NORTH DAKOTA
WILDLIFE MOVEMENT AND CONNECTIVITY PLAN

AUGUST 2025

NORTH Dakota | Game and Fish
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North Dakota Wildlife Movement & Connectivity Plan

Purpose

In February of 2018, Department of the Interior Secretarial Order 3362 was signed with the goal of 'Improving habitat quality in Western Big Game Winter Ranges and Migration Corridors'. Eleven states were initially asked, and they developed action plans for the implementation of the Order. This action plan has been developed by the North Dakota Game and Fish Department (NDGF) in response to the Western Association of Fish and Wildlife Agencies (WAFWA) Wildlife Movement and Connectivity Initiative (WAFWA 2025). NDGF is one of seven WAFWA member states without an existing connectivity action plan. Development of such a plan will guide the implementation of projects within focus areas of North Dakota.

Introduction

North Dakota stretches 211 miles from north to south and 340 miles from east to west, covering a total of 70,699 square miles, making it the 19th largest state in the United States. North Dakota's highest point is White Butte in the southwestern part of the state, standing at 3,506 feet above sea level, while its lowest point, at 750 feet above sea level, is in the extreme northeast.

Land-use changes such as agricultural and energy development, noxious weed expansion, urban sprawl, development and expansion of highways and interstate's, can create barriers to seasonal wildlife movements. This action plan will allow stakeholders to evaluate and maintain habitat connectivity for various wildlife species movements in North Dakota.

North Dakota has four primary grassland ecoregions with unique flora and fauna. Each grassland type is shown in Figure 1. Although all grassland ecoregions are important, this plan focuses on the western mixed-grass shortgrass prairie (southwestern North Dakota) because it offers North Dakota's big game and other grassland-dependent wildlife species valuable mixed grass habitat. North Dakota's big game species utilize seasonal movements (i.e., migrations) throughout this ecoregion to maximize resource availability year-round and fulfill their life history strategies. This area of North Dakota is also known as the Missouri Slope due to its unglaciated rolling plains, buttes, and badlands formations west of the Missouri River.

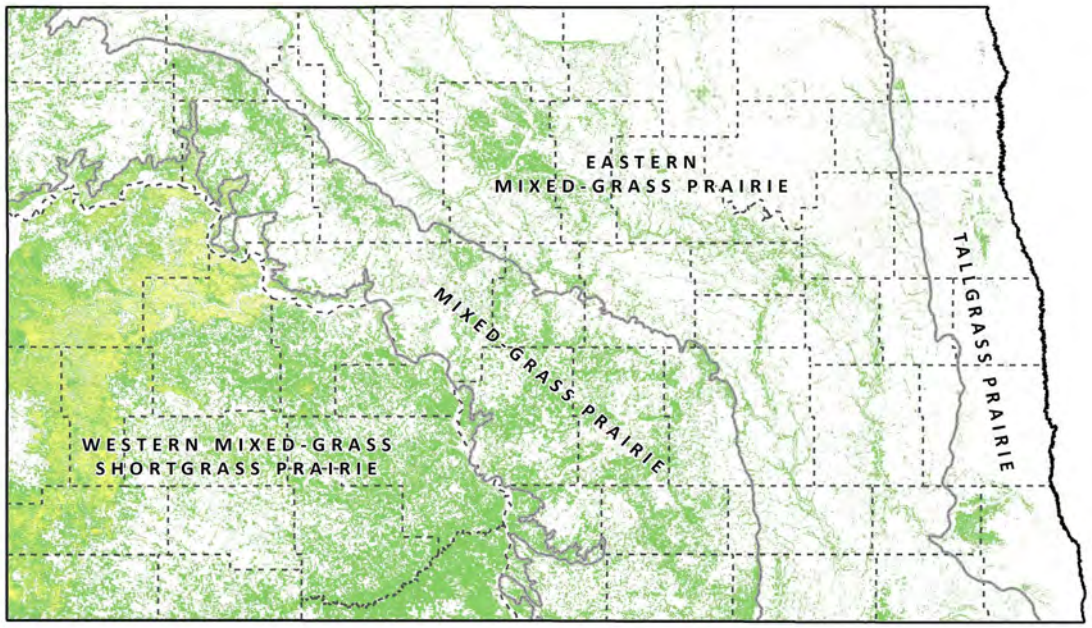

Figure 1. *Grassland regions of North Dakota along with estimated extent of unbroken grassland (green) and unbroken grassland/shrubland (yellow).*

Grasslands may be native prairie or planted grassland, including pastures and rangeland, and all are frequently used for grazing livestock. Unbroken Grassland is also referred to as "native prairie." This is grassland that, according to the best available spatial information, has not been converted to another type of land or land cover (e.g. cropland, developed, roads). Figure 1 also illustrates the extent of unbroken (native) grassland and shrubland within the State. Other attributes of grasslands include the following:

- May be composed of native and/or non-native grasses and forbs.
- May be heavily invaded with nonnative species such as Kentucky bluegrass or smooth brome, but it is still considered unbroken/native prairie if there is no cultivation history.
- May be grazed or otherwise "disturbed" with animals, hayed, or burned. Appropriate grazing can be very beneficial to grasses and forbs.
- May be fenced, contain structures (e.g. old homesteads, water tanks, overhead lines), or two-track roads (i.e. with grass between the tire ruts).
- May contain patches of shrubs (e.g. buffaloberry, chokecherry, silverberry bush) or woody draws.
- May contain natural or created wetlands (e.g. stock dams).
- May be any size or configuration.

