

**SOUTH DAKOTA
WHITE-TAILED AND MULE DEER
ACTION PLAN 2024-2028**



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**South Dakota Department of Game, Fish and Parks
Pierre, South Dakota**

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All text and data contained within this document are subject to revision for corrections, updates, and data analyses.

A supportive document to this action plan, the “South Dakota White-tailed Deer and Mule Deer Management Plan, 2017-2023” (SDGPF 2017), provides a historical background, research, management surveys and monitoring, challenges and opportunities, and citizen involvement related to deer and can be found at <https://gfp.sd.gov/management-plans/>. Additionally, biennial population status updates for deer in South Dakota are available at <https://gfp.sd.gov/deer/> under “Related Documents”.

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This action plan is a product of substantial discussion, evaluation, and input from many wildlife professionals, constituents, and the 2023-24 South Dakota Deer Stakeholder Group. In addition, comments and suggestions received from private landowners, hunters, and those who recognize the value of deer and their associated habitats were also considered.

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INTRODUCTION

South Dakota's diverse landscapes of grassland, wetland, cropland, and timbered areas host white-tailed deer (*Odocoileus virginianus*) across the entire state and mule deer (*Odocoileus hemionus*) primarily adjacent to and west of the Missouri River breaks. Deer hunting is a popular outdoor activity for many sportsmen and women in South Dakota. Approximately 62,800 residents and 8,700 non-residents hunted deer in 2022, and hunting remains the number one tool for managing deer populations across South Dakota. South Dakota Game, Fish and Parks (GFP) staff develop harvest strategies to ensure sustainability of each deer species and its habitat while maintaining populations at levels compatible with human activity and land use.

Involving the public in the development of the "*South Dakota White-tailed and Mule Deer Action Plan, 2024-2028*" has been a high priority of GFP. Numerous opinions and suggestions have been received, and all were carefully considered in identifying the action plan objectives and strategies. Multiple avenues for involvement and outreach were used to engage the public at various stages of plan development and to ensure opportunities for participation were accessible to all citizens. In 2023, GFP conducted a public opinion survey of South Dakota landowners and hunters to collect and evaluate opinions on numerous topics related to deer management. GFP also put together a South Dakota Deer Stakeholder Group, which included representation from deer hunters, private landowners, agricultural interests, commercial hunting interests, legislators, GFP commissioners, and conservation organizations. This group met multiple times to discuss many topics and issues related to deer management in South Dakota.

The "*South Dakota White-tailed and Mule Deer Action Plan, 2024-2028*" will serve as the guiding document for decision-making and implementation of actions to ensure deer populations and their habitats are managed appropriately, addressing both biological and social tolerances, while considering the needs of all stakeholders. This action plan will be formally evaluated every four years, however, updates may occur more frequently, as needed. Additional information regarding deer management, research, and history can be found in the *South Dakota White-tailed Deer and Mule Deer Management Plan, 2017-2023*" at <https://gfp.sd.gov/UserDocs/nav/deer-mgmt.pdf>.

POPULATION MONITORING

White-tailed and mule deer herds are monitored frequently across their range in South Dakota. Survey efforts are completed to assess herd status and predict population trends in 8 data analysis units (DAUs) for mule deer and 11 DAUs for white-tailed deer (Figure 1). A DAU is an aggregate of management units that serves as representation of a similar population at a large geographic extent, but potentially large amounts of heterogeneity may exist in deer abundance within a DAU. GFP currently conducts harvest surveys, abundance surveys, survival monitoring, herd composition surveys, disease monitoring, winter severity evaluation, and population

modeling to assess deer populations. For the latest survey data and population updates, see GFP’s Biennial Status Updates (Lindbloom et al. 2023) at <https://gfp.sd.gov/deer/> under “Related Documents”.

