



Prescribed Fire Timing for South Dakota USDA Conservation Programs, Native Grass Plantings, and Native Pastures

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Introduction

South Dakota grasslands are renowned for their abundance of ecological, economic, and recreational value. As federal, state, non-government, and privately funded conservation efforts continue to focus on grasslands, the ecology and resources to improve grassland management continues to be researched, developed, and modified. Best management practices, methods and tools must remain fluid as shifts in weather patterns, landscape use, and policies fluctuate over time.

As grassland conservation practices continue to evolve so too does the understanding of ecological principles and options for management. With more conventional management methods such as mowing, clipping, disking, or chemical treatments, agency land managers and private landowners have other options including prescribed fire, grazing, and haying as well as improved precision technology and resources to aid in grassland management planning processes. Interest, awareness, applicability, education, and resource investment regarding the use of prescribed fire as a primary grassland management tool continues to grow as conservation professionals and landowners co-educate on the merits of fire as an ecological process, all during a time when government and non-government organizations are dramatically improving their technical services for landowners interested in using fire for grassland management in South Dakota.

South Dakota has been a leader in cooperative classroom and field-based fire education since 2014. Consequently, we are now entering an era where landowner acceptance and desire to implement prescribed fire as a management tool has outpaced our

collective ability to provide resources to meet objectives during the traditional March/April burn window. In addition, many acres where fire is desired are enrolled in some type of conservation program, most of which require coordination of objectives but do not necessarily hinder fire implementation. Other programs may limit opportunity for objectives-based prescribed fire due to timing. An example of one such program limitation is the Farm Service Agency's (FSA) rules for use of prescribed fire during the Primary Nesting Season (PNS) on Conservation Reserve Program (CRP) lands. This is an example of policy that is not consistent with the evolution of fire management objectives in South Dakota and can inadvertently limit a landowner's ability to conduct objectives-based prescribed fire in a safe and cost effective manner.

Objectives-Based Prescribed Fire

Prescribed burning is considered one of the best management practices to establish, maintain, or restore the diversity, vigor, and habitat value of natural or planted grasslands in South Dakota. Diverse and healthy grasslands provide improved cover for birds, production of insects and pollinators, and overall nesting and brood rearing habitat. Prescribed burning enhances the return on investment from federal, state, and non-government grassland focused conservation programs by encouraging vegetative diversity and vigor resulting in improved stand resiliency and a long-term reduction in general input costs related to chemical or mechanical management of invasive species.

Historically North America's grasslands burned frequently and became fire-dependent or fire-adapted ecosystems, with fire likely occurring throughout the year

when conditions were favorable for ignition and spread. Today, advanced fire practitioners apply prescribed fire to achieve the appropriate burn duration and intensity to accomplish one or more objectives, including burns conducted during the growing season. The National Wildfire Coordinating Group generally defines growing season burning as “Prescribed burning or use of wildland fire during the photosynthetically-active growing season, where live fuel moistures are relatively high and the dominant vegetation, grasses, forbs, and herbaceous vegetation are fully greened” (National Wildfire Coordinating Group, 2026).

For example, burns conducted in the early spring or late fall often burn with more heat intensity and less duration when most vegetation is dormant and fuel moisture is low than those conducted during the height of the growing season when vegetation is green and fuel moisture is high.

To further illustrate the practical application of objectives-based prescribed fire timing for grassland establishment and maintenance, we requested records from several agencies that utilize prescribed burning in South Dakota and the surrounding areas. The US Fish and Wildlife Service in South Dakota and Minnesota, the South Dakota Department of Game, Fish, and Parks, and the Minnesota Department of Natural Resources all generally center their spring burn seasons around May

15th, with the bulk of the spring burn season occurring between April 15 and May 30. We also evaluated 1,684 prescribed fires conducted by The Nature Conservancy in South Dakota, Minnesota, and North Dakota from 1989 - 2013. These fires were conducted for the ecological management of high-diversity native prairies and native prairie reconstruction projects (plantings). Of the 1,373 fires implemented between April 1 – May 31, 545 (40%) were considered dormant season or very early growing season burns conducted between April 1 and April 30th while 828 (60%) were considered as growing season burns conducted between May 1 and May 31.

Often there are false perceptions related to management of ‘public land’ and ‘private land’, with misconceptions regarding managing for wildlife and habitat vs managing for production and profit. Ecological processes such as fire are relatively consistent and yield similar results regardless of land ownership history or objectives. For example we evaluated nearly 140 private land prescribed fires performed by the Prairie Coteau Habitat Partnership from 2004 to 2012. Figure 1 indicates that even on privately owned native pastures, most objectives were addressed by burning later in April and throughout May. Figure 2 indicates an even greater affinity to May burning for all grassland plantings (except for CRP burns that had to be conducted before the Primary Nesting Season Date of May 1).

**Prairie Coteau Habitat Partnership
Private Lands Prescribed Burning Program**
NATIVE PRAIRE/PASTURE
Northeast South Dakota, 2004 -2012
n=80

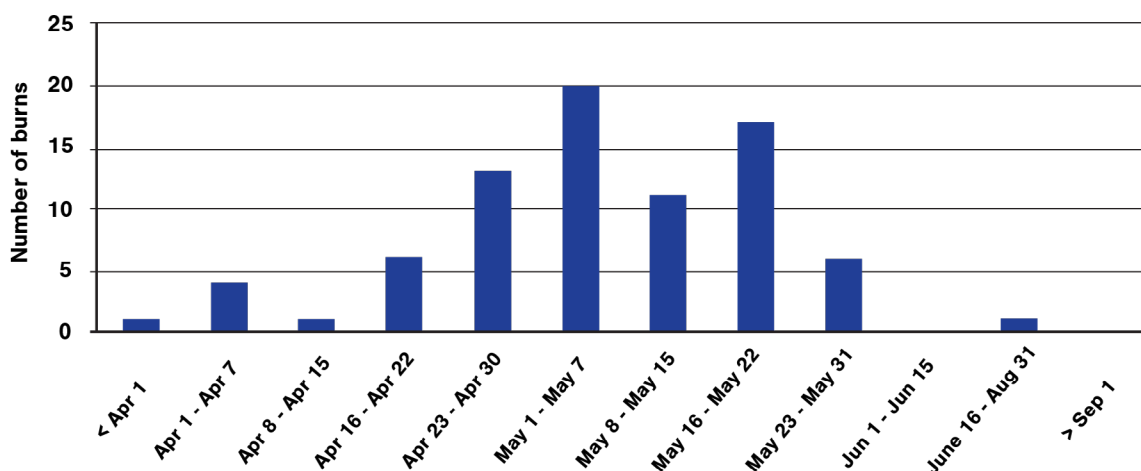


Figure 1. Prescribed burn history for The Prairie Coteau Habitat Partnership private lands burn program in northeast South Dakota from 2004 to 2012. Burns conducted primarily on Native Pasture/Native Prairie for native grassland (native sod) maintenance (n = 80). (source: The Nature Conservancy).

Prairie Coteau Habitat Partnership
Private Lands Prescribed Burning Program
 ALL GRASS PLANTINGS (Establishment and Maintenance)
 Northeast South Dakota, 2004 -2012
 n=59

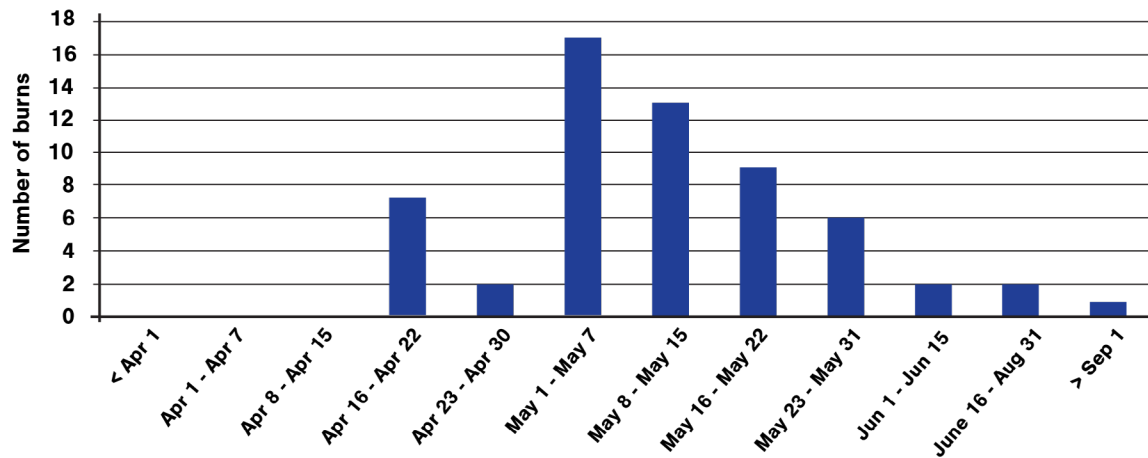


Figure 2. Prescribed burn history for The Prairie Coteau Habitat Partnership private lands burn program in northeast South Dakota from 2004 to 2012. Burns conducted by TNC and partner agencies primarily on warm-season grass plantings for stand establishment and maintenance. Blue bars indicate CRP fields. (n = 59). (source: The Nature Conservancy).

As with any management action, prescribed burning can yield undesirable consequences such as impacts to bird nests, insects, and general cover. However, these impacts are short term and mitigated by positive consequences such as stand establishment, stimulation of native grasses and forbs, invasive species control, stimulation of broadleaf plants and nectar sources for pollinators, future nesting habitat, improved grassland structure, and brood foraging areas.

The intent of this publication is to provide clear information on the merits of expanding the acceptable prescribed fire season in South Dakota based on a clear understanding of fire timing that achieves stated objectives. Figure 3 below addresses most prescribed burn objectives during the primary months of South Dakotas active growing season. The numerical score per month is relative to the objective and the time of year, with 3 (green) representing the most favorable outcome and 1 (red) the least. Although the score is represented by month, the transition periods between months and conditions are rarely an abrupt change but rather a gradual shift between favorable to unfavorable outcomes and vice versa.

Within each objective category the growing season months of May and June rank highest overall for effective prescribed burn outcomes for grassland management in South Dakota except for woody species control where later growing season months rank as the more effective period to conduct prescribed burns. Regarding safety and fire weather patterns, March and April present real challenges for many landowners to conduct prescribed fire due to volatile conditions during that period.

