# 2023 RANGE-WIDE STATUS OF BLACK-TAILED AND MULE DEER

**Compiled by the 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 is the general population status and trajectory of this species. Because of a general and widespread decline in this species in the 1990s, there is still a perception that black-tailed and mule deer populations are declining range-wide. Population status throughout their range is more complex than that with many jurisdictions recovering after that decline and some declining again recently. We created this document to illustrate that complexity. Herein we provide a quick snapshot of the status of this species 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. Black-tailed and mule deer populations are below agency goals in most jurisdictions, but have been recovering to various degrees for the last decade or more. The last few years have been marked with summer drought and a harsh winter which is reflected in recent population trends. Of the 24 WAFWA member agencies, black-tailed and mule deer populations are increasing in 5, stable in 7, and declining in 12 jurisdictions over the last 3 years.

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[1] | Total Harvest | % Males in Harvest | Hunter Numbers |
|---|---|---|---|---|
| Alberta | 193,300 | 15,117 | 44% | 34,800 |
| Arizona[2] | 80,000 – 90,000 | 6,747 | 99% | 38,410 |
| British Columbia[3] | 100,000 - 170,000 | 9,497 | 95% | 48,681 |
| California[4] | 450,000-500,000[4] | 22,872 | 97% | 177,785 |
| Colorado[5] | 391,900 | 38,049 | 77% | 88,937 |
| Idaho | 281,988 | 23,588 | 83% | 79,516 |
| Kansas | 51,400 | 1,724 | 93% | 17,869 |
| Montana[6] | 249,758 | 42,609 | 78% | 144,740 |
| Nebraska[6] | 60,000-100,000 | 7,381 | 80% | 29,210 |
| Nevada | 68,000 | 5,500 | 87% | 15,500 |
| New Mexico[5] | 80,000 - 100,000 | 9,266 | 98% | 36,748 |
| North Dakota[8] | 16,000 (Badlands) | 8,305 | 55% | 8,493 |
| Oklahoma[9] | 1,750 – 3,000 | 209 | 96% | No Estimate |
| Oregon | 150,000 – 160,000 | 10,294 | 95% | 38,873 |
| Saskatchewan[10] | 65,000 – 85,000 | 11,519 | 46% | 16,300 |
| South Dakota[7,] | 86,500 | 6,816 | 80% | 71,516 |
| Texas | 183,257 | 7,763 | 84% | 30,473 |
| Utah | 335,000 | 27,537 | 93% | 70,173 |
| Washington[11] | 90,000 - 110,000 | 7,264 | 94% | 90,783 |
| Wyoming | 242,500 | 17,785 | 85% | 40,539 |
| Yukon | 1,000 | 10 | 100% | 12 |

[1] Estimated population may be presented as ranges to denote the difficulty and levels of uncertainty in gathering an estimate over a large spatial scale.
[2] Totals for mule deer hunting only.
[3] All data presented are from the most recent year available.
[4] 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.
[5] 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).
[6] Hunter Numbers is based on the proportion of all hunters who reported hunting mule deer.
[7] Hunter Numbers reflects total deer hunters including both mule deer and white-tailed deer hunters.
[8] 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.
[9] Numbers are difficult to estimate as many permits allow the take of mule deer or white-tailed deer.
[10] Estimates are from 2022 Report.
[11] General season only. Estimate of Hunter Numbers reflects all deer hunters; WA does not estimate hunters by species or subspecies.

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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[1] | Total Harvest | % Males in Harvest | Hunter Numbers |
|---|---|---|---|---|
| Alaska[2] | 326,200–335,200 | 12,620 | 83% | 12,046 |
| British Columbia[3] | 98,000 - 155,000 | 5,618 | 85% | 12,148 |
| Hawaii[4] | No Estimate | 30-50 | 50-60% | No Estimate |
| Oregon | No Estimate | 22,751 | 89% | 84,877 |
| Washington[5] | No Estimate | 10,080 | 90% | 90,783 |

[1] Estimated populations may be presented as ranges to denote the difficulty and levels of uncertainty in gathering an estimate over a large spatial scale.
[2] 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.
[3] All data presented are from the most recent year available.
[4] Estimates are reported for the 2022 hunting season.
[5] 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.

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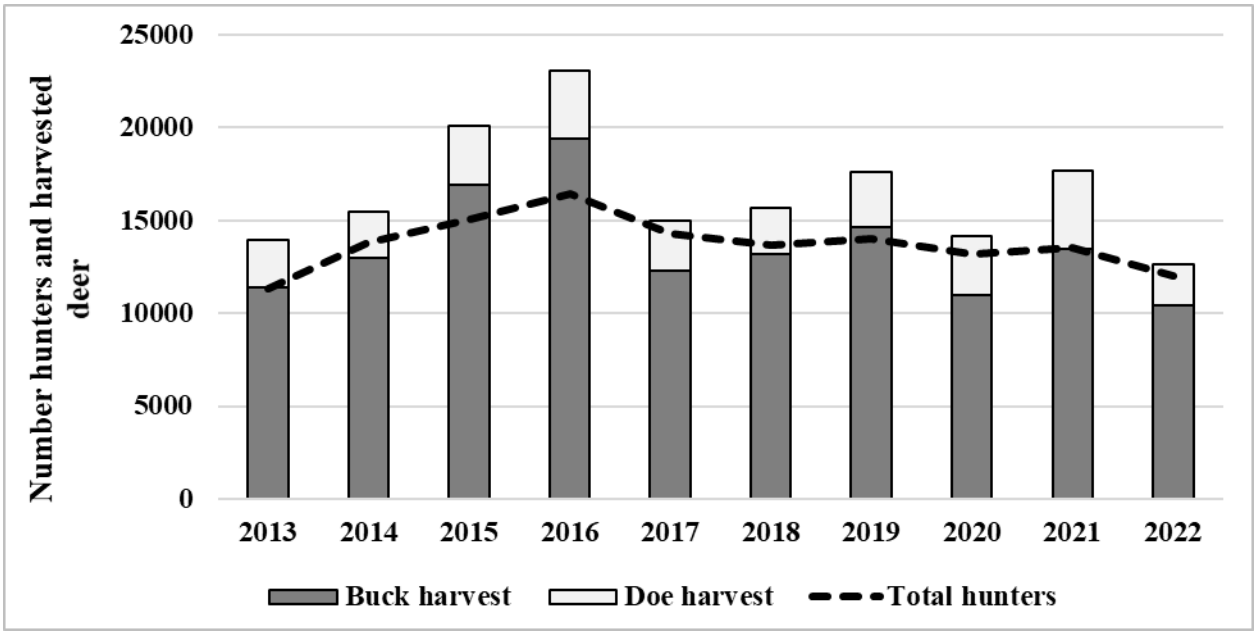


*Fig. 1. Statewide Sitka black-tailed deer harvest for regulatory years 2013–2022, Alaska.*

-Tessa Hasbrouck, Alaska Department of Fish and Game

**Alberta**

The 2022 pre-hunting season population estimate of mule deer in Alberta was 190,300. This represents a slight decrease from the 2021 estimate of 193,000. A provincial estimate was not calculated for 2023, but populations were stable prior and are expected to have remained stable in 2023. 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 has been stable over the last 6 years, ranging from 97,000 to 102,000. Antlerless mule deer special license applicants were stable around 43,000 from 2017 to 2020, and then jumped to 53,000 in 2021and increased again in 2022 to nearly 56,000. Based on voluntary hunter harvest surveys for the 2022 hunting season 34,800 mule deer hunters in Alberta directed an estimated 213,930 days hunting mule deer, producing an estimated harvest of 15,117 mule deer (~44% antlered deer).

In 2022 Alberta confirmed the intent to manage mule deer 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 resulted in a drop in the percentage of males in the harvest to 44% in 2022 from 55% in both 2021 and 2020. For 2023, there will be nearly 35,000 licenses allocated for mule deer, of which 30% are for antlered animals. 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-

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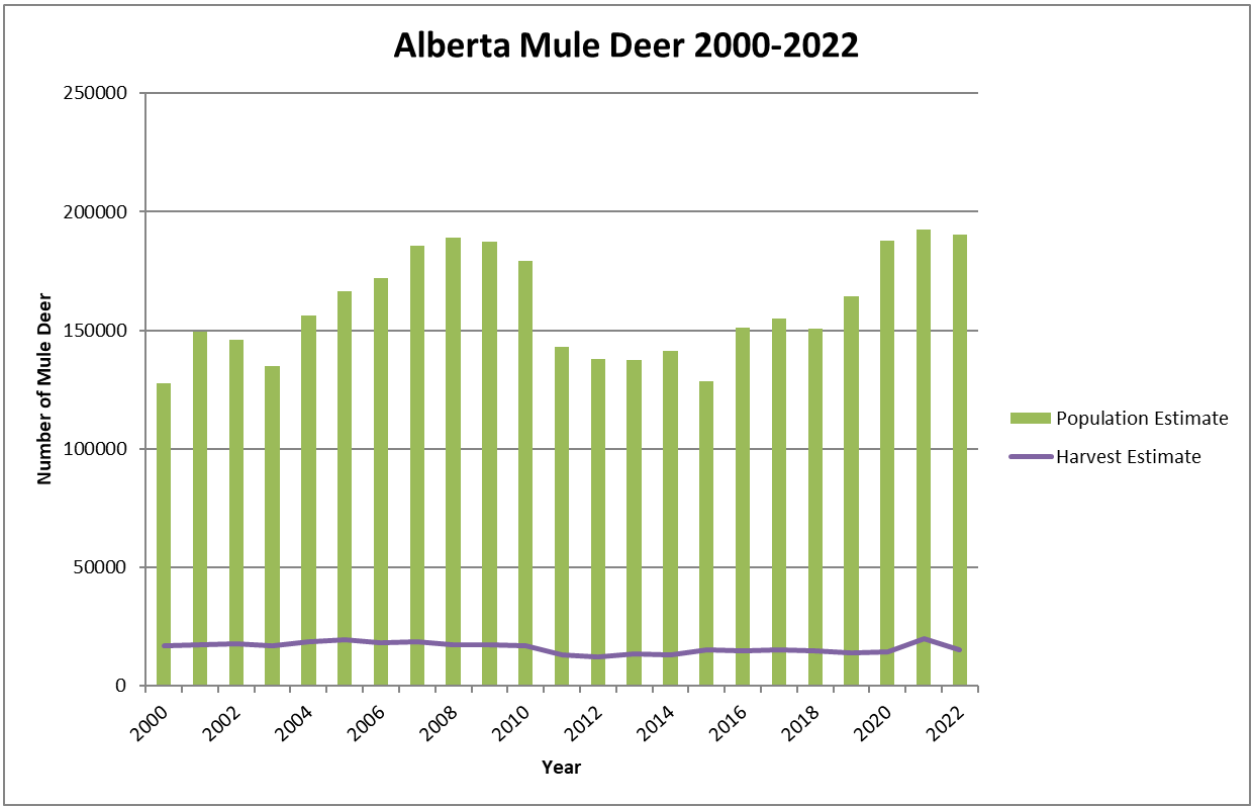
guide allocations. There is an unknown number of rights-based hunters in Alberta that do not require a license to hunt for sustenance and thus information on effort and harvest by these groups are unknown.

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 2022 results are 15.8% positives (n=4,517) and the discovery of CWD in one additional WMU. 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, Parks and Tourism – Hunting and Fishing Branch

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## Arizona

In 2022, 6,747 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 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 2022, hunter response rates were at 39.3%, and hunter harvest was estimated using the voluntary mail questionnaire that provided 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. The Arizona Game and Fish Department is working towards employing text messaging starting with the 2023 hunts as another approach to increasing hunter response rates.

Buck:doe ratios for mule deer were managed at 20–30 per 100 and currently the statewide average is 21. 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 43 which is within management guidelines (40-50) and is the first observed increase in recruitment after a steady decline between 2016 and 2021.

Significant harvest reductions have been recommended for the last three years (2021 – 2023); limited draw permits were reduced by 8,395 across the state, a 20% 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 2023 and 2024 seasons.

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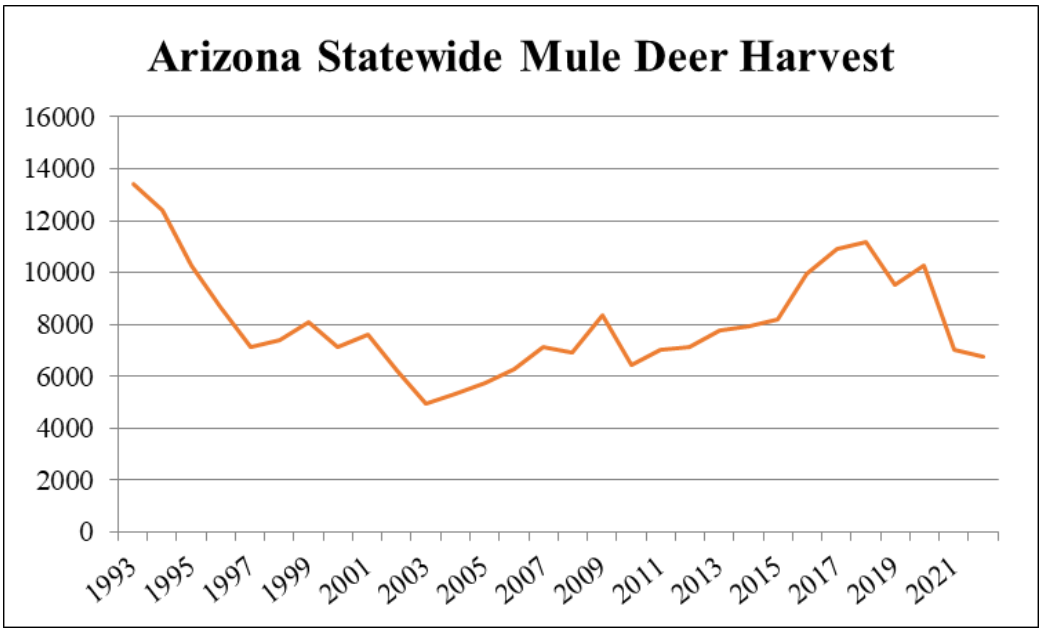


*Figure 1. Statewide Mule deer harvest estimates in Arizona from 1993-2022.*

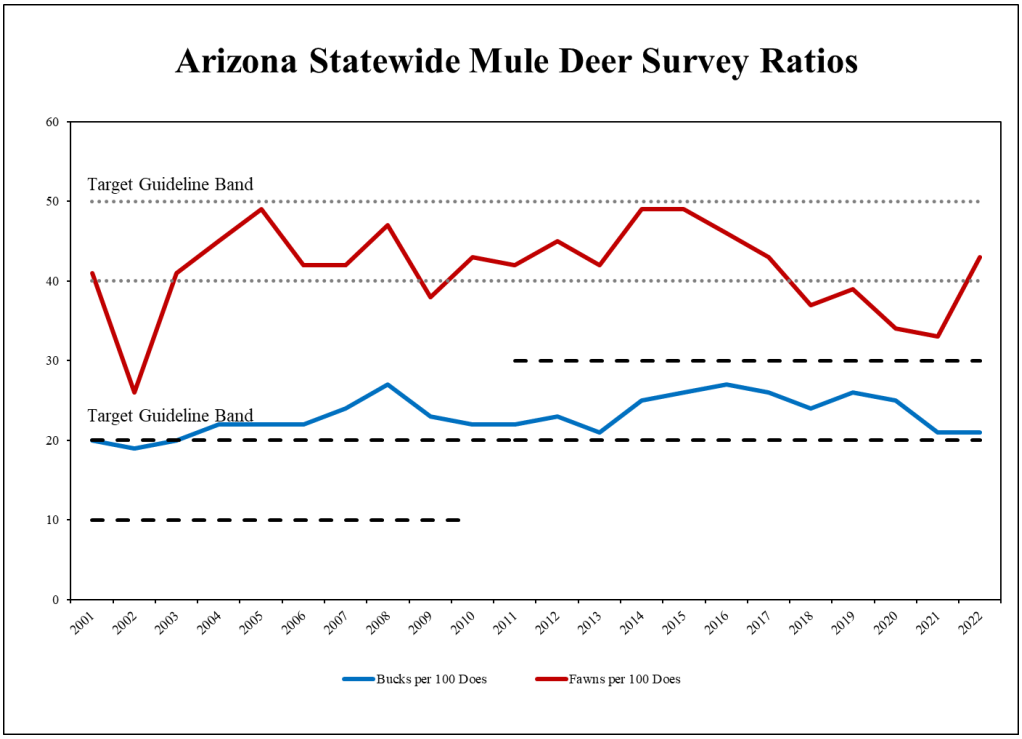


*Figure 1. Statewide Mule deer buck to doe and fawn to doe ratios in Arizona from 2001-2022. Guidelines for buck to doe ratios target between 20-30 bucks per 100 does. Guidelines for fawn to doe ratios target between 40-50 fawns per 100 does.*

-Callie Hartson-Cavalcant, Arizona Game and Fish Department

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**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 and 2021 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 buck harvest had 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. Recent declines in hunter numbers and harvest coupled with an increase in hunter effort and poor juvenile survival suggest overall declines in populations. Meeting the provincial management objective of 20 bucks per 100 does has become increasingly challenging with declines in fawn recruitment in some areas and recent increases in road density and hunter access. Changes to habitat quality and predator-prey dynamics might also be affecting population growth in much of the province.