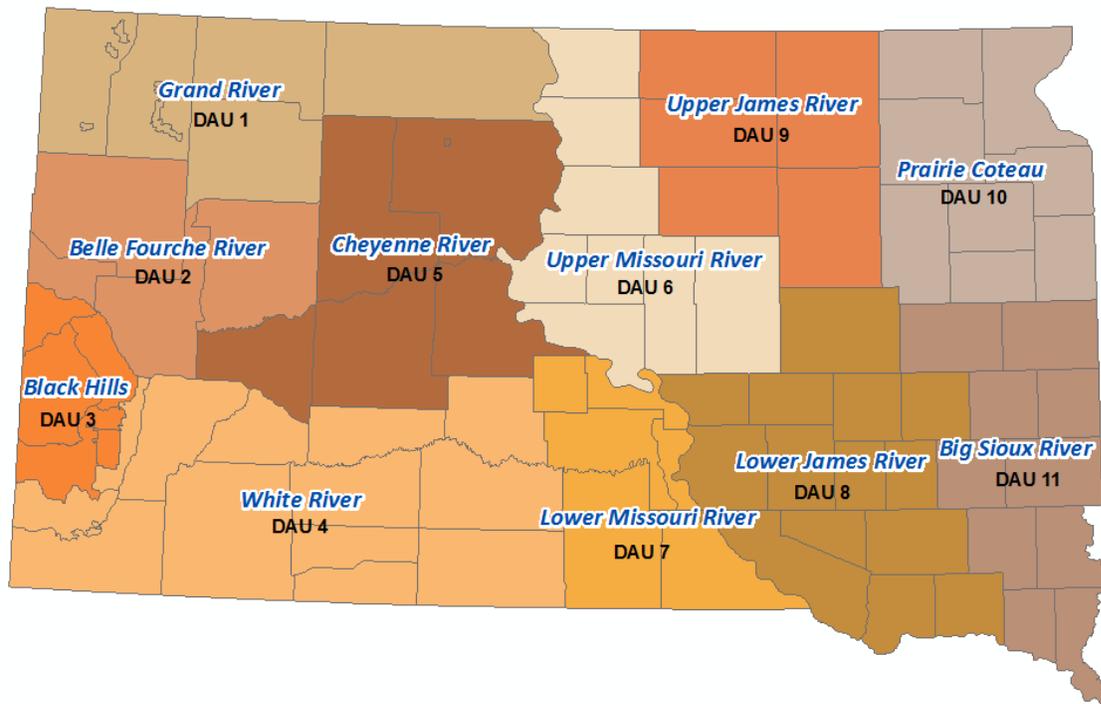


Figure 1. Data Analysis Units (DAUs) for deer management in South Dakota.

Harvest Surveys

Surveys are used to estimate hunter harvest of both mule deer and white-tailed deer. All hunters with a valid email address are surveyed each year using an electronic survey. Information from respondents is used to estimate total harvest by species, age, and sex, and harvest success of respondents is assumed to be similar to nonrespondents. GFP staff provide multiple survey reminders to improve response rates and ensure reliable harvest estimates. Harvest by season is estimated at the deer management unit scale.

Abundance surveys

Abundance surveys provide important data to manage both white-tailed and mule deer populations in South Dakota. GFP currently uses 2 methods (aerial surveys and spotlight road surveys) to estimate abundance in certain areas within the state. Aerial surveys are an efficient way to estimate deer abundance. However, few surveys accurately count all animals, due mainly to visibility biases (i.e., unobserved animals). One approach used to correct for visibility bias of ungulate populations are sightability models (Samuel et al. 1987). GFP has developed a sightability model that is valid for surveying white-tailed deer in most habitats found in eastern

South Dakota (Robling 2011). Aerial surveys are conducted at the DAU level on a scheduled rotation for DAUs 9 and 10 east of the Missouri River, when snow conditions exist.

Spotlight road surveys are conducted within the boundaries of the Black Hills, and distance sampling methods are used to estimate detection rates and abundance for white-tailed deer (Cudmore 2017). Sixty transect routes have been selected by General Randomized Tessellation Stratified sampling (Stevens and Olsen 2004), with transect lengths varying from 3.5 km to 16 km. Variability and low precision make interpretation of road surveys challenging, but results suggest that white-tailed deer are below the objective established for the Black Hills of 70,000.

Survival Monitoring

Survival rates aid in estimating deer abundance and trend as the result of changes in winter conditions, disease outbreaks, or harvest strategies. Since 2013, over 4,600 deer have been radio-collared to evaluate survival in South Dakota for both sexes and all age classes of white-tailed and mule deer. GFP staff are currently monitoring previously GPS-collared mule deer and white-tailed deer in DAU 1. Survival studies have been instrumental in providing area specific biological data for evaluating deer populations and management options.