OBJECTIVE / IMPACT OF GROWING SEASON BURN TIMING (assumes appropriate fuel load and conditions for objectives)	Mar	April	May	June	July	Aug	Sept
ESTABLISHED GRASSLAND MANAGEMENT and MAINTENANCE (native or planted)							
Stimulation of native grasses (cool and warm)	3	3	3	2	1	1	2
Stimulation of cool season native pollinator habitat	3	3	2	2	1	1	2
Stimulation of warm season native pollinator habitat	2	2	3	2	1	1	2
Suppression / reduction of invasive grasses	1	2	3	3	2	2	3
Suppression / reduction of invasive broadleaf	1	1	3	3	2	2	2
Score	10	11	14	12	7	7	11
GRASSLAND PLANTINGS / SEEDING / CRP ESTABLISHMENT							
Strong establishment within 2 to 3 years	1	2	3	2	2	2	2
Reduce/eliminate mowing OR chemicals in year 2	1	1	2	2	2	2	2
Reduce/eliminate mowing OR chemicals in year 3	1	2	3	2	2	2	2
Score	3	5	8	6	6	6	6
GRASSLAND BIRDS							
Provides nesting habitat in year of burn	1	1	1	1	3	3	3
Provides improved nesting habitat over subsequent 2 to 3 years	2	3	3	3	3	2	2
Provides brood forage/insects in year of burn	2	3	3	2	2	2	2
Brood forage/insects over time due to improved pollinator plants	2	3	3	3	2	2	2
Provides escape, roosting, or winter cover in year of action	3	3	3	3	2	1	1
Provides escape, roosting, or winter cover in subsequent 2 to 3 years	3	3	3	3	3	3	3
Hay or grazing value / working lands over time / diverse forage	2	3	3	3	1	1	2
Decreased input costs	2	2	3	3	2	2	3
Score	17	21	22	21	18	16	18
WOODY SPECIES ENCROACHMENT							
Control of cedar/Juniper: 0 - 4 ft tall	3	3	3	3	3	3	3
Control of cedar/Juniper: 4 - 7 ft tall	3	3	2	2	3	3	3
Control of cedar/Juniper: > 7 ft tall	3	3	2	2	3	3	2
Control of deciduous saplings, 1st year trees	3	3	3	3	3	3	3
Control of deciduous, 2 - 3 year old trees	1	1	2	2	3	3	3
Control of deciduous, > 3 yr. old trees	1	1	1	1	2	2	2
Score	14	14	13	13	17	17	16
SOCIAL CONSIDERATIONS							
Safety / reduced offsite risk (injury, fire escape)	1	2	3	3	3	3	2
Smoke management	3	3	2	2	2	2	3
Good VFD / EMS relationships	1	1	3	3	3	3	2
Ease of action	1	2	3	3	3	3	2
Cost effectiveness / personnel, equipment, other resources needed	2	2	3	3	3	3	3
Score	8	10	14	14	14	14	12
FIRE WEATHER PATTERNS							
Red Flag Warnings days: Rapid City	2	3	3	3	2	1	1
Red Flag Warnings days: Aberdeen	2	1	3	3	3	3	2
Red Flag Warnings days: Sioux Falls	1	1	3	3	3	3	3
Grassland Fire Danger Index High, Very High, or Extreme: Rapid City	1	1	3	3	2	1	1
Grassland Fire Danger Index High, Very High, or Extreme: Aberdeen	1	1	2	3	2	2	1
Grassland Fire Danger Index High, Very High, or Extreme: Sioux Falls	1	1	3	3	3	3	2
Score	8	8	17	18	15	13	10
Cumulative scores across all objective categories indicate that growing season burns offer the most opportunity for success.	60	69	88	84	77	73	73

Figure 3. Effectiveness of growing season prescribed burns in meeting ecological objectives in South Dakota. The scores indicate the probability of meeting the stated objectives, assuming fuel load is adequate to achieve desired burn intensity and duration, on a scale of one (least favorable) to three (most favorable).

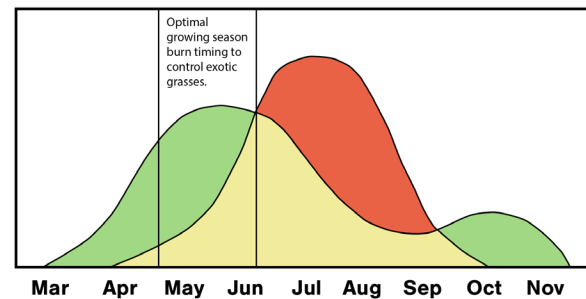
Impacts of Growing Season Burns on Vegetation

By extending the conventional spring burn season into the growing season managers can achieve a variety of alternative objectives, including ecological selectivity. For example, fire conducted during the dormant season can have limited impact on certain cool season or exotic undesirable plants, and may even encourage invasion of certain species. Conversely, burning within the growing season may reduce many weedy exotic invasive species while having minimal detrimental impact on native grasses and forbs resulting in a more vigorous native plant community with increased nutritive value and increased seed and nectar production. Growing season burns also offer opportunity to burn under higher ambient temperatures to increase mortality on woody plants, including junipers and some invasive hardwood species.

Most grassland conservation projects include an establishment and maintenance phase when it is critical to encourage rapid plant root and shoot growth to ensure future resiliency and diversity of the stand. All other goals and objectives rely on the basic building block of early establishment to ensure a healthy plant community. Further, well timed fire can help ensure investments into seeding, establishment, diversity, and resiliency to invasion in will continue to pay dividends over time.

Native Grasses and Forbs vs. Exotic and Invasive Grasses and Forbs

Ehlert and Bachelor (2022a and 2022b) provide a general guide to South Dakota's native warm season and cool season grasses. Native warm season and cool season grasses both benefit from prescribed fire during the establishment period. Generally, most native forbs included in plantings tend to be more of the warm season variety and thus should be assumed to be included in the warm season discussions below. The growth periods of warm season and cool season grasses and forbs is best described as a gradual continuum from early spring through early summer with the peak 'overlap' period occurring in early to mid-June (Figure 4).



Generalized growth curve for cool-season grasses (green, and warm-season grasses (red) and overlap (yellow).

Figure 4: Generalized growth curves for cool season (green) and warm season (red) grasses and the seasonal overlap (orange) for South Dakota. Dr. Alexander Smart, SDSU Extension for the South Dakota Grassland Coalition. <https://sdgrass.org/range-101-warm-season-growth>

Exotic cool season and warm season grass species such as Kentucky bluegrass, smooth brome, crested wheatgrass (and even downy brome and reed canary grass to some degree) follow generally the same growth curve and can invade and eventually dominate a warm season grass planting. Fire applied within the growing season (May 1 to June 15) tends to significantly reduce the competitive advantage of cool season exotic species resulting in improved resiliency of the native planting to future invasion of undesirable species. Burns targeting exotic grass invasion also benefit both cool season and warm season native grasses, even if they are burned when 'green'.

Several authors have also addressed timing of late growing season burns in relation to species temporal and spatial diversity and densities. The dynamic interaction of fire on plant communities and individual species is primarily a result of factors and influences that are generally related to, but ultimately independent of specific calendar dates (Biondini et al. 1989; Steuter 1987). Although fire late in the growing season can have a short-term negative impact on common native warm season grasses such as big bluestem, switchgrass, and indiangrass, these impacts are relatively temporary and minor compared to the long-term benefits that burning can provide compared to non-burning (Cuomo et al. 1998).

Fire is a proven tool for control of cool season undesirable species if applied at the appropriate time (Higgins et al. 1989). Since South Dakota's climate can vary dramatically, a cold and wet spring can easily shift

this growth chart (Figure 4) by two weeks, effectively pushing the onset and major growth period of the cool season grasses to the “right”....thus rendering March and April burns ineffective for control of exotic grasses (essentially mimicking a dormant season burn) by stimulating the re-growth of the undesirable cool season plants. Conversely, during an early warm spring, a May 1st burn might provide excellent cool season species control but may still harbor significant challenges regarding safety and fire weather patterns for many landowners.

In the event of an early or late spring, targeting burn dates between about May 1 and May 31 offers maximum flexibility for targeting cool season exotic grass control in most grasslands while incurring minimal impacts to the growth curve of the warm season species, even if the warm season growth curve shifts to the “right” or “left” (Figure 5).



Figure 5. July 2026 photo of the results of a late May burn on native pasture infested with smooth brome. The center of the photo shows a strip of mature smooth brome with seed heads that was a mowed firebreak where no fire occurred. To the left is lush big bluestem where the fire occurred. Photo credit: Pete Bauman

It is common and standard practice for federal, state, and non-government conservation organizations to conduct and/or promote objectives-based prescribed burning during the growing season in South Dakota. Agencies that practice burning during May and into June and include: SD NRCS, SD GFP, USFWS, TNC, SDSU Extension, SD Wildland Fire, Pheasants Forever, Ducks Unlimited, Audubon Great Plains, and private burn associations. In most instances the objectives for growing season burns include grassland stand establishment, enhancement, and/or woody species control.

In most instances conservation agency managers implement fire in May and June specifically to enhance diverse native grassland species or for woody species control. Native prairies and diverse conservation plantings may contain dozens to hundreds of native plant species consisting of cool and warm season grasses and forbs. Conservation organizations establish and maintain these grasslands through well-timed prescribed fire specifically focused on stand establishment in the early years and stand maintenance in subsequent years. The Nature Conservancy is considered a leading grassland conservation management organization in South Dakota. Figure 6 provides an example of when The Nature Conservancy conducts most burns in the Northern Tallgrass Prairie region.