A five-year research project initiated in 2018 is entering its fifth 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). Survival rates of adult does and fawns suggest declining populations in the Boundary study area.

The winters of 2019, 2020 and 2021 were considered relatively mild with 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 survival relative to habitat selection, 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) is a new on Vancouver Island in recent years. AHD, coupled with heavy snow and abnormally cold winters have impacted overwinter survival, particularly of juveniles. Predation from wolves and cougars on black-tailed deer continues to be a concern 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 agricultural areas. In general, Columbian black-tailed deer numbers are thought to be

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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. Maintaining or increasing deer populations will remain challenging given current predator densities and lack of measures available to mitigate disturbance and improve seasonal ranges.

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 Columbian black-tailed deer populations in British Columbia. This has reduced both the biomass of understory plants and diversity of vegetation on parts of the islands. 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.

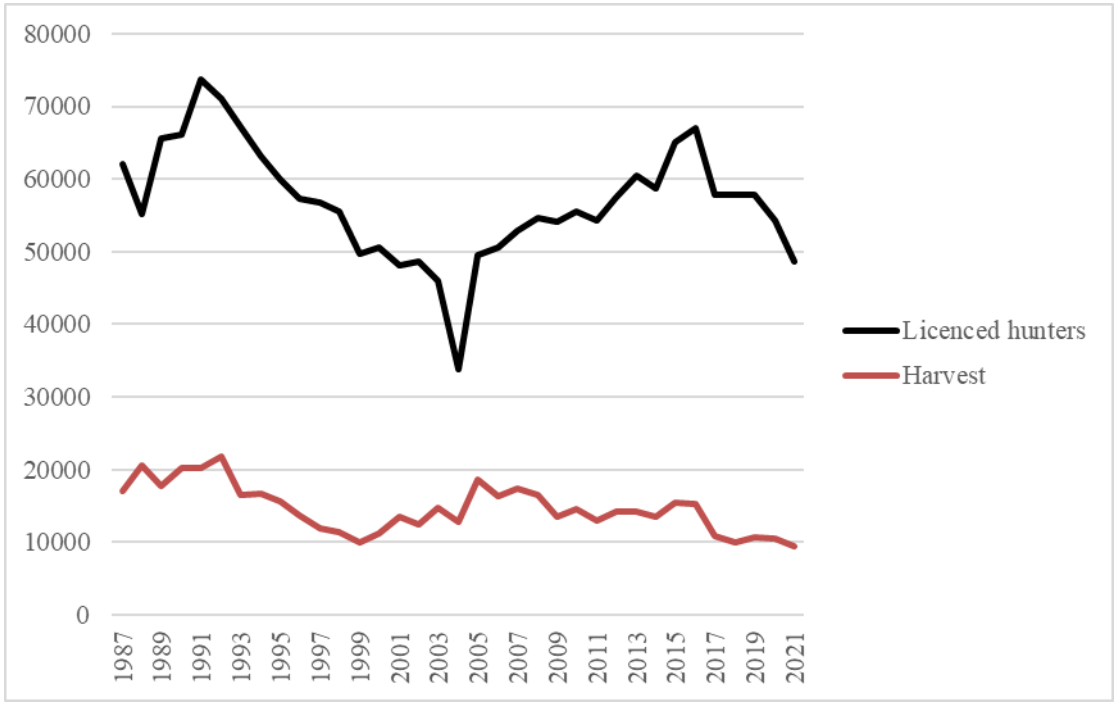


*Figure 1. Mule deer hunter and harvest estimates in British Columbia from 1987-2021.*

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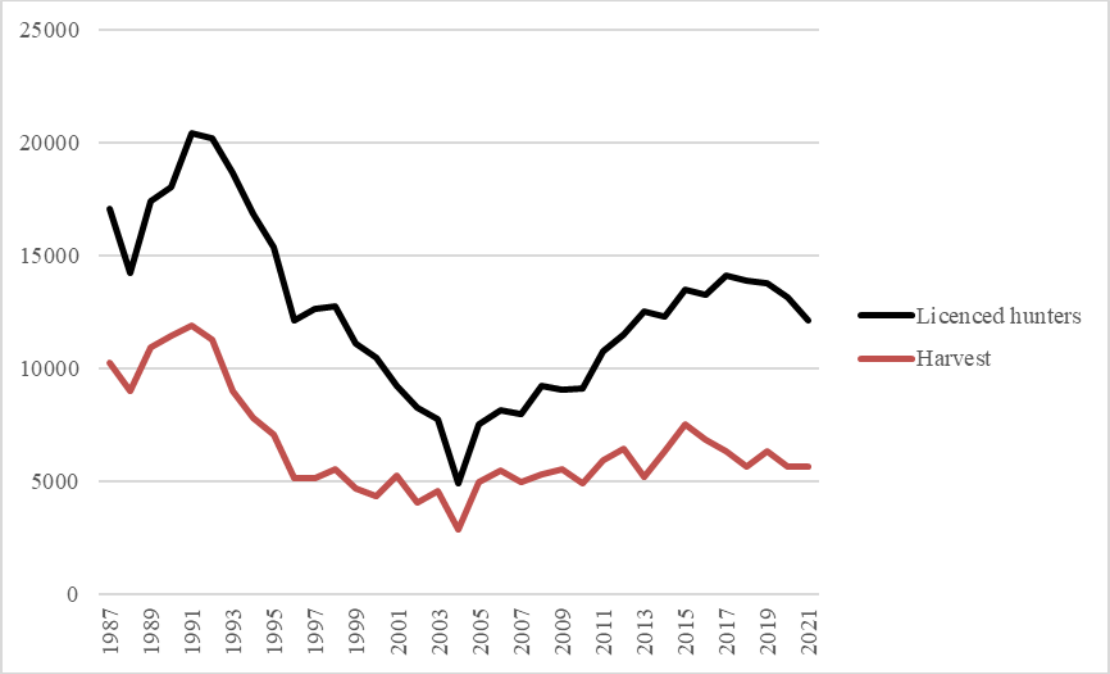


*Figure 2. Black-tailed deer hunter and harvest estimates in British Columbia from 1987-2021.*

- Andrew Walker, British Columbia Ministry of Forests

**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

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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.

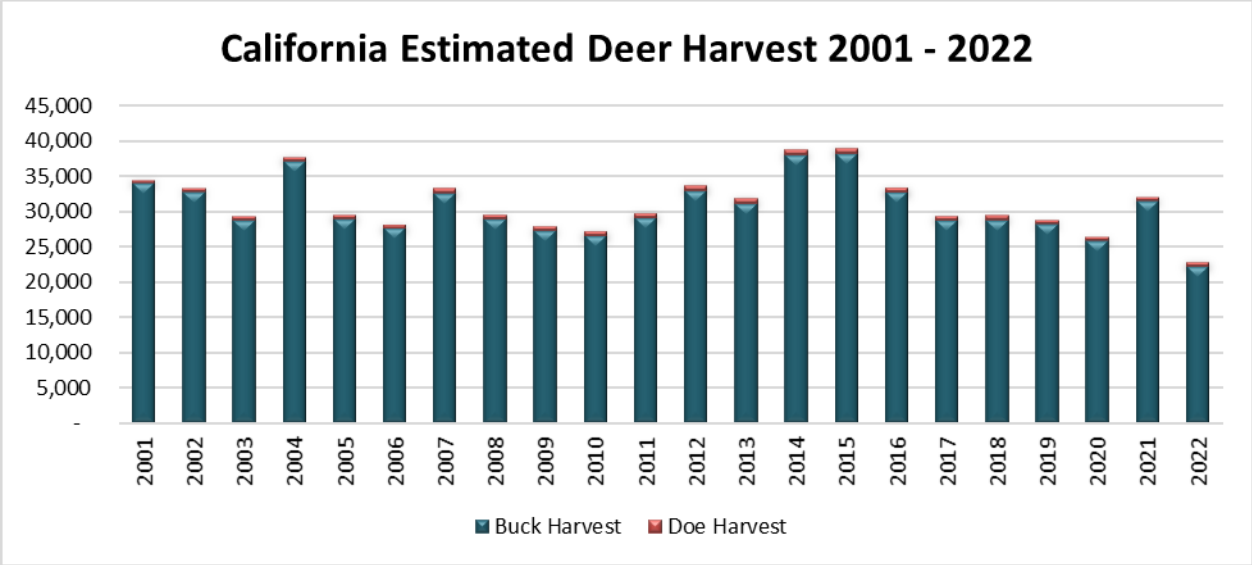


*Figure 1. Harvest estimates of California deer 2001 - 2022.*

- Brian Leo, California Department of Fish and Wildlife

## Colorado

The Colorado statewide post-hunt 2022 deer population estimate is 392,000, down from 416,000 last year (Figure 1). Over the last 3 years, the statewide population estimate for mule deer is on a declining trend. This decline will continue for 2023 because the winter of 2022-2023 was above average in severity on the entire Western Slope and was extremely severe in the northwestern portion of the state.

Over the last 10 years the population has been stable, averaging 418,000 (Figure 1). The decade prior to that was marked by significant declines in some of the large westernmost herds in

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the state. The sum of statewide population objective ranges is 431,000-521,000 for all 54 deer herds combined. In 2022, only 15 of 54 (28%) 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.

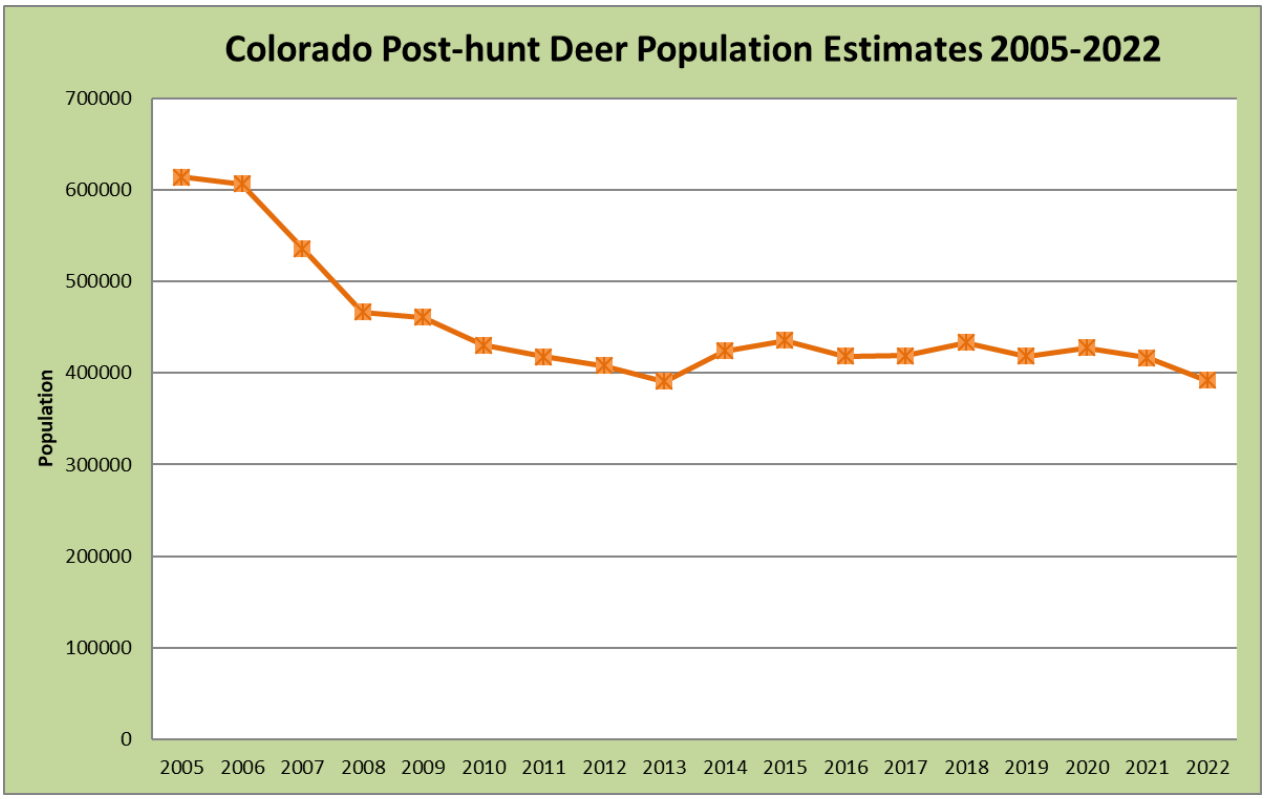


*Figure 1. Colorado post-hunt deer population estimates from 2005-2022.*

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 83% and over-winter fawn survival has averaged 69%. Since 2008, annual buck survival in two of the five monitoring areas has averaged 79%.

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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 2022, CPW staff classified 86,809 deer and observed an average sex ratio of 30 bucks/100 does weighted by population size (Figure 2), compared to 29 bucks/100 does in 2021. Buck/doe ratios have responded to our management actions (Figure 2). The statewide average observed age ratio from helicopter inventory was 60 fawns/100 does, the same as observed in 2021. Figure 3 shows 5-year average fawns/100 does mapped by herd.

