SOUTH DAKOTA STATE ACTION PLAN
2024

SOUTH DAKOTA GAME, FISH AND PARKS
OCTOBER 2024

We serve and connect people and families to the outdoors through effective management of our state's parks, fisheries and wildlife resources.

Introduction

South Dakota's position in the northern Great Plains and many unique physiographic features are responsible for the state's diverse landscape and ecoregions. The Missouri River divides the state nearly in half with the eastern half lying within the Prairie Pothole Region. The Prairie Pothole Region (PPR) contains a mosaic of depressional wetlands, tall and mixed grass prairies, and productive cropland. The western half of South Dakota is composed principally of mixed grass prairie with areas of ponderosa pine forest, woodlands, and badlands. Grasslands is the most prominent ecotype in western South Dakota making up nearly 73% of the total land area when compared to woodland 6.7%, Badlands 1.6%, cropland 11.7% and other 7%. (Figure1).

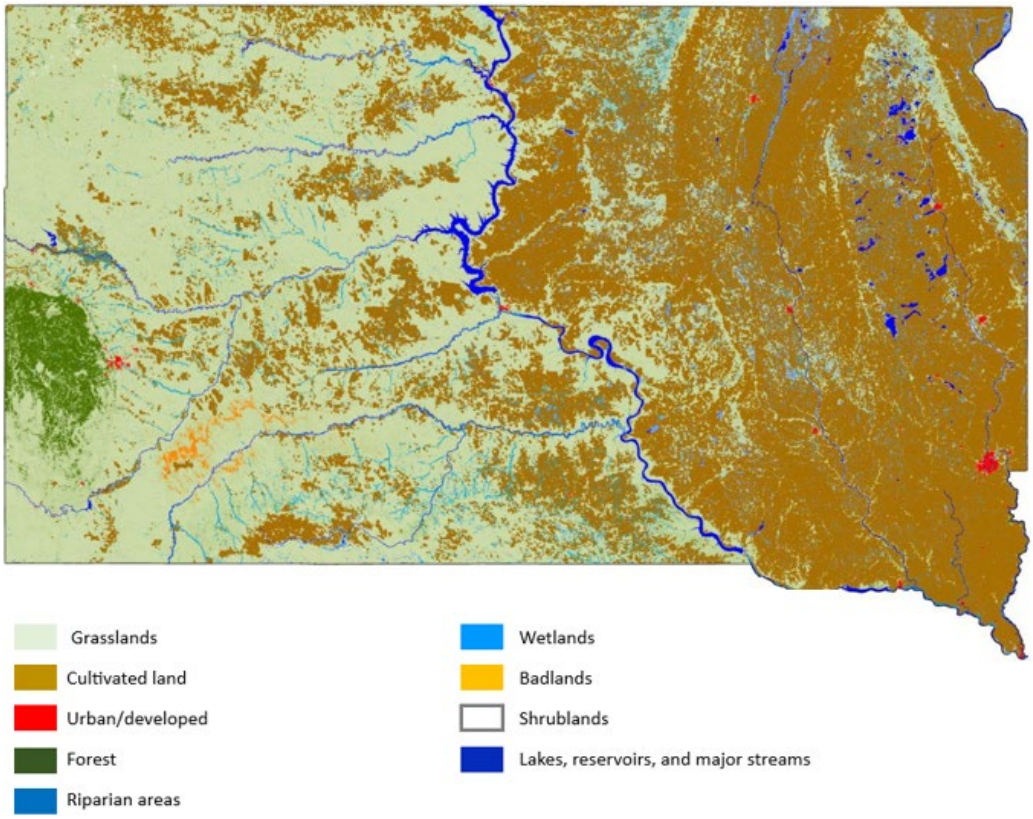

Figure 1. Habitat classification using 2021 National Land Cover Data and the Midwest Landscape Initiative – Conservation Blueprint to help understand current land uses across South Dakota. MLI wetlands were merged with the 2021 NLCD. (USGS 2021, MLI 2024)

Historically, this region's ecosystem was shaped by periodic ungulate grazing and fire events that created a habitat mosaic beneficial for grassland species. Bison originally held the grazing role, but since European Settlement, cattle and other livestock assumed this position on the landscape (Robb et al. 2005).