Priority Area: Western Mixed-Grass Shortgrass Prairie (Missouri Slope)

The western mixed-grass shortgrass prairie of southwestern North Dakota is a semiarid unglaciated landscape, with level to rolling plains and occasional sandstone buttes or badlands formations. Natural wetland basins are limited, but small creeks and streams are plentiful. Shrub-steppe, an open landscape of sagebrush and perennial grasses, is found throughout the western mixed-grass shortgrass prairie. Land use is primarily dryland farming of crops like spring and winter wheat, barley, sunflowers, and corn,

along with cattle production. A substantial amount of native vegetation remains throughout this region, which makes it an ideal focus area for conservation actions.

Throughout the Missouri Slope, restored grasslands are also present. Restored grassland is former cropland that has been converted back to grassland by replanting with tame or native grasses and forbs and provides valuable wildlife habitat. One of the leading programs for restoring grasslands is through the Conservation Reserve Program (CRP). Established in the 1985 Farm Bill, this program allowed producers to conserve marginal soils by retiring cropland for contracts of typically 10-15 years. The program provides income for producers and creates valuable wildlife habitat while conserving soil and water. In 2007, there were 3.38 million acres enrolled in CRP in North Dakota. In 2022, this declined 63% to 1.24 million acres. There are, however, many other grassland restoration initiatives that have been established by various state, federal, and conservation organizations. Restored grasslands are also common on public lands throughout the state, including NDGF wildlife management areas and US Fish and Wildlife Service (USFWS) waterfowl production areas and refuges.

An example of grassland decline in North Dakota can be illustrated by the loss of CRP. As seen in Figure 2, each county within the Missouri Slope region documented a loss of general or continuous CRP acres from 2007 to 2022, ranging from -45% to -95%.

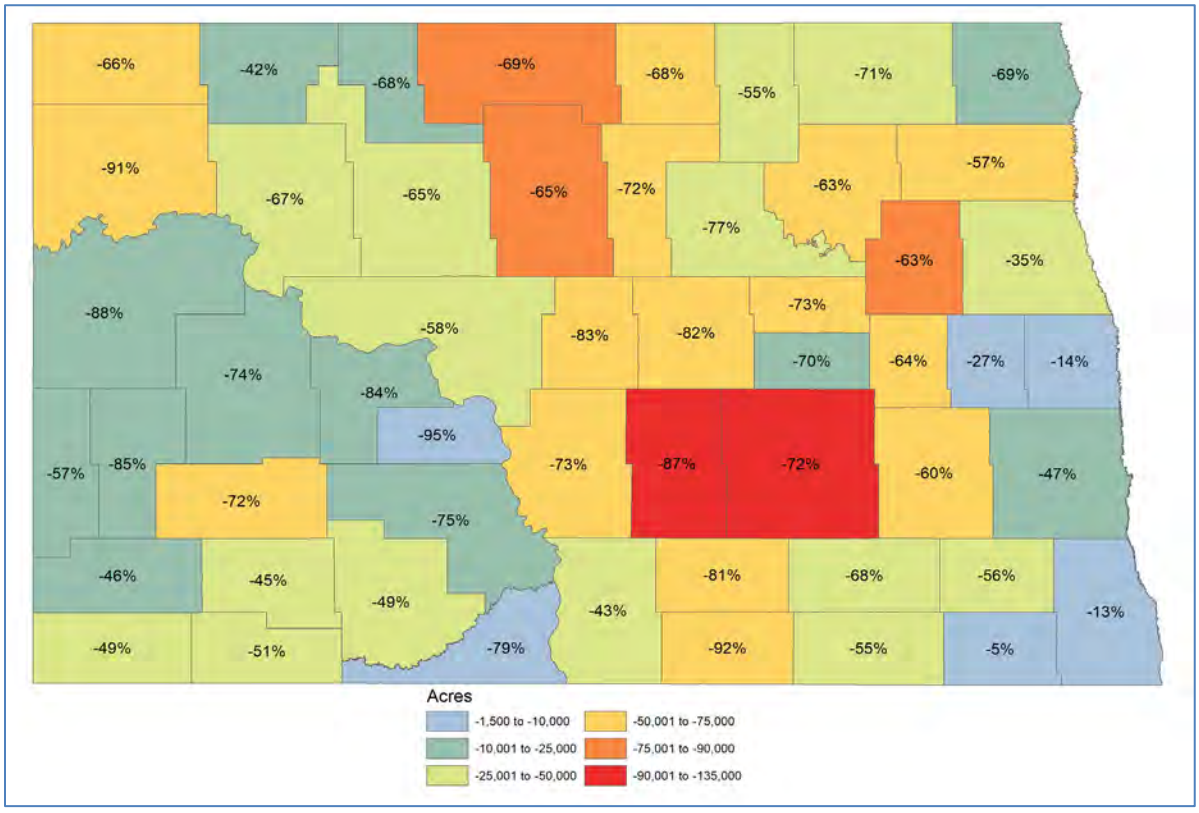

Figure 2. *Percent loss of CRP general and continuous enrollment acres from 2007 to 2022.*