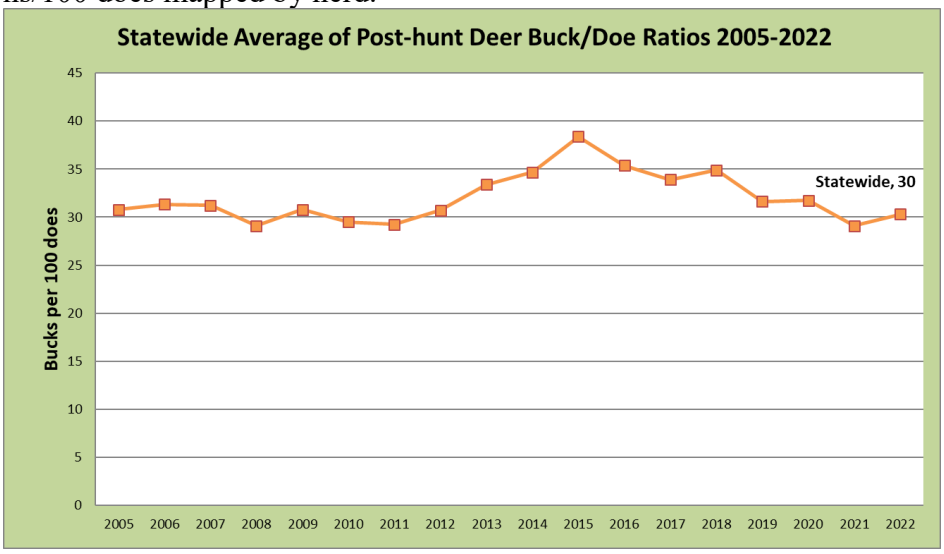


*Figure 2. Colorado statewide average of observed post-hunt bucks/100 does for 2005-2022 weighted by herd population size.*

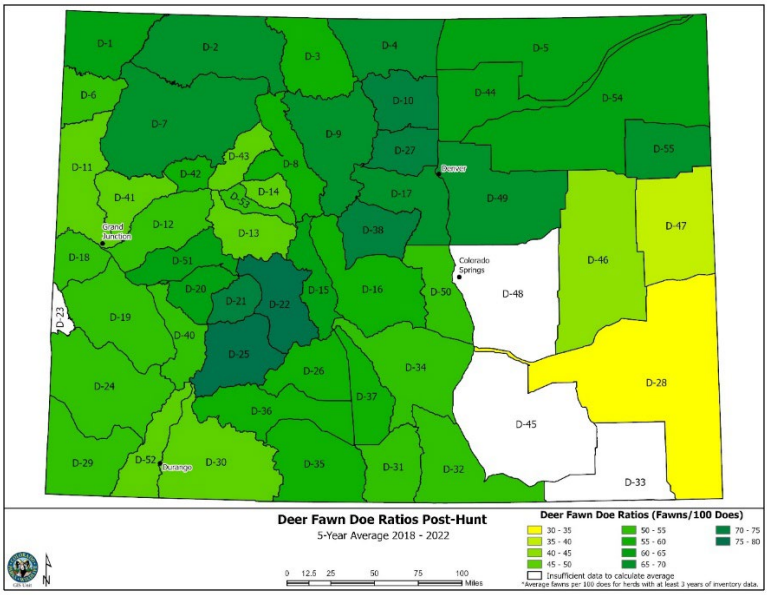


*Figure 3. Colorado 5-year average fawns/100 does by herd.*

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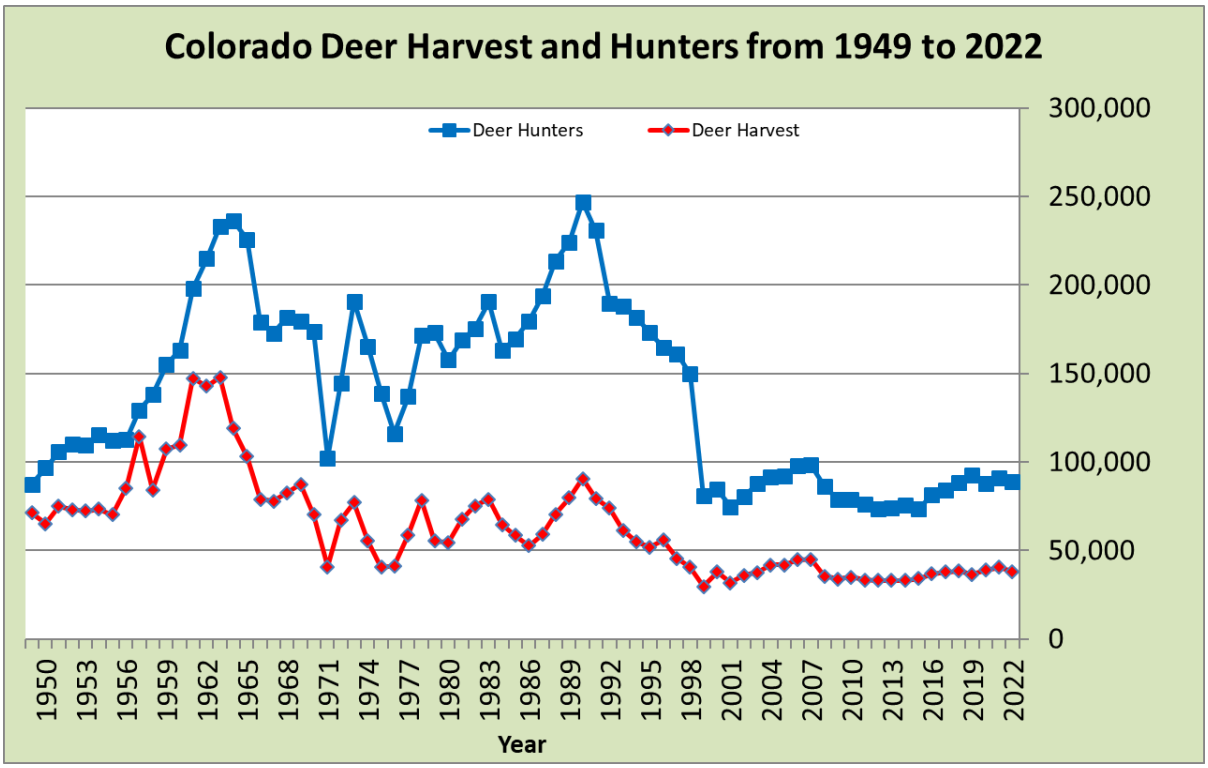


*Figure 4. Colorado statewide hunters and harvest from 1949-2022.*

Since 1999, all mule deer hunting in Colorado is by limited license only. In 2022, the estimated harvest from 88,937 deer hunters was 38,049 (Figure 4). Based on observed post-hunt sex ratios and an average hunter success rate of 47% for all rifle seasons in 2022, 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)** ***2022 Information***

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

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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.

| Year | Buck | Doe | Total |
|---|---|---|---|
| 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[1] | 4 | 0 | 4 |
| 2013[1] | 5 | 0 | 5 |
| 2014[2] | 36 | 0 | 36 |
| 2015[3] | 36 | 15 | 51 |
| 2016 | 37 | 33 | 70 |
| 2017 | 31 | 24 | 55 |
| 2018 | 25 | 7 | 32 |
| 2019 | 22 | 15 | 37 |

[1] Two units closed to deer hunting due to wildfires
[2] All units reopened to deer hunting
[3] Two units open to year-round deer hunting

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

**Idaho**

Mule deer populations in Idaho have reflected decreased winter severity through Spring 2022 however winter 2022/2023 was severe in some locations and decreased adult and fawn survival was documented. Reductions in antlerless hunting opportunities beginning in 2017 have continued across several regions in southern Idaho. Mild conditions over the previous two winters resulted in improved overwinter fawn survival however mule deer survival for the 2022-2023 winter was below the long-term average and similar to the 2010/2011 and 2016/2017 winter which were also had severe conditions with early persistent snow and extended periods of colder than normal temperatures.

The state continues the process of converting population monitoring techniques to allow total population estimates through a combination of sightability, 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

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2021/2022 population levels increased to approximately 249,691 mule deer south of the Salmon River drainage and further increased to 281,988 to an estimated as of January 1, 2022.

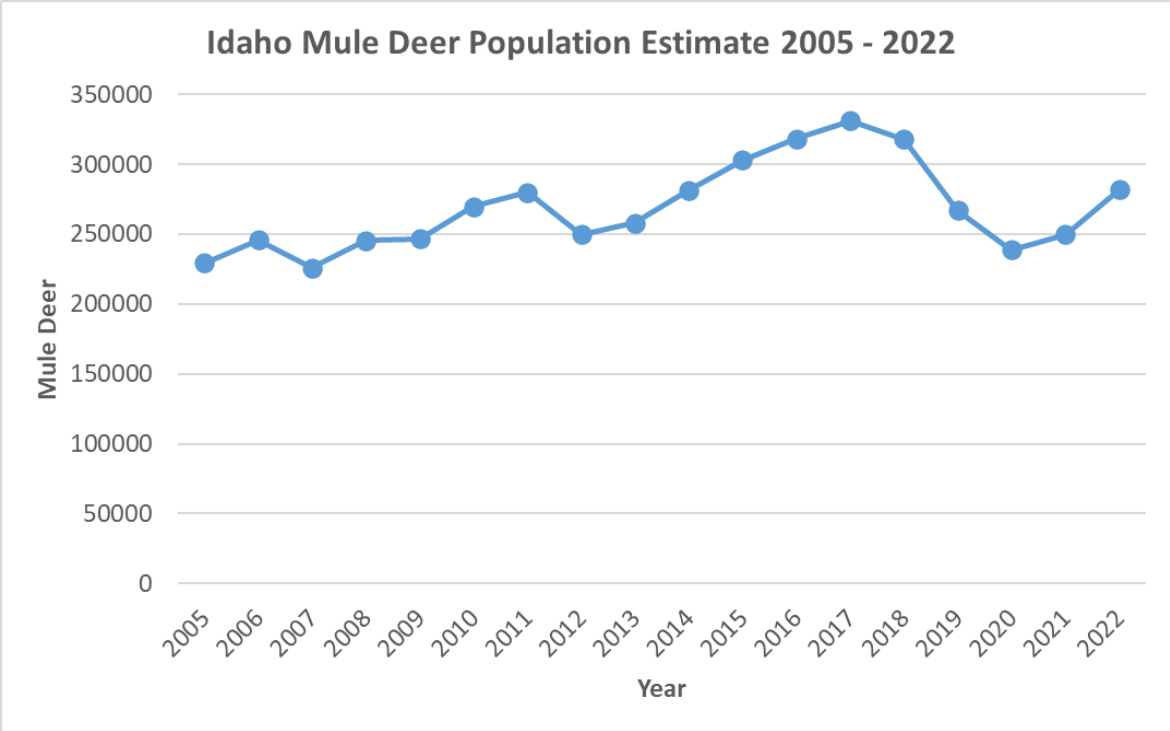


*Figure 1. Mule deer population estimates from the Salmon River drainage south. Estimates are midpoint of confidence limits based on an integrated population model.*

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 2022 surveys.

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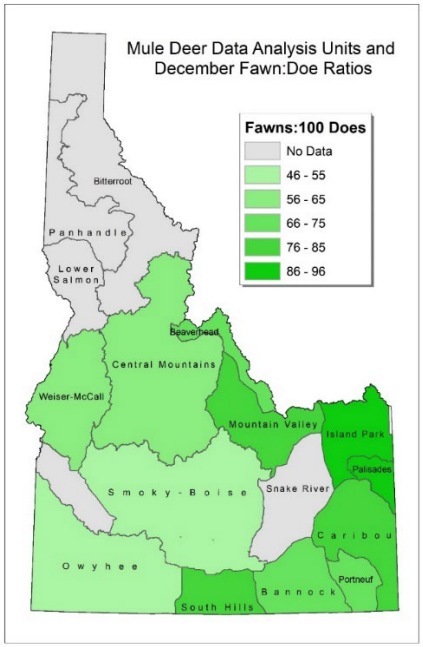


*Figure 2. Most recent fawns:100 does by mule deer data analysis unit (2019-2020)*

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 59% in 2022.

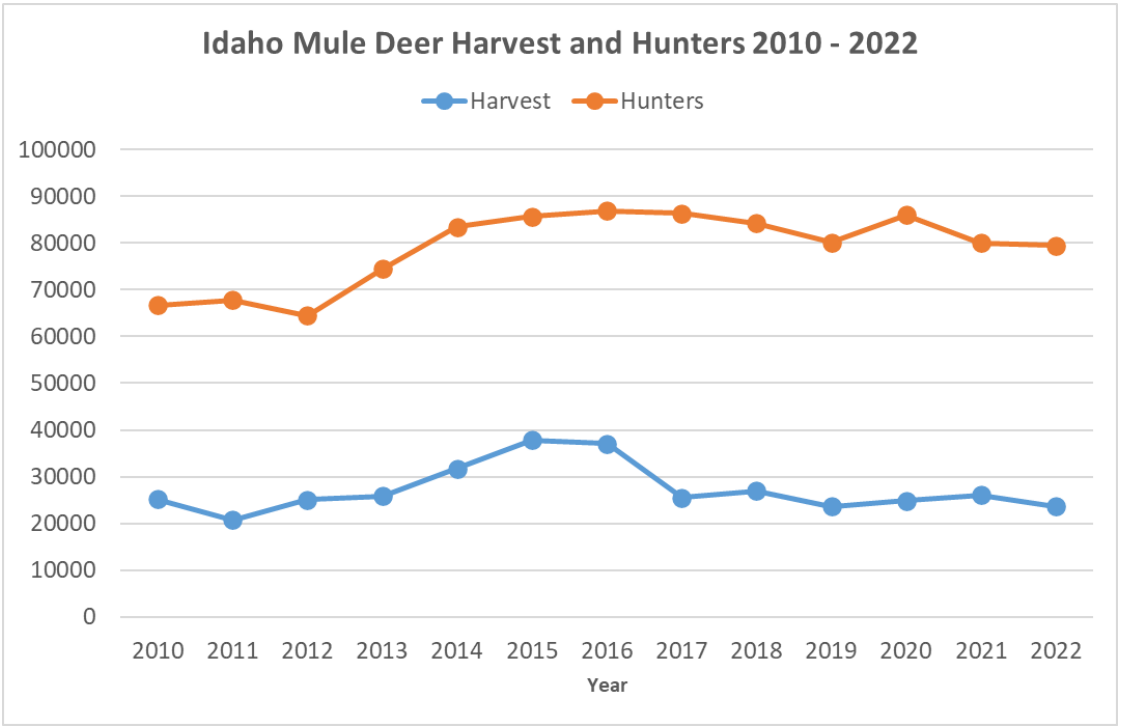


*Figure 3. Total Idaho Mule Deer Harvest and Mule Deer Hunters, 2010 – 2022*

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In conjunction with the University of Idaho, a five-year survey assessing hunter congestion issues among deer and elk hunters is currently being conducted. Results from the 2019, 2020 and 2021 hunting seasons are currently being analyzed. Surveys will continue in 2023 and 2024 to cover the 2022and 2023 hunting seasons.