Because of the high degree of vastness and habitat connectivity, the mixed grass prairie of South Dakota harbors a myriad of grassland obligate species reliant on large uninterrupted grassland complexes, especially grassland passerines. However, land use changes continue to result in habitat loss and threaten connectivity. During the 1700's, prairie grasslands covered

about 96% of South Dakota, but in 2016 only 50% of the state remains grass. (Johnson and Knight 2022). From 2021-2022 alone, 497,583 acres of intact habitat was lost in South Dakota (WWF 2024). While a large part of habitat loss occurs more the further east one travels, cropland conversion continues to expand westward. This loss in habitat connectivity results in a network of smaller, isolated patches spatially across a landscape and can contribute to lower occurrence or density of individuals, philopatry rates of breeding birds, nesting success, gene flow, and recruitment into a population. Many grassland songbirds are area sensitive and select for landscapes with a higher abundance of intact grasslands. For example, Western Meadowlark abundance increases in landscapes with greater grassland composition (Greer et al., 2016). Other species, such as Upland, Sandpiper, Greater Prairie-Chicken, and Chestnut - collared Longspur, have also demonstrated increased occurrence or density with larger patch area (Ribic et al.,2009). Habitat selection for smaller, isolated, or linear grasslands may be perceived by grassland birds as a risk or threat. Birds occupying fragmented landscapes tend to experience lower vital rates as a result of greater edge effect and a subsequent increase in nest predation, lower recruitment, and brood mortality. Larger grassland tracts tend to be less desirable habitat for common nest predates and may also dilute the effects of predators by decreasing search efficiency. Furthermore, because of territoriality tendencies, larger grassland tracts can increase breeding bird carrying capacity.

Landscape fragmentation not only has profound influences on bird occurrence and density but also on the habitat itself. Smaller blocks of grassland habitat are more susceptible to encroachment by non-native, less desirable herbaceous vegetation such as smooth brome, Kentucky bluegrass, and crested wheatgrass. These aggressive species can invade native grassland and quickly become dominant, shifting the plant community from one that is heterogenous in composition and structure to one that is homogenous. Grassland bird habitat preference occurs along a continuum with species selecting for shorter, sparse cover and others for taller, denser vegetation. As vegetation invaders take over native vegetation, habitat diversity and structure changes and, consequently, bird species richness declines. (Bakker and Higgins, 2009). Large, intact grasslands, such as those that occur in western South Dakota, can mitigate the deleterious effects of fragmentation and plant community transitions. Because western South Dakota's landscape and habitat features, this area remains a stronghold for grassland passerines and should continue to be prioritized for grassland preservation, enhancement, and conservation.

Why This Area Was Selected as a Priority

Western South Dakota contains some of the most intact mixed grass prairie remaining on the continent. This is of particular significance when considering grassland passerines are declining at a faster pace than any other bird guild in North America(Bernath-Plaisted et al. 2023, Knopf 1994). Chestnut-collared longspur, lark bunting, and grasshopper sparrow have experienced a population decline in South Dakota of 4.21%, 4.31%, and 3.74% per year from 1966-2022 (Sauer et al.). These grassland obligate species persist in unfragmented, interconnected grasslands

characteristic of western South Dakota. It is therefore imperative that conservation efforts continue to focus within these landscapes to help stem the loss of these species and their accompanying habitats.

Spatial Location

Working in cooperation with the United State Fish and Wildlife Service's (USFWS) Habitat and Population Evaluation Team (HAPET) and USFWS South Dakota Partners for Fish and Wildlife Program (PFW), the South Dakota Department of Game, Fish, and Parks (GFP) have harnessed a suite of decision support tools (DST) developed by HAPET to identify and prioritize grassland tracts for conservation. One DST example (Figure 2) focuses on western South Dakota that contain greater than or equal to 1 grassland nesting bird in the top 25% of two priority grassland bird species, grasshopper sparrow and western meadowlark. These DST's analyze grassland passerine species populations and their associated habitats. In essence, because of their habitat requisites, these species are used as a proxy to assist in identifying important landscapes or tracts of land that aid in supporting habitat connectivity conservation efforts.

Because western South Dakota does still contain a high degree of intact habitat, conservation efforts should focus on the most important tracts of land that will maintain habitat connectivity. Maintaining or enhancing existing habitats in important landscapes is not only an important piece for connectivity but also for biodiversity. Although any conservation work in general is thought to be beneficial, habitat reconstruction is an exceedingly complex and expensive endeavor with varying degrees of success. For example, because of its plant diversity, reconstructing a native prairie is nearly impossible to accomplish because of the intensive management that is involved with specific plant species requirements for germination, establishment, and persistence. seed availability and overall project cost is also challenging. Therefore, it is not only more economical to maintain or enhance existing habitat, but also more beneficial for wildlife. However, in unique scenarios, if lower priority land is spatially isolated or disconnected from areas of higher priority and habitat restoration or enhancement will serve to connect high priority areas, consideration should be taken as a means to connect higher priority areas. The DST notion mentioned will not only serve to identify and prioritize landscapes to work in but also specific higher priority properties that will benefit species when habitat connectivity between them is improved.