Herd Compositions Surveys

Pre-hunting season herd composition ground surveys are completed by driving roads or hiking in areas of known deer concentrations in September and October. All deer herds that are observed in their entirety are classified to numbers of fawns, adult does, and adult bucks. A minimum sample size of 200-400 independent group observations per deer species per DAU is currently obtained to ensure sufficient precision in herd composition estimates. Quantifying deer recruitment for each DAU is critical to estimate growth rates and determine appropriate license allocation for deer herds throughout the variable landscapes of South Dakota.

Disease Monitoring

Numerous diseases and parasites can impact individual white-tailed and mule deer in South Dakota; however, Chronic Wasting Disease (CWD) and Hemorrhagic Disease are the primary diseases that may affect populations and herd growth. The South Dakota Chronic Wasting Disease Action Plan (SDGFP 2023) was approved by the GFP Commission in 2019 and most recently updated in 2023

https://gfp.sd.gov/userdocs/docs/sd_cwd_action_plan_south_dakota_june_2023.pdf).

Epizootic Hemorrhagic Disease and Blue Tongue disease (collectively called hemorrhagic disease) may cause substantial but usually localized mortalities of ungulates in South Dakota. White-tailed deer are primarily affected by these viruses, but GFP has documented mortalities in other ungulate species. When reported losses from hemorrhagic disease are substantial, GFP may remove leftover tags in affected units and reduce future license allocation. Hunters may also return deer licenses before the hunting season begins if they feel disease has negatively affected their opportunity to harvest a deer.

Winter Severity Evaluation

Winter severity is an important metric which can impact survival of white-tailed and mule deer populations (Verme 1968). Weather data are obtained through an annual data request via the National Oceanic and Atmospheric Administration (NOAA). Program R, a software programming package (R Core Team 2015), is used to extrapolate weather data across all deer units using an inverse distance weighted interpolation function. In addition, GFP collects and maintains a database of deer mortalities reported to staff from the public during hard winters. The combination of weather and mortality data provide a relative assessment of overwinter mortalities and represent an approximate spatial distribution of where those losses occur.

Population Modeling

Harvest-based population models are used to reconstruct the previous year's pre-hunting season population and project abundance to future years for each DAU while considering various harvest management strategies for each management unit (Norton et al. 2021). Future antlerless harvest strategies are manipulated to achieve the desired population growth rates based on population projection models. The projected (model generated) and objective growth rates are compared and future antlerless harvest strategies are manipulated to achieve the desired growth rates derived from the DAU population objective. In the population projection model, antlerless harvest is assumed to be additive, and the number of antlerless deer added or removed from the population is calculated at the DAU level and then distributed to the unit level in accordance with the defined unit objective (increase or decrease lambda). Three-year average harvest success rates are calculated for all previously used license types within the management unit and license combinations needed to achieve unit level antlerless harvest recommendations are selected for future harvest season license recommendations. This process is repeated for all white-tailed and mule deer firearm management units across the state.

WILDLIFE DAMAGE AND HABITAT MANAGEMENT

GFP understands that cooperative partnerships with private landowners are an essential component to deer management and that private lands serve an important role regarding deer management in South Dakota. With about 80% of the state being held in private ownership, GFP relies heavily on private land for wildlife production and hunting access. Buckley (2024) reported that 50% of responding landowners who were surveyed indicated that they experienced deer damage within the past year. The ability to effectively address deer depredation (i.e., impacts on crops, trees, landscaping, and land used for livestock production) fluctuates annually because of weather events (e.g., severe winters and deep snow), deer population levels, and changes that occur to deer habitat (e.g., habitat loss, human encroachment, and agricultural development).

Primary management techniques include loaner panels to construct temporary stackyards around stored livestock food sources, cost share assistance with permanent stackyards and protective fencing, and direct assistance with hazing deer away from problem areas and other

damage concerns. Over the past 10 years, GFP has spent considerable resources (nearly \$5 million) providing long-term solutions (i.e., protective stackyards and panels which permanently protect hay and stored-feed supplies) to address deer damage. GFP is continually striving to find the balancing-point between recreational opportunities and impacts on private lands caused by deer. While many of GFP's damage abatement techniques have proven successful over the last 20 years, deer depredation and the associated conflicts will continue to challenge landowners and GFP. GFP acknowledges that its programs will not be able to completely resolve all issues regarding deer depredation; however, GFP has a proven history of working with private landowners and is committed to cooperatively working with private landowners to implement reasonable solutions to address most concerns.