Idaho detected their first CWD positive case in November 2021. It was found during one of our random rotational sampling areas of the state, not in the 2 sampling areas that have been prioritized by their proximity known detections in Wyoming and Montana. The department has taken steps to increase harvest to attain more samples and conducted a removal effort in March 2023. So far, we have detected CWD in mule deer, white-tailed deer and one elk. During the 2022 hunting season sample prevalence was 1.2% for mule deer and 3.3% for white-tailed deer in a portion of GMU 14. After the hunting season the department conducted a control action during which we collected 526 samples consisted of 9 elk, 178 mule deer and 342 white-tailed deer with prevalence of 1.2 % in mule deer and 7.0% in white-tailed deer samples with zero detection in the elk tested during the control action. Beyond GMU 14, where we first detected CWD, sampling effort is also focused on northern and eastern Idaho due CWD-positive ungulates in neighboring Wyoming and Montana. Additional geographic areas in Idaho are sampled on a rotational basis. Idaho will continue to monitor and adaptively manage ungulate populations in the affected area to reduce and maintain low prevalence and reduce the spread of the disease from the positive area. Since July 1, 2022, 3950 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 2022 was estimated to be 1.9 mule deer/mile$^2$ (95% CI: 1.3 – 2.9) while the density in the eastern zone was estimated to be only 0.11/mile$^2$ (95% CI: 0.03 – 0.44) resulting in a pre-firearm season total population estimate of 51,400 ± 11,800 mule deer. In the west zone, the mule deer buck:doe ratio was 30.9B:100D. In the east zone the buck:doe ratio was 133.3B:100D, although the reliability of the estimate is questionable due to the small sample size of 15 mule deer observed. Fawn:doe ratio in the west zone was 11.9F:100D; in the east zone 100F:100D, again the east zone sample size was small and reduces confidence in the accuracy of the estimate. The low reproduction rate of mule deer in Kansas is a concerning trend.

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 16.8% of the either sex deer permits issued in Kansas last year. Landowners received 47.5% of those permits. Each of those permits allowed only one deer to be

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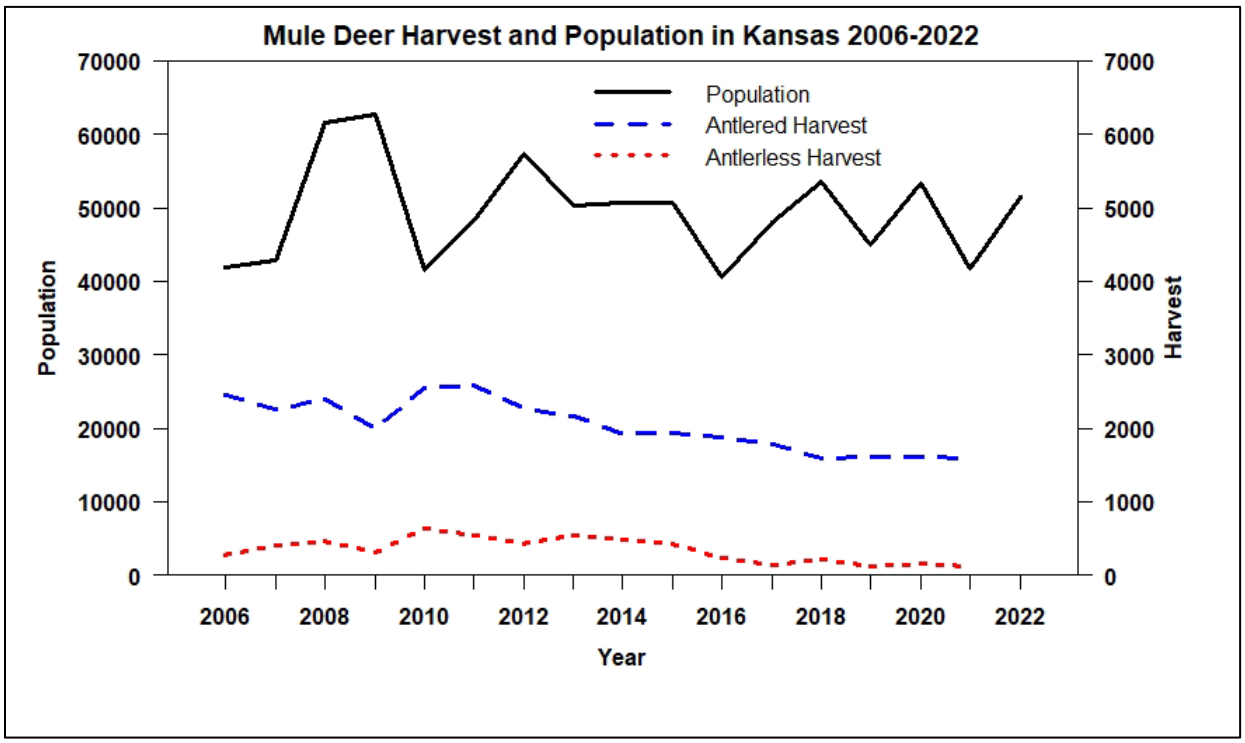
taken but it could be either a mule deer or a white-tailed deer. By allowing either species to be taken, the permit system generally takes hunters out of the field earlier in the season as compared to a mule deer only permit system and takes pressure off mule deer while allowing approximately 17,000 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 2,125 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 2022, for the sixth 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 ± 0.05 and firearms hunting was the main source of mortality. Adult female survival was 0.78 ± 0.03. Mule deer fawn 10-week survival was 0.28 ± 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, 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

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from low genetic diversity and that there is some hybridization between mule deer and white-tailed 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 (FWP) 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, FWP 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 approximately 25,000 non-resident opportunities valid across most of the state during a 6-week archery season followed by a 5-week rifle season. Therefore, 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 2022, the statewide mule deer buck harvest estimate was 33,292; this was below the 1960-2021 average of 44,910 (Figure 1).

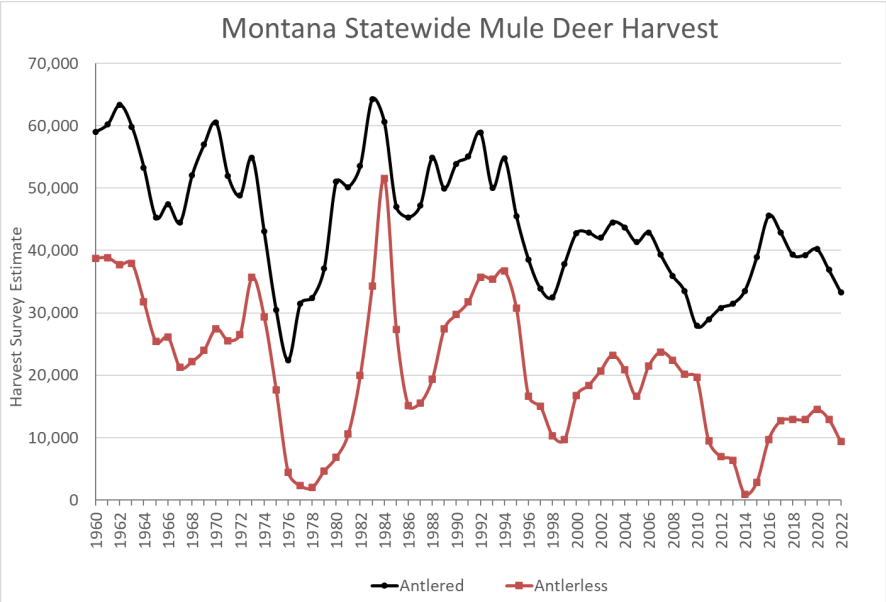


*Figure 1. Montana statewide mule deer harvest, 1960-2022.*

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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 2018-19 and from severe widespread drought conditions more recently. Following the 2022 hunting season, the statewide average buck:doe and fawn:doe ratios were 23:100 and 47:100, respectively.

Within the state, long-term mule deer populations have varied. Those across the western 1/3 of the state, in the mountain/foothill environments, have generally trended down and remain below historic highs and averages. Habitat changes facilitated by conifer forest succession, over-utilization of browse resources by mule deer, and increased resource competition from growing populations of elk and white-tailed deer are thought to be primary influencers of mule deer trend across the mountain/foothill environments. On the contrary, populations across the eastern 2/3 of the state, in the prairie/breaks environments, have generally remained stable or increased.

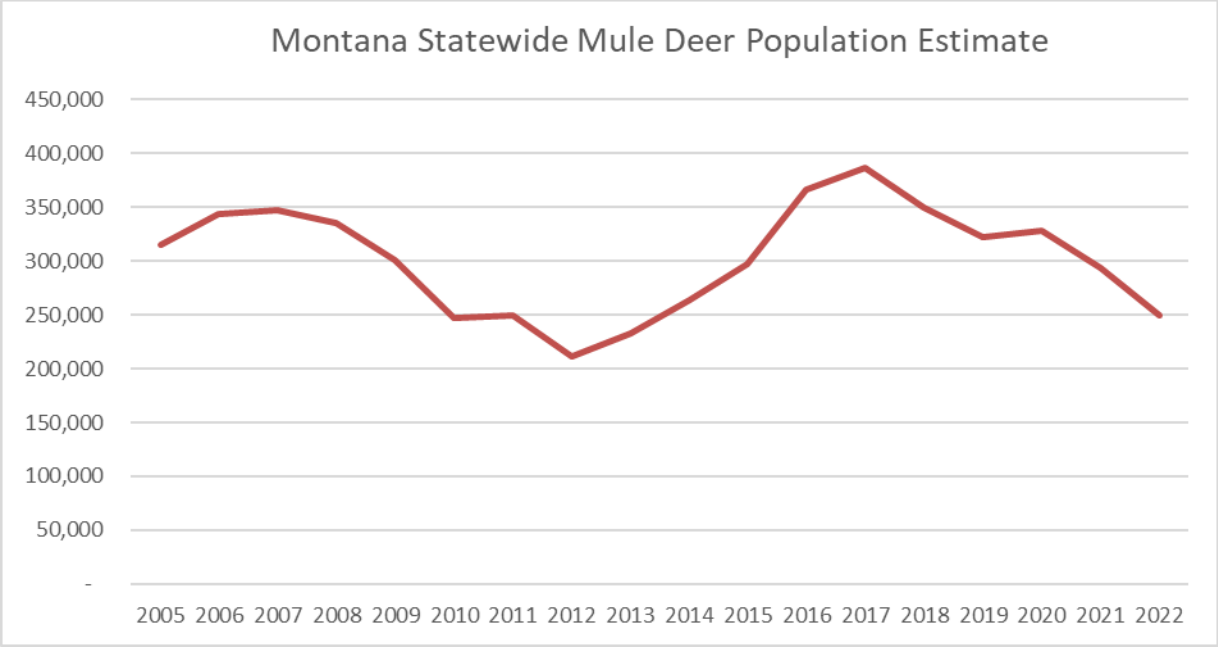


*Figure 2. Montana statewide mule deer population estimate, 2006-2022.*

The statewide estimate for deer (mule and white-tailed) hunters was 144,740 in 2022, which is the lowest number since 2014 (144,638), the second lowest since 1986 when FWP began consistent deer hunter number estimation. Deer hunters in 2022 were well below the 1986–2021 average of 162,492. 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 determined by following guidelines outlined by the state's Adaptive Harvest Management (AHM) plan. This plan

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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).

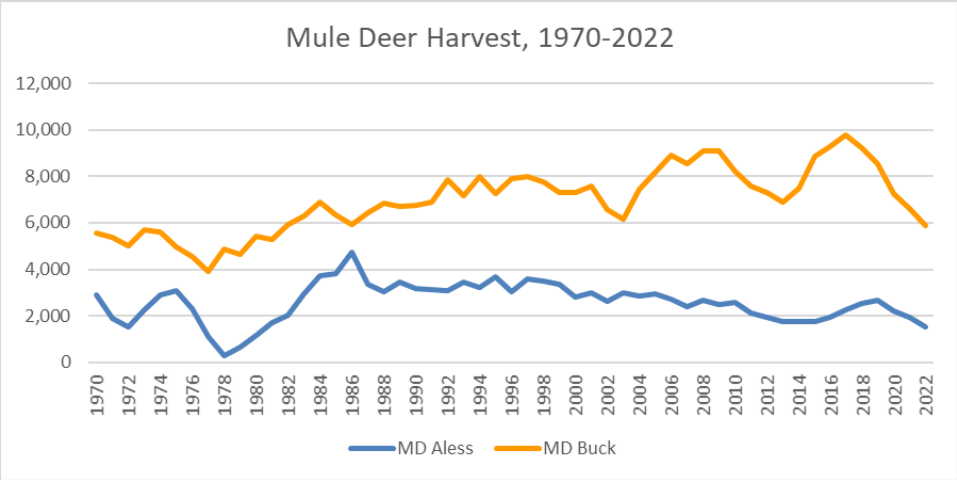
-Lindsey Parsons, Montana Fish, Wildlife & Parks

**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 have 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 5,878 in 2022, an 11% decline from 2020 and 40% down from the high in 2017 and the lowest buck harvest since 1981. Antlerless mule deer harvest was 1,503 in 2021. Total deer harvest in 2021 was 47,212 in Nebraska, of which 16% were mule deer. Mule deer harvest exceeds white-tailed deer harvest in 3 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 the target of 60%. However, fawn rates have declined over the past 5 years and the buck ratio dropped below 20 last year. 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.

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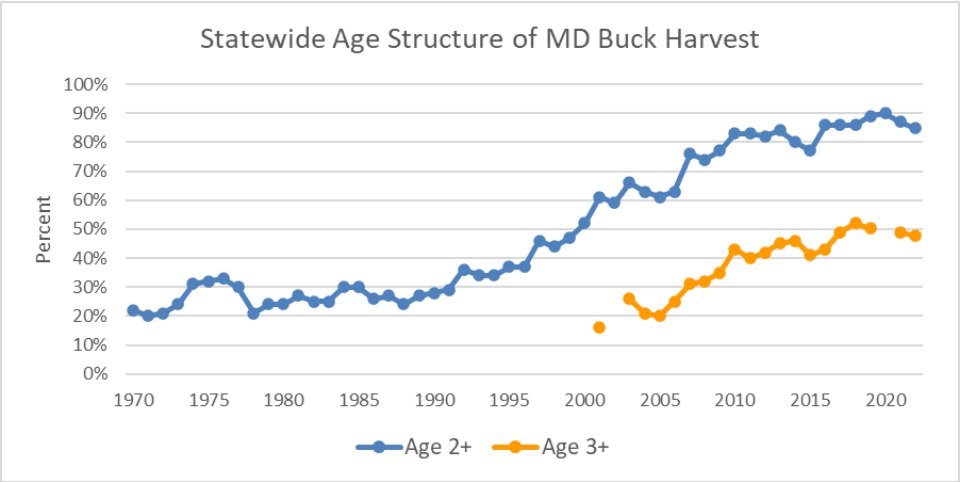


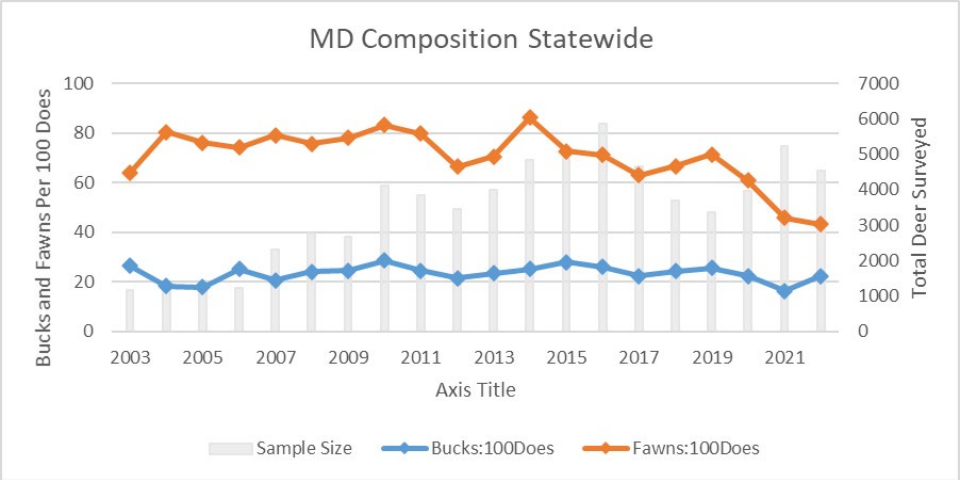


-Luke Meduna, Nebraska Game and Parks Commission.