North Dakota's remaining tracts of unbroken prairie are essential to many declining resident and migratory species. This habitat supports 62 Species of Greatest Conservation Need and 55 Species of Greatest Information Need identified in the Draft North Dakota State Wildlife Action Plan (NDGF 2025). Grassland dependent species are on the decline. The state bird of North Dakota, the Western Meadowlark, has decreased by approximately 48% globally. Further, many pollinators are experiencing similar trajectories. The monarch butterfly has declined by over 80% since the 1990s. The loss and fragmentation of native prairie in the project area may further negatively impact these declining species, making conservation efforts a necessary priority.

WHY THIS AREA WAS SELECTED: Grassland ecosystems face continued threats and are in danger of continued loss of acreage. It's estimated that the Great Plains region is losing 1 to 2 million acres of grassland habitats per year (North American Bird Conservation Initiative 2025). Threats to grassland ecosystems include habitat loss and fragmentation due to conversion of row crops, energy development, etc. Conservation practices to enhance existing grasslands and restore altered grasslands are now more important than ever.

This portion of southwestern North Dakota contains primary and secondary mule deer habitat, pronghorn high use areas and travel corridors, along with bighorn sheep (BHS) and elk high use areas (Figure 3). This region contains the highest proportion of unbroken shrubland/grassland (Figure 1), underlying the importance of conservation practices to maintain existing habitat and improve habitat connectivity.

Pronghorn migrate throughout the Missouri Slope (Figure 3). According to Kolar 2009, the mean distance for migratory pronghorn movement in the spring was 46.4 miles, where they typically move to the north and east. In the fall, the mean distance travelled for pronghorn moving to the south and west was 39.2 miles. On occasion, migration distance was greater than 124 miles.

In addition to ungulate use in southwestern North Dakota, grassland birds continue to decline. The Chestnut-collared Longspur and Baird's Sparrow have declined more than 67% in the past 50 years (North American Bird Initiative 2025). Overall, grassland bird populations have declined 53% since 1970 (Rosenberg et al. 2019).

SPATIAL LOCATION*:* Southwestern North Dakota. South and west of Lake Sakakawea/Missouri River system to the Montana and South Dakota borders (Figure 3).

HABITAT TYPE: The western mixed-grass shortgrass prairie is semiarid and unglaciated with level to rolling plains and occasional sandstone buttes or badlands formations which contain pronghorn travel corridors, elk, bighorn sheep, and mule deer high use areas.