In addition to direct mitigation of deer damage as described above, a primary GFP priority is habitat management which proactively mitigates deer damage. Specifically, GFP strives to provide adequate deer habitat on public and private lands to reduce damage impacts during severe winters. Some of these strategies include providing adequate winter forage and thermal cover to reduce reliance of deer consuming stored feed, standing crops, and generally aggregating near feed lots and farmyards where anthropogenic food sources are abundant. Woody habitat provides an ideal source of thermal cover, but more importantly it provides a source of browse when persistent, deep snow makes waste grain, forbs, and grasses inaccessible. In addition, strategically placed food plots can provide an alternative food source during severe winters.

CITIZEN INVOLVEMENT AND OUTREACH

Understanding public attitudes is important since they can influence and predict behavior, and the more specific the attitude is toward a certain behavior (i.e., same target, context, action, and time) the stronger the relation between attitude and behavior (Ajzen and Fishbein 1980, Fishbein and Manfredo 1992, Vaske 2008). As part of developing this deer action plan, and as a first step in identifying the interests and needs of South Dakota landowners and hunters, GFP conducted comprehensive opinion surveys in the fall of 2023 (Buckley 2024). The results of this survey are discussed below.

Hunters were asked to report their perceptions of the white-tailed deer and mule deer populations in the units they hunted in the most. Forty-three percent of hunters indicated the white-tailed deer population was *just about right*. Most hunters indicated the mule deer population in the unit they hunted the most was either *far too few* (32%) or *slightly too few* (32%). Thirty-eight percent of landowners reported that the white-tailed deer population in the unit they owned property in was *just about right*. Additionally, the largest percentage of landowners had no opinion of the mule deer population in the unit where they owned property (34%), followed by *far too few* (26%).

Landowners reported on the positive and negative aspects of deer in South Dakota. Landowners agreed with the benefits of deer. Sixty-eight percent agreed that having a healthy

self-sustaining population of deer in South Dakota is important to them. Fifty-one percent agreed the presence of deer near their property improves their quality of life. Fifty-five percent agreed deer support local economies through hunting and wildlife viewing opportunities. Landowners also expressed concerns about the potential risks of deer in South Dakota. Seventy percent agreed that they worry about deer-vehicle collisions. Forty percent agreed deer damage to tree plantings, landscaping, and gardens reduced their quality of life. Forty-five percent agreed deer damage to private feed supplies and agricultural crops threatens people's livelihoods.

Furthermore, half of landowners experienced crop or property damage caused by deer (50%). Respondents were asked to rate the damage they experienced on a Likert scale (1 = Not a problem, 4 = Major problem). However, for those who experienced damage, they rated the damage as only a minor problem (i.e., crop damage/consumption [Mean = 2.44], fence damage [Mean = 2.09]) or a moderate problem (i.e., livestock feed damage/consumption [Mean = 2.45], tree damage [Mean = 2.46]).

Respondents were asked whether they generally supported limiting the total number of deer licenses a hunter can obtain to increase the chance an individual hunter can obtain their preferred license. Forty-six percent of landowners and 53% of hunters were supportive. Respondents were also asked how strongly they would support or oppose a process that would increase resident hunters' chances of getting at least one buck deer license per year, knowing it would limit some hunters' chances of getting multiple buck licenses in a year. Sixty-nine percent of hunters and 58% of landowners were supportive.