**Nevada**

The Nevada Department of Wildlife (NDOW) issued approximately 15,500 mule deer tags for the 2022 hunting season. The number of tags has steadily decreased over the past 20 years and represents the third lowest number of tags issued since 1974. The overall success rate for Any Legal Weapon seasons was 35% statewide, which is below the 3-year average success rate of 38%. Muzzleloader and archery hunt success rates were 31% and 14% respectively, which were both below the 3-year averages of 35% and 16% for those weapon categories. Junior hunters realized a success rate of 51%, which was below the 3-year average success rate of 56%. Overall, about 4,850 bucks and 650 does were harvested by all hunters and 37% of the bucks harvested were 4-points or greater. The statewide average for bucks with 4-points or greater has been on a steady decline since 2019 when the statewide average was 45%.

During 2022, biologists classified approximately 18,128 mule deer during the fall survey. Statewide fawn production was 54 fawns per 100 females for post-season surveys, compared to 47 fawns per 100 females during the fall of 2021. The observed post-season buck ratio was 31 bucks per 100 does for 2022, which is slightly higher than the 5-year average of 30 bucks per 100 does. The observed spring fawn ratio of 30 fawns per 100 adults was equal to the 5-year average

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of 30 fawns per 100 adults. This was somewhat surprising, given that the winter 2022-23 experienced well above average snowfall and cold temperatures into the later spring months of March and April.

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. For the third year in a row the state of Nevada experienced extreme drought conditions for most of the state until early autumn of 2022. However, many areas of the state experienced well above average precipitation starting in September through October. Early snowfall started to accumulate in

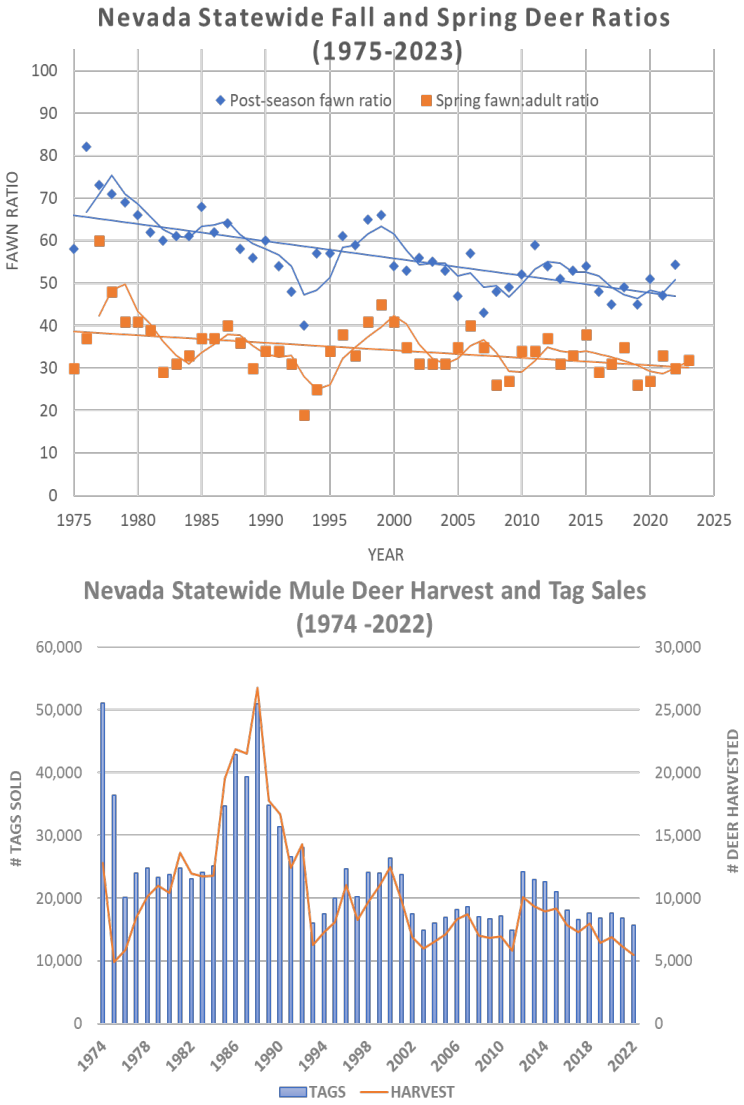


Figure 2. Trends in statewide mule deer fawn:doe ratios for Nevada, 1975 to 2023 (top panel). Number of mule deer tags sold (bottom panel) and total deer harvested by year from 1974 to 2022.

November and December in the northern regions. As of April 15, 2023, the Natural Resources Conservation Services (NRCS) snotel sites for Nevada ranged from 195% to 390% of median snow water equivalent. Some regions including the Ruby Mountains and Sierra Nevada ranges

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experienced the highest snowfall ever recorded as of April 1, 2023. Those regions experienced some of the lowest spring fawn ratios observed throughout the state and adult mortality was expected to be higher than average in those regions.

Nevada's mule deer populations have continued to decline over the past decade largely due to lack of consistent precipitation, large-scale range fires, conversion of native shrubs to invasive grasses, and degraded range conditions from feral horses and burros. Nevada's statewide population estimate for 2023 is 68,000 which is the lowest estimate on record since 1974. We have been on a steep downward trend since 2020 when we estimated about 98,000 mule deer statewide.

-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. New Mexico has been in a long-term drought which has resulted in reduced recruitment. Moisture and growing conditions in recent years have altered between above average moisture and drought, but there have been enough beneficial moisture years to allow the population to remain stable throughout the state with local variation. The 2022 summer monsoons were very robust in New Mexico, and we saw major improvements in vegetative health, soil moisture, and streamflow. The 2023 spring moisture has been also above average for the state. In addition, New Mexico experienced 3 major wildfires in 2022. Two of which were the biggest wildfires in state history. It is currently unknown how the 2022 fire season will impact deer populations.

Post-hunt aerial surveys are conducted annually in December for select Game Management Units (GMUs). The 2022 statewide buck:doe ratio was 31 bucks:100 does (Fig. 1); this is at the long-term average. State wide fawn recruitment has been higher than the long-term average in the last few years with an estimated 49 fawns:100 does in 2022. Because of consecutive years of good precipitation and fawn recruitment, many populations should start increasing throughout the state.

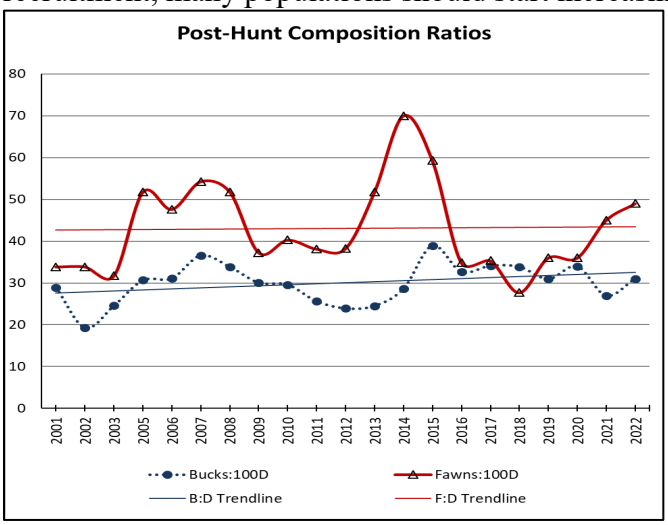


*Figure 1. New Mexico statewide composition ratios obtained during post-hunt winter surveys from 2001-2022.*

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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 31,415 hunters harvested 9,266 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 29% during the 2022-2023 hunting season for all weapon types combined. This is slightly lower than the long-term average success rate for deer hunters in New Mexico (31%; 2006-2022). License allocations were slightly reduced for many southeastern GMUs for the 2023 hunting season.

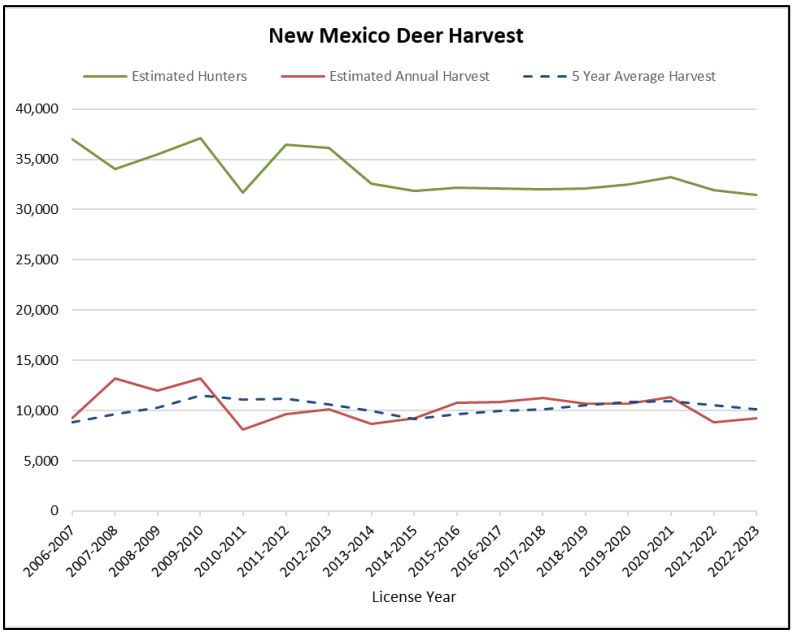


*Figure 2. Estimated annual deer hunters and harvest in New Mexico 2006-2022.*

-Orrin Duvuvuei, New Mexico Department of Game and Fish

## North Dakota

North Dakota's badlands mule deer population has declined due to extreme winter weather conditions during 2022/2023. Winter severity index was second highest on record and resulted in lower overwinter survival of mule deer in the badlands. The 2023 spring index was 29% lower than the 2022 index, and 5% below the long-term average. Mule deer abundance was trending upward since 2019 before this extreme winter event.

North Dakota has a limited quota license system and a goal of maintaining at least 30 bucks:100 does prior to the 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. Mule deer fawn production is expected to decline following extreme winter of 2022/2023.

The mule deer buck:doe ratio has remained stable and above objective since 1999. Mule deer are currently slightly above the objective of maintaining at least six deer per square mile in

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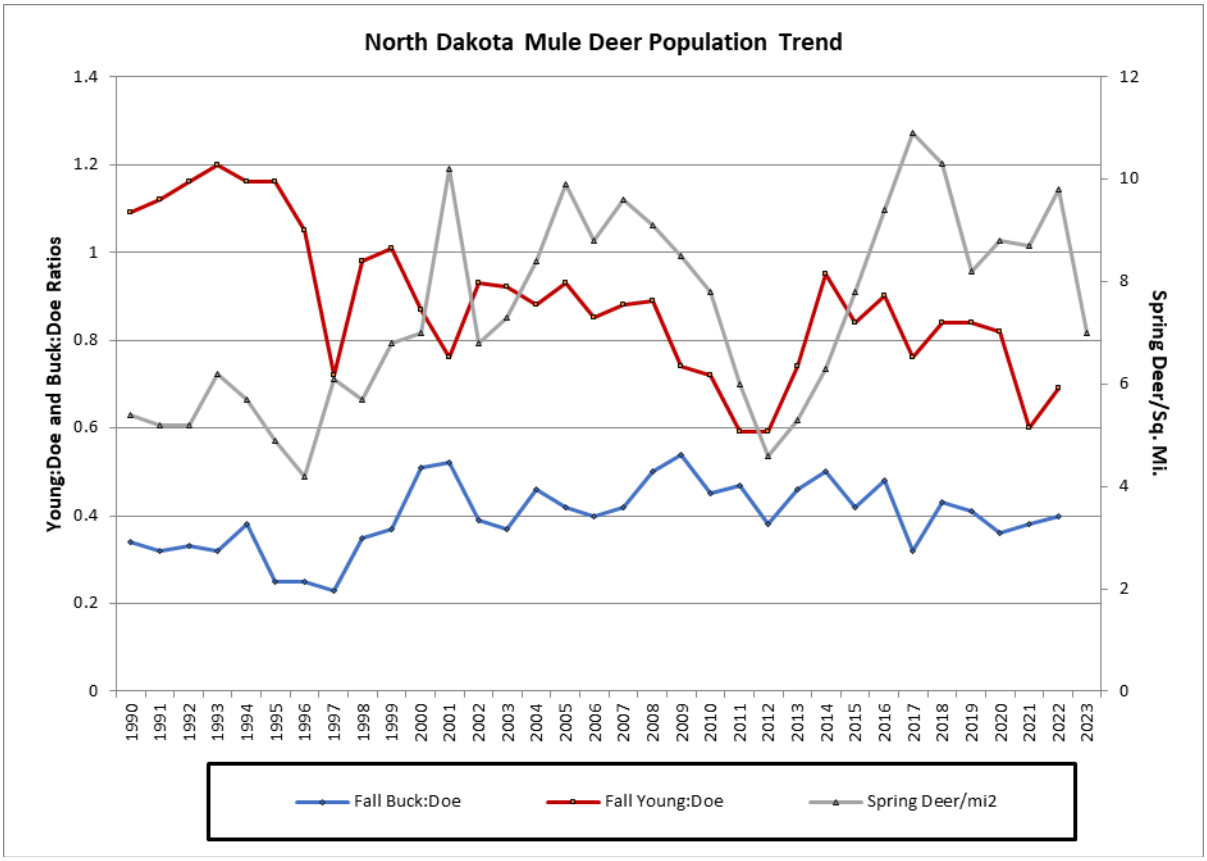
the badlands. A conservative harvest strategy with a limited number of antlerless licenses is being used to encourage population growth of mule deer in the badlands. Antlered mule deer licenses are a coveted license in North Dakota and currently only 1,600 licenses are available for the 2023 deer gun season.

We assessed female mule deer mortality risk using 203 deer fitted with global positioning system (GPS) radio-collars that were deployed from 2012 – 2016. The estimated annual adult survival probability was 85.6%, and overwinter juvenile survival probability (Dec – May) was 67.7%. Survival probabilities were lowest in the winter season for adults and juveniles. The leading cause of mortality for adults was predation (32%) and for juveniles was malnutrition (22%).