The Nature Conservancy Prescribed Burn History for the Northern Tallgrass Prairie Regions South Dakota and Minnesota, 1989 - 2013 n=1,429

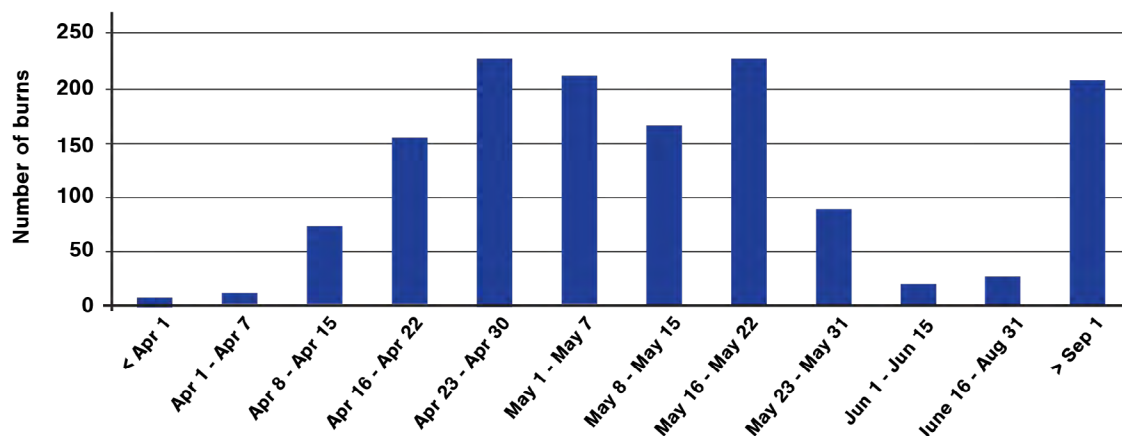


Figure 6. Prescribed burn history for The Nature Conservancy (TNC) in the Northern Tallgrass Prairie Ecoregion of Minnesota and Eastern South Dakota from 1989 to 2013. Burns primarily conducted by TNC on conservation lands for ecological objectives. Chart includes burns performed for grassland maintenance, native grassland establishment, research, and training (n = 1,429). Does not include wildfires or non-broadcast burns. (Source: The Nature Conservancy).

Many of South Dakota's conservation organizations have extensive experience in managing grassland projects that harbor diverse cool season and warm season native species. Records indicate that growing season prescribed fire applied under the timeframe described below are the most efficient, effective, and ecologically sound options, with the third year post-seeding triggering the need for flexibility in burn dates due to variance in biomass (fuel load) and weather patterns. It is precisely at this juncture in grassland management that growing season burning should continue for the next several years to ensure proper stand health and vitality (especially for diverse seed mixes that include broadleaf flowering forbs). Practically speaking, it is rare to successfully accomplish prescribed fire in each of the first five growing seasons on a new grass planting. Realistically, most managers will likely only successfully implement prescribed burns in 2 to 3 of the first five years due to fuel, weather, or available resource concerns.

Overall, expansion of the burn window through the growing season allows managers to accomplish site-specific objectives for long term vegetation community resilience that benefits pollinators and wildlife while reducing weed and woody species pressure and input expenses associated with mechanical or chemical management. Figures 7 - 9 provide examples of diverse native vegetation resulting from prescribed burns conducted in late May in South Dakota.



Figure 7. Native forb diversity in grassland plantings as a result of mid-May prescribed fire. Photo credit: Pete Bauman



Figure 8. 2024 wormwood sage infestation persisting into the fourth growing season (August 2024) in a diverse grassland planting. Wormwood had been mowed in previous growing season with no observable reduction. Photo credit: Pete Bauman



Figure 9. The same site as figure 8 in July 2025 after a May 30th prescribed fire. Note the dead stalks of wormwood sage and the diversity of broadleaf forbs. Photo credit: Pete Bauman

Shrubs, Brush, and Tree Species

Invasion of native and exotic shrubs, brush, and trees threaten the integrity of the grasslands of the Great Plains, including South Dakota. Collectively, the issue of invasion of these species is generally referred to as 'woody species encroachment' and it is considered one of the top concerns for the future of grasslands along with physical conversion and non-target chemical impacts (Twidwell et al. 2021).

Woody species/brush invasion into native and planted grasslands is common in South Dakota and is often the result of volunteer plants invading from nearby sources. Common examples include eastern red cedar, Siberian elm, or Russian olive planted for conservation or other purposes spread into nearby grasslands. Left unchecked, this spread can result in scattered or dense stands of volunteer trees. It is well documented that woody species can be detrimental to long-term

grassland bird survival due to bird avoidance (due to edge effect) or increased mortality from improved predator and parasite habitat associated with woody cover (Bakker 2003; Bollinger and Gavin 2004; Grant et al. 2004; Kelsey et al. 2006). The resource concerns presented by woody species encroachment are understood well by conservation managers and many published resources describe the issues, possible actions, and the consequences of inaction. For nearly all levels of woody species encroachment in South Dakota, from pre-invasion to full stand replacement, prescribed fire is cited as the most cost-effective tool. The Great Plains Fire Science Exchange has an extensive library of online resources detailing the sources and consequences of woody species invasion into grasslands and the economics of the issue (Great Plains Fire Science Exchange <https://gpfirescience.org/all-resources/>).

Appropriately timed prescribed burning can reduce or eliminate many forms of woody brush and tree encroachment. South Dakota land managers report that the efficacy of fire on woody species can be highly variable with many factors influencing success or failure including: species type, age, stand density, fine fuel load, fuel moisture, landscape position, ambient temperature, relative humidity, wind, fire intensity, heat duration, and others. Timing of these burns is important in relation to the burn date and the maturity of the shrubs/trees. Generally, burns conducted on young actively growing trees can be very effective for control and/or elimination, depending on the tree species and other factors. A shorter fire return interval (< 3yrs) has proven effective in managing woody encroachment as long as the individual shrubs/trees are not allowed to reach a level of maturity where fire becomes ineffective (Twidwell et al. 2013). Overall, woody species management can be enhanced by fire throughout the growing season depending on the target species and abiotic factors influencing the burn (weather, fuel load, topography, etc). The argument in favor of burning for woody species control into the later growing season is primarily logistical, as it is often difficult to accomplish burns early in the season for reasons already discussed related to safety and fire weather patterns.

South Dakota's prescribed burn associations are finding success in controlling stands of woody species, such as eastern red cedar, in May when air temperatures are higher than those typical of March or April burning

(Figures 10 and 11). Twidwell et al. (2021) provides excellent discussion



Figure 10. Prescribed burn conducted on June 12, 2026 for woody species control. Targeted woody fuels still burn well while higher fuel moisture in surrounding grassland provides a green buffer to avoid rapid fire spread beyond the fire unit. Photo credit: Cody Grewing.



Figure 11. Results of June 12, 2026 prescribed fire (Figure 10 above). Excellent control of eastern red cedar. Photo credit: Cody Grewing.

Impacts of Growing Season Burns on Grassland Birds and other Wildlife

Wildlife, especially grassland birds, are a primary concern when conducting prescribed burns. In the very short term, prescribed burns in any season can limit nesting opportunity and may result in egg and/or chick mortality, but this is a very narrow and somewhat flawed interpretation of the actual fire effects on grassland birds.

The first point to consider is that grassland birds generally associate with grassland structure more than specific grassland species. To that point, grassland bird use of young or new grassland plantings during the establishment period is lower as birds prefer more mature stands. Second, any negative impacts of fire on a few individuals in a single fire event on any given burn unit has little bearing on the overall population, while the long-term effects of the fire enhance the habitat

for the entire local population of wildlife. Finally, it is a misnomer that earlier burns in March and April are 'better' for grassland bird populations because females are generally not nesting (the primary nesting season in South Dakota is from May 1 to Aug 1). This argument is largely based on a narrow view of the impacts on individual birds or nests and does not accurately reflect the impacts to the bird population of the area. A more accurate assessment of true impacts on birds should focus on recruitment of young-of-the-year into the adult population. In the instance of prescribed fire, recruitment of young birds into the adult population from any given burn unit will likely be zero, regardless of when a prescribed fire occurs. This zero recruitment of young results from either no available nesting cover after March or April burns or from females being displaced and/or egg mortality during May or June burns. In all cases, there is likely no significant bird recruitment from a burn unit in the year of the burn. However, there are many post-burn benefits to the entire bird population.

A narrow focus on bird nesting can hinder management of long-term bird habitat in diverse grassland plantings in South Dakota. Objectives-based prescribed fire conducted during the growing season focuses on improvement of habitat for birds and other wildlife over time. Intentional, objectives-based prescribed fire can achieve positive outcomes for wildlife including nesting, brood rearing, foraging, escape, and thermal factors. Prescribed fire cannot create, preserve, or enhance all habitat factors immediately or simultaneously, and often positive wildlife habitat factors are delayed as the stand is replenished during the post-burn growing seasons. It is with this understanding that grassland wildlife managers commonly utilize prescribed fire throughout the dormant and growing seasons to benefit grassland bird habitat, even if some burns create negligible short-term impacts on certain population or habitat factors.

Bakker et al. (2009) clarified key aspects of grassland bird use of various types of grasslands. They found that grassland bird species richness was higher in native sod prairies than it was in planted grassland cover types, except plantings comprised of native warm-season mixes. Over time, if not managed well, warm-season plantings, such as CRP plantings, degrade and become dominated by cool-season exotic grasses, thus compromising grassland bird habitat. Prescribed burning during the growing season is considered the best management tool for maintaining diversity in both native sod and warm-season mix plantings.

Economically Important Birds

The effects of fire on waterfowl and grassland bird productivity have been debated, theorized and scientifically evaluated. There is no doubt that nests are lost during prescribed fires conducted during the Primary Nesting Season (PNS). Early research determined that fire benefited waterfowl by improving wetland conditions. Kantrud (1986) and Higgins et al. (1992) suggested in planted cover that duck nest success and densities would benefit from the use of prescribe fire at 3 to 4 year intervals. Higgins et al. (1992) suggested a proposed burn window of March – June, and found nest success highest in planted grasslands treated with fire (22.7%) compared to idle (16.7%) and grazed (9.3%). Kruse and Piehl (1984) stated that burning during the PNS does not eliminate waterfowl productivity and determined nest success for waterfowl to be 22% pre-burn and 21% post burn. Some studies concluded that fire was detrimental to productivity; however, Naugle et al. (2000) concluded that most of those studies lacked adequate research design to determine bird response to fire, haying, and grazing. Most studies did not evaluate productivity over time, thus missing the overall picture. It has been well documented that waterfowl productivity is highest 2-3 years post fire and then decreases by 8 years post management (Kantrud 1993). Many studies deemed fire detrimental to waterfowl and grassland bird species, despite the evidence that these species are flexible and often re-nest as a result of fire (Naugle et al. 2000). The most comprehensive research on the effects of fire on waterfowl and grassland birds comes from the mixed-grass prairie of North Dakota. Grant et al. (2011) conclude that waterfowl and grassland birds are adapted to periodic fires occurring at pre-Euro-American frequencies.