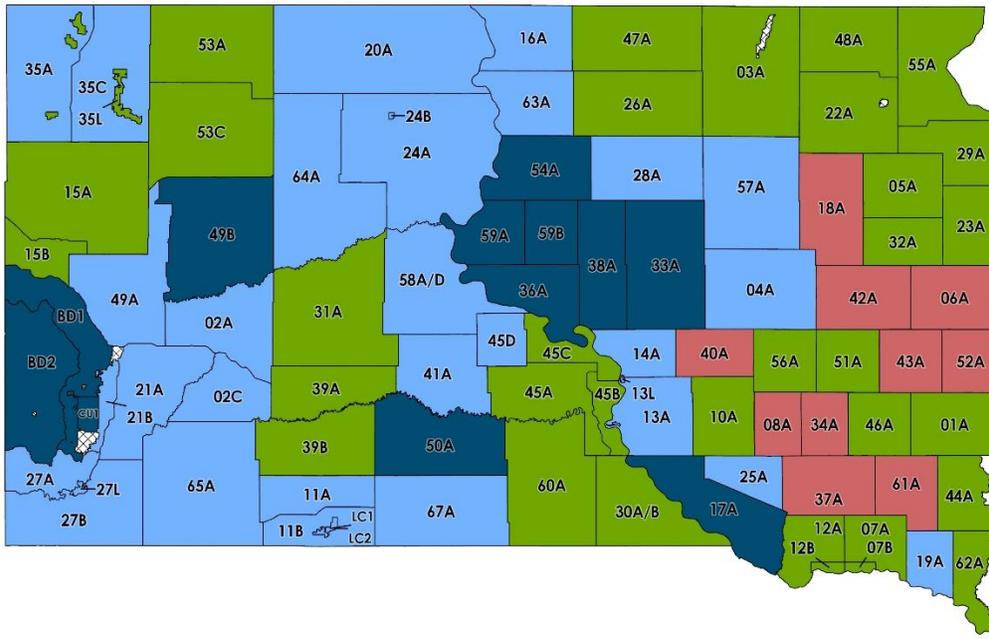
POPULATION OBJECTIVES

Population objectives (increase, maintain, or decrease) for each firearm deer hunting unit are set every 2 years when season recommendations are brought forward to the GFP commission (Figure 2). Deer population objectives for each unit are based on population assessments, habitat conditions, and social considerations.

Within the Black Hills DAU, GFP has estimated white-tailed deer abundance for multiple years and therefore was able to define a pre-season abundance objective of 70,000 (range 65,000-75,000) white-tailed deer. Since hunter satisfaction is strongly correlated with hunter success, GFP has established minimum success thresholds for firearm licenses containing "any deer" or "any whitetail" firearm tags. Furthermore, in Limited Access Units, harvest must meet either hunter success or license density thresholds (see objectives and strategies section).



South Dakota White-tailed Deer Unit Objectives (2023-2024)



South Dakota Mule Deer Unit Objectives (2023-2024)

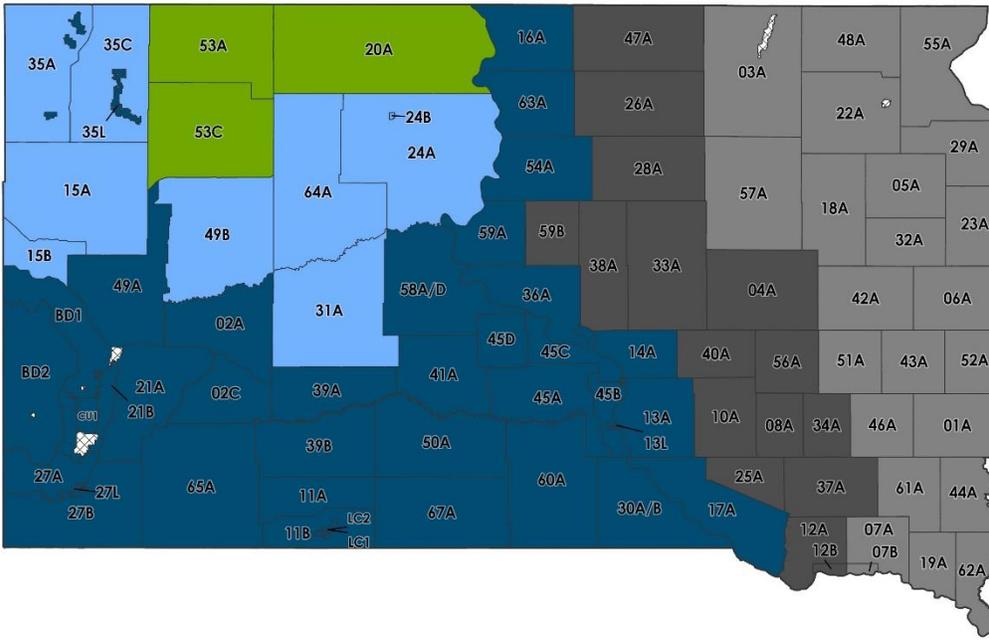


Figure 2. Population objectives for white-tailed and mule deer, 2023-24. Areas in gray are outside the primary range of the species and have limited suitable habitat.