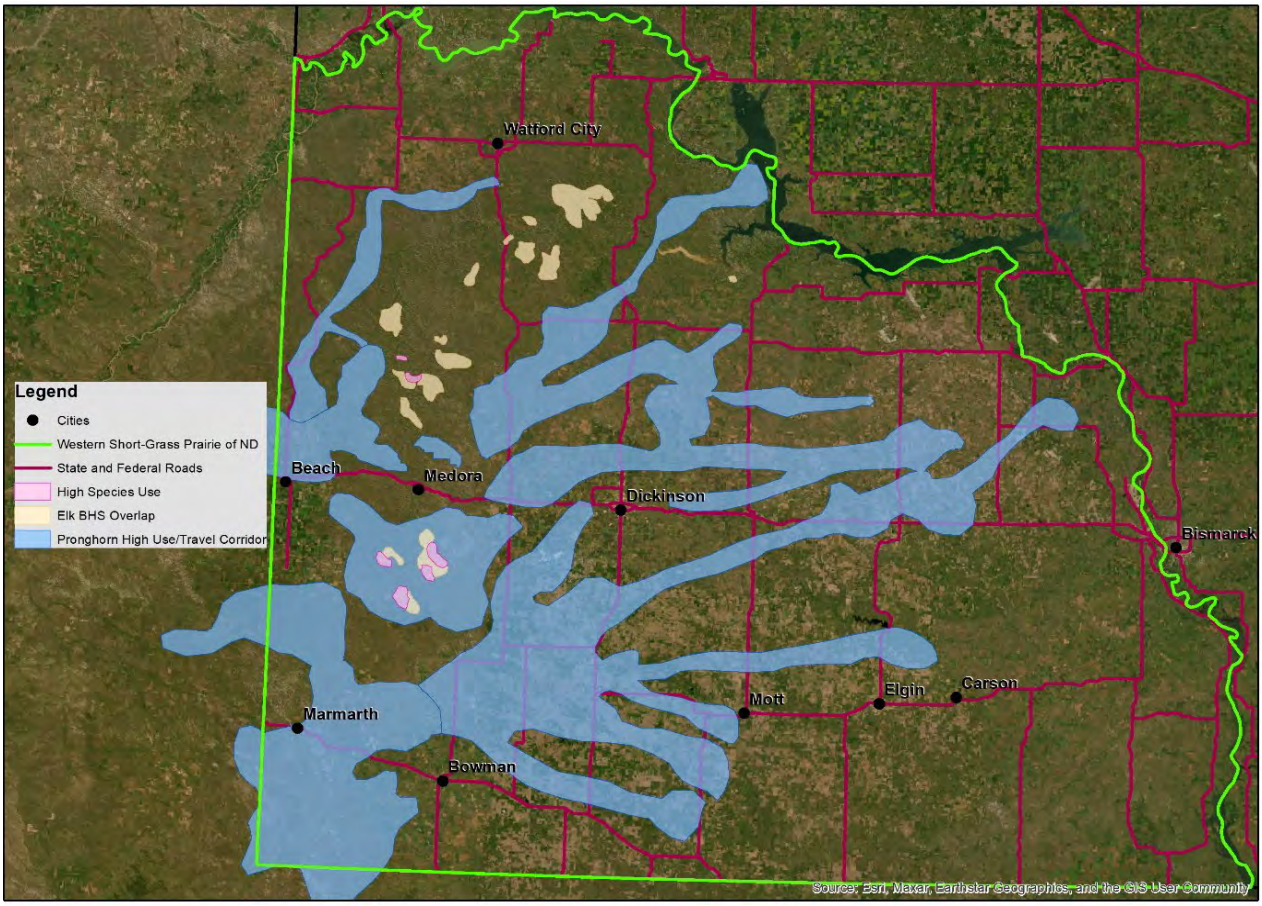

Figure 3*. Southwestern North Dakota's wildlife travel corridors and high use areas.*

LAND OWNERSHIP**:** The Missouri Slope area of southwestern North Dakota is comprised of 12,499,080 acres. Private lands total 10,694,217 acres (85.6%) and public lands consists of 1,574,019 acres (12.6%). There is an additional 230,844 acres (1.8%) of open water calculated into this area. In addition to the land ownership breakdown below, two Tribal Reservations overlap with the Missouri Slope in southwestern North Dakota and will be discussed separately in the '***OTHER ISSUES FOR AWARENESS'*** section of this report. The following is a breakdown of the public lands:

- NDGF Wildlife Management Areas: 48,099 acres
- US Fish and Wildlife Service National Refuges: 8,760 acres
- US Fish and Wildlife Service Waterfowl Production Areas: 1,213 acres
- US Forest Service National Grasslands: 1,034,466 acres
- US National Parks: 71,719 acres
- US Bureau of Reclamation: 13,345 acres
- US Bureau of Land Management: 53,963 acres
- ND State Trust Lands: 333,468 acres
- ND Parks & Recreation: 8,986 acres

In contrast, the entire state of North Dakota is comprised of approximately 93% private land and 7% public land. The Missouri Slope has considerably more public lands due to the large presence of the US Forest Service national grasslands.

LAND USES: Western North Dakota's land is primarily used for agriculture, energy development, and recreation. The region supports diverse agricultural practices but mainly dryland farming and livestock grazing. It is also a significant center for energy production, with substantial oil and gas reserves, particularly in the Bakken formation, driving exploration, extraction, and processing activities. The region further offers various opportunities for recreation and conservation, including hunting, birdwatching, camping, and utilizing native vegetation areas like the badlands and grasslands.

RISKS/THREATS: The Department held a State Wildlife Action Plan (SWAP) summit in the fall of 2024 to receive input from stakeholders regarding threats to habitats. The recurring threats were conversion of grassland habitat, invasive non-native species, and energy development. Roadway systems are also a significant threat for wildlife connectivity and movements.

Conversion of grassland habitat in North Dakota has become a significant environmental concern over the past few decades, primarily driven by agricultural expansion. Native prairies, which once covered vast areas of the state, are increasingly being converted to agriculture. It is estimated that only 25 percent of the state's original native grasslands are still intact, albeit altered due to invasive non-native species. This transformation leads to the loss of critical habitats for grassland dependent species such as the baird's sparrow, grasshopper sparrow, western meadowlark and various pollinators. Additionally, converting grasslands to cropland increases soil erosion, reduces carbon sequestration, and threatens water quality due to runoff. The shift also diminishes the ecological resilience of the landscape, making it more vulnerable to a changing climate and extreme weather events.

Invasive non-native plant species have significantly impacted North Dakota's native grasslands, leading to the degradation of these vital ecosystems. Species such as leafy spurge, Canada thistle, and smooth brome aggressively outcompete native grasses and forbs, altering plant community composition and reducing biodiversity. These invasives often form dense monocultures that provide poor habitat and forage for native wildlife, including grassland birds and pollinators that rely on diverse plant species. The spread of invasive plants also disrupts natural fire regimes and soil health, further hindering the recovery of native vegetation. Agricultural practices, energy development, and roadside disturbances often accelerate the introduction and spread of invasive species, compounding their impact on already vulnerable grassland habitats. As a result, managing invasive plants is critical to preserving North Dakota's native prairie ecosystems and the species that depend on them.

Although it's a native species, the Rocky Mountain Juniper can create ecological challenges. It is present throughout much of the primary mule deer range of North Dakota, occupying approximately 600,000 acres (Claeys 2020). This species of juniper is undesirable at high, uncontrolled densities and presents a significant habitat, resource, conservation, and management concern. According to the North Dakota Forest Service, it's presumed that its persistence on prairie habitats is likely due to many years of fire suppression. Its continued expansion can shade out preferred grassland vegetation and increase erosion throughout the badlands.