Generally, diverse native grasslands and diverse grassland plantings are preferred habitat by grassland passerine birds (Bakker and Higgins 2009). As planted grasslands 'age', their suitability to a variety of grassland birds can be diminished as the stand increases in thickness and density (Bakker and Higgins 2009; Bakker et al. 2006). In lower-diversity stands fire can be timed to effectively decrease the vitality of the dominant native species resulting in more open canopy in subsequent years (Bauman personal observation). The variation in life histories of grassland birds and their habitat needs supports increased plant composition and structural diversity within a CRP field as well as a variance in ages of CRP stands across the landscape (Bakker

et al. 2006). Both strategies can be enhanced with management techniques tailored to manipulation of both structure and composition, such as prescribed fire.

Ring-necked pheasants are perhaps the most economically important grassland bird species in South Dakota. Peak pheasant hatch date in South Dakota is June 21 and nest success is relatively consistent from year to year. Clark et al. (2008) conducted a population sensitivity analyses and concluded that the most sensitive population parameter for ring-necked pheasants is chick survival. Initial nest success or failure, regardless of cause, is likely not as important to the overall population as is poor chick survival. As an example, initial nest survival can be compromised by lack of forage for chicks in low diversity grasslands or by the use of mechanical management such as mowing for weed control as chicks may not be able to escape. Therefore, although prescribed fire may initial harm nests in the fire unit, the opportunity for chick survival in within burn units is important in regard to foraging, escape cover, and lack of additional mechanical disturbance (Alex Solem, SD GFP Senior Wildlife Biologist, Pers. Comm).

Matthews et al. (2012a, 2012b) evaluated pheasant use and survival in managed and unmanaged CRP fields. In this study vegetation diversity was enhanced through inter-seeding of forbs and legumes into low diversity CRP fields, resulting in positive impacts on pheasant hen site selection and chick survival. Matthews suggested that low diversity, poorly managed or unmanaged CRP simply does not reach its optimal wildlife potential. It is very important to note that this field research was conducted from 2005 to 2006 in older low-diversity CRP plantings typical of the first generation of CRP plantings. These fields were simple monocultures of either smooth brome or switchgrass and lacked any initial pollinator diversity. Pheasant use and survival increased with active inputs (discing and inter-seeding) to increase diversity.

Fortunately, today in South Dakota most grassland plantings (including CRP plantings) include at least a basic level of pollinator plants for insects and brood foraging. Again, this diversity can be maintained at low cost and low risk by using growing season prescribed fire to benefit pheasants and other economically important species.

Invertebrates (Pollinators)

Invertebrates (insects) provide vital ecological services such as dung burial, pest control, pollination, and wildlife nutrition (Losey and Vaughan 2006), and their function and importance in grasslands must be considered when discussing prescribed burning. Most grassland invertebrates likely benefit from establishment and maintenance of diverse plantings...especially those grassland projects tailored to nectar producing/pollinator species. Losey and Vaughan (2006) also state that wild invertebrates may require more 'active conservation' than domestic invertebrates (such as honeybees).

Because of the sheer magnitude of prairie invertebrates and their various life histories, it is not possible to efficiently detail specific effects of fire on all types. Therefore, ecologists tend to focus discussions on invertebrates that are either most appealing (butterflies) or that have economic impacts such as pollinators and pest species. The effects of fire on invertebrate populations are subject to a myriad of factors such as fuel load, time of year, time of day, scale, life cycle stage, mobility, reproductive biology, and a host of other factors. Generally, early spring fire may be less detrimental to invertebrate populations than later spring fires regarding direct mortality resulting from the burn event, especially if invertebrates have not yet emerged. Within these large parameters, the individual factors discussed above will influence both immediate and long-term populations (Higgins et al. 1989).

Although direct mortality from fire can be a negative, the after-effects of burning on invertebrate habitat and species that utilize invertebrates as forage can be positive. As fire stimulates flowing plants, pollinators and other insects generally thrive, providing food sources to species reliant on invertebrates as a primary food source, such as birds (Losey and Vaughan 2006). In addition, excess litter is often removed during the fire event, improving the ability of young broods to utilize the burned area when foraging for insects.

Understanding the role of invertebrates in grassland ecosystems is important. During the early stages of a planting emphasis should be placed on sustaining the diversity of the planting to provide future habitat for a greater variety of invertebrates, even if management methods in early years (such as fire) are somewhat detrimental to certain invertebrates. This approach is justified in that establishment of diversity (or

heterogeneity) is a process that cannot be accomplished in its entirety in the early years of a planting, and over time plantings will provide much improved biodiversity potential when compared to the previous condition as crop land, so any short term 'loss' of invertebrate diversity due to a management action (such as fire) in grassland plantings should be kept in perspective and should be evaluated in the broader context of long-term gain for populations of invertebrates now occupying the site and the landscape.

Growing Season Weather Patterns in South Dakota

Prescribed fire relies on certain pre-determined conditions to be conducted appropriately, i.e. within 'prescription'. Along with various planning, safety, and preparation parameters, adhering to pre-determined weather conditions is paramount to safe and effective implementation of any planned fire, regardless of actual fire timing.

Historically, South Dakota's prescribed fire emphasis was from early March through late May with a secondary window of opportunity in September and October. Today, more local and focused objectives and program policies influence these dates, with a much broader window of fire use. For example, wildlife managers often burn during May and June. Prescribed burn associations occasionally conduct fires beginning in February and again from September through November if conditions are conducive to objectives. Conversely, private lands burning that involves Conservation Reserve Program fields must not utilize burning during the Primary Nesting Season, even if conditions are conducive to meeting management objectives. As weather conditions continue to fluctuate, extreme or volatile weather can be a major factor in the success or failure of accomplishing a planned burn.

South Dakota State University Extension gathered historic weather data from the National Weather Service to determine the relative availability of 'burn days' during the primary growing season from March through June to determine if weather parameters aligned with burn objectives. As previously discussed, most objectives are best accomplished in May and June as outlined in Figure 3 above, and we were curious to determine if weather patterns created or hindered opportunity during the early growing season (March through June).

Data analysis indicates that appropriate fire weather windows can be rare in March and April and are often confounded by specific local weather conditions that prompt fire danger warnings, including Red Flag Warnings and Grassland Fire Danger Index warnings. These weather conditions not only affect the day-of-burn decisions, but also will impact Go/No Go decisions for several days ahead of or behind the actual warning. Additionally, weather patterns resulting in Red Flag Warnings or elevated Grassland Fire Danger Index warnings have social and political implications as they are most often associated with dry or drought conditions and volatile fuels. Collectively, county government and emergency managers often respond to these conditions by placing restrictions on all burning through burn bans that can be subjective. Additionally, once in place, burn bans are seldom removed in a timely manner once burn conditions improve.

While April and May weather data indicates major challenges, data indicates that May and June offer greater opportunity with overall warnings decreasing dramatically across South Dakota, offering substantial opportunity to complete objectives-based prescribed fires within appropriate weather prescription parameters.

South Dakota is served by three National Weather Service stations: Rapid City, Aberdeen, and Sioux Falls (Figure 12). The following analysis documents challenging weather conditions in March and April while realizing the relative ease of burning in May and June (National Weather Service 2026a).

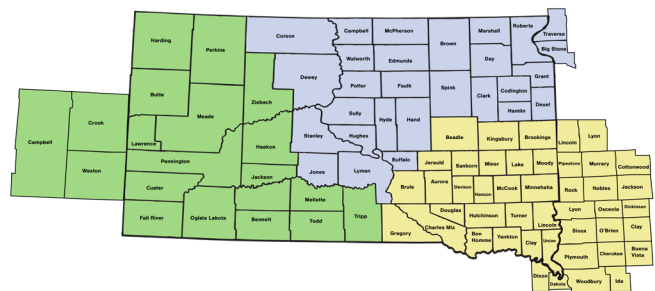


Figure 12. National Weather Service Stations serving South Dakota and the surrounding region (<https://www.weather.gov/water/sd-hydro>).

Weather Data Evaluation Methodology and Results

Red Flag Warnings History

South Dakota's National Weather Service stations cover broad geographic areas including out-of-state coverage, and since Red Flag Warnings can be issued multiple times per day across non-consistent areas (such as

individual counties) within each National Weather Service (NWS) office region, it is important to adjust data so as not to overtly inflate the occurrence of Red Flag Warnings. Therefore, we limited our analysis of Red Flag Warning data to allow only one warning per day per each NWS office, regardless of how many independent warnings were issued for specific areas within the larger reporting area under each office.

Grassland Fire Danger Index History

Grassland Fire Danger Index (GFDI) ranking criteria varies across short-grass (west) mixed-grass (central) and tallgrass (east) prairie regions of South Dakota and thus can be highly variable within smaller geographies nested under larger NWS reporting areas. Grassland Fire Danger Index rankings can also fluctuate quickly with changes in local conditions. Fortunately, regardless of specific regional criteria, interpretation of GFDI is standardized, with rankings as Low, Moderate, High, Very High, Extreme, and Catastrophic (rare). Changes to GFDI rankings can be issued multiple times per day across non-consistent areas within each National Weather Service (NWS) office region (similar to Red Flag Warnings). To avoid inflating the impact of multiple GFDI rankings issued by a single NWS station among all categories, we limited our evaluation to allowing only one warning per day per NWS station restricted to only the categories that would impede safe fire practices (GFDI of high, very high, extreme). This evaluation restriction thus allows a maximum total of three GFDI rankings per day per NWS office (one per ranking category). Note: catastrophic GFDI is extremely rare and was not reported in data received from the National Weather Service for any of South Dakota's forecast stations.

For a comprehensive description of Red Flag Warnings and Grassland Fire Danger Index criteria for South Dakota visit <https://www.weather.gov/unr/rfd-info>.

Red Flag Warning Data Patterns by National Weather Service Station

Aberdeen: Of the 1,071 total Red Flag Warnings issued from 2003 - 2025, 427 warnings (39%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely only 99 warnings (9%) were issued between the dates of May 8 - June 30, indicating a much safer burn period (Figure 13).

