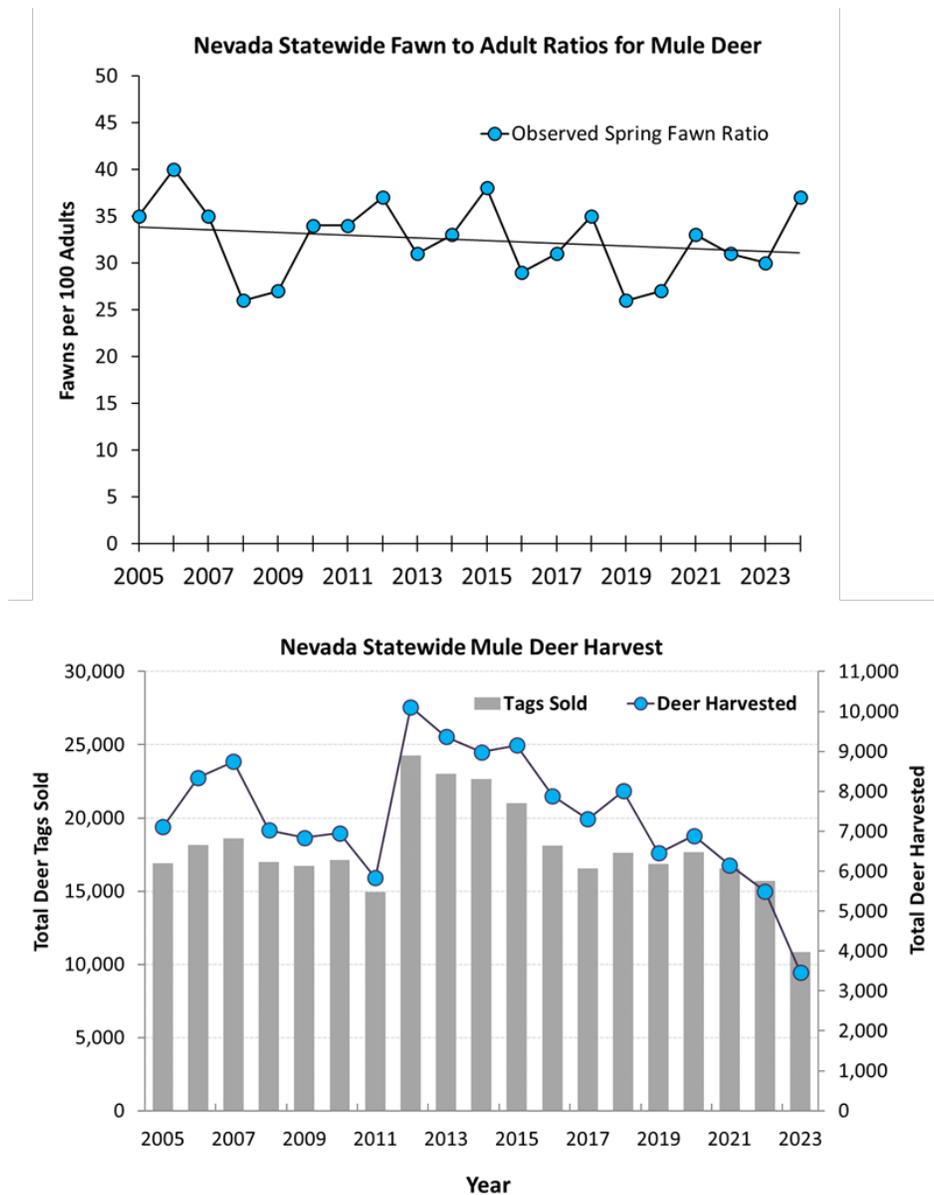


Figure 2. Trends in statewide mule deer fawn to adult ratios for Nevada, 2005 to 2023 (top panel). Number of mule deer tags sold, and total deer harvested by year from 2005 to 2023 (bottom panel).

-Cody Schroeder, Nevada Department of Wildlife

**New Mexico**

Mule deer population growth in New Mexico is highly dependent habitat conditions. This is influenced by the amount and timing of precipitation. If moisture levels and timing are appropriate, fawn survival and recruitment can increase, and consecutive years of good rainfall are

important to grow a deer population. During periods of drought, or if the summer monsoon rains arrive late in the summer, fawn survival may be low resulting in declining populations.

Moisture and growing conditions in recent years have altered between above average moisture and drought. The 2023 summer monsoons were below average and most of New Mexico remained in a long-term drought. As such, vegetative health, soil moisture, and streamflow were reduced. The 2023-2024 winter has been good in New Mexico with normal or above average snowfall in most parts of the state. New Mexico's long-term drought has resulted in reduced recruitment. However, there have been enough beneficial moisture years to allow the population to remain stable throughout the state with local variation.

New Mexico's wildfire activity during 2023 was significantly reduced compared to 2022. With good winter and summer precipitation, deer populations should benefit from the 2022 wildfires in a few years.

Post-hunt aerial surveys are conducted annually in December for select Game Management Units (GMUs). The 2023 statewide buck to doe ratio was 25 bucks:100 does (Figure 1); this is slightly below the long-term average. Statewide fawn recruitment was slightly down last year with an estimated 34 fawns:100 does in 2023. This is within the within the parameters for stable populations. Because of good recruitment the last few years, overall mule deer numbers in New Mexico are stable with some local variations.

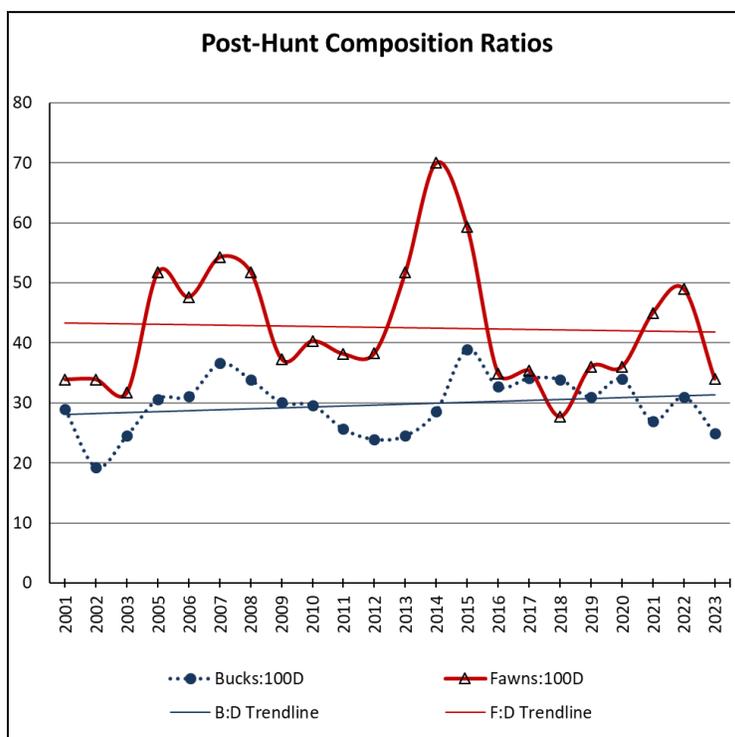


Figure 1. New Mexico statewide composition ratios obtained during post-hunt winter surveys from 2001-2023.

Deer hunting opportunities on public land are issued through the public draw; private land deer hunting opportunities are available over-the-counter with written permission in most areas of the state. Trends in composition ratios obtained from the aerial surveys are used to adjust the number of deer hunting licenses that are issued through the public draw.

Deer license holders are only permitted to harvest bucks in New Mexico except for a few specific instances where deer are overpopulated near urban areas. An estimated 30,762 hunters harvested 9,399 deer in 2022 (Figure 2). The majority of deer harvested in New Mexico are mule deer with white-tailed deer comprising approximately 3% of the total harvest. Hunter success was approximately 31% during the 2022-2023 hunting season for all weapon types combined. This is equivalent to the long-term average success rate for deer hunters in New Mexico (31%; 2006-2023).

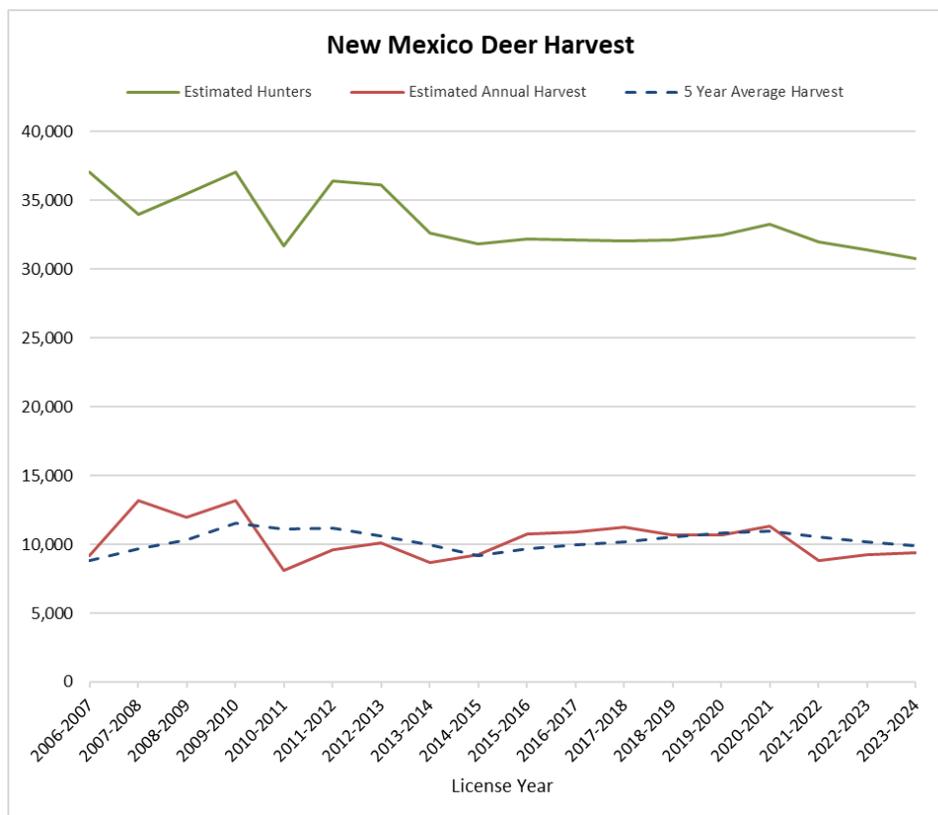


Figure 2. Estimated annual deer hunters and harvest in New Mexico 2006-2023.