- Bruce Stillings, North Dakota Game and Fish Department

## Northwest Territories

The number of mule deer in the Northwest Territories is not known, but it is believed that no viable population exists in the Northwest Territories. There have been 2 recorded sightings of mule deer in the last 4 decades and both were in the southeastern corner of the Nahanni National Park (1979 and 2003). In addition, there is 1 unrecorded sighting from a wildlife officer working for the Government of the Northwest Territories of 2 mule deer just north of the British Colombia /Northwest Territories border near the Liard River in 2018. We consider mule deer observations in the Northwest Territories as vagrants. Mule deer were occasionally observed in the Northwest Territories from the 1920s to late 1960s with white-tailed deer being the deer observed since that

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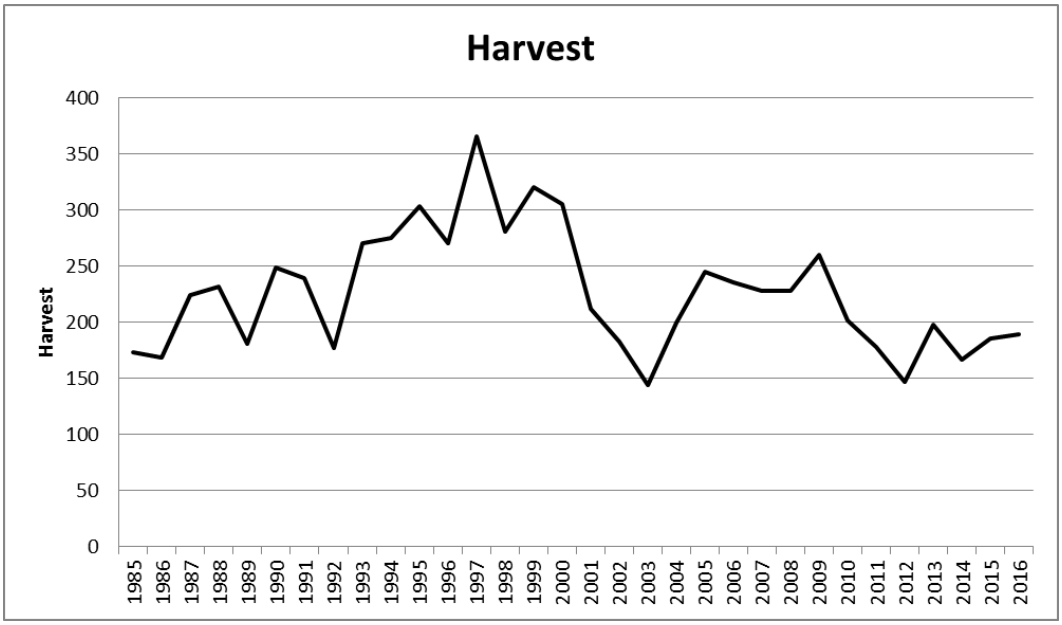
time. It is not clear how long mule deer existed in the Northwest Territories and their habitat is probably marginal. They have completely disappeared from their former range, except in the Nahanni-Liard area where mule deer are seldom reported. Mule deer are not hunted in the Northwest Territories and so there is no formal survey or collection of harvest data, nor active research on this species. The decline of mule deer in the Northwest Territories may be caused by a complex of factors.

-Ève Lamontagne, Department of Environment and Natural Resources, Government of the Northwest Territories

**Oklahoma**

With Oklahoma being the eastern edge for what is considered mule deer habitat, we estimate between 1,750 and 3,000 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 2022-23 season led to 209 mule deer being harvested




-Dallas Barber, Oklahoma Department of Wildlife Conservation

**Oregon**

Mule deer are substantially below long-term management objectives and Oregon's population continues to decline, estimated to be between 150,000 – 160,000 in 2023. Number of hunters declined by 4% (1,790) to 38,813 while harvest declined 18% to 10,294 in 2022. Survival continues to vary considerably across the landscape. Adult annual survival in areas with sufficient collars for analysis ranged from 80% to 96% for the biological year 2022–2023. Oregon does not

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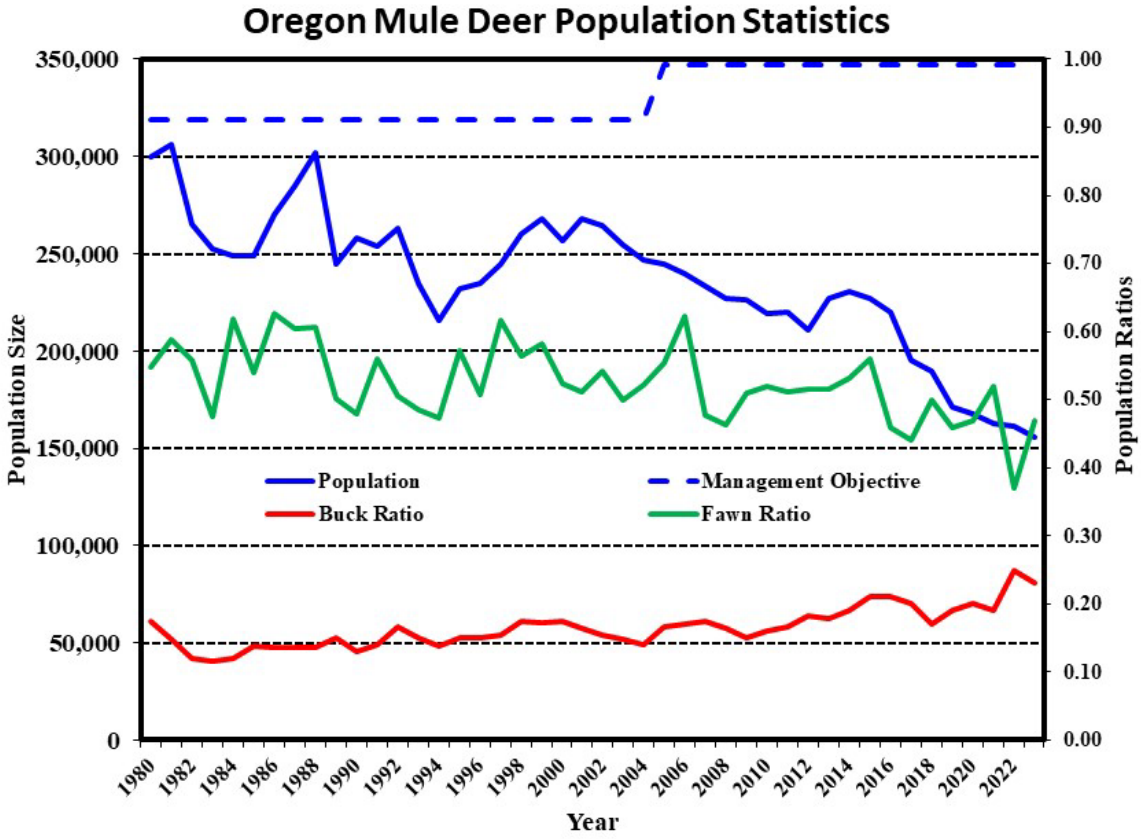
survey black-tailed deer in a way allowing development of annual population estimates. Density estimates and population modeling developed using non-invasive fecal DNA sampling suggests black-tailed deer populations have stabilized or increased slightly. Data also indicate the ratio of bucks:100 females is much higher than estimated using traditional survey methods. Number of black-tailed deer hunters and harvest decreased to 84,877 (-2%) and 22,751 (-12%), respectively.

Oregon recently completed analyses from nearly 2,000 GPS collars and has identified 22 mule deer herd ranges. These ranges represent a significant step for Oregon towards a more reliable, biologically based monitoring and management system for the species. This information is being used as the foundation for revision of Oregon's Mule Deer Management Plan with a tentative completion date during early 2024.




*Trends in Oregon's mule deer population size and structure, 1979 – 2023.*

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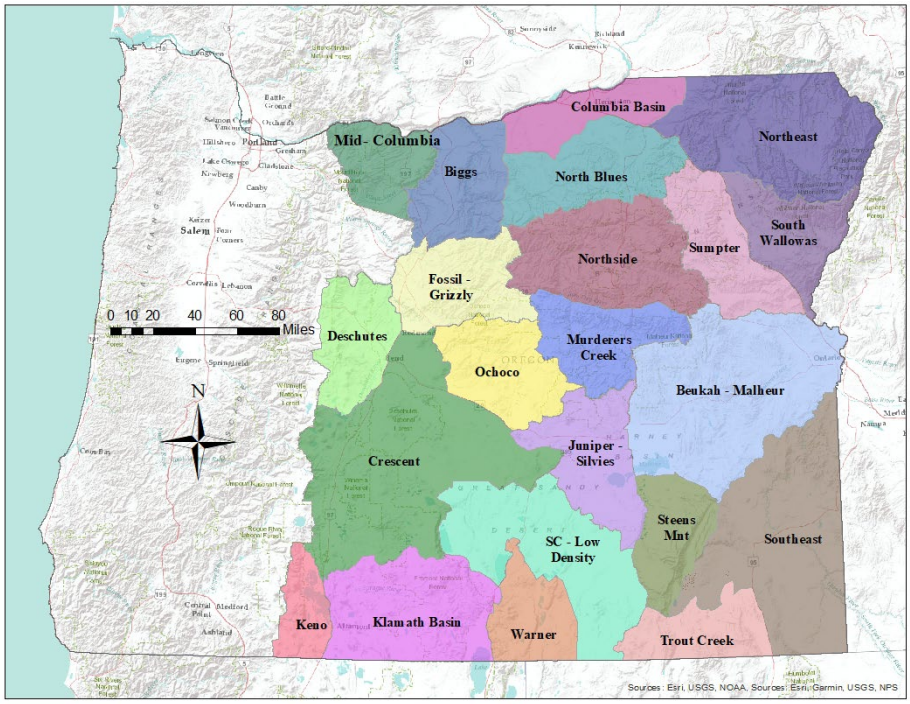


*Oregon's newly defined, biologically based mule deer herds.*

-Don Whittaker, Oregon Department of Fish and Wildlife

**Saskatchewan *(2022 Information)***

Mule deer populations are currently monitored in Saskatchewan using annual spotlight surveys, hunter harvest surveys, volunteer cooperative-wildlife surveys and intermittent aerial surveys. Mule deer density varies considerably in Saskatchewan, ranging from 0.05 deer / $km^2$ in the northern part of their range to > 2.0 deer / $km^2$ in the southwest portion of the province. Annual spotlight surveys indicate mule deer populations have been generally increasing across Saskatchewan over the past three years, with particularly strong population growth at the northern extent of their range in the Parkland and Boreal Forest Fringe (i.e., north-central) regions of the province. Some mule deer populations, in core mule deer range in the southwestern portion of the province, have been declining during this period likely due to high prevalence rates of chronic wasting disease. Chronic wasting disease continues to increase in prevalence and distribution across the province in an eastern bearing. In 2021, voluntary hunter surveillance sampling resulted in a province-wide prevalence rate of 36% (i.e., 314 CWD positive / 1254 testable samples) in mule deer (both sexes). A chronic wasting disease strategy remains in development, though has proved challenging given the establishment of the disease throughout most of the province. Saskatchewan is in the process of updating mule deer population estimates, monitoring initiatives and management objectives as part of the development of the ten-year mule deer management plan.

Mule deer hunting license sales and harvest has increased in Saskatchewan over the past 5 years. A total of 20,286 mule deer hunting licenses (16,300 active hunters) were sold in 2021, consisting of 7,518 limited entry either-sex, 7,502 limited entry antlerless, 318 quota-limited over-the-counter antlerless licenses and 3986 over-the-counter archery-only mule deer licenses. An estimated 11,519 mule deer were harvested in the province in 2021 (Figure 1). Bucks made up

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46% of the total estimated harvest, with a total of 5,372 buck mule deer harvested in 2021. Saskatchewan continued to have the highest proportion of antlerless (females and young of year) mule deer reported in harvest of all western jurisdictions in 2021. Despite a high proportion of antlerless harvest, overall harvest rates (i.e., the proportion of the population harvested each year) is relatively low (e.g., < 10%) as the province primarily manages mule deer through limited entry (i.e., draw) hunting. Hunters holding limited entry either-sex licenses harvested 5,063 mule deer (4,702 bucks), with an average success rate of 70%, which was below the previous five-year (2016 – 2020) average of 81%. Limited entry antlerless mule deer hunters harvested 5,482 doe or fawn mule deer, with an average harvest success rate of 93%. Hunters holding over the counter (OTC) archery mule deer licenses harvested an estimated 796 mule deer (670 bucks), with an average harvest success rate of 16%, which was the same as the previous 5-year average (2016-2020). Starting in 2020, Saskatchewan began to phase in mandatory hunter harvest reporting for all licensed hunters, which has increased the harvest reporting response rate over 40% from previous years. Improved reporting is believed to have led to differences in hunter harvest success estimates, likely due to a reduction in sampling bias previously associated with voluntary harvest reporting.

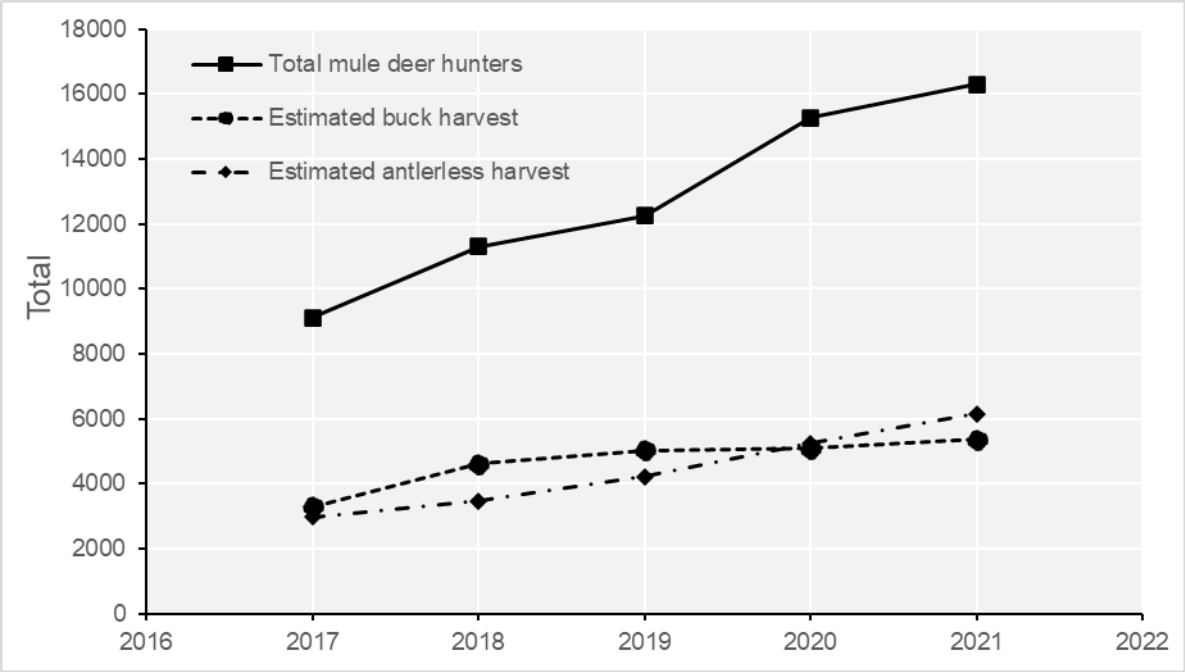


*Figure 1. Estimated number of mule deer hunters and harvest in Saskatchewan, 2017-2021.*

-Tom Perry, Saskatchewan Ministry of Environment, 2022 Report

**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

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Commission season setting process. Pre-season herd composition surveys documented better recruitment in most Data Analysis Units (DAU) in 2022 with overall recruitment at 61 fawns:100 does compared to 55 fawns:100 does the previous year. The statewide pre-season sex ratio in 2022 was 36 bucks:100 does (Figure 2).