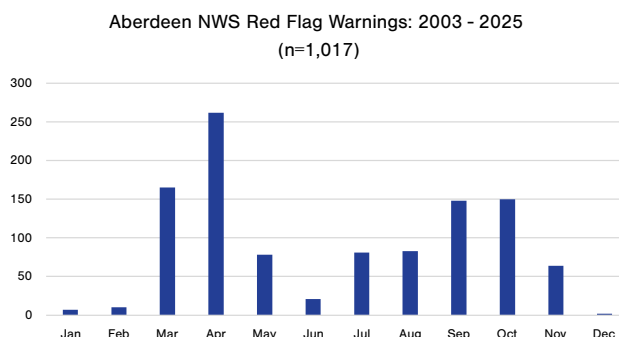


Figure 13. Red Flag Warnings issued by the Aberdeen National Weather Service office from 2003 – 2025.

Rapid City: Of the 1,547 total Red Flag Warnings issued from 1999 - 2025, 349 warnings (23%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely, only 71 warnings (5%) were issued between the dates of May 8 - June 30, indicating a much safer spring burn period (Figure 14).

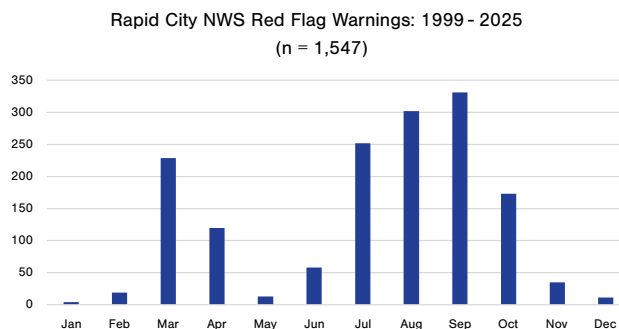


Figure 14. Red Flag Warnings issued by the Rapid City National Weather Service office from 1999 – 2025.

Sioux Falls: Of the 941 total Red Flag Warnings issued from 1999 - 2025, 482 warnings (51%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely, only 81 warnings (9%) were issued between the dates of May 8 - June 30, indicating a much safer spring burn period (Figure 15).

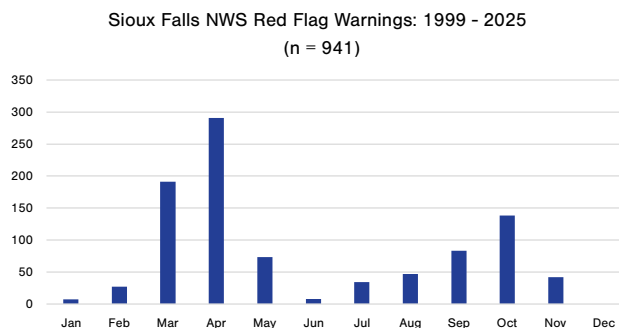


Figure 15. Red Flag Warnings issued by the Sioux Falls National Weather Service office from 1999 – 2025.

Grassland Fire Danger Index Data Patterns by National Weather Service Station

Aberdeen: Of the 3,709 total Grassland Fire Danger Indexes (GFDI) of High, Very High, or Extreme issued from 1999 - 2026, 1,157 warnings (31%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely, only 251 warnings (7%) were issued between the dates of May 8 - June 30, indicating a much safer spring burn period. Figure 16 indicates the average number of GFDI warnings issued by week over time. Figure 17 indicates the overall volatility and unpredictability of GFDI warnings in the most volatile spring period from March 1 through May 7, with dramatic swings over the last decade and a relatively upward trend.

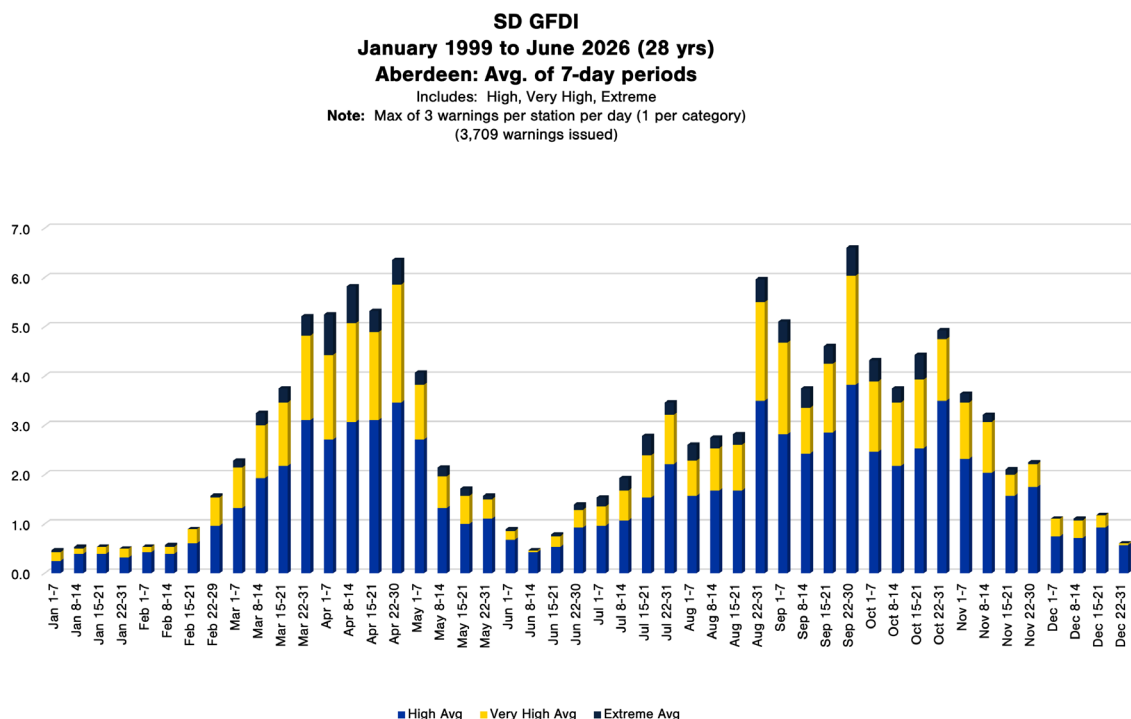


Figure 16. Average number of High, Very high, or Extreme Grassland Fire Danger Index warnings issued by week by the Aberdeen National Weather Service office from 1999 – 2026.

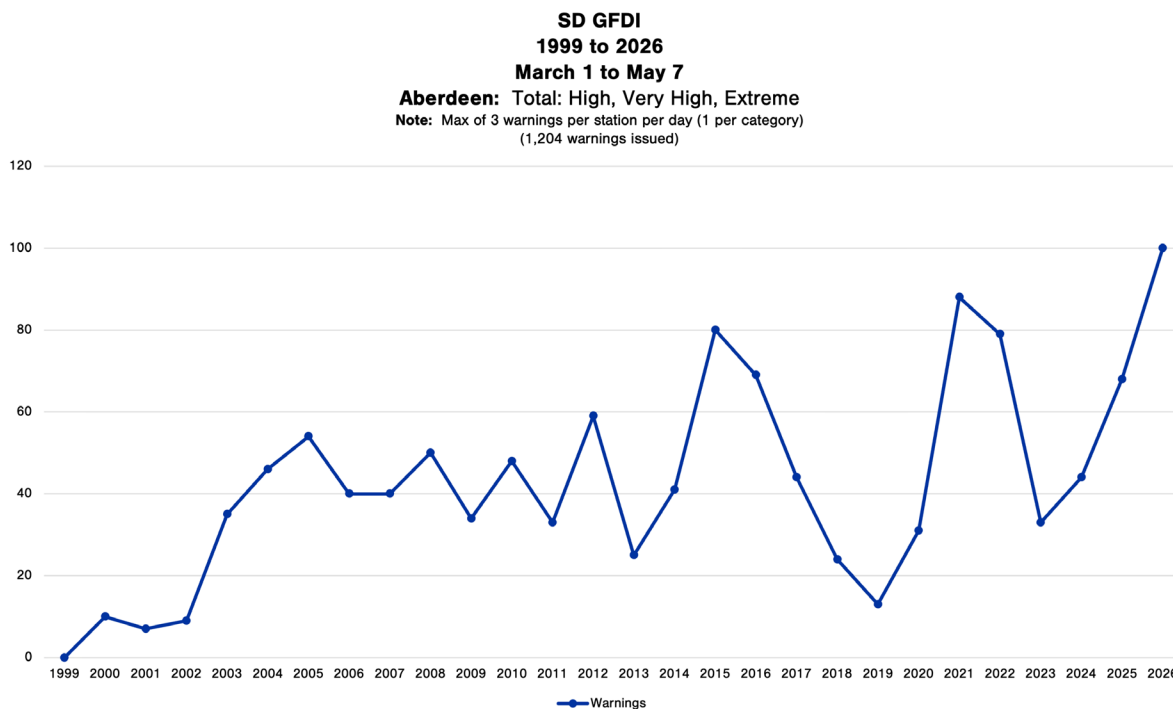


Figure 17. High, Very high, or Extreme Grassland Fire Danger Index warnings issued from March 1 – May 7 by the Aberdeen National Weather Service office from 1999 – 2026.

Rapid City: Of the 5,497 total Grassland Fire Danger Indexes (GFDI) of High, Very High, or Extreme issued from 2004 - 2026, 1,222 warnings (22%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely, only 380 warnings (7%) were issued between the dates of May 8 - June 30, indicating a much safer spring burn period. Figure 18 indicates the average number of GFDI warnings issued by week over time. Figure 19 indicates the overall volatility and unpredictability of GFDI warnings in the most volatile spring period from March 1 through May 7, with dramatic swings over the past 15 years and a relatively upward trend.