-Orrin Duvuvuei, New Mexico Department of Game and Fish

### **North Dakota**

Mule deer in the Badlands are stable following record low fawn production and decreased gun harvest in 2023, and a very mild winter during 2023/2024. The 2024 spring index was 1% higher than the 2023 index but 4% below the long-term average (Figure 1). Mule deer outside of the Badlands are stable to increasing based on hunter observations (Figure 2).

North Dakota has a limited quota license system and a goal of maintaining at least 30 bucks:100 does prior to the gun season and 6 mule deer per square mile in the Badlands. A conservative harvest strategy with a limited number of antlerless licenses is being used to encourage population growth of mule deer in the Badlands. Antlered mule deer gun licenses are a coveted license in North Dakota and currently only 1,600 licenses are available for the 2024 deer gun season.

Buck:doe ratio has remained stable over the last three years, while fawn:doe ratio trended downward during this period due to drought conditions and an extreme winter during 2022/2023. Record low fawn production was observed in 2023. A very mild winter during 2023/2024 has set the stage for increased fawn production in 2024.

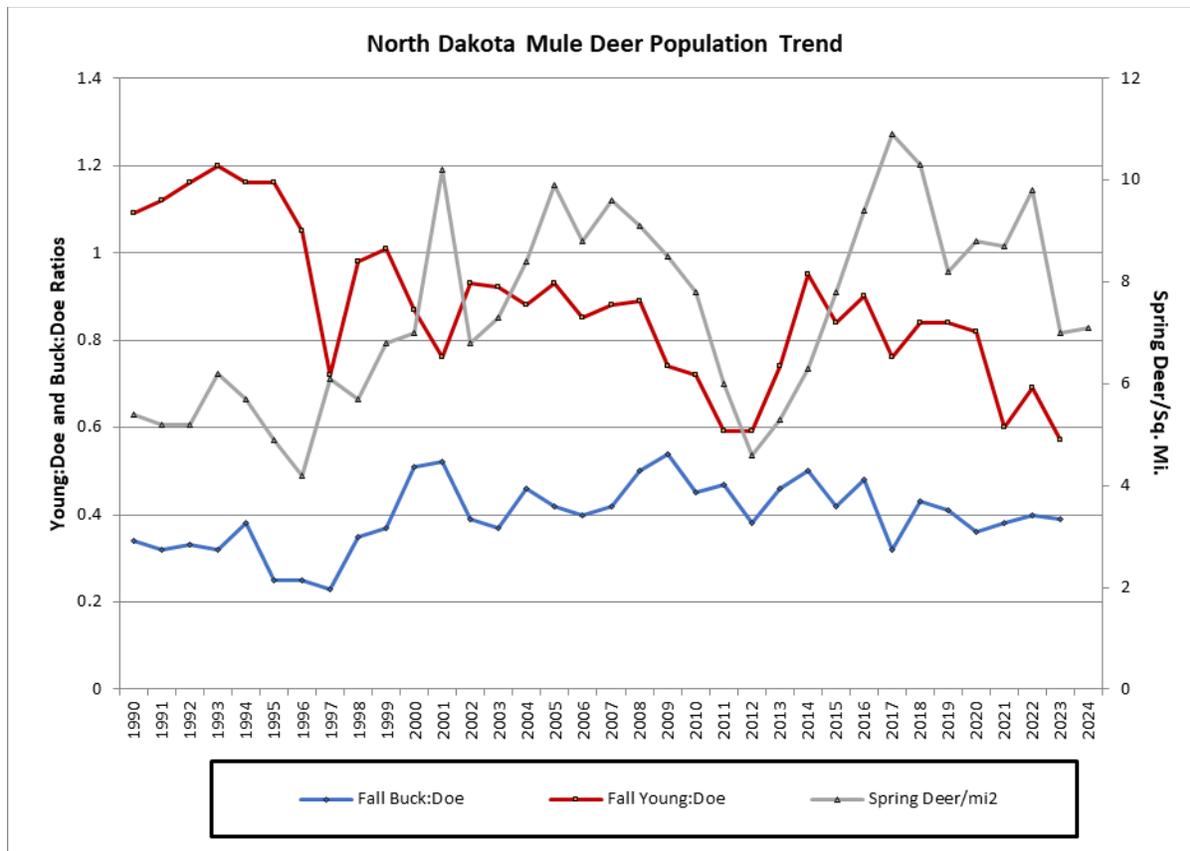


Figure 1. Population trends of badlands mule deer, 1990-2024.

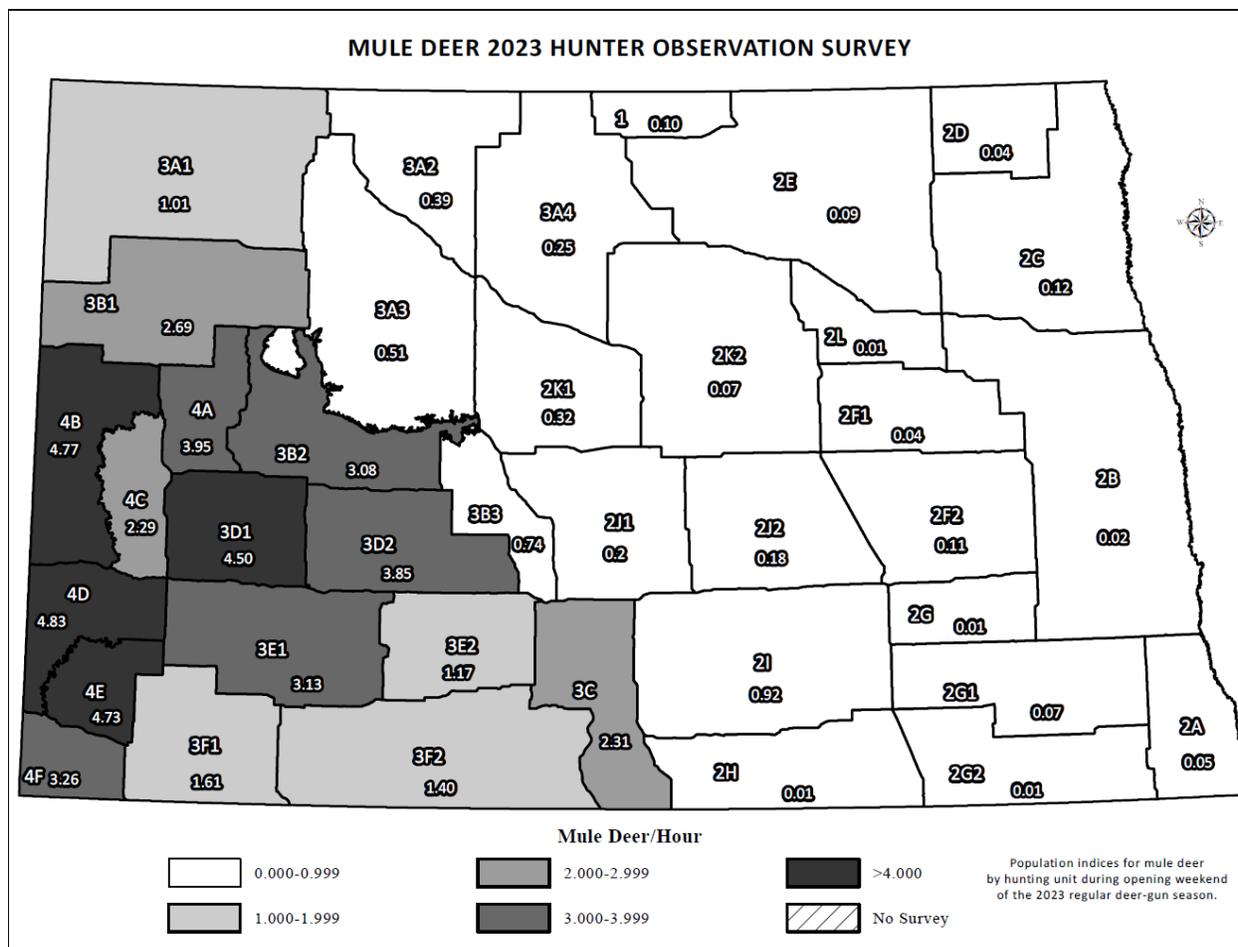


Figure 2. Mule deer sighted per hour based on hunter observations, 2023.