MANAGEMENT OBJECTIVES AND STRATEGIES

Objective 1: Manage for biologically and socially acceptable white-tailed and mule deer populations in each firearm deer management unit within South Dakota.

- a) Gather hunter input on white-tailed and mule deer population unit objectives.
 - Annually survey hunters to assess objectives as desired by hunters.
- b) Gather input from landowners and the general public on white-tailed and mule deer population unit objectives.
 - Evaluate current database for contacts, sampling strategies, and costs needed to collect data at the unit level.
 - Biennially survey landowners and the general public to further evaluate deer populations, objectives, management needs, and social tolerance.
- c) Survey all hunters to estimate annual white-tailed and mule deer harvest statistics.
- d) Annually conduct and assess fall white-tailed and mule deer herd composition surveys.
- e) Assess and monitor white-tailed deer abundance by completing aerial surveys in DAUs 9 and 10 at least every six years and spotlight surveys annually in DAU 3.
- f) Monitor and assess the impacts of severe winter and drought conditions on deer populations.
- g) Monitor and evaluate impact of disease to white-tailed and mule deer herds.
- h) Further evaluate the utility of trail camera surveys in the Black Hills and other appropriate areas to estimate abundance and population parameters of mule and white-tailed deer.
- i) Further assess deer-vehicle collision data from SD Department of Transportation to evaluate deer trends and coordinate potential mitigation strategies.
- j) Further evaluate methods to reliably monitor changes in deer abundance.

Objective 2: Manage hunting opportunity fairly and equitably among various user groups and interests within South Dakota.

- a) Modify and adopt future hunting season structure as needed to maximize hunting opportunity for unique hunters and minimize regulation complexity.
- b) In Custer State Park, "Any whitetail" licenses will be set at 1% of the current CSP white-tailed deer population estimate (calculated as CSP acreage x Black Hills white-tailed deer density). No more than 50 "any whitetail" licenses will be issued in any year. "Any deer" licenses will be set at 1% of the current Black Hills Type 01 license allocation.

- c) Manage Limited Access Units (27L and 35L) and CSP for a quality hunting experience by using the following established thresholds:
- Maintain a minimum 1st tag harvest success of 75% (3-year average) for licenses containing “any deer” or “any whitetail” firearm tags; or
 - Maintain firearm license densities no greater than 1.5 licenses/square mile for “any deer” licenses and no greater than 2.5 licenses/square mile for “any whitetail” licenses.
- d) Manage for a minimum 1st tag harvest success (3-year average) for licenses containing “any deer” or “any whitetail” as follows:
- 60% in the Black Hills firearm deer season
 - 60% in each West River firearm deer season unit
 - 50% in each East River and National Wildlife Refuge firearm deer season unit
 - 40% (3-year average) for muzzleloader licenses containing “any deer” or “any whitetail” tags in each National Wildlife Refuge deer hunting unit.
- e) Archery and muzzleloader antlerless harvest opportunities will be managed as follows:
- If 0-50 firearm antlerless tags are offered – the management unit may or may not be open to archery and muzzleloader antlerless-only white-tailed deer hunting.
 - If >50 firearm antlerless tags are offered – the management unit will be open to archery and muzzleloader antlerless-only white-tailed deer hunting.
- f) Other antlerless harvest opportunities will be managed as follows:
- Antlerless-only firearm tags may be used during late seasons in units with > 0 firearm antlerless licenses offered.
 - Landowner free antlerless-only tags available in units with > 0 firearm antlerless licenses offered.
 - Youth/Mentor/Apprentice antlerless-only tags – always available, but unit boundaries for any deer and white-tailed deer only tags may be changed based on population growth objectives.
- g) Manage mule deer populations according to habitat available and range designation (see Figure 2 objectives map for delineation):
- Primary range – Population objectives established, continuous population monitoring, and all license types available to meet management needs.
 - Secondary range – No established objectives, no population monitoring (except harvest), and antlerless license types limited to Type 13 (antlerless-only whitetail). No restrictions on antlered license types.
 - Tertiary range – No established objectives, no population monitoring (except harvest), and license types limited to Type 13 (antlerless-only whitetail) and Type 01 (any deer) for antlered any deer.

Objective 3: Cooperatively work with private landowners to resolve white-tailed and mule deer depredation to growing crops, stored-feed supplies, trees, and private property.