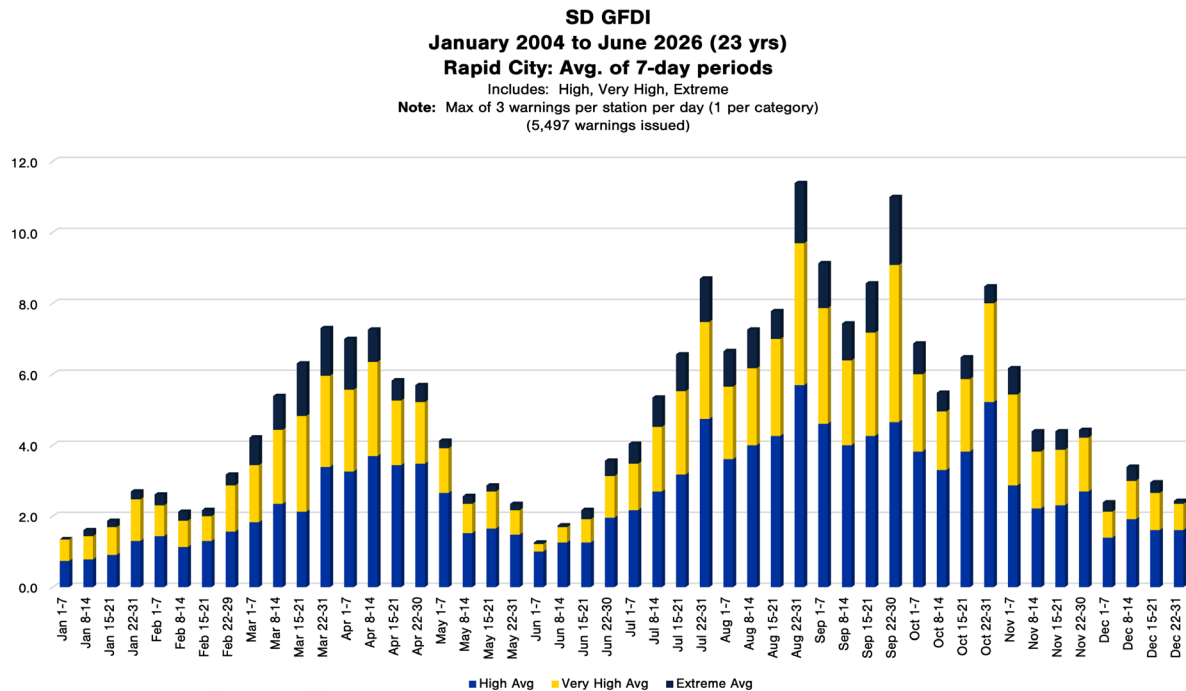


Figure 18. Average number of High, Very high, or Extreme Grassland Fire Danger Index warnings issued by week by the Rapid City National Weather Service office from 2004 – 2026

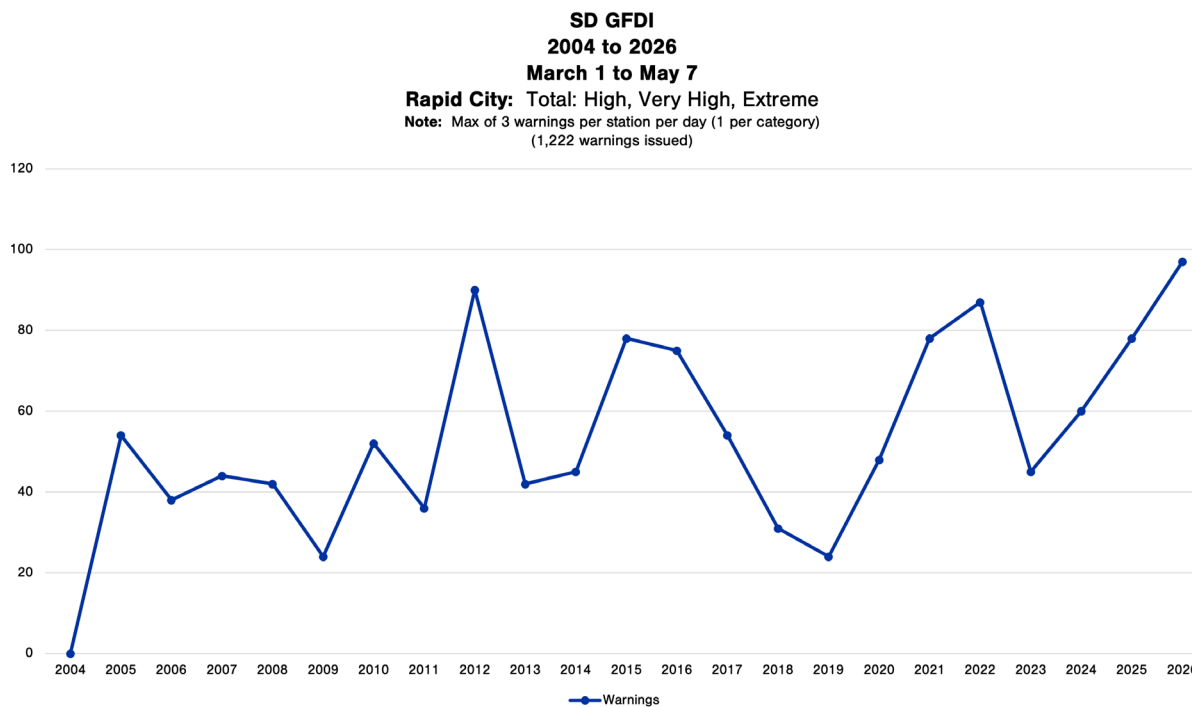


Figure 19. High, Very high, or Extreme Grassland Fire Danger Index warnings issued from March 1 – May 7 by the Rapid City National Weather Service office from 2004 – 2026.

Sioux Falls: Of the 2,673 total Grassland Fire Danger Indexes (GFDI) of High, Very High, or Extreme issued between 1985 - 2026, 1,186 warnings (44%) were issued between the dates of March 1 - May 7, thus limiting the opportunity to conduct prescribed burns during this period in that region. Conversely, only 122 warnings (5%) were issued between the dates of May 8 - June 30, indicating a much safer spring burn period. Figure 20 indicates the average number of GFDI warnings issued by week over time. Figure 21 indicates the overall volatility and unpredictability of GFDI warnings in the most volatile spring period from March 1 through May 7, with dramatic swings over the past two decades and a relatively upward trend.

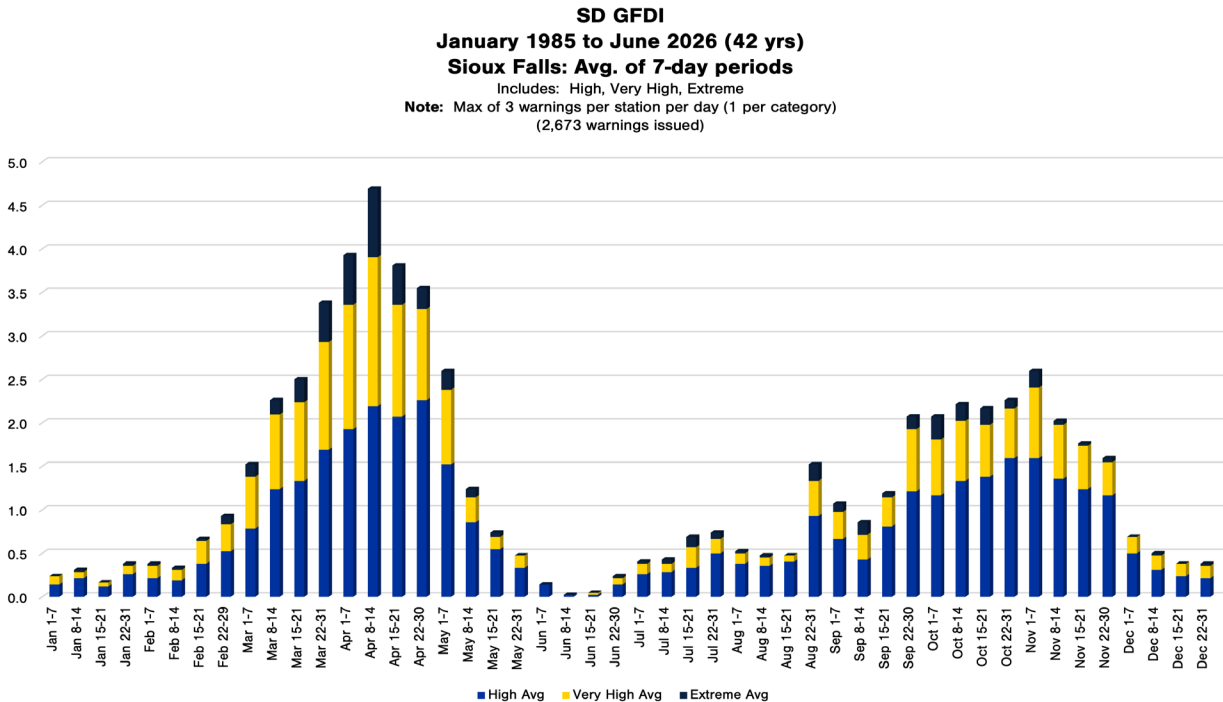


Figure 20. Average number of High, Very high, or Extreme Grassland Fire Danger Index warnings issued by week by the Sioux Falls National Weather Service office from 1985 – 2026.

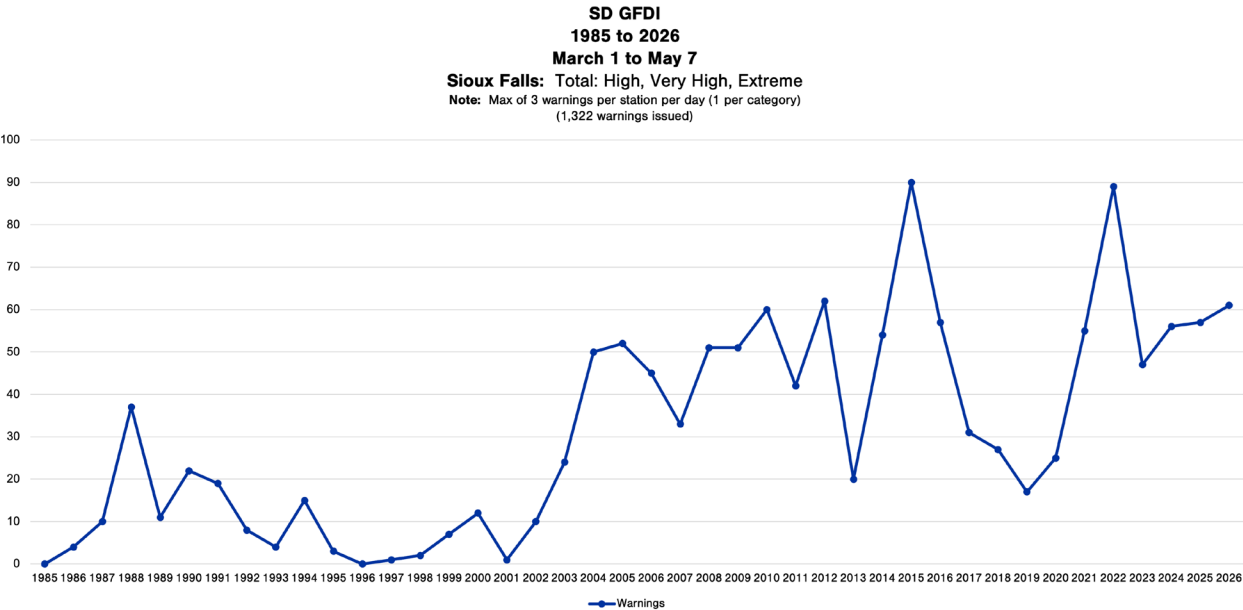


Figure 21. High, Very high, or Extreme Grassland Fire Danger Index warnings issued from March 1 – May 7 by the Sioux Falls National Weather Service office from 2004 – 2026.