- Bruce Stillings, North Dakota Game and Fish Department

**Northwest Territories**

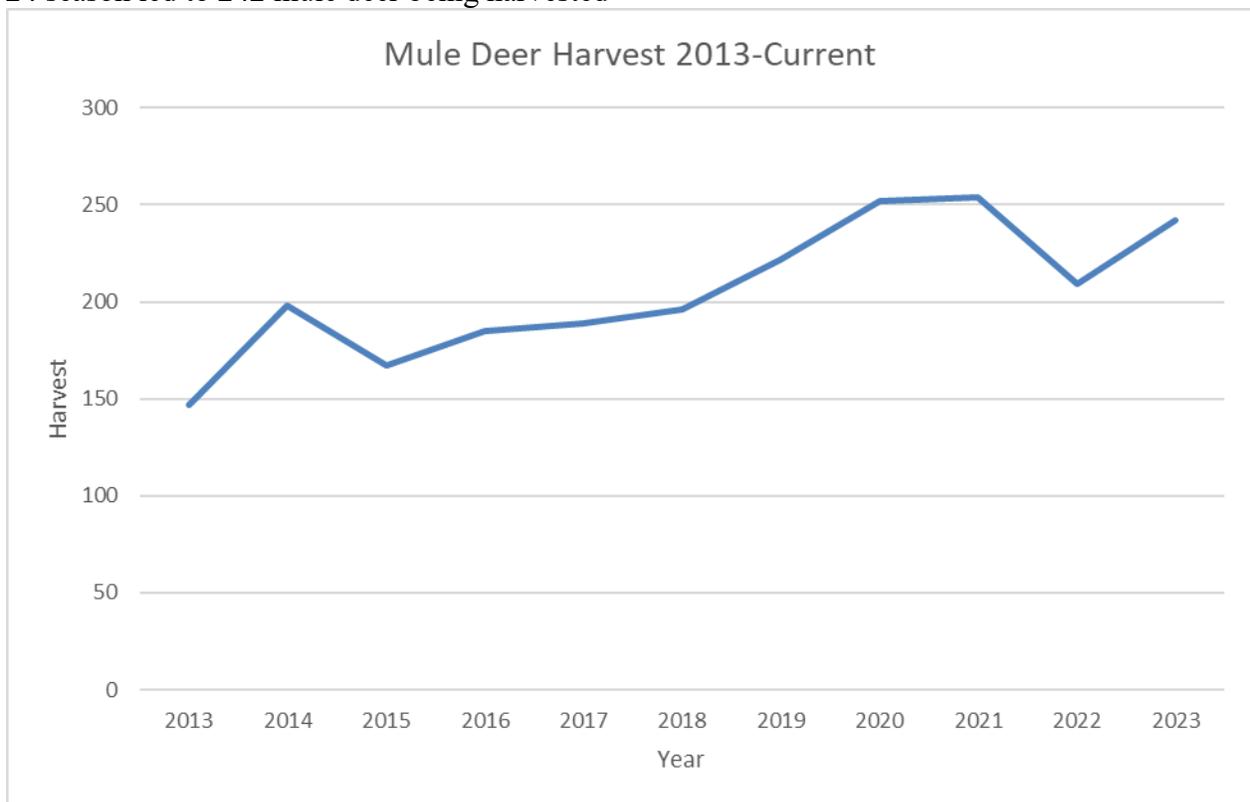
The population of mule deer in the Northwest Territories is unknown, but it is believed that there is no viable population. In the last four decades, there have only been two recorded sightings of mule deer, both of which occurred in the southeastern corner of the Nahanni National Park in 1979 and 2003. In 2018, a wildlife officer working for the Government of the Northwest Territories reported an unrecorded sighting of two mule deer just north of the British Columbia/Northwest Territories border near the Liard River. We consider mule deer observations in the Northwest Territories as vagrants because their habitat is probably marginal, and they are not commonly found in this area.

Mule deer were occasionally observed in the Northwest Territories from the 1920s to late 1960s, with white-tailed deer being the predominant species seen since then. It is unclear how long mule deer existed in the Northwest Territories, and their population has completely disappeared from their former range, except in the Nahanni-Liard area where sightings are rare. Mule deer are not hunted in the Northwest Territories, so there is no formal survey or collection of harvest data, nor any active research on this species. The decline of mule deer in the Northwest Territories may be caused by a complex of factors, which are not yet fully understood.

- Ève Lamontagne, Department of Environment and Climate Change, Government of the Northwest Territories

### **Oklahoma**

With Oklahoma being the eastern edge for what is considered mule deer habitat, we estimate between 2,000 and 4,000 animals pre-hunting season in our panhandle, NW and far SW portions of the state. A slight increase from previous years. Most harvest occurs on private lands, but opportunities to harvest a mule deer does exist on some of our public hunting areas. Oklahoma does not differentiate between mule deer and white-tailed deer in our tagging system. A statewide deer permit allows the harvest of either species. In general, habitats are beginning to rebound from catastrophic drought conditions. This is aiding a slight increase in populations, with folks beginning to see mule deer in areas that have not held populations in quite some time. The 2023-24 season led to 242 mule deer being harvested



-Dallas Barber, Oklahoma Department of Wildlife Conservation

**Oregon**

Oregon’s Rocky Mountain mule deer population continues to persist at levels substantially below long-term management objectives (MO), estimated to be about 155,000 (45% of MO) for the last two years (Figure 1). The general trend in average fawn ratio mirrors the declines in population and has hovered in the high 40s to low 50s. Average buck ratios have increased in recent years and now hovers in the mid-20s.

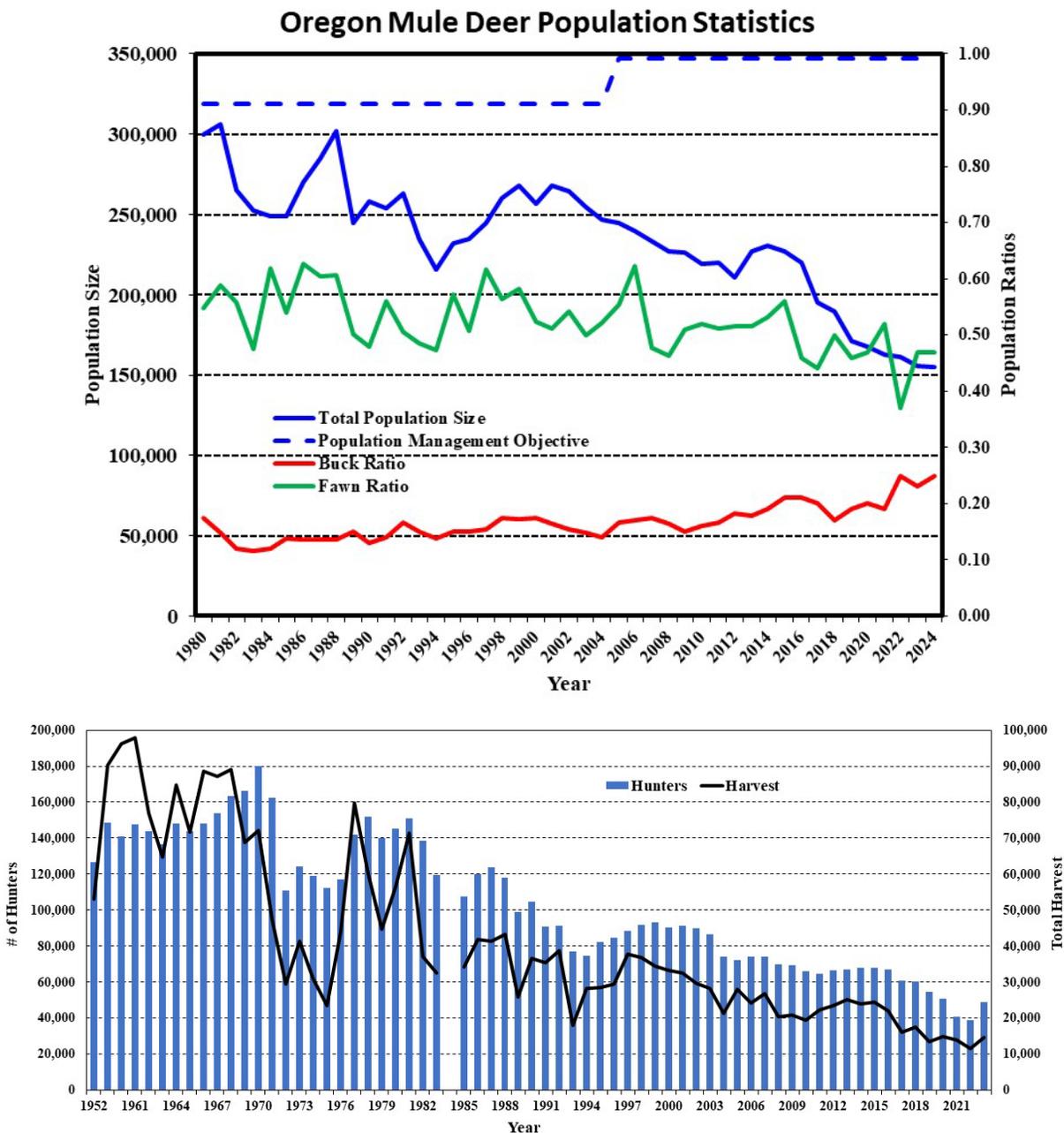


Figure 2. Trends in Oregon’s mule deer hunters and harvest, 1952 – 2023.

Not surprisingly, the general long-term trend in hunter numbers and harvest mimics the declining population size (Figure 2). However, number of hunters increased to 49,071 in 2023. A total of 11,643 mule deer (97% males) were harvested. Adult female survival continues to vary between herds but has increased since winter 2017-2018 to an average of 93% (80% - 96%) across herds during winter 2022 - 2023.