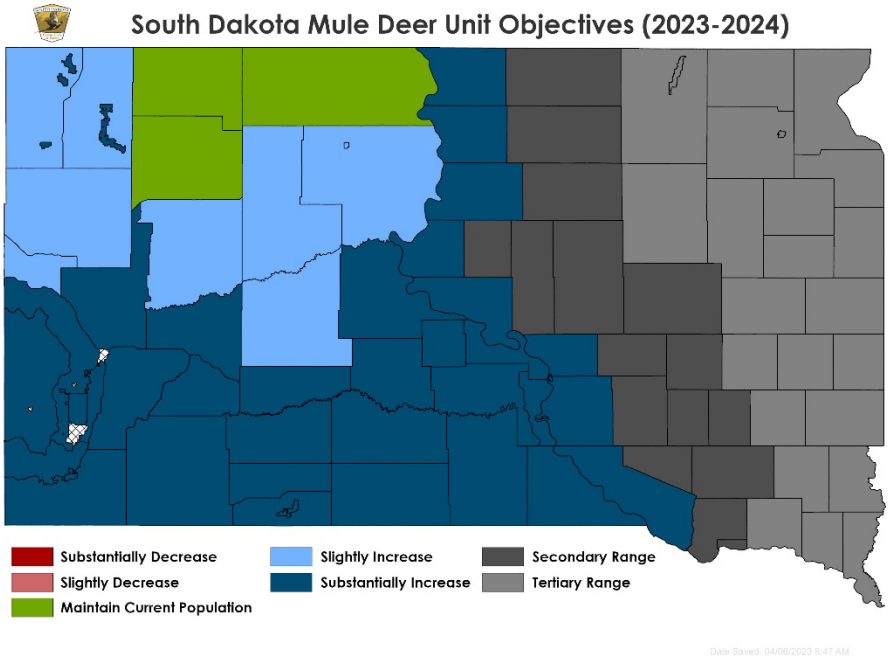


*Figure 1. Mule deer population objectives for South Dakota hunting units, 2023-24.*

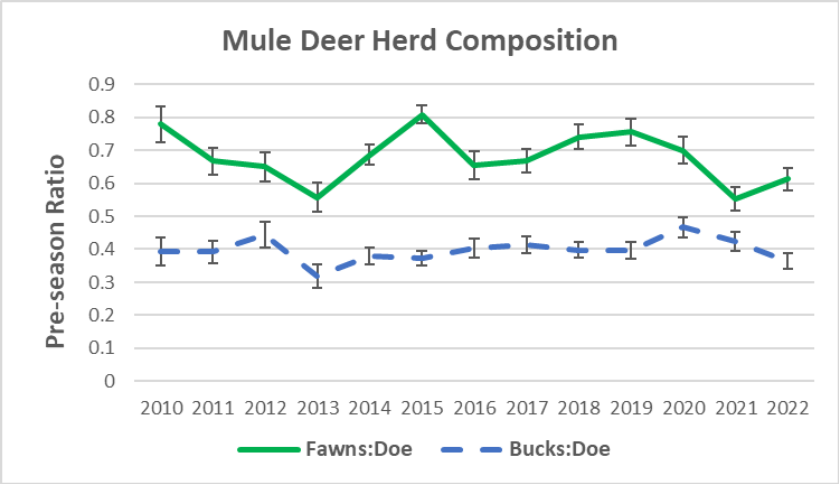


*Figure 2. Statewide sex and age ratios from pre-season herd composition surveys in South Dakota, 2010-2022.*

Currently all deer hunters are surveyed via email or electronic 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 6,816 in 2022, mostly due to increased buck harvest since doe harvest has been

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substantially restricted for the past 8 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.

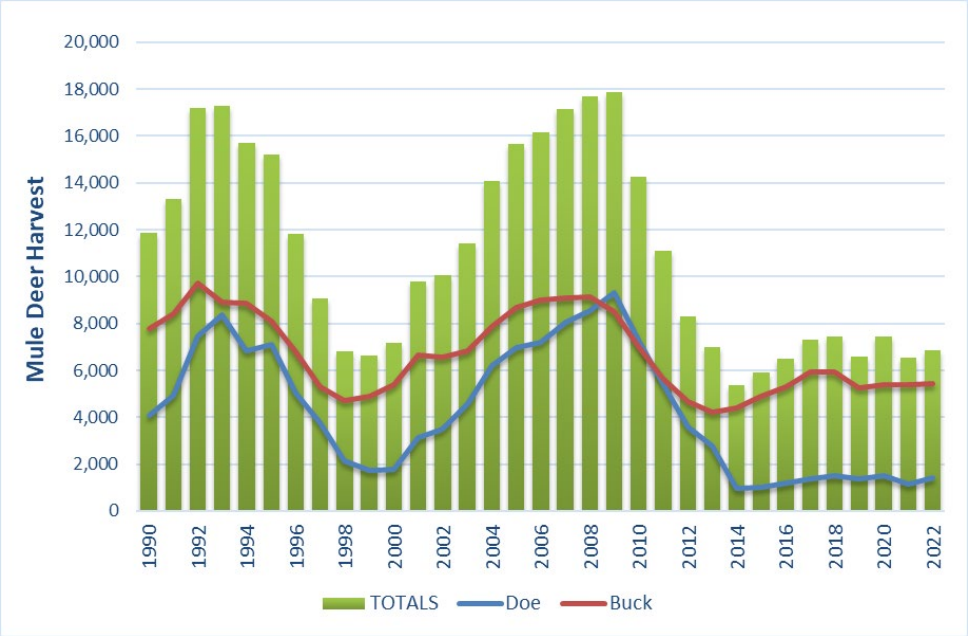


*Figure 3. Mule deer harvest from all hunting seasons in South Dakota, 1990-2022.*

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 2022 were 79% for adult does and 64% for bucks. 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 86,500 for 2022 and will be re-assessed for 2024.

-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.

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*Trans-Pecos*

In general, the Trans-Pecos population has been on an increasing trend since 2012 because of good range conditions and fawn production and recruitment from 2013–2017. However, recent drought conditions have led to a decrease from 135,655 mule deer in 2019 to 112,136 in 2022. Surveys were not conducted in 2007, 2010, and 2020. The estimated 2022 fawn crop of 37 fawns:100 does was lower than 2021 (44 fawns:100 does). The sex ratio for 2022 was 31 bucks:100 does, the lowest bucks:100 does estimate since 2011.

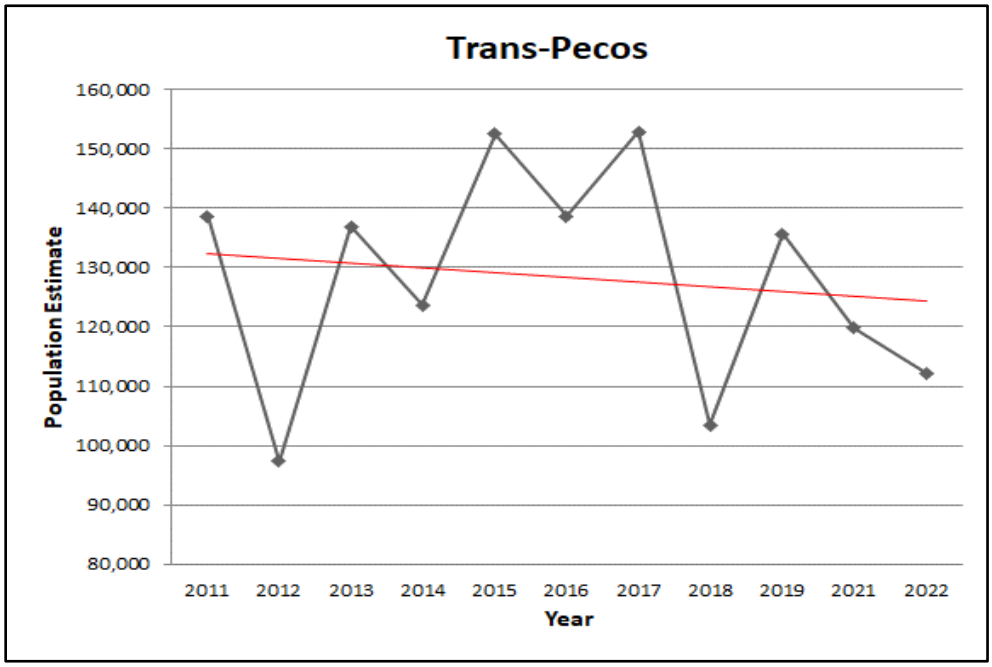


*Figure 1. Trends in mule deer population estimates in Trans-Pecos, Texas, 2011–2022.*

*Panhandle*

The Panhandle population trend has been increasing since 2011. However, mule deer numbers have been declining after the all-time high documented in 2017. Surveys were not conducted in 2015 and 2020. The 2022 population estimate of 71,121 was similar to the 2021 estimate of 71,171. Fawn production was 17 fawns:100 does in 2022, which was well below the region average (33 fawns:100 does). The sex ratio for 2022 was 30 bucks:100 does. 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 9 out of 10 survey years.

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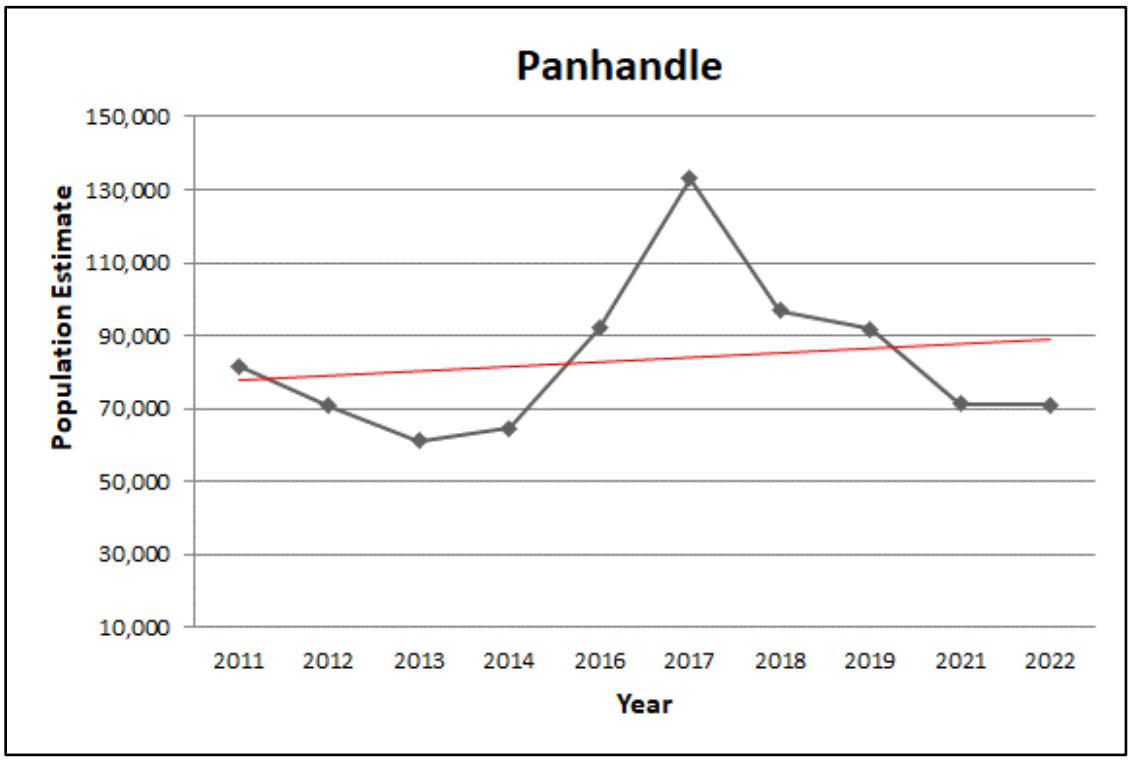


*Figure 2. Trends in mule deer population estimates in the Texas Panhandle, 2011–2022.*

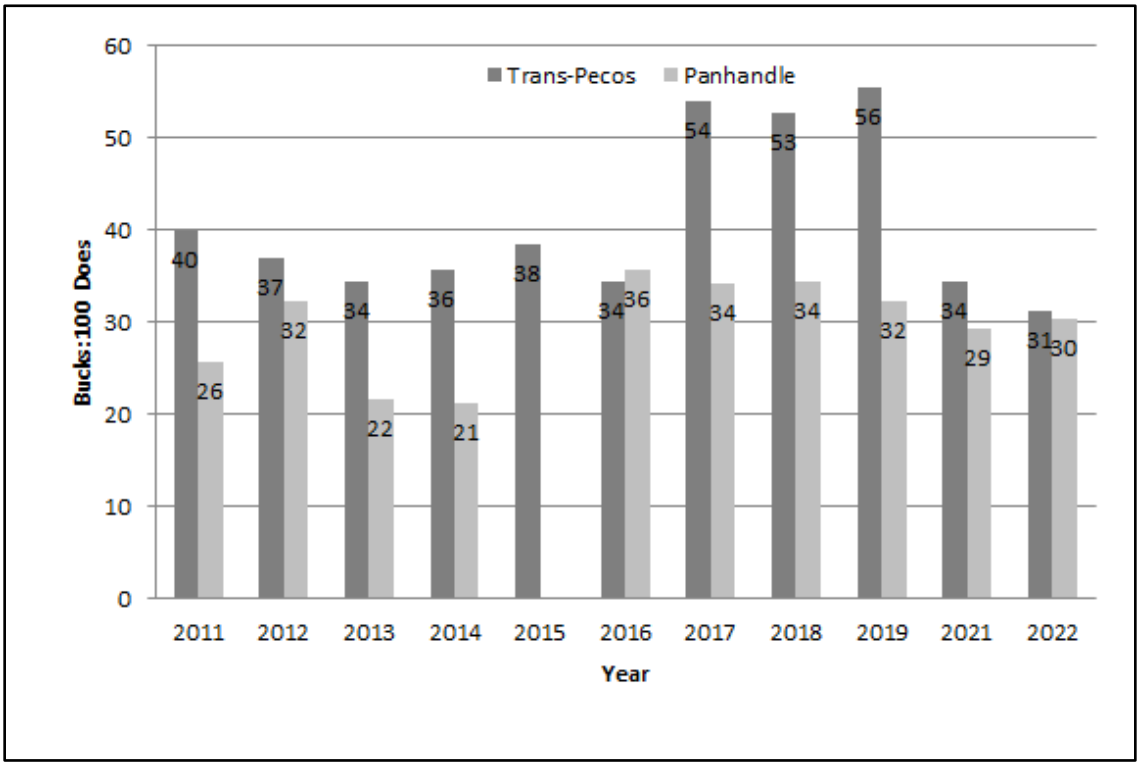


*Figure 3. Trends in the number of mule deer bucks per 100 does in the Texas Panhandle and Trans-Pecos areas, 2011–2022.*

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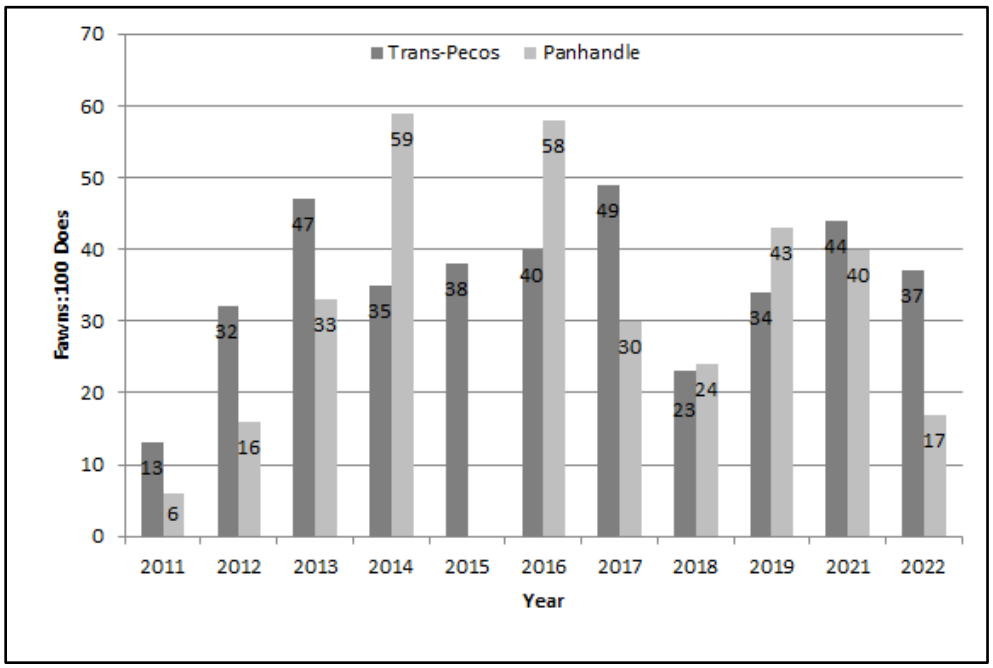


*Figure 4. Trends in the number of mule deer fawns per 100 does in the Texas Panhandle and Trans-Pecos areas, 2011–2022.*

-Shawn Gray, Texas Parks and Wildlife Department

**Utah**

Utah's current statewide mule deer population estimate is 335,000 with a total population objective of 404,900 (Figure 1). This is an increase of 29,300 deer from the previous year, largely due favorable monsoon moisture patterns in the summer and fall resulting in deer with high body condition and fat levels. Post-season fawn-to-doe ratios in 2022 were up to 62 fawns per 100 does from 56/100 both of the previous two years. Adult and fawn survival is estimated annually by radio-collaring approximately 500 deer on 7 representative units throughout the state. After several years of drought conditions and lower survival, we were pleased to observe that survival from Dec. 2021 through Dec. 2022 was for 87% adult does and 59% for fawns.