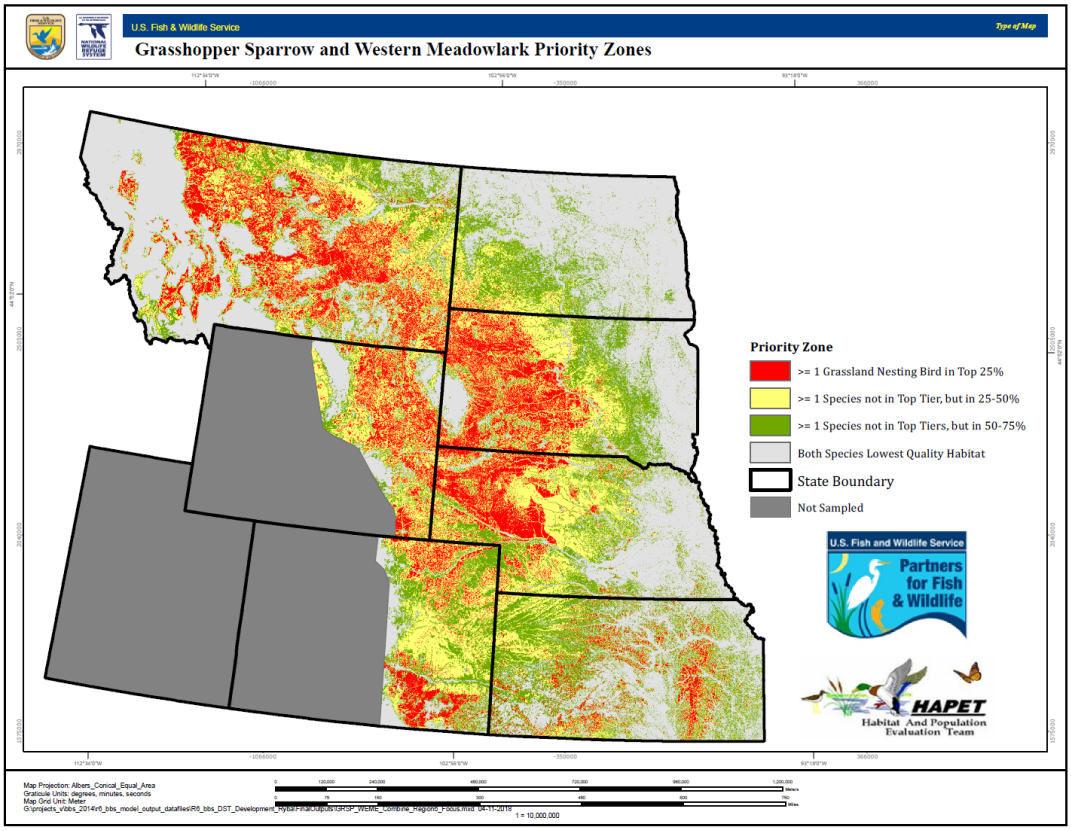

Figure 2. HAPET model depicting percentage of the population in relation to the habitat present

Habitat Type

The principal habitat type focuses on the mixed grass prairie of western South Dakota. Vegetation of this areas is characterized by a variety of grasses, forbs, and legumes including western wheatgrass, big and little bluestem, green needlegrass, porcupine grass, sideoats grama, fringed and cudweed sagewort, purple coneflower, and silverleaf scurfpea.

Land Ownership

Land ownership in western South Dakota contains approximately 87.16% privately owned, 8.05% United State Forest Service, 0.6% State(GFP, Parks and Recreation) owned, 1.03% Bureau of Land Management(BLM), 0.07% USFWS, 2.36% School and Public Lands, 0.7% National Parks, and 0.03% Bureau of Reclamation.

Land Uses

Land uses in relation to the priority area is predominately working lands used for livestock production and interspersed grain production. Many of the lands under state or federal ownership, such as the United State Forest Service (USFS) and BLM, utilizes private grazing tenants as a means for grassland management. Recreation opportunities abound with nearly

17% open for public hunting. This includes much of the land owned by the previously mentioned state and federal entities as well as leased properties under GFP's public hunting access program. Energy development exists in the form of oil production in the northwestern part of the state and sporadic wind development.