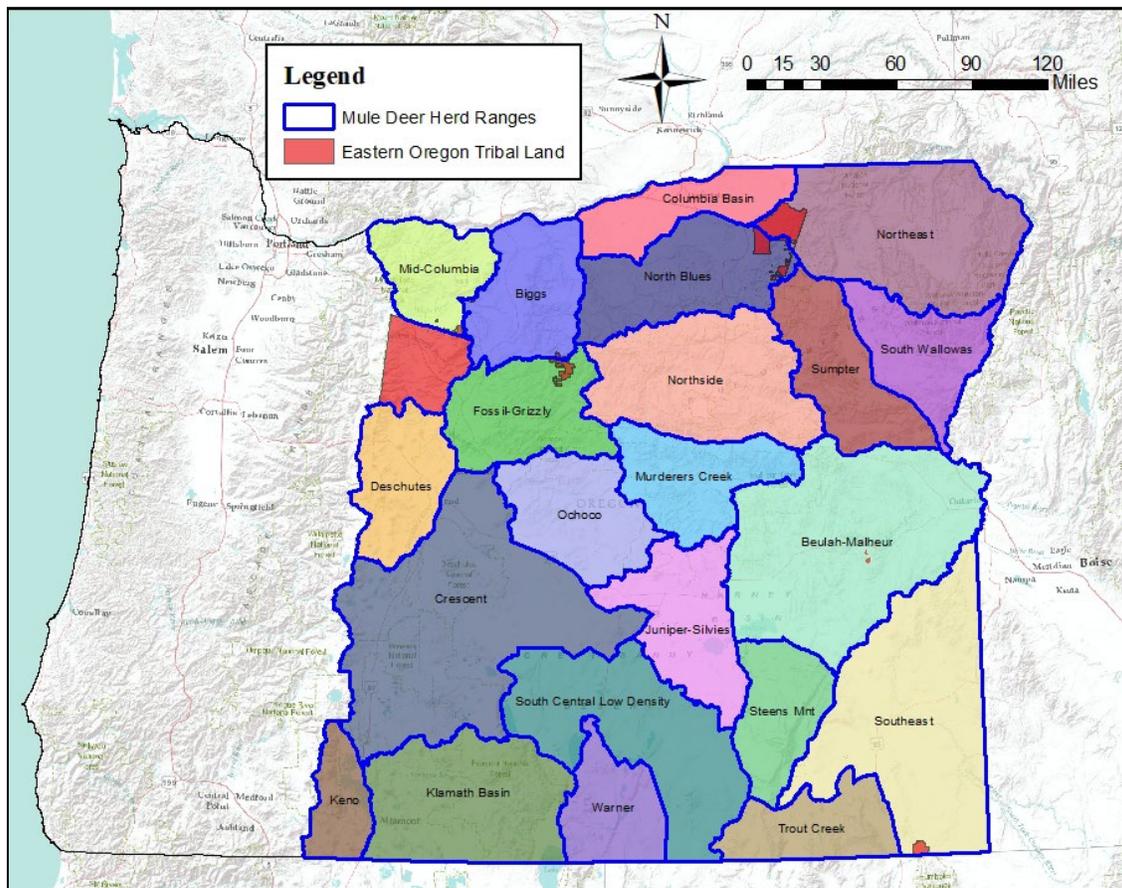


Figure 3. Mule deer herd ranges in Oregon.

Oregon recently completed analyses from nearly 2,000 GPS collars and has identified 22 mule deer herd ranges (Figure 3, Oregon Department of Fish and Wildlife. 2023a. Delineating Mule Deer Herd Ranges in Oregon: Internal Technical Report of Methods and Results. Salem, Oregon. 20 pp). These ranges will be used as a reliable, biologically based foundation for mule deer management in the future.

Following delineation of herd ranges for mule deer, data from GPS collared animals ( $n = 1,587$ ) was further analyzed for detailed movements. Brownian Bridge Movement Modelling (BBMM) was used to delineate migration corridors (Figure 4), stopover areas, and seasonal ranges for the entire distribution of Rocky Mountain mule deer in Oregon. A comprehensive publication summarizing movement and migration data is currently in preparation. These BBMM analyses are already providing critical information for land use, development, and conservation management prioritization decisions.

Similar to most WAFWA jurisdictions with mule deer, management is guided by a Mule Deer Management Plan which was last revised in 2003 for Oregon. The two-year process of Figure

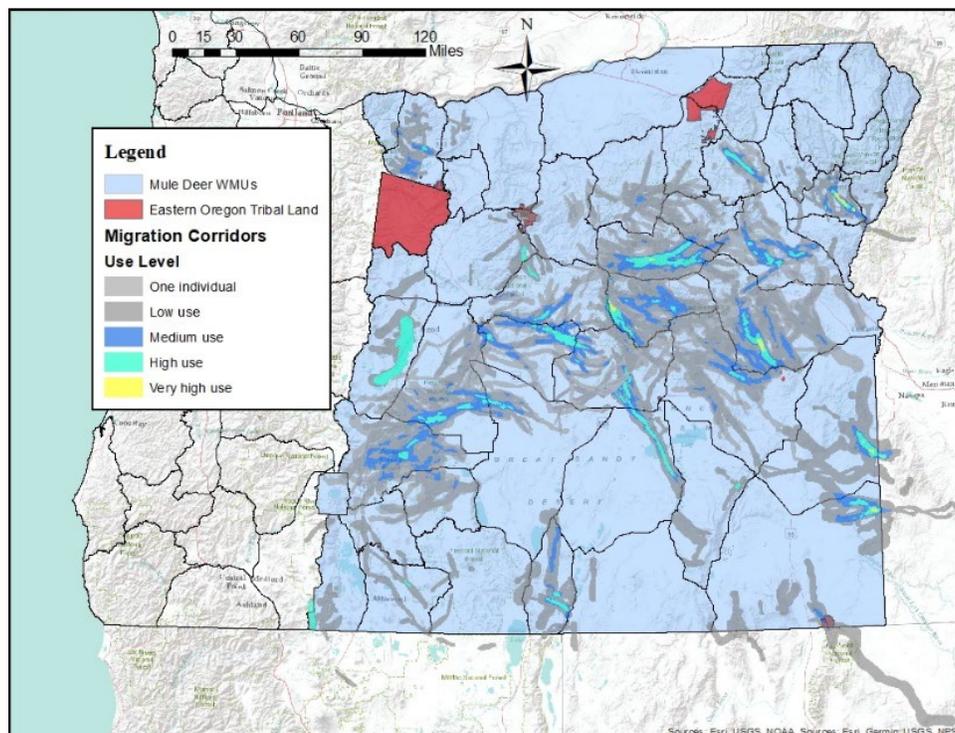


Figure 4. Mule deer migration corridors in Oregon.

revising Oregon’s 20-year-old mule deer management plan will likely culminate in mid-June 2024 with a presentation of the revised plan to the Oregon Fish and Wildlife Commission. Because of the significant changes that have occurred in mule deer populations, the landscape mule deer rely on for persistence, populations of other species’ sharing the landscape with mule deer, social and political values associated with mule deer, and in the science of mule deer management, the revisions are substantial.

The first significant changes in the revised plan focuses on the scale for management and monitoring. Modern GPS technology and associated analytic methods indicate the scale of mule deer movements can be extensive and that data collection and harvest allocation methods are out of sync spatially and temporally. Deer are normally counted during early winter following fall migrations, usually in concentration areas at the wildlife management unit (WMU) scale. After spring migrations, animals tend to distribute widely on the landscape, often crossing multiple WMUs. As a result, mule deer are often hunted during a time frame and in a WMU with dramatically different densities. The revised mule deer management plan adopts the recently defined herd ranges as the basis for mule deer management.

The second significant change revolves around population management objectives. Population MOs have historically represented an established, desired number of animals in a specified WMU. Since population MOs were established in Oregon by the legislature, they have never been met. This is largely due the hard nature of the number in that it cannot evolve with changes in the mule deer landscape and associated factors affecting mule deer. To address this ORDF staff are proposing population management objectives incorporating population performance in a 4-tiered evaluation matrix. The primary criterium revolves around the 5-year average population growth rate ( $\lambda$ ) with tiers based on value relative to 1.0 which equals population stability. Tiers for population size are based on the relative population size compared

to the 2023 modelled population size which is assumed to be at or near current carrying capacity. The combined tier scores identify the level of concern for the population in the herd ranges being scored. A herd with an average growth rate tier of 1 ( $\lambda \leq 0.97$ ) and a population tier of 1 would have a total score of 2, relating to an extreme management concern for this herd. Conversely, combined higher scores related to lower levels of management concern for the herd. Levels of management concern will be used to prioritize management actions and resources.

Oregon does not survey black-tailed deer in a way allowing development of annual population estimates. Density estimates and population modeling developed using non-invasive fecal DNA sampling suggests black-tailed deer populations have stabilized or increased slightly. Data also indicate the ratio of bucks:100 females is much higher than estimated using traditional survey methods. Number of black-tailed deer hunters and harvest increased dramatically in 2023 to 132,954 and 42,219, respectively. Ninety percent of the harvest was males. These increases are due to a later season interacting with excellent hunting conditions for black-tailed deer in 2023.

-Don Whittaker, Oregon Department of Fish and Wildlife

### **Saskatchewan**

Mule deer populations are monitored in Saskatchewan using annual spotlight surveys, hunter harvest surveys and intermittent aerial surveys. Mule deer density varies considerably in Saskatchewan, ranging from 0.05 deer/km<sup>2</sup> in the northern part of their range to > 2.0 deer/km<sup>2</sup> in the southwest portion of the province in years of average population size. Annual spotlight surveys indicate that mule deer populations have declined substantially over the past two years, particularly in the core of their range across the grassland region. The decline is especially pronounced in the southwestern portion of the province, where a 48 per cent reduction in spotlight survey observations over the past two years was driven by a combination of severe winters in 2021 and 2022, ongoing drought conditions, and high prevalence rates of chronic wasting disease (CWD). CWD is increasing in prevalence and distribution across the province in an eastern bearing. In 2023, voluntary hunter surveillance sampling resulted in a province-wide prevalence rate of 34 per cent (i.e. 314 CWD positive/1080 testable samples) in mule deer (both sexes). A CWD strategy remains in development, though has proved challenging given the establishment of the disease throughout most of the province. Saskatchewan is updating mule deer population estimates, monitoring initiatives and management objectives as part of the ten-year mule deer management plan.

Mule deer hunting license sales and harvest numbers have dropped slightly in Saskatchewan over the past two years, likely due to a combination of recent mule deer population declines, inflation, and the implementation of new land access legislation in 2022. A total of 19,632 mule deer hunting licences (15,633 active hunters) were sold in 2023, consisting of 8,158 limited entry either-sex, 8,804 limited entry antlerless, 157 quota-limited over-the-counter antlerless licences and 2,513 over-the-counter archery-only mule deer licenses. An estimated 10,175 mule deer were harvested in the province in 2023 (Figure 1). Bucks made up 43 per cent of the total estimated harvest, with a total of 4,357 buck mule deer harvested in 2023. Despite a high proportion of antlerless harvest, overall harvest rates (i.e. the proportion of the population harvested each year) is normally relatively low (e.g. < 10 per cent) as the province primarily manages mule deer through limited entry (draw) hunting. Hunters holding limited entry either-sex licenses harvested 4,488 mule deer (4,008 bucks), with a province-wide average success rate of 60 per cent, which was below the previous five-year (2018 – 2022) average of 72 per cent. Limited

entry antlerless mule deer hunters harvested 5,170 doe or fawn mule deer, with an average harvest success rate of 89 per cent. Hunters holding over the counter archery mule deer licenses harvested an estimated 421 mule deer (349 bucks), with a provincial average success rate of 20 per cent, which was lower than the previous 5-year average of 23 per cent (2018-2022).