Energy development in North Dakota, particularly oil, gas, and wind energy, has significantly impacted wildlife habitats. The expansion of oil drilling throughout the Bakken Formation has led to habitat fragmentation, increased noise pollution, and the disruption of mule deer and elk movement. Infrastructure development, including roads, pipelines, and well pads, reduces the availability of intact native prairie and grasslands, which are critical for many grassland-dependent birds and mammals. A recent elk study found that female elk react similarly to drilling and active wells across seasons, selecting

areas greater than 2.5 km away. Interestingly, the greatest avoidance of inactive wells took place in early and late fall, selecting areas greater than 5 km away (Morina et al. 2025). Additionally, spills and leaks from oil operations can contaminate soil and water sources, further degrading habitat quality. While wind energy is often promoted as a cleaner alternative, poorly sited turbines can pose threats to bird and bat populations, particularly in sensitive areas. As energy development continues, balancing economic growth with habitat conservation remains a pressing challenge throughout western North Dakota.

The roadway system in North Dakota poses significant challenges to wildlife movement, particularly for species that rely on large, uninterrupted tracts of land for migration, foraging, and breeding. Highways and rural roads fragment habitats and create physical barriers that disrupt natural movement patterns, leading to increased mortality from vehicle collisions, especially among deer, coyotes, and smaller mammals. Elk likely select areas far away from all road types in all seasons because humans are the main source of mortality for elk in this system, and therefore areas close to roads are perceived as risky due to their high human use (Prokopenko et al. 2017b). Roads also facilitate human access into previously remote areas, increasing disturbance and the potential for poaching or habitat degradation. Morina (2025) found elk select habitat at least 0.5-2.5 km away from improved and unimproved roads and greater than 5 km from paved roads. Additionally, the spread of invasive plant species along roadsides alters the native vegetation communities that many wildlife species depend on. These impacts can isolate wildlife populations, reduce genetic diversity, and hinder species' ability to adapt to environmental changes, emphasizing the need for wildlife-friendly infrastructure planning such as underpasses, overpasses, and habitat corridors.

ARE THREATS IMMMEDIATE OR LONG-TERM: The identified threats are long-term and require significant conservation commitments to protect, enhance and restore habitat and connectivity in western North Dakota.

ACTIONS NECESSARY TO REDUCE OR ELIMINATE RISKS/THREATS: Wildlife friendly fencing, wildlife crossings, Rocky Mountain Juniper removal, wildlife jump-outs along major highways/interstates, grassland restoration and conservation.

CURRENT CONSERVATION EFFORTS: The Department has implemented several programs and efforts to start addressing the loss of grasslands and ultimately habitat connectivity within the focus area. The NDGF has partnered with numerous other conservation partners and organizations to deliver grassland restorations, enhancements and protection. The following programs and projects are ongoing to specifically address habitat loss:

- A collaborative effort known as the Meadowlark Initiative unites 14 partners to achieve two key objectives: improving, expanding, and linking wildlife habitat, and ensuring the long-term viability of new and existing livestock ranches. By pooling contributions, they aim to leverage Regional Conservation Partnership Program (RCPP) funding using an innovative spatial modeling approach to prioritize land management and rental conservation activities. To date, the Meadowlark Initiative has enhanced over 230,000 acres, restored almost 28,000 acres, and protected 13,796 acres under 30-year grassland protection agreements.
- The North Dakota SWAP is a strategic vision to guide the management and conservation of rare and declining species identified as Species of Greatest Conservation Need (SGCN) and their habitats. State Wildlife Grants (SWG) are utilized to monitor and research SGCN's as well as enhance and protect vital habitat for these species. The Department provided the ND Natural

Resources Trust with a SWG to develop a process to implement a habitat protection program focused on areas underserved by conservation protection programs, providing a tool to ensure mid-term protection of priority habitats in the Missouri Slope. Additionally, following the research and development phase of this project, the North Dakota Natural Resources Trust executed three 30-year grassland conservation agreements that protect from conversion. The development of this process served as the blueprint for the Meadowlark Initiative Rangeland Legacy Program (RLP). This grant successfully protected over 1,600 acres of grasslands for 30 years.

- The National Fish and Wildlife Foundation (NFWF) grant "The Meadowlark Initiative: Advancing Grassland Conservation on Private Lands in North Dakota" adds a 30-yr grassland protection feature (RLP). The SWG grant T-56-HM provided a foundation to accelerate the development of the RLP program. In 2025, the Department enrolled 8,324 acres of grasslands, protecting them from conversion or development for 30 years. The Department enrolled an additional 5,471 acres in RLP using funds from other sources. In total, the Department enrolled 13,796 acres in RLP across three counties in southwestern ND.
- Several habitat-based programs within the Department are designed to enhance and restore grasslands and wetlands on private lands. In 2024, the Private Lands Open to Sportsman (PLOTS) program completed 41 grass plantings totaling 4,264 acres of restored grasslands. Additionally, the Department's Habitat Program completed 10 seeding projects totaling 235 acres. These acres are protected with soil rental payments which vary considerably throughout the state.
- The Department works cooperatively with the North Dakota Department of Transportation (NDDOT) to enhance wildlife movements and habitat connectivity through the installation of wildlife crossings. Two successful wildlife crossings developed by this collaborative effort in the past include the Long X bighorn sheep wildlife crossing on Highway 85 south of Watford City, ND (Figure 6 & 7) and a moose crossing on Highway 85 south of Williston, ND (Figure 8 & 9). Both structures are successfully in operation today. Future efforts include evaluating wildlife roadkill data, wildlife movement data, and best professional judgement from biologists to identify additional potential wildlife crossing locations to maximize resources. Wildlife paths have also been installed under bridges throughout the state to facilitate wildlife movements across highways. Additional crossings and wildlife accommodations are continually being evaluated for consideration.