- a) Continue to respond to all white-tailed and mule deer depredation concerns on private land in a timely manner.
- b) Encourage the enrollment of willing landowners that are experiencing chronic deer depredation issues into Walk-In Area and Controlled Hunting Access Programs to allow public hunting access.
- c) Utilize deer depredation pool hunts when warranted to address white-tailed and mule deer depredation concerns.
- d) Expand hunting opportunities where/when possible, to address white-tailed and mule deer depredation on private lands.
- e) Evaluate additional depredation management strategies to increase acceptance of deer population goals.

Objective 4: Cooperatively work with private landowners and public land managers to create, enhance, restore, and protect white-tailed and mule deer habitat.

- a) Annually strive for at least 65 Woody Habitat Program cooperators.
- b) Promote the establishment, restoration, and enhancement of high-quality woody habitats critical for deer on private lands, state-owned Game Production Areas (GPAs), and other public lands.
- c) Annually strive for at least 10 cooperative projects of riparian habitat development or restoration.
- d) Annually strive for at least 5 hardwood release projects primarily in the Black Hills.
- e) Develop program options to restore deer forage and security cover in shrub steppe habitats through plantings and management assistance.
 - Investigate and identify forb and browse enhancement options that are specific to each ecoregion.
- f) Annually strive for at least 1,100 Food Plot Program cooperators.
 - Promote food plots for big game species utilizing west river and east river GFP seed mixes.
- g) Support grassland and wetland establishment or restoration that may provide benefits to white-tailed and mule deer.

Objective 5: Cooperatively work with private landowners and public land managers to provide and enhance hunting access for white-tailed and mule deer.

- a) Annually lease an additional 5,000 acres of private land for deer hunting opportunities through the James River Watershed CREP, Big Sioux River Watershed CREP, Controlled Hunting Access Program, or the Walk-in Area program.

LITERATURE CITED

- Ajzen, I., & Fishbein, M. 1980. *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall.
- Buckley, S. 2024. *South Dakota Deer Management: 2023 Public Opinion Survey Results*. South Dakota Game, Fish and Parks.
- Cudmore, Kristopher W. 2017. *An evaluation of deer and pronghorn surveys in South Dakota*. M.S. Thesis, South Dakota State University, Brookings, USA.
- Fishbein, M., & Manfredo, M. J. 1992. *A Theory of Behavior Change*. In *Influencing Human Behavior Theory and Applications in Recreation, Tourism, and Natural Resources Management*. pp. 29–50. Sagamore Publishing.
- Lindbloom, A. J., L. M. Wiechmann, S. L. Griffin, B. R. Buckley, and A. S. Norton. 2023. *Deer Population Status Update*. Wildlife Report 2023-02. South Dakota Game, Fish and Parks, Pierre, South Dakota.
- Norton, A. S., A. J. Lindbloom, L. M. Wiechmann, and S. L. Griffin. 2021. *Compilation of Deer Survey Methods and Results Reports*. Wildlife Survey Report 2021-06. South Dakota Game, Fish and Parks, Pierre, South Dakota.
- R Core Team 2015. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <http://www.R-project.org>.
- Robling, K. A. 2011. *Movement patterns, survival, and sightability of white-tailed deer (*Odocoileus virginianus*) in eastern South Dakota*. M.S. Thesis, South Dakota State University, Brookings, USA.
- Samuel, M. D., E. O. Garton, M. W. Schlegel, and R. G. Carson. 1987. *Visibility bias during aerial surveys of elk in northcentral Idaho*. *Journal of Wildlife Management* 51:622-630 pp.
- South Dakota Department of Game, Fish and Parks. 2017. *South Dakota White-tailed Deer and Mule Deer Management Plan, 2017-2023. Completion Report 2017-02*. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.
- South Dakota Department of Game, Fish and Parks. 2023. *Management of Chronic Wasting Disease in South Dakota. Completion Report 2023-09*. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA.
- Stevens, D. L. and A. R. Olsen. 2004. *Spatially balanced sampling of natural resources*. *Journal of American Statistical Association* 99:262-278 pp.
- Vaske, J. J. 2008. *Survey Research and Analysis: Applications in Parks, Recreation and Human Dimensions*. Venture Publishing, Inc.
- Verme, L. J. 1968. *An index of winter weather severity for northern deer*. *Journal of Wildlife Management* 32(3):566-574 pp.