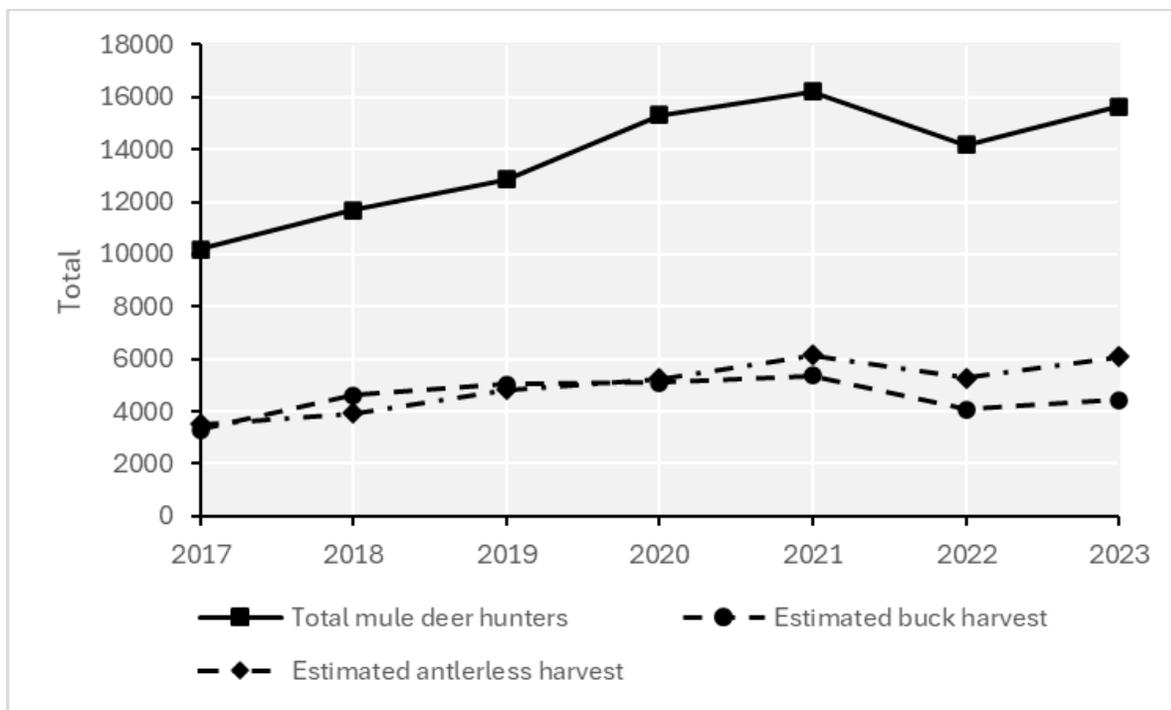


Figure 1. Estimated number of mule deer hunters and harvest in Saskatchewan, 2017-2023.

-Dale Barks, Saskatchewan Ministry of Environment

### South Dakota

Mule deer populations in South Dakota are slowly responding to reduced harvest rates in recent years, and results from several surveys provide evidence that populations are increasing. Most hunting unit population objectives are set to increase or substantially increase mule deer numbers; however, several unit objectives have recently been modified as populations approach desired densities (Figure 1). Objectives will be re-evaluated in 2025 during the SDGFP Commission season setting process. Pre-season herd composition surveys documented similar recruitment in most Data Analysis Units (DAUs) in 2023 with overall recruitment at 63 fawns:100 does compared to 61 fawns:100 does the previous year. The statewide pre-season sex ratio in 2023 was 43 bucks:100 does (Figure 2).

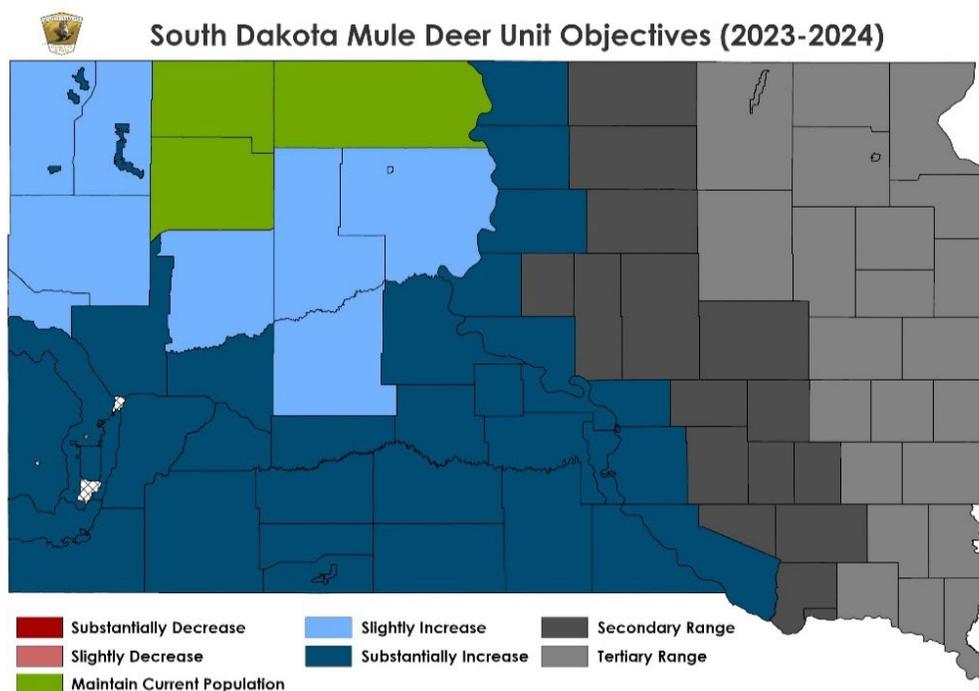


Figure 1. Mule deer population objectives for South Dakota hunting units, 2023-24.

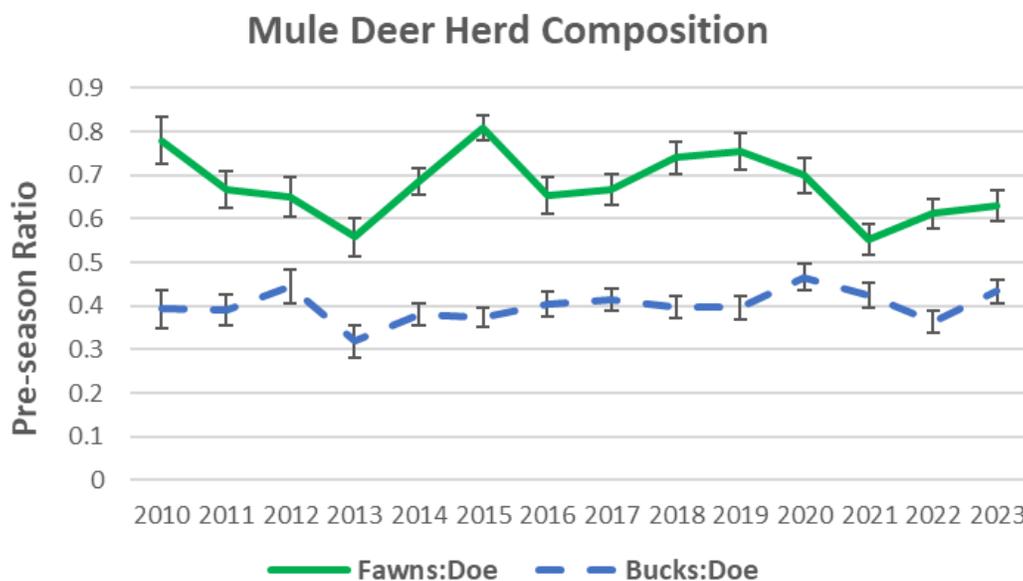


Figure 2. Statewide sex and age ratios from pre-season herd composition surveys in South Dakota, 2010-2023.

Currently all deer hunters are surveyed via email submission methods. Annual deer hunter surveys are conducted to estimate harvest at each management unit for each species and age/sex cohorts. Statewide mule deer harvest has slowly increased from a low of about 5,400 in 2014 to 6,071 in 2023, mostly due to increased buck harvest since doe harvest has been substantially

restricted for the past 9 years (Figure 3). A consistently low mule deer doe harvest of approximately 1,000 – 1,500 has allowed some deer herds of the state to grow to more desirable levels although many areas are still substantially below objective (Figure 1 and Figure 3). The current harvest of antlerless mule deer occurs primarily from youth deer hunters and hunters with “any deer” licenses. Hunting season regulations were modified in 2021 to further restrict youth doe harvest to improve growth rates in areas below objective.