***SPECIFIC HABITAT NEEDS*:** Specific habitat needs within the Missouri Slope include the addition of wildlife jump-outs along major roadways, removal of Rocky Mountain Juniper, and continued emphasis on wildlife friendly fencing, grassland conservation, and wildlife accommodation opportunities.

- South Unit of Theodore Roosevelt National Park (TRNP). The southern boundary of the South Unit of TRNP is adjacent to east/west bound traffic on Interstate 94 (I-94). As a result, several vehicle-wildlife collisions occur annually along the southeast boundary of the national park (Figure 4). From 2015-2023, the NDDOT removed 77 whitetail deer, 37 mule deer, 1 pronghorn, and 4 coyotes from this stretch of interstate. It's assumed numerous other vehicle-wildlife collisions occur in this area that go unreported. Construction of wildlife jump outs along this stretch of interstate would be a welcome addition to the road right-of-way and provide additional opportunities for wildlife to escape nearby vehicular traffic and decrease the number of collisions in this area.
- Rocky Mountain Juniper removal. Rocky Mountain Juniper is present throughout much of the badland's region of North Dakota, which is the primary mule deer habitat within the state. Its

continued expansion and persistence can negatively impact wildlife habitats throughout this core habitat type.

- Wildlife Friendly Fencing. This refers to constructing agricultural fencing in a fashion that minimizes impacts on wildlife movements. The need for wildlife-friendly fencing across the state is ever-present. These projects arise on a case-by-case basis and examples include smooth wire at the bottom of the fence with a 14" height above ground for pronghorn (NRCS 2019). Another form of wildlife friendly fencing includes the adoption of poly-wire or virtual fencing, which eliminates barriers on the landscape.
- As mentioned previously, North Dakota, along with other Great Plains states, continues to lose grassland acreage. Intra and inter-state grassland conservation actions will improve wildlife habitat and connectivity across the region. As shown in Figure 3, pronghorn travel corridors and high use areas extend beyond North Dakota's border, into Montana and South Dakota.
- The Department is continually evaluating the need for additional wildlife studies to identify unknown wildlife corridors and habitat preferences. Although studies have been conducted in the past on elk, mule deer, pronghorn, and bighorn sheep, continued landscape alterations and stressors underly the importance of collecting up to date wildlife movement and habitat connectivity information.