2026 was a challenging spring for conducting prescribed fires across South Dakota. Across the state 77 days saw a Red Flag Warning issued. Fifty-two of these days occurred between March 1 and May 7, 2026 (68%), while only 25 warning days occurred between May 8 and June 30, 2026 (32%). While conservation and wildlife organizations focused grassland prescribed burn efforts during May in 2026, most CRP burning objectives were not accomplished because safe and effective weather patterns did not occur until after the Primary Nesting Season date of May 1 had passed. In 2026 conservation managers shifted their prescribed fire efforts to the growing season to meet objectives while the majority of CRP went largely unmanaged (Figure 22). This reality underscores the increasing difficulty in applying early spring prescribed fire in March and April for common CRP objectives like establishment, maintaining diversity, reducing weeds, and controlling woody invasion.

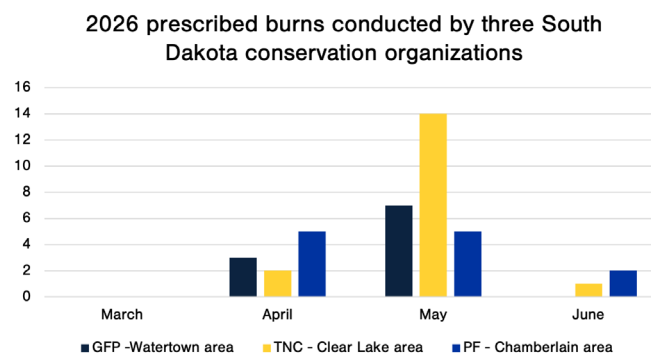


Figure 22. Spring 2026 prescribed burns conducted by offices of South Dakota Department of Game, Fish, and Parks (GFP – Watertown area), The Nature Conservancy (TNC – Clear Lake area), and Pheasants Forever (PF-Chamberlain area).

Social Implications

Landowner Demand, Education, and Technical Support

As landowners have been educated on the merits of appropriate timing to achieve objectives, they have come to expect a reasonable opportunity to implement fire safely and effectively. The demand for appropriate prescribed fire implementation is expanding in South Dakota in relation to objectives, geography, and sheer number of interested landowners. Current resources are limited and those limitations are confounded by difficulties in burning in March and April or not having legal options after May 1 on certain program lands like CRP.

Landowner demand for technical burn support continues to be very high as evidenced by the participation in

South Dakota's cooperative landowner prescribed fire trainings. Since 2014, over 1,500 landowners and agency staffers have participated in these training events. During this period dozens of agency staff with private lands technical support duties have also completed the training to better serve the growing demand for improved prescribed fire objectives planning, preparation, and implementation. These staff participants include Farm Service Agency, Natural Resources Conservation Service, SD Department of Game, Fish, and Parks, SDSU Extension, Pheasants Forever, Ducks Unlimited, Audubon Great Plains, Lower Brule Sioux Tribe, several volunteer fire departments and prescribed burn association officers.

Emergency Responders and Public Safety

A key factor in timing of prescribed fire in South Dakota is building and maintaining relationships with the emergency response community, especially rural volunteer fire departments. The burn planning process specifically addresses the expectation for communications with emergency services, and landowners who engage in training and burn planning with resource professionals understand the need for good communications. Others sometimes fail to communicate their intentions adequately, creating a misconception that all 'controlled' burns follow a true prescription.

The culture amongst landowners regarding use of prescribed fire in South Dakota continues to center on a misinformed belief that early spring as the 'best' time to burn. This belief stems from decades of private lands programs emphasizing avoidance of burning during bird nesting seasons. Emerging science and an improved understanding of burn effects challenges this assumption (see bird and wildlife section above).

Under most circumstances landowners often do not have the appropriate resources necessary to conduct burns safely during the more volatile periods of March and April. Long term data indicates that these periods are also the most challenging for rural volunteer fire departments (VFDs) who are tasked with responding to unplanned wildfires or poorly planned prescribed fires. Understandably, VFDs sometimes have little patience with those who intentionally light grass fuels under volatile conditions, regardless of intent. By shifting prescribed fires further into the growing season landowner relationships with local VFDs will improve as

burns are less volatile and the chances for fire escape are dramatically reduced.

We analyzed 5,263 wildland fire response incidents reported by South Dakota Volunteer Fire Departments between 2002 and 2012. Of this initial data set, we removed Fall River, Custer, Pennington, and Lawrence counties due to the influence of Black Hills or other forest fires. We also removed any VFD responses that were missing county-of-occurrence data. Of the original 5,263 VFD responses reported, 2,991 occurred in the remaining 62 South Dakota counties and included date-of-occurrence data. Figure 23 represents the distribution of those fires by month of occurrence. From 2002 – 2012, 21% of SD VFD's wildland fire response activity was in March and April, versus 14% in May and June (source: SD Great Plains center), indicating the relatively safe burning conditions in May and June.

Distribution of VFD Fire Response 2002-2012 (n=2,991)		
Burn Dates	Total Burns	Percent
Jan	74	2%
Feb	83	3%
Mar	230	8%
Apr	378	13%
May	187	6%
Jun	234	8%
Jul	560	19%
Aug	347	12%
Sep	284	9%
Oct	313	10%
Nov	211	7%
Dec	90	3%

Figure 23. South Dakota Volunteer Fire Department wildlife responses from 2002 – 2012. (Data in table represent wildland fires reported to the Great Plains Center via the SD VFD report card system and logged in the Fire Administration Database. The data was submitted to the National Association of State Foresters, Fire Occurrence Data by SD Wildland Fire Division. Paul A. Reiter, Communication Specialist Supervisor, SD Department of Agriculture, Wildland Fire Division, Great Plains Interagency Dispatch Center- Pers. Comm, 2012).

Additional data from 2015 – 2025 indicates that 25% of SD VFD's activity was in March and April, versus 19% in May and June during that decade (Figure 24. source: SD Great Plains center).

Distribution of VFD Fire Response 2002-2015 Custer, Fall River, Lawrence and Pennington Counties Removed (n=13,685)		
Burn Dates	Total Burns	Percent
Jan	288	2%
Feb	469	3%
Mar	1429	10%
Apr	1978	14%
May	1245	9%
Jun	1335	10%
Jul	2089	15%
Aug	1065	8%
Sep	970	7%
Oct	1307	10%
Nov	1025	7%
Dec	485	4%

Figure 24. South Dakota Volunteer Fire Department wildlife responses from 2015 – 2025. (Source: National Fire Incident Reporting System (NFIRS) includes only "wildland fires." Compiled through the South Dakota State Fire Marshals Office. Tyler Steen, South Dakota Department of Public Safety Emergency Services Division Director, Pers. Comm., 2026)

During both 10-year reporting periods, April represented the highest percentage of VFD activity of any spring months (13% and 14%) respectively. Also, during both reporting periods, May represented the lowest percentage of VFD activity of any spring months (6% and 9%) respectively, again indicating a substantial shift toward safer burning in May.

There is growing interest amongst South Dakota's rural Volunteer Fire Departments to become more engaged as service providers for prescribed fire implementation across the state. For this emerging opportunity or to be realized, VFDs have indicated their best option to reduce conflict and provide service to landowners would be to shift fires from March and April to later in the growing season, citing factors such as a reduction in wildfire risk, higher relative humidities, increased fuel moisture, greening of grassland fuels, slower fire rates of spread, reduced fire spotting potential, reduced chance of ignition of heavier fuels or infrastructure (such as wood fence posts), and reduced resource needs (people, water, equipment). Generally, later fires may produce more and heavier smoke but overall, less smoke exposure to fire personnel as fires become more manageable and controllable for both professionals and non-professionals.

Landscape Position and Firebreak Efficiency

An often-overlooked safety factor is agricultural activity and how a burn unit is positioned on the landscape. Generally, delaying a prescribed burn until after May 1st provides the greatest opportunity to take advantage of adjacent land uses such as spring cropland field work and pasture grazing that occurs across South Dakota. Common agriculture activities can drastically reduce the risk of unintentional fire spread, and fire plans can be easily modified to take advantage of landscape conditions that reduce fire escape risk as compared to March and April when volatile crop residue persists prior to tillage or planting seasons.

Along with improved safety is the practical opportunity for producers to install or modify firebreaks in the early growing season. The conscientious grassland manager usually desires to avoid disturbing the sod, so taking advantage of landscape factors that control the spread of fire is efficient and advantageous. Implementing fires later in the growing season provides many alternatives by taking advantage of the natural greening of field edges, roads, waterways, and mowed firebreaks.

Figures 25 and 26 illustrate various firebreak conditions to consider when attempting to optimize fire safety and efficiency in grassland plantings with heavy fuel loads during volatile early-spring conditions.



Figure 25. March can be a very challenging time to manage prescribed fire for landowners. This photo represents a comparison of disked, mowed, and blacklined firebreaks along edge of low diversity switchgrass dominated (warm season) CRP field in early March. Although the native warm season grasses can be stimulated by fire in early March, much more can be accomplished if fire is postponed until mid to late May under most scenarios. Safety and fire control concerns can be avoided with a later burn. Photo credit: Pete Bauman.