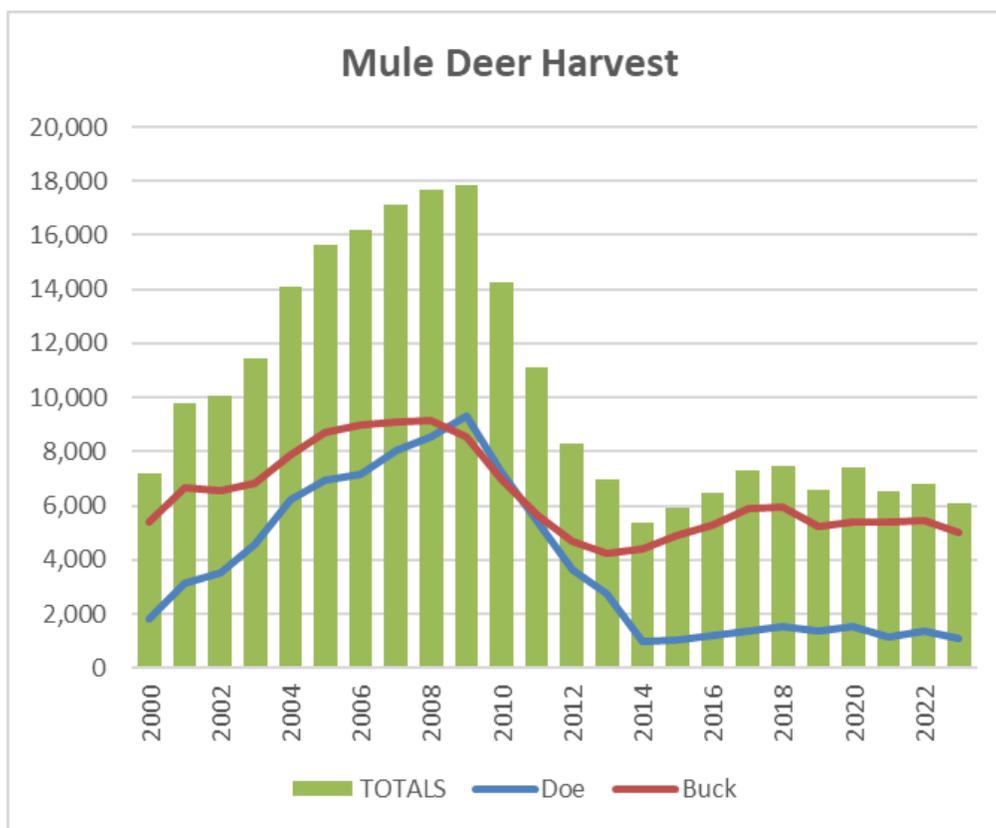


Figure 3. Mule deer harvest from all hunting seasons in South Dakota, 1990-2023.

Radio collaring and survival monitoring efforts have been discontinued in South Dakota, with the exception of one remaining research project in the northwest part of the state. Preliminary annual survival rates for mule deer does in this study area (DAU 1) in 2023 were 78% for adult does. These vital rates, in conjunction with other survey data, are used to model population abundance and trend at the DAU level. The statewide pre-season estimate was 90,500 for 2024 and will be re-assessed for 2025.

-Andy Lindbloom, South Dakota Game, Fish and Parks

## Texas

Texas Parks and Wildlife Department (TPWD) conducts post-season helicopter surveys for mule deer using a stratified random sampling design within monitoring units. In 2011, a sightability model was initiated to improve population estimates. The data are used to determine population trends, estimate population densities, and document herd composition to evaluate the

impacts of regulations and management actions on mule deer at ecoregion and monitoring unit scales.

### *Trans-Pecos*

In general, the Trans-Pecos population is on a decreasing trend because of drought conditions since 2020. In addition, aoudad and elk numbers have exploded over the last 10 years in the region and are more than likely compounding the impacts of drought on mule deer. The 2023 mule deer estimate of 96,549 is the lowest since 2011. Surveys were not conducted in 2007, 2010, and 2020. The estimated 2023 fawn crop of 44 fawns:100 does was higher than in 2022 (37 fawns:100 does) and the long-term average of 36 fawns:100 does, which is promising. The sex ratio for 2023 was 48 bucks:100 does, higher than the 2011–2023 average of 44 bucks:100 does.

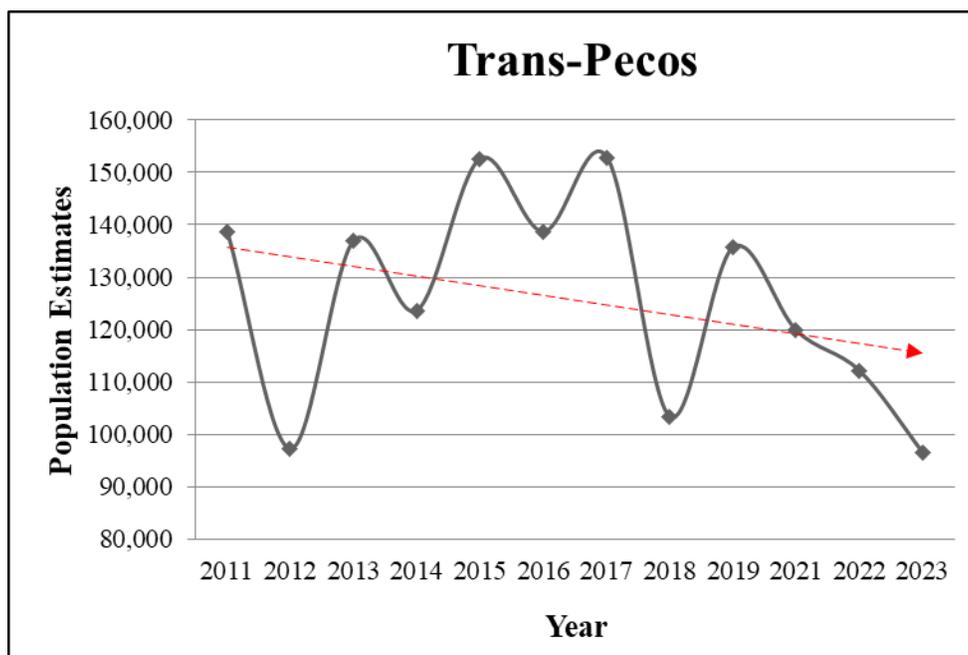


Figure 1. Trends in mule deer population estimates in Trans-Pecos, Texas, 2011–2023.

### *Panhandle*

The Panhandle population trend is on an increasing trend since 2011. However, mule deer numbers have declined after the all-time high documented in 2017 until 2022 when the population seemed to stabilize. Surveys were not conducted in 2015 and 2020. The 2023 population estimate of 86,710 was higher than the 2021 and 2022 estimates of 71,171 and 71,121, respectively. Fawn production was 29 fawns:100 does in 2023, which was above the 2022 estimate region average (17 fawns:100 does). The sex ratio for 2023 was 23 bucks:100 does, lower than 2022. Sex ratios have varied from 21 to 36 bucks:100 does since 2011. Sex ratio data indicate a higher harvest rate of mule deer bucks compared to the Trans-Pecos in almost every year, but the post-season sex ratio has been above 21 bucks:100 does in 10 out of 11 survey years.

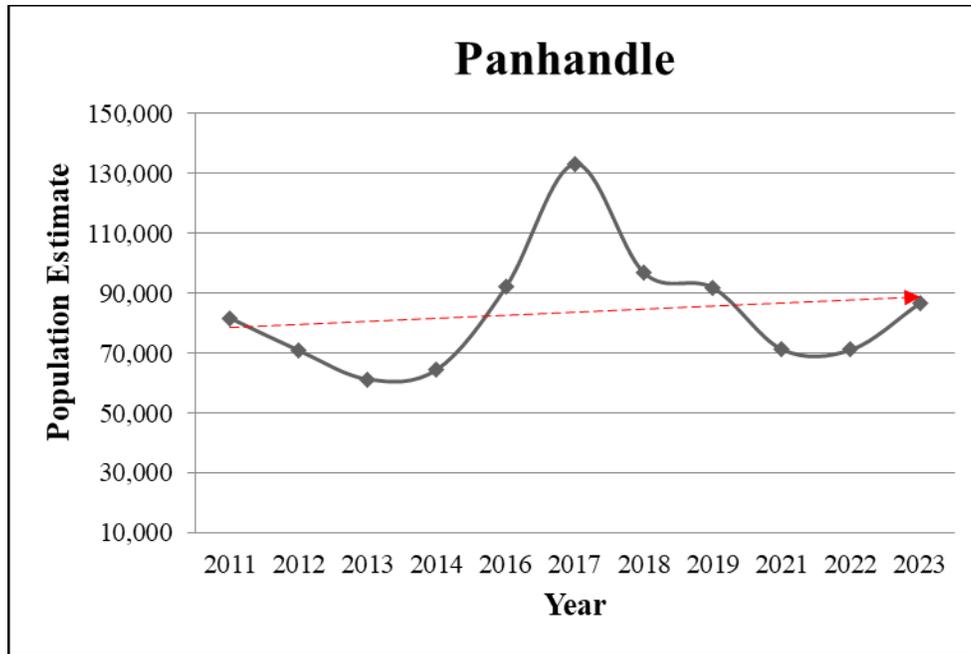


Figure 2. Trends in mule deer population estimates in the Texas Panhandle, 2011–2023.

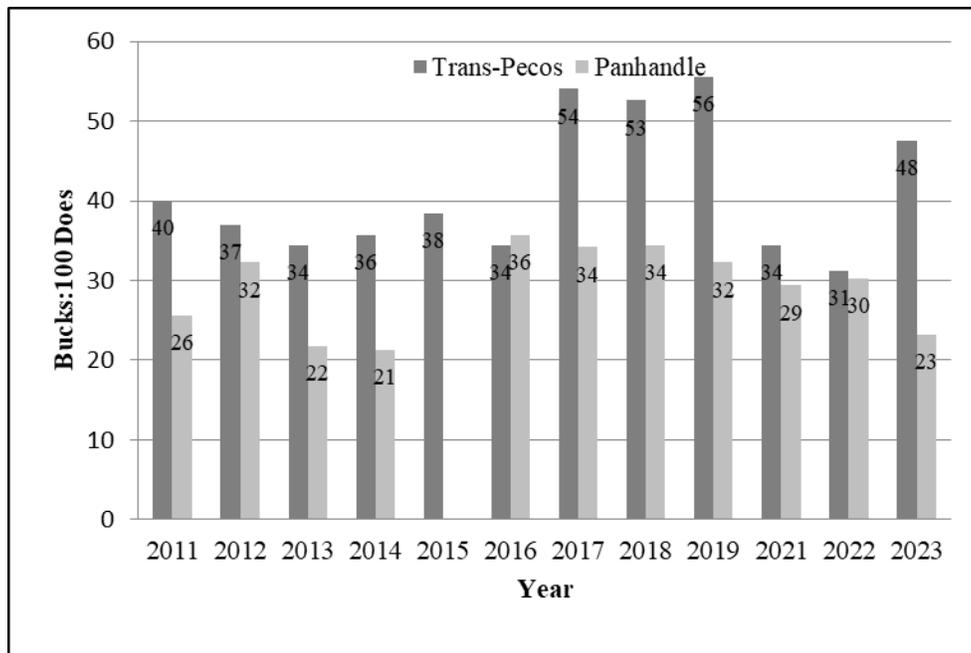


Figure 3. Trends in the number of mule deer bucks per 100 does in the Texas Panhandle and Trans-Pecos areas, 2011–2023.