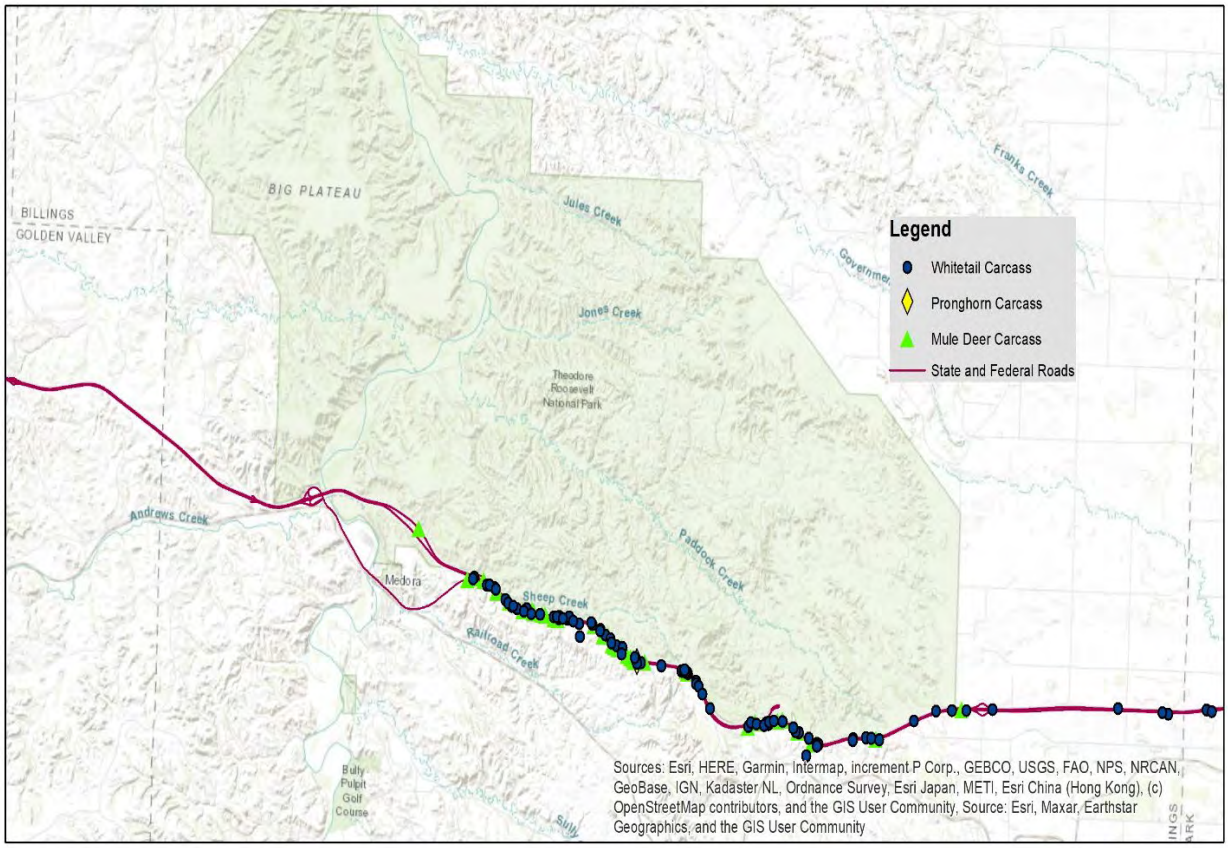

Figure 4*. Aerial view of the Southern Unit of TRNP showing proximity of the National Park Boundary and I-94. The blue circles, green triangles, and yellow diamonds represent wildlife carcasses removed by NDDOT following vehicle-wildlife collisions from 2015-2023.*

COST OF CURRENT OR NEEDED HABITAT TREATMENTS: The Department's primary means of addressing habitat loss and degradation is through our Private Lands Initiative (PLI). The Working Lands Program provides multi-year rental and access payments to private landowners for maintaining and improving wildlife habitat and implementing management activities that have a positive impact on wildlife habitat on active agricultural lands and working grasslands. Landowners may also receive cost-share and increased payments for implementing new conservation practices or developing new habitat. The cost of habitat projects varies considerably with the area of the state and the condition of the land. Soil rental payments range significant by county from $47/acre in the western part of the state to $198/acre in the eastern part. On average, the cost to establish grass on degraded lands is approximately $60/acre. The cost of restoring and protecting grasslands is high, but the importance of maintaining habitat connectivity is extremely important and an exact monetary value is unknown.

OTHER ISSUES FOR AWARENESS: At least one additional wildlife crossing is being considered near the Summit Campground area of Highway 85, along with fencing. This would be approximately four miles south of the existing Long X bighorn sheep crossing on Hwy 85 (Figure 7). Hwy 85 has seen increased traffic in recent years due to oil development in the region. As a result, NDDOT is planning to widen this section of Hwy 85 to accommodate additional industrial traffic.

The State of North Dakota continues to prioritize strong relationships with tribal nations. The State, NDGF, and Tribal entities would benefit from continued conservation activities. Within the Missouri Slope of North Dakota, two tribal reservations are present (Figure 5). Past collaborative NDGF/Tribal efforts include a bighorn sheep relocation effort on the Fort Berthold Indian Reservation and elk management the Standing Rock Indian Reservation.

The Fort Berthold Reservation encompasses 988,000 acres in northwestern North Dakota. In 2020, 30 bighorn sheep (5 rams, 25 ewes) were translocated from the Rocky Boy's Reservation in north-central Montana to the Fort Berthold Reservation in North Dakota. All bighorns were released in the Little Missouri Arm southeast of Mandaree on January 28, 2020, with the goal of establishing a new herd (NDGF 2020). The NDGF and Three Affiliated Tribes Fish & Wildlife Division entered into an MOU (Memorandom of Understanding) where NDGF would conduct translocation efforts and co-management of the herd for two years in exchange for three future bighorn sheep hunting licenses.

The Standing Rock Indian Reservation encompasses 2.3 million acres along the Missouri River in south-central North Dakota and north-central South Dakota. In 2017, a new elk hunting unit was established in the North Dakota portion of the Reservation. Elk unit E6 (east of Hwy 31) in Sioux County was established via MOU to manage a growing elk herd in the region. Management efforts were coordinated between the NDGF, Standing Rock Sioux Tribe, and private landowners. Seven elk licenses were issued in 2017 (two any-elk and five antlerless elk licenses), with four elk being harvested (NDGF 2018).