Risk/Threats

Cropland conversion, woody encroachment, wind and solar development, and nonnative and invasive species are the primary risks and/or threats which are further defined below.

Cropland Conversion

While western South Dakota boasts expansive, intact grassland complexes, conversion to other uses, chiefly row crop agriculture, remains the preeminent threat to maintaining landscape integrity and interconnectedness. Continued market support for agricultural production has led to an increase in conversion of grasslands to row crop agricultural land use across South Dakota. Wright and Wimberly (2013) compared crop data layers for 2006 and 2011 and found that 1,561,706 acres of grasslands had been converted to corn or soybean fields during that time in South Dakota. A higher rate of conversion is occurring in eastern South Dakota as compared to the western part of the state. However, crop genetics have advanced in recent years and crops are becoming more drought tolerant and will likely continue to expand westward (McFadden et al., 2022). The World Wildlife Fund (WWF) 2024 Plowprint Report provides a more recent perspective of grassland conversion. The 2024 Plowprint Report, which uses 2022 data, shows 1.9 million acres of grasslands were converted to cropland in the US and Canadian portions of the Great Plains during the year. In South Dakota, approximately 104,000 acres of grassland were converted during 2022. The crop drivers in South Dakota continued to be corn and soybean production (World Wildlife Fund 2024). Figure 3 provided by WWF shows the footprint of intact habitat, the existing agricultural plowprint, new agricultural plowprint, developed areas, and roads/water. The conversion rate as shown in the figure much greater in the eastern half of South Dakota but continues to push westward.

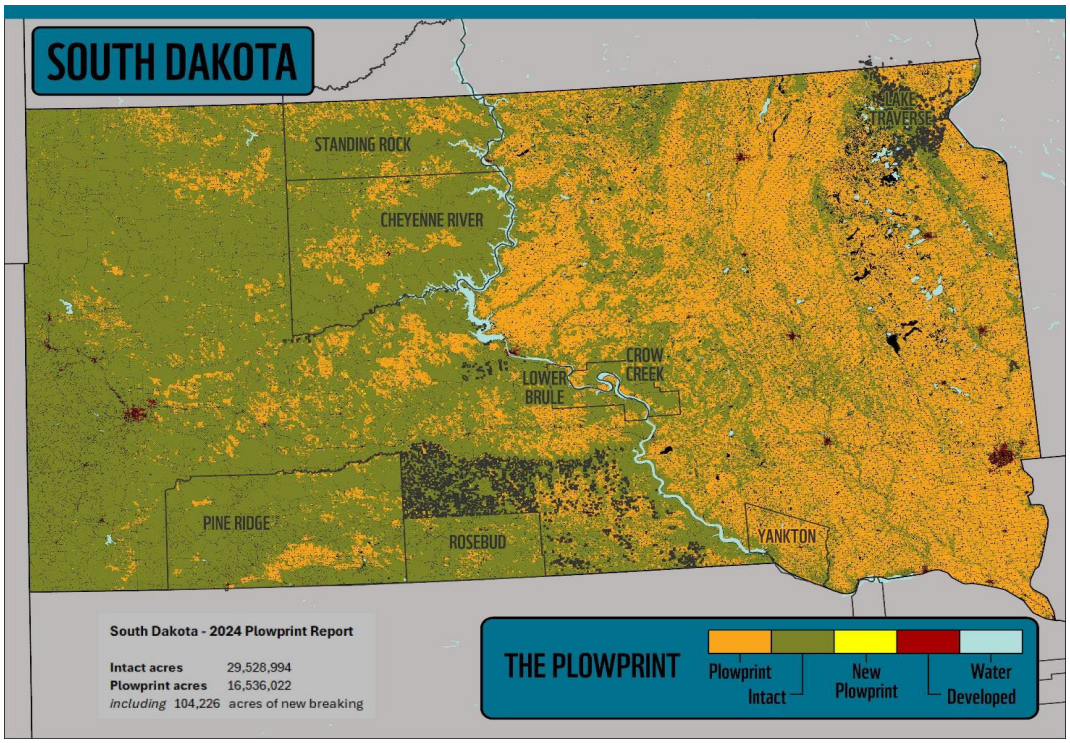

Figure 3 World Wildlife Fund Plowprint Map of South Dakota from the 2024 report showing where lands have been converted to row crop agriculture or developed and those acres that remain intact.