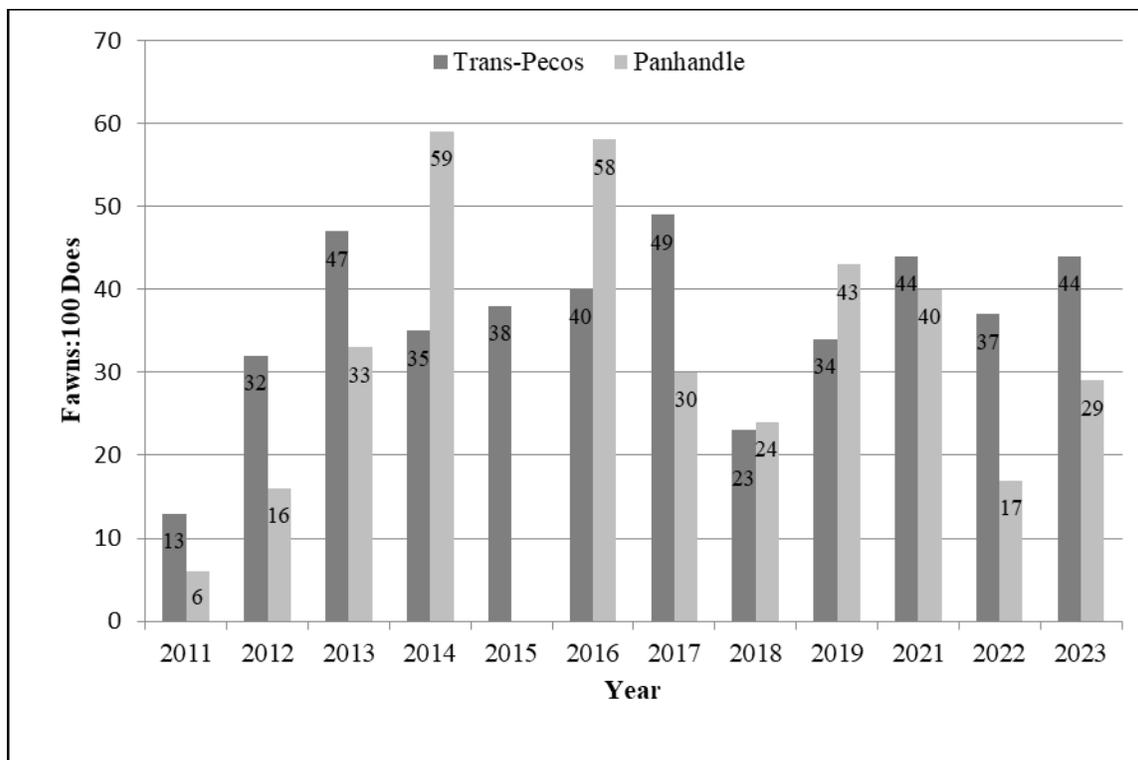


Figure 4. Trends in the number of mule deer fawns per 100 does in the Texas Panhandle and Trans-Pecos areas, 2011–2023.

-Shawn Gray, Texas Parks and Wildlife Department

## **Utah**

Utah's current statewide mule deer population estimate is 279,000 with a statewide population objective of 404,900 (Figure 1). This is a decrease of 56,000 deer from the previous year, largely due severe winter conditions during the winter of 2022/2023. Post-season fawn-to-doe ratios in 2023 were slightly down at 60 fawns per 100 does from 62/100 the previous years. Adult and fawn survival is estimated annually by radio-collaring approximately 500 deer on 7 representative units throughout the state. Statewide survival estimates from Dec. 2022 through Dec. 2023 was for 72% for adult does and 40% for fawns.

While the decline and observed survival numbers for 2023 are discouraging, they do not tell the whole story of Utah's deer herd after the winter of 2022/2023. Utah broke all recorded measurements for snow water equivalent and observed unprecedented snowpack levels across the state with most basins in the 200-400% of normal range. The statewide average may be misleading, as the conditions last winter affected the state very differently based on latitude and temperature. In Northern Utah, survival estimates were much lower and in Southern Utah, adult doe and fawn survival were much higher. The winter of 2023/2024 has been warmer with snowpack totals in most drainages in the 110%-130% range. The snow has accumulated in the higher elevations while at the same time warmer temperatures have produced favorable conditions on deer winter ranges. Survival is tracking at average to high for the entire state as of early spring 2024.

Utah manages for diverse hunting opportunities and attempts to balance quality and opportunity. We have 31 general-season units that are managed for hunter opportunity with a goal of 15-17 or 18-20 bucks per 100 does following the fall hunts. Utah also has limited-entry units

that are managed for increased quality at 25-35 bucks per 100 does. In addition, we have 2 premium limited-entry units that are managed for 40-55 bucks per 100 does with a supplemental metric of  $\geq 40\%$  of harvested bucks being 5 years of age or older.

In 1994, Utah issued 97,000 public draw permits for general-season deer units, and the postseason buck-to-doe ratio was 8 bucks per 100 does. Since that time, buck-to-doe ratios have increased as a result of growing deer populations and decreased buck permits, peaking at 23 bucks per 100 does in 2015 (Figure 2). Buck-to-doe ratios were stable in 2023 compared to last year, at 21 bucks per 100 does with 64,725 public draw permits issued for the 2023 season. Many units, especially units in the Southern portion of the state, are exceeding the buck-to-doe ratio objectives in our approved Statewide Deer Management Plan. Utah DWR biologists' are recommending increasing permits on these units for the 2024 hunting season.

## STATEWIDE DEER POPULATION TRENDS

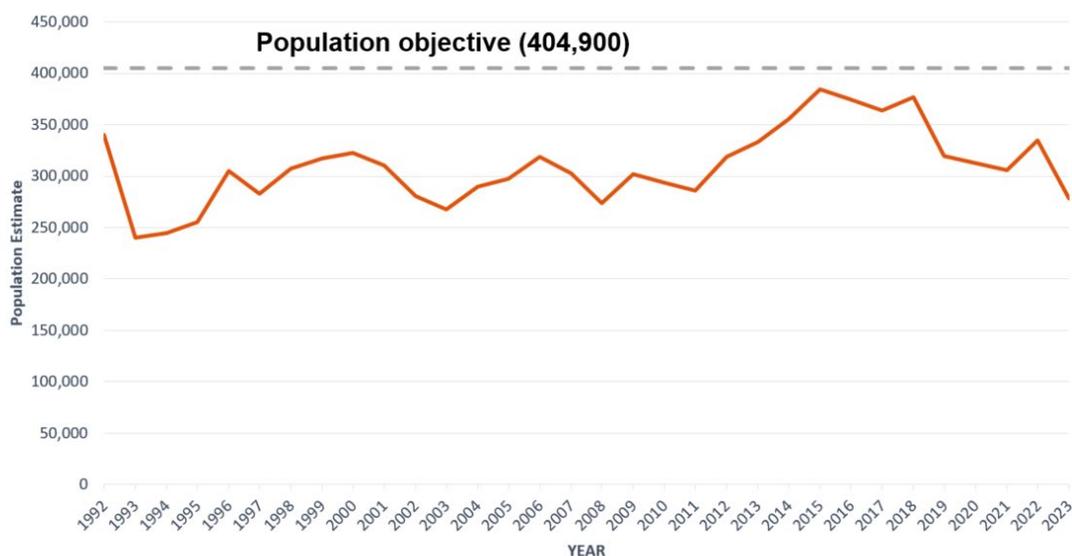


Figure 1. Mule deer population estimates from 1992-2023.

## BUCK-TO-DOE RATIO TRENDS (1994-2023)

These classification surveys took place on general-season public land units.