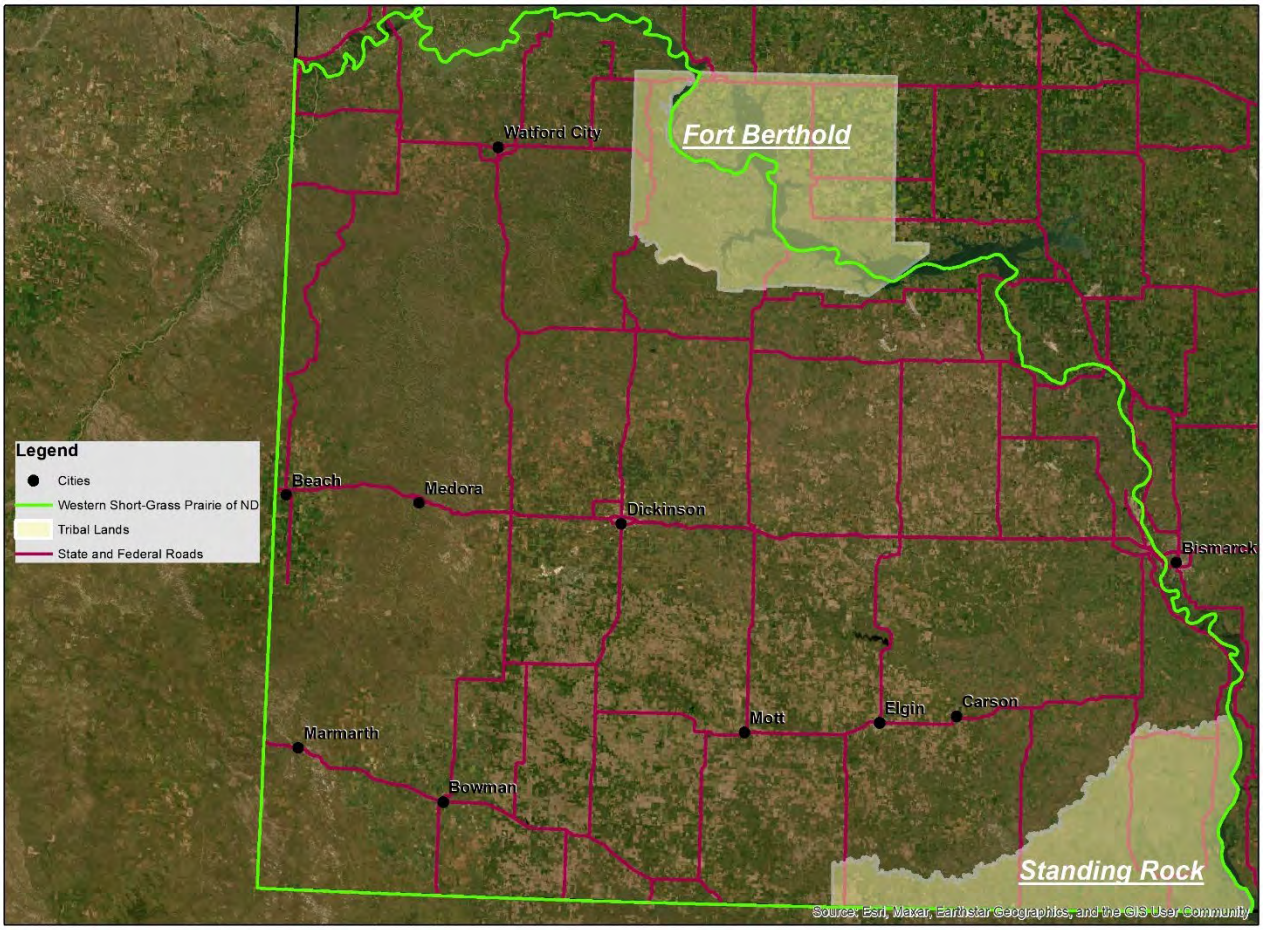

Figure 5*. Tribal lands within the Missouri Slope ecoregion of North Dakota.*

Figure 6. *Aerial image of the Long X bighorn sheep wildlife crossing location south of Watford City, ND.*

Figure 7. *Ground view of Long X bighorn sheep crossing on Hwy 85 south of Watford City, ND looking to the west.*

Figure 8. *Aerial image of the Lewis and Clark Wildlife Management Area wildlife crossing south of Williston, ND.*

Figure 9. *Ground view of the Lewis and Clark Wildlife Management Area wildlife crossing south of Williston, ND looking to the east.*

Literature Cited

Claeys, Thomas. North Dakota forest action plan. May 2020. North Dakota Forest Service. Bismarck, ND.

Kolar, Jesse L. 2009. Pronghorn migration and resource selection in southwestern North Dakota. University of Missouri-Columbia.

K. V. Rosenberg et al. 2019. Decline of North American avifauna. Science 10.1126/science.aaw1313.

Morina, Daniel et al. University of Montana. Stillings, Bruce A. North Dakota Game and Fish Department March 24, 2025. Movement patterns, resource selection, survival and development of a monitoring program for elk populations in western North Dakota. Missoula, Montana.

Natural Resource Conservation Service, 2019. Incorporating wildlife friendly fencing for connectivity of wildlife food resources.

North American Bird Conservation Initiative. 2025. The State of the Birds, United States of America, 2025. StateoftheBirds.org

North Dakota Department of Transportation wildlife map. *https://gis.dot.nd.gov/external/ge_html/?viewer=ext_wildlifemap*

North Dakota Game and Fish Department (NDGF). 2018. Moose and elk population and harvest data. R-58.A-256.

North Dakota Game and Fish Department (NDGF). 2020. Bighorn sheep population studies. C-111.R-60.

North Dakota Game and Fish Department (NDGF). 2025. Draft North Dakota state wildlife action plan.

Prokopenko, C. M., M. S. Boyce, and T. Avgar. 2017b. Characterizing wildlife behavioral responses to roads using integrated step selection analysis. Journal of Applied Ecology 54:470–479.

Western Association of Fish & Wildlife Agencies (WAFWA). 2025. Wildlife Movement & Connectivity Plan. Version 1.0: January 2025 – January 2028.