Woody Encroachment

The process of woody encroachment threatens grassland ecosystems and associated grassland dependent species by modifying the plant community from one that is dominated by herbaceous vegetation to one dominated by woody plants. This ecological shift displaces wildlife species that rely on grassland dominated landscapes. Grasshopper Sparrows and Western Meadowlarks avoided areas near woody species (Bakker et al. 2002). Grant et al. also found grassland endemic bird species occurrence declined as woody plants species increased within grassland. Woody encroachment into grassland dominated habitats can result in habitat fragmentation, and consequently, reduce nesting success of grassland bird species and increase brood parasitism (Johnson and Temple (1990.) The negative implications associated with woody encroachment is not only alarming for wildlife populations but also for preserving the livelihoods of the ranching community reliant on grasslands as a means for cattle production and income. From 1990- 2022, the cumulative grass production loss in South Dakota was over 5.6 million tons. In terms of scale, this results in a loss of over 191,000 acres (Working Lands For Wildlife, 2023).

Wind and Solar

Habitat conversion and alteration through fragmentation are top concerns regarding renewable energy development, especially with grasslands in the Great Plains. Every energy source requires some amount of land to be temporarily or permanently converted to accommodate energy infrastructure pads, power stations, transmission lines, new service roads, and the like (Ott et al., 2021). Threats from the development of renewable energy infrastructure apply to other habitat types besides grasslands. However, wind and solar development have primarily impacted grasslands within the state. These two common types of renewable energy infrastructure are increasing in South Dakota.

As of 2022, South Dakota had around 1,400 wind turbines with a total capacity of approximately 2,000 megawatts (American Wind Energy Association 2022). A modern wind turbine requires approximately 3 acres of land, including the turbine pad and access roads (Arnett et al., 2007). With almost nine-tenths of South Dakota identified as "suitable" for large-scale wind development, wind facilities could be proposed in virtually all areas of the state (EIA 2018). The National Renewable Energy Laboratory estimates that South Dakota could generate many times its current electricity needs from wind. These data suggest that over time, wind generated energy development will occupy a significant amount of surface area in South Dakota.

On the other hand, solar is a much smaller industry within the state with around 40 utility-scale solar farms with a total capacity exceeding 400 megawatts (Solar Energy Industries Association 2023). Moderate solar photovoltaic (PV) potential exists across most of the state, with the greatest solar resources in the southwest corner of South Dakota. The Fall River Solar Farm in the southwest corner of the state was operational in 2023 and the Wild Springs project is expected to come online in mid-2024. The National Renewable Energy Laboratory (NREL) suggests that it takes around 5 to 10 acres of land to produce one megawatt of power through solar (Labratory, 2023). This would mean the 400 megawatts produced in South Dakota impact between 2,000 and 4,000 acres of land.

Nonnative and Invasive Species

More recently, the accidental or intentional introduction of nonnative species has had a major impact on native species and ecosystems. Nonnative invasive plant species are a challenge in all South Dakota ecoregions and across all ecosystem types. They are of particular concern to maintaining the ecological integrity of historical ecosystems. Nonnative invasive species will often reduce the overall biodiversity of a vegetative community by displacing native species and altering normal ecological processes (e.g., nutrient and water cycles) (Mack et al., 2000). Where heavy infestations of nonnative invasive plants occur, many of the habitat values of that ecosystem will be converted to conditions no longer favorable to native wildlife. Kentucky bluegrass (*Poa pratensis*) and Smooth brome (*Bromus inermis*) are two nonnative cool season grasses that have invaded most of the grassland habitats across the state as well as many types of ecosystems. These two invasive grasses have degraded grassland habitat and been aided by fire suppression and altered grazing regimes. Grassland degradation has negative ramifications

for a wide range of ecosystem functions including biological diversity, wildlife habitat, pollination, hydrologic systems, and nutrient cycling (Grant et al., 2020). In addition to these grass species, noxious weeds (such as Canada thistle and leafy spurge) are found throughout South Dakota and cover thousands of acres of previously native ecosystems. These noxious weeds can impact wildlife habitat and forage, deplete soil and water resources, and reduce plant and animal diversity (DiTomaso, 2000).

Are the Threats Immediate or Long Term

The previously mentioned threats are both immediate and long term.