While the growth and observed survival numbers for 2022 are encouraging, 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 and some basins in excess of 4,000-5,000% of normal snowpack. As of early May 2023, GPS collar data shows statewide deer survival was tracking at 81% for adult does and 51% for fawns. However, the statewide average may be misleading, as the winter precipitation has affected the state very differently based on latitude and temperature. In Northern Utah, survival estimates were at 70% for adult does and 30% for fawns while in warmer, Southern Utah adult doe survival was tracking at 90% with fawn survival at 80%. We anticipate some of the lowest observed survival in the last decade in Northern Utah and some of the highest in Southern Utah.

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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 ≥ 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 up in 2022 from the previous two years, at 21 bucks per 100 does with 73,075 public draw permits issued last year. For the 2023 hunting season, Utah's Wildlife Board approved an 11% decrease in the number of general-season deer permits to 64,725. This decrease was largely in response to public concern about winter mortality. Many units, especially units in the Southern portion of the state, are exceeding or are expected to exceed the buck-to-doe ratio objectives in our approved Statewide Deer Management Plan. Despite Utah DWR biologists' recommendations to increase permits on some of these units, the Utah Wildlife Board chose not to increase permits and, in some cases, further reduced permits for the 2023 season.

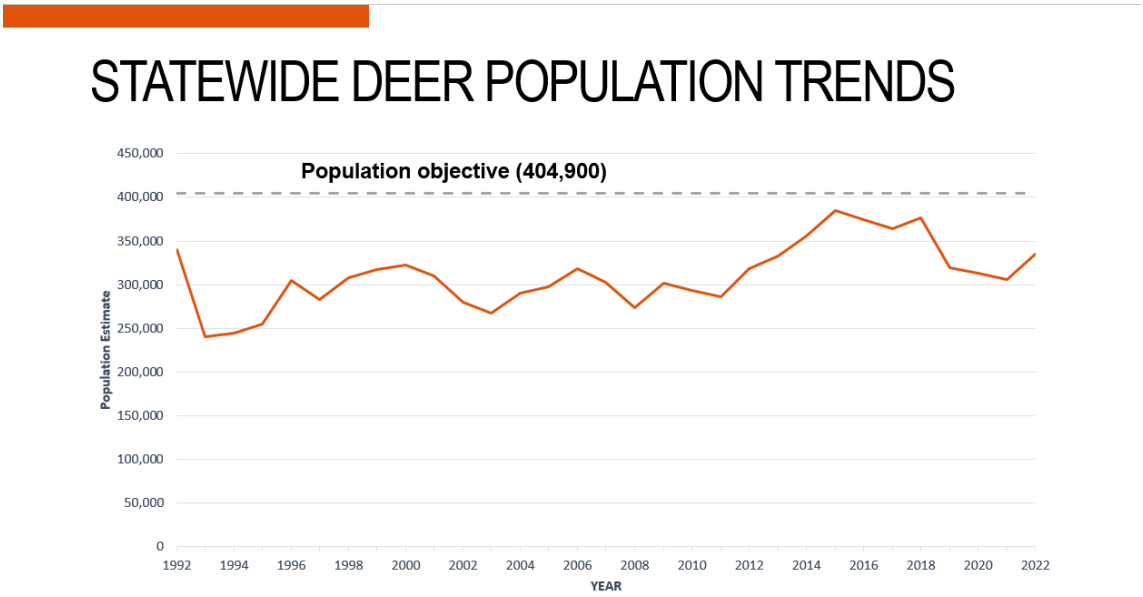


*Figure 1. Mule deer population estimates from 1992-2022.*

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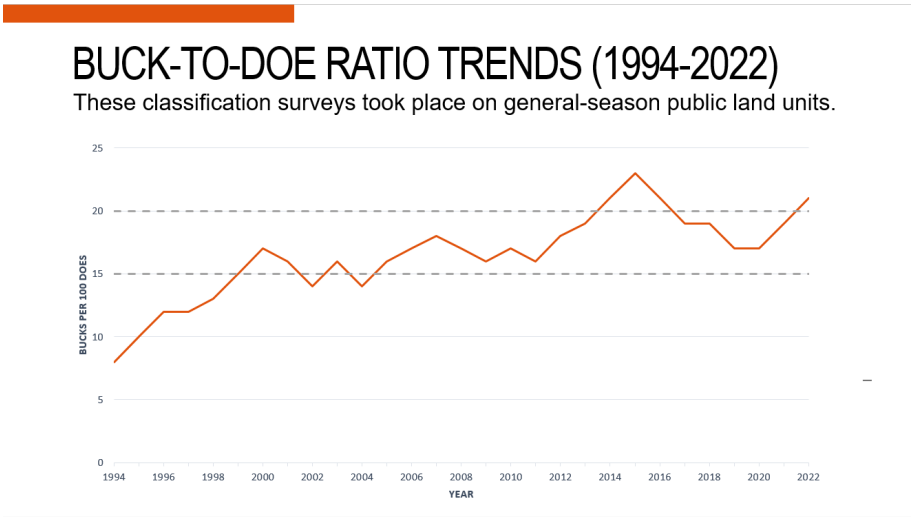


*Figure 2. General season buck to doe ratios from 1993-2022.*

-Dax Mangus, Utah Division of Wildlife Resources

**Washington**

The statewide deer harvest estimate for 2022 was 21,413 deer (white-tailed deer, black-tailed deer, and mule deer; general and permit seasons combined), down ~12% from 24,318 harvested deer in 2021 and down 27% from a recent high in 2020 of 29,435 harvested deer. The consistent reduction 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

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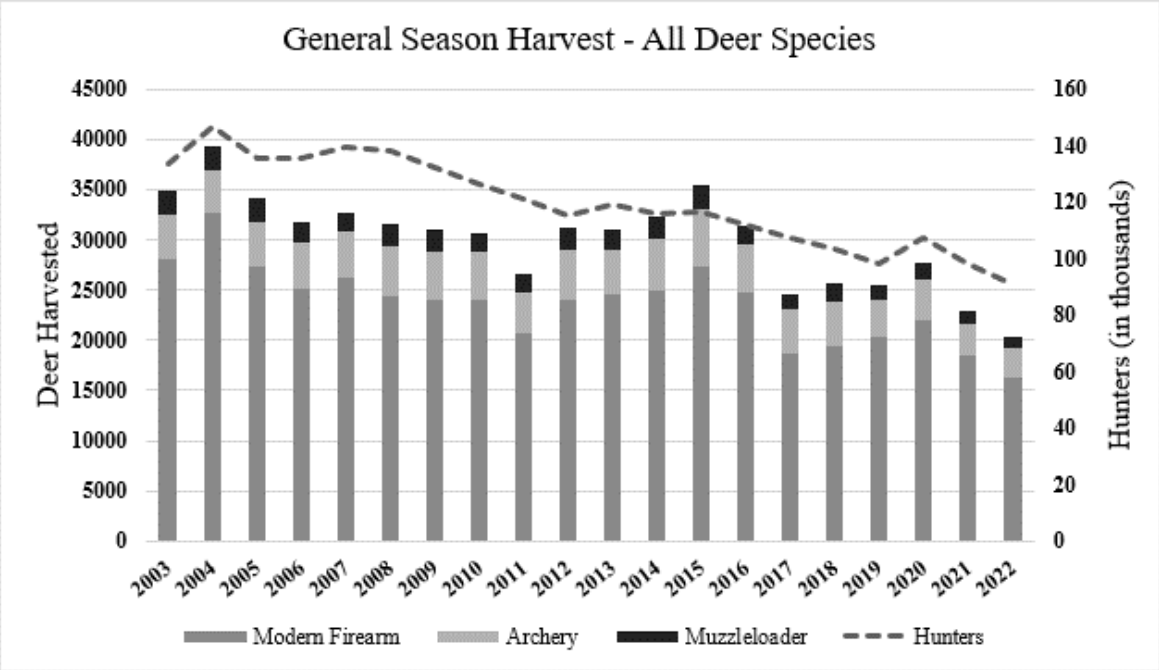
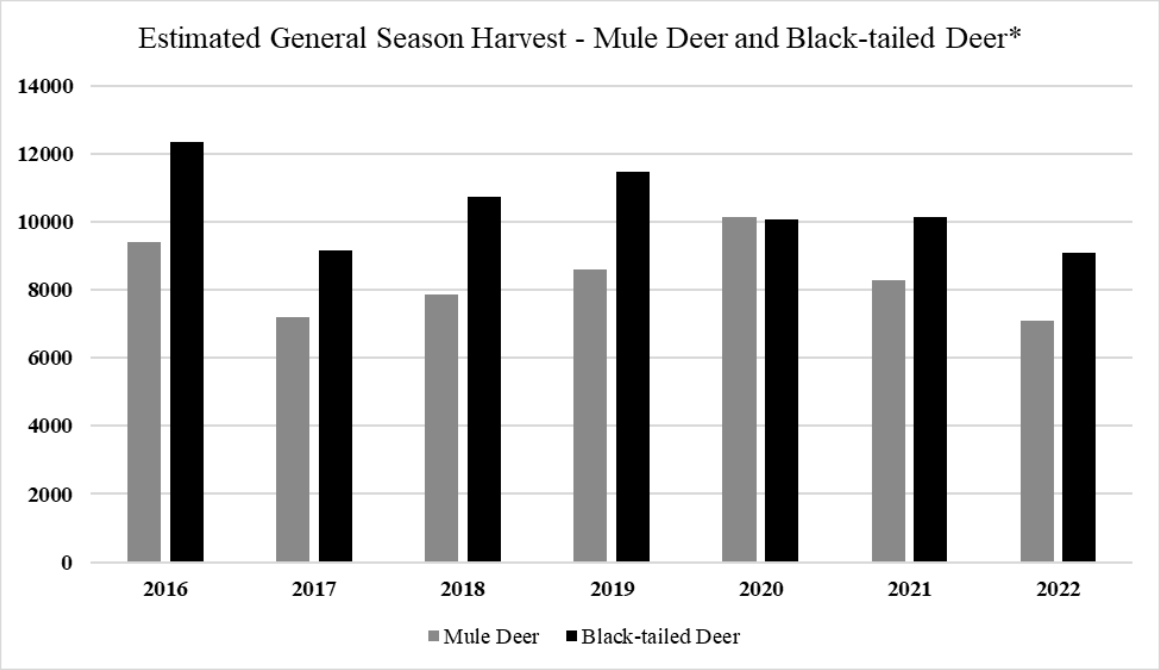
ongoing to address deer vehicle collisions, enhance gene flow among mule deer populations, improve crossing structures for irrigation canals (a source of deer mortality), post-fire restoration of shrub steppe habitat, and energy development impact mitigation.




**Species-specific estimates are a function of reported hunter effort, not shown, and sensitive to sampling unit used (e.g., GMU vs. Management Zone). Displayed values are an aggregation of management-zone estimates.*

-Kyle Garrison, Washington Department of Fish and Wildlife

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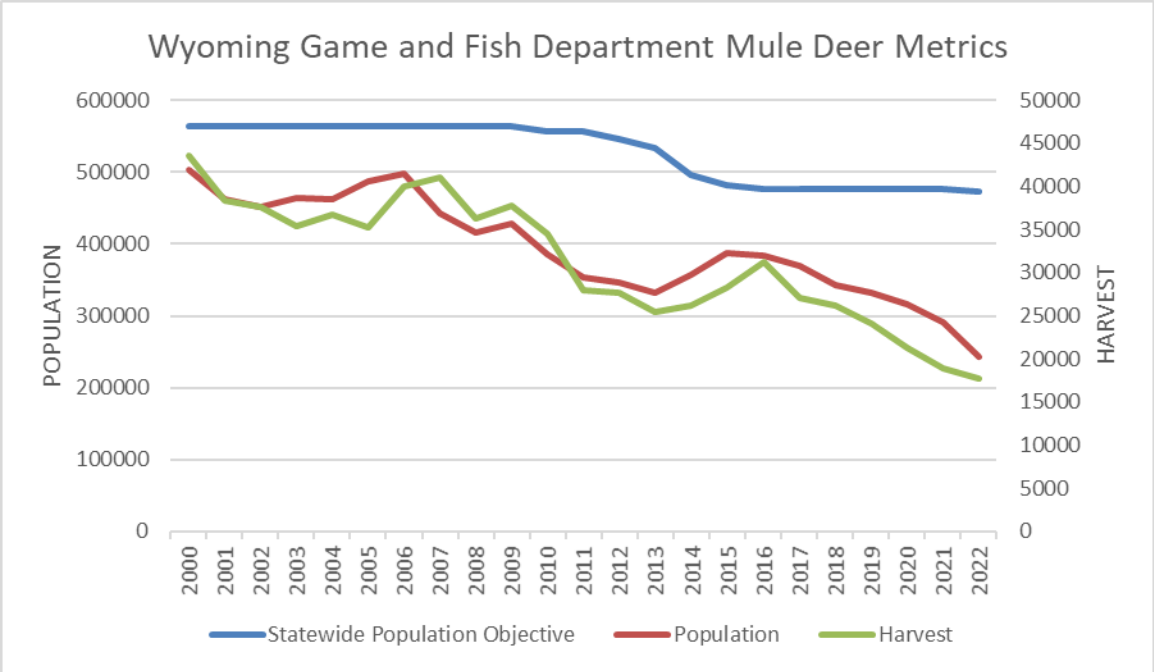
**Wyoming**

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 18 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 260,800 (52%) mule deer since 2000. Due to the decrease in total population numbers, mule deer harvest has declined 59% since 2000. After the 2022 hunting season, the Wyoming Game and Fish Department estimates a total population of 242,500 mule deer in the state. This is 49% 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, four herds were at objective (10.8%), 33 herds were below objective (89.2%) 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 inventory work on mule deer in Yukon to date. However, funding has been secured to initiate a pilot study in the Whitehorse area in 2022. 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.

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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 2021 hunting season was 10 deer and 27 were killed in vehicle collisions. Generally, the annual licensed harvest ranges between 4 and 9 deer.

-Sophie Czetwertynski, Yukon Department of Environment

**Acknowledgements**
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Mule Deer Working Group

WAFWA
Western Association of Fish & Wildlife Agencies

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