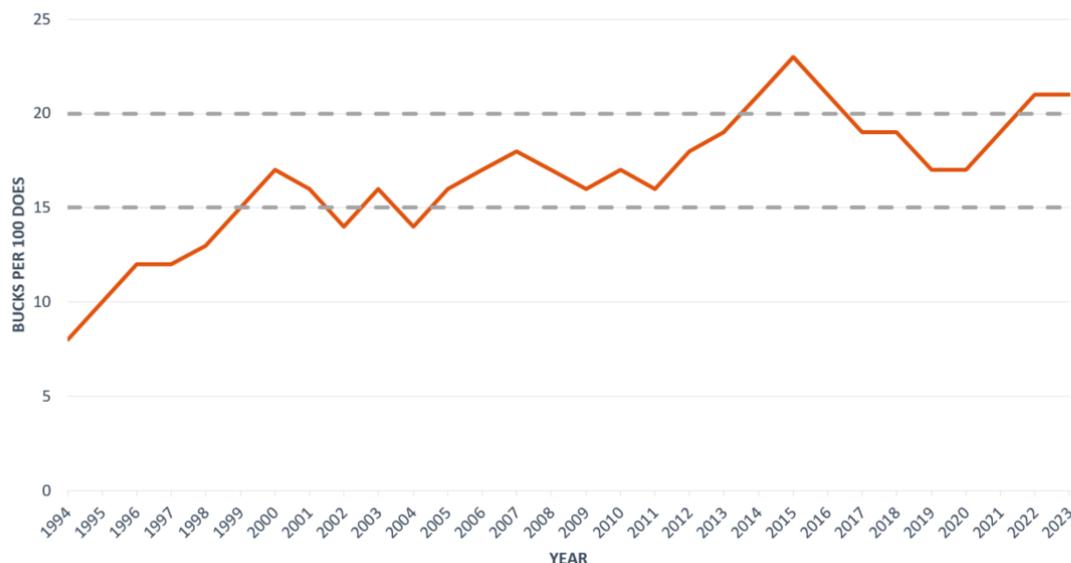


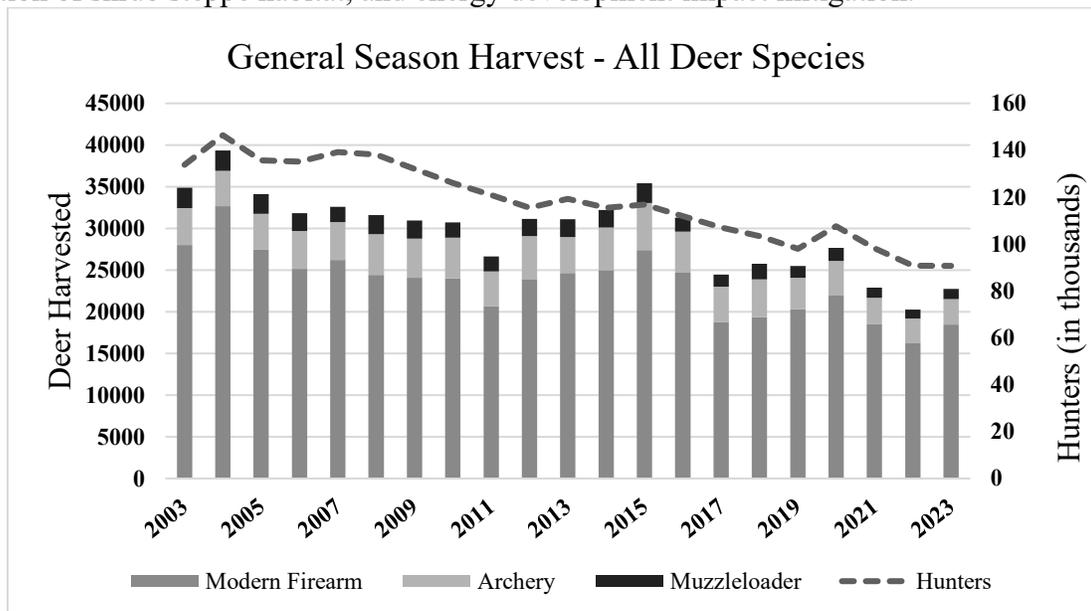
Figure 2. General season buck to doe ratios from 1993-2023.

-Dax Mangus, Utah Division of Wildlife Resources

### **Washington**

The statewide deer harvest estimate for 2023 was 23,902 deer (white-tailed deer, black-tailed deer, and mule deer; general and permit seasons combined), up ~12% from 21,413 harvested deer in 2022 and down 19% from a recent high in 2020 of 29,435 harvested deer. The dip in harvest is attributed to hemorrhagic disease outbreaks that reduced abundance in the summer and fall of 2021, which likely depressed hunter participation (i.e., fewer hunters in 2021). Lagging impacts of disease outbreaks and extreme drought in 2021, unseasonably hot and dry late-fall conditions in 2022 which kept deer at higher elevations longer, and reduced hunter participation (~9% reduction in general season hunters) are likely culprits for the documented decline in harvest for the 2022 season. Populations within most of Washington's 7 mule deer management zones are generally stable but status varies by region, zone, and locally influential factors (e.g., wildfire, disease). In late summer of 2021, outbreaks of epizootic hemorrhagic disease and bluetongue in eastern Washington caused major and widespread deer mortality. This outbreak primarily affected white-tailed deer, but mule deer were also impacted in many areas. Harvest trends for three of five black-tailed deer management zones are stable to increasing, whereas two zones have exhibited recent declines in harvest. Black-tailed deer abundance, indexed via harvest, generally fluctuates in response to timber harvest rotation/frequency. Loss of black-tailed deer habitat due to encroaching human development continues to be a concern. Eligible Washington hunters can pursue any of three species of deer during a general season with harvest and transport authorized under a single deer tag. WDFW offers limited-entry opportunity via a special permit draw system. For the 2023 season, WDFW managers have maintained conservative mule and black-tailed deer

special permit opportunity (i.e., limited antlerless special permit opportunity) to promote population stability or growth. Habitat management and restoration activities for mule deer are ongoing or in preparation, including movement corridor enhancement and conservation associated with Secretarial Order 3362. Projects include restoration of areas impacted by unauthorized vehicle use, weed control, and restoration of native vegetation on both public and private lands. Related work is planned or ongoing to address deer vehicle collisions, enhance gene flow among mule deer populations, improve crossing structures for irrigation canals (a source of deer mortality), post-fire restoration of shrub steppe habitat, and energy development impact mitigation.

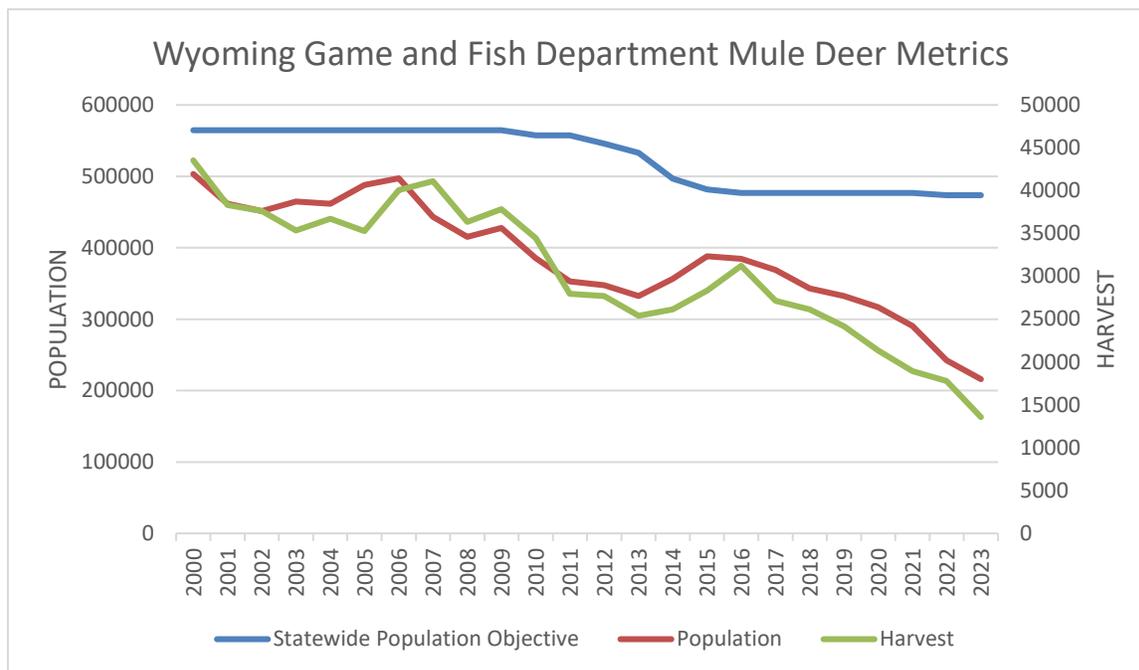


-Samantha Bundick, Washington Department of Fish and Wildlife

## Wyoming

Mule deer populations throughout Wyoming have declined since 2000. Populations appear to be responding in a density-dependent fashion to decreasing habitat availability and/or quality. Since 2000, fawn productivity has decreased statewide and has been below the objective of 66 fawns:100 does 19 times. Postseason buck:doe ratios have trended upward, ranging from 26 to 38 and averaging 32:100 since 2000. Throughout Wyoming, populations have declined by an estimated 329,300 (60%) mule deer since 2000. Due to the decrease in total population numbers, mule deer harvest has declined 69% since 2000. After the 2023 hunting season, the Wyoming Game and Fish Department estimates a total population of 216,000 mule deer in the state. This is 54% below the statewide objective of 473,600 mule deer. This is a significant decrease and is due, in part, to ongoing population declines and the use of a new population model. Beginning in 2022, population estimates are derived using Integrated Population Models (IPM's). This change has resulted in numbers that varied substantially from previous spreadsheet estimates. Within Wyoming's 37 mule deer herd units, one herd was at objective (2.7%), 36 herds were below

objective (97.3%) and no herds were above objective (0%). Harvest has been largely limited to bucks the past several years in response to declining deer numbers.



- Ian Tator, Wyoming Game and Fish Department

## Yukon

There has been no formal annual inventory work on mule deer in Yukon to date. However, we secured funding to survey a large portion of known mule deer range in the Territory in 2024 using a fixed-wing drone with infrared capabilities. The results from this survey will be the first quantitative estimate of deer in the Yukon. Until now, trends in abundance and distribution are monitored primarily through sightings and motor vehicle collision reports. Numbers and distribution have generally been on the upswing since first reports in the early 1920's. The current population estimate of 1,000 territory-wide is a guess based on observations in agricultural areas and from aerial surveys for other species.

This past winter we initiated a pilot study in an 800 km<sup>2</sup> area north of Whitehorse where most permit hunters harvest deer. We installed a grid of 50 wildlife cameras, trapped over 50 deer in box traps, and collared 18 adult does with GPS collars. This pilot project will provide the first movement and habitat use data on mule deer in the Yukon and help plan studies in other populations.

The first deer hunting season was implemented in 2006. Licensed hunters in Yukon must apply for a male-only permit through a lottery system. Interest in the deer hunt continues to be high with 400 to 500 hunters applying for 10 permits issued each year. As of 2010, two additional permits have been available annually to young hunters. First Nation beneficiaries are entitled to harvest deer under their subsistence rights as of the effective date of their settled final agreements. No records of First Nation harvest are available. The licensed harvest for the 2023 hunting season was 7 deer and 23 were killed in vehicle collisions. Generally, the annual licensed harvest ranges between 4 and 9 deer.

-Sophie Czetwertynski, Yukon Department of Environment

**Acknowledgements**

Information in this report was provided by MDWG members from the 24 Western Association of Fish and Wildlife Agencies (WAFWA) and compiled by Luke Meduna. Contributors are listed after their respective state, province, or territorial report. We would also like to thank WAFWA Staff, MDWG Leadership Sponsor Tom Finley, and also Joel Pedersen and Steve Belinda of the Mule Deer Foundation for their support throughout the year.