Actions Necessary to Reduce or Eliminate Risks/Threats

Because the vast majority of western South Dakota is under private ownership, working alongside landowners, more specifically the ranching community, is paramount to curb the loss of grasslands. Maintaining and devising voluntary conservation programs that promotes grassland retention, are flexible, and foster landowner/conservation relationships are consequential to support working ranches, both financially and technically. Specifically, designing programs that support the needs of the western South Dakota ranching community is important to keeping grass intact. Successful practices that share mutual benefits for the producer and wildlife is cross fencing, water development, and grass seeding. Oftentimes, grazing management upgrades can be financially challenging. Offering these project types demonstrate support for grass-based producers that produce long-term landowner partnerships. Building these partnerships and keeping these grass-based producers on the landscape keep high priority grassland habitats connected which in turn benefits the wildlife species dependent upon it. In many cases offering these programs are twofold as they not only improve connectivity between other high priority grasslands but also greatly improve the habitat quality on the land on which they are implemented.

Current Conservation Efforts

In response to the ongoing threats associated with grassland loss, GFP has partnered with multiple conservation partners to prioritize grassland restoration and enhancement within the western South Dakota priority area. The following projects are currently ongoing and are described below:

- Phase III of the NFWF “Using Decision-Support Tools to Strategically Deliver Grassland Bird Conservation” uses a collaborative approach employing a tract prioritization protocol based on grassland bird support tools to identify grassland tracts on private land in western South Dakota with the highest value to grassland nesting passerines. This project focuses working with grass-based producers to provide financial and technical assistance on designing and implementing grazing systems. Outcomes include working with 25 ranchers across 14,000 acres. Project partners include Pheasants Forever, the South Dakota Grassland Coalition, and USFWS PFW.

- Phase II of the NFWF "Supporting Resilient Rangelands and Storing Carbon in the Northern Great Plains" aims to expand upon the initial successful project of working jointly with American Bird Conservancy, the Prairie Pothole Joint Venture, and SD Natural Resources Conservation Service to expand and enhance cost share opportunities to private landowners through the Northern Grassland Restoration Incentive Program for grazing systems. The objective of this opportunity is to restore or enhance.
- The "Working Grasslands Partnership" is a joint effort through the NRCS Regional Conservation Partnership Program (RCPP) amongst multiple conservation organizations to reconstruct grasslands on 25,000 acres of cropland statewide. Because establishing perennial cover on cropland can be a challenging financial endeavor, the premise with this effort is to provide up to three years of forgone income payments while the seeded cover establishes. This enables the landowner to receive income during the establishment period. Ducks Unlimited is the lead partner while subsidiary partners being GFP, USFWS, South Dakota Grassland Coalition, Audubon Great Plains, and the South Dakota Soil Health Coalition.
- State wildlife grants (SWG) focus solely on projects that benefit state species of greatest conservation need. The goal "Private Lands High Diversity Grassland Reconstruction" SWG is to establish high diversity native perennial grassland seedings in former cropland to benefit a multitude of SD species of greatest conservation need, most notably related to this action plan, are grassland passerine endemic species Baird's sparrow, Chestnut-collared longspur, Greater prairie-chicken, Lark bunting, Le Conte's sparrow, Marbled godwit, and Sprague's pipit. This project aims to impact 3,600 acres of new grassland habitat by provided cost share on seed cost.

Specific Habitat Conservation Needs

As previously mentioned in the actions to reduce risk narrative, program availability to private landowners that remain flexible and focus on grassland sustainability and producer profitability are critical to maintaining grassland habitat on the landscape. Landowner access to knowledgeable resource professionals that are adept in understanding producer goals and programs and can provide the nexus between successful ranching operations and wildlife habitat are invaluable. Programs and projects such as the ones mentioned will continue to be a valuable component of habitat conservation across the western South Dakota landscape.

Cost of Current or Needed Habitat Treatments

Comparatively, few financial assistance programs exist for grass-based livestock producers versus grain operations. Program accessibility to livestock producers is an important facet that assist ranch vitality. The average cost per acre for grazing infrastructure in western South Dakota is approximately $34/acre while the average cash rent for pasture in 2024 in western South Dakota is approximately $18 according to the National Agriculture Statistics Survey. The

cost share provided is nearly equivalent to two years' worth of cash rent. This statistic is important to note as a landowner would not necessarily have to sacrifice two years' worth of income to maintain or upgrade their grazing infrastructure to one that is potentially more profitable in the long term due to a producer's ability to manage pastures in a more sustainable, profitable manner. Other program options such the aforementioned RCPP and SWG help to offset the initial investment in seed cost and foregone income in exchange for a beneficial land use to perennial cover for wildlife.

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