Figure 26. Disked firebreak along edge of low diversity, smooth brome dominated (cool season) CRP in mid-April. Disked firebreaks

offer improved safety in when conditions are volatile. If the fire is shifted to later in the season disked firebreaks become less necessary, reducing input costs to install the firebreak and manage future weeds caused by disturbance. Disked firebreaks should never be used on native sod. Photo credit: Mike Blaaid.

Below is a series of photos illustrating the dramatic changes that can take place to firebreaks and vegetation during April and May.

Figures 27 through 30 illustrate how tilled firebreaks and volatile conditions can be avoided, allowing the natural greening of mowed firebreaks and grassland fuels throughout the growing season to improve safety and reduce the needs for excessive personnel, equipment, and water.



Figure 27. March conditions reduce the ability of a mowed firebreak to reduce the spread of fire due to fuel and weather conditions. Photo Credit: Pete Bauman.



Figure 28. April conditions can be variable, but often greening of fuels begins. In heavy fuels, greening is not yet sufficient to reduce the spread of fire significantly. Photo Credit: Pete Bauman.



Figure 29. May conditions generally begin a dramatic change in the greening of fuels and firebreaks. Fuel and weather conditions become conducive to safer and more effective prescribed fires in most situations. Photo Credit: Pete Bauman.



Figure 30. June conditions usher in very safe burn conditions. Fuel and weather conditions are very safe and still allow for effective prescribed fires in many situations, depending on objectives. Photo Credit: Pete Bauman.

Management Implications to Current Policy on Planted Grasslands and Conservation Reserve Program (CRP) Projects

It is generally understood that prescribed fire removes nesting habitat in the short term while providing improved nesting opportunity in the long-term. It is also generally understood that while prescribed fire may negatively impact nesting or laying, the actual impact on females (mortality) is rare and females often re-nest successfully. Finally, it is generally understood that the results of prescribed fire on the vegetation can result in a rich environment for nectar-bearing flowers that attract insects which in turn provide foraging opportunity for young grassland birds. Similar positive and negative impacts occur for most other categories of wildlife and insects, and thus birds generally serve as a reasonable surrogate for most wildlife considerations.

The Conservation Reserve Program (CRP) is a United States Department of Agriculture (USDA) program that is administered through the Farm Services Agency (FSA) with technical support provided by the Natural Resources Conservation Service (NRCS). In South Dakota, additional technical support is also offered through partnerships between NRCS, Conservation Districts, and other organizations such as SD Department of Game, Fish, and Parks (SDGF&P), Pheasants Forever, and Ducks Unlimited through their private lands support programs. As part of the SD NRCS State Technical Committee structure, FSA and NRCS also utilize various subcommittees to review technical guidance for CRP and other program policies and practices in South Dakota.

Since its inception in 1985, CRP has been a major component in South Dakota's grassland landscape. What began as a simple bid-in enrollment program targeting soil conservation on marginal lands with low-diversity seed mixes has matured into a program that can be tailored to individual conservation or business goals. In South Dakota, we now have options for CRP contracts that protect native grasslands as well as grass plantings on marginal crop ground. In addition, we have partnership programs such as State Acres for Wildlife Enhancement (SAFE), Conservation Reserve Enhancement Program (CREP) and pollinator options that allow producers to further refine their CRP acreage portfolio by partnering with state and non-government conservation agencies.

Currently, prescribed fire is subject to rules consistent with the other management practices and is generally not allowed during the Primary Nesting Season (PNS) dates of May 1 to August 1. The influence of PNS dates in CRP management is a critical factor in strategizing establishment and maintenance plans for CRP projects. Regarding fire management, the PNS restriction can force implementation of less effective and less wildlife friendly management practices because of the challenges related to early spring implementation (as discussed throughout this paper). Either fire simply is not practiced or landowners use fire during a less 'ecologically effective' time period for the sake of getting the burn done to meet contract date requirements, which is clearly not objectives based.

The interest in prescribed fire as a management practice on all grasslands continues to increase in South Dakota. As a result there is a dramatic shift toward the general acceptance of fire as a functional tool amongst farmers, ranchers, and landowners. It is rare to hear strong opposition to fire from any sector, and most understand the need for more effective fire timing in CRP management.

The FSA rules on CRP is the single obvious exception to normal and effective fire use policy under USDA guidelines and is confounded by contradictory guidance and/or program policy administered through the NRCS whose policies and practice standards clearly support the use of objectives-based prescribed fire in conservation strategies. Programs under NRCS allow fire to be used throughout the growing season and within the Primary Nesting Season.

Range Technical Note No. 12 (NRCS, Tech Note 12, 2021) is the most comprehensive technical document that addresses the application of prescribed fire on private land enrolled in USDA programs in South Dakota. Within this comprehensive guidance is a clear understanding of goals, stating that “the burn project and associated practices must be consistent with management goals of the desired plant community”. This statement is critical because it recognizes the natural order of goals, focusing on the habitat first while clearly calling for appropriate weather, fuel, resource, safety, and social conditions.

Range Technical Note No. 12 also devotes an extensive discussion to timing of prescribed fire, stating that “timing and frequency are the most critical elements for obtaining the desired results” and that “for most ecological objectives such as improved native plant vigor, seed production, weed control, or wood species control, late spring is the preferred time to burn”. This is in direct opposition to FSA CRP policy that forces burning into the more volatile early spring period prior to the Primary Nesting Season in South Dakota. Range Technical Note No. 12 categorically provides guidance on weather, safety, equipment, communications and other standard elements of sound objectives-based burn planning that can be conducted throughout the growing season; these are often compromised during volatile spring periods ahead of the PNS.

Similarly, Range Technical Note No. 13 (NRCS, Tech Note 13, 2021) provides additional guidance on objectives and criteria for alternative fire use and timing for pasture management, woody species control, warm and cool season plant communities, invasive species, and wildlife. Part G. of this document specifically identifies burning later in the growing season as a primary consideration for meeting objectives for all parameters previously discussed in this document.

Additional NRCS program guidance to landowners clearly recognizes the importance of appropriate timing to meet prescribed fire objectives. Conservation Practice Standard (CPS) Prescribed Burning (NRCS 338 SD CPS, 2021) provides a general outline for conducting prescribed fire while CPS Firebreaks (NRCS 394-CPS, 2023) addresses the importance of managing fuel breaks and firebreaks with ‘greenup’, a condition that becomes more prevalent throughout the later growing season.

Inconsistencies within program guidelines between NRCS and FSA, both USDA agencies, results in confusion and frustration among USDA staff, landowners, and partner organizations.

The ecological and social arguments for allowance of the use of fire after May 1 are clearly addressed in NRCS guidance documents. Here we provide perspective on the actual impact of allowing flexibility in burn timing of CRP fields. In 2026, South Dakota had approximately 140,000 acres of Grassland CRP, 700 acres in general CRP, and over 68,000 acres in continuous CRP for a total of about 208,700 total acres accepted for enrollment. If all these acres result in enrollment, South Dakota will have nearly 2 million acres of Grassland CRP and nearly 1 million acres of General and Continuous CRP in the near future. Even in a year with ideal burning conditions, private lands planning indicates that it is unlikely that more than about 30,000 acres of CRP land would burn in any given year, or less than 1% of all CRP acres. Therefore, any actual negative impact to nesting birds is statistically insignificant while the positive impacts to habitat on the landscape will be very significant. Ironically, when burning must be completed before May 1 it is unlikely that more than .01% (3,000 acres) would be accomplished in any given year (Mark Norton, SD GFP Senior Wildlife Biologist – Private Lands, Pers. Comm.).

Farm Service Agency guidelines for the CRP establishment period allows for management to be performed only during the first 2 years of the contract period outside of the PNS dates (2-CRP Manual Par. 426, Part 13), and includes the use of prescribed fire. Diverse plantings are most desirable, but they can be expensive to establish and maintain if not managed appropriately. It can be difficult to accomplish a prescribed burn during the allowable to year establishment period because of lack of vegetation for fuel in new plantings. Encouraging opportunities for ecologically sound management throughout the contract period provides the best chance of retaining quality grassland cover in the long term. To illustrate this point, about 80,000 acres of combined general and continuous CRP expired in 2026, for a net reduction of about 11,000 acres of general and continuous CRP. Might these acres have been re-enrolled had objectives-based management and maintenance been allowed throughout the full contract as necessary under the guidance of NRCS technical direction?

As agency professionals continue to practice prescribed fires while educating landowners on the merits of objective-based management it is realistic that the interest in implementation of safe, ecologically effective, and financially efficient prescribed fires will continue to increase. The majority interest has been from CRP landowners and private lands service providers who desire to utilize prescribed fire during grassland establishment and mid-term management periods to meet their contractual obligations and their grassland management objectives. These landowners are confused by the perceived double standard associated with spring burning for wildlife habitat as they witness most conservation agencies implementing burns well after the PNS date of May 1.

As long as science and observation indicate that grassland birds will re-nest and that post-burn effects are overwhelmingly positive for birds (including economically important birds), burn timing hindered by the PNS date and the narrow objective of only providing nesting habitat is, ironically, of very little importance to grassland bird populations, thus rendering the current PNS rule obsolete. The PNS date is inconsequential in the sense that an April burn will result in low recruitment of birds in the year of the burn, similar to a May 31 or June 15 burn date. What is gained by the later burn dates is improved opportunity for success along with grassland health, vigor, and diversity that yield bird nesting and brood rearing habitat in subsequent years.

Perhaps the most critical management implication for CRP management in South Dakota is to understand the catastrophic results of no management, specifically on grassland bird populations and grassland retention. These implications generally fall into three primary negative outcomes. First, prescribed fire objectives are most often not accomplished prior to the primary nesting season date of May 1 due to all of the reasons outlined in this paper (safety, fuel volatility, lack of resources, dangerous weather patterns, etc.), and often those fields are left unmanaged and thus degrade in habitat quality over time. Second, unmanaged grasslands or those with fire applied too early often result in invasion of weedy species. Left unchecked, these fields are likely to be subject to non-selective herbicide application and eventually degrade into poor diversity. Consequently these fields may not qualify for future re-enrollment into CRP, or more tragically, the landowner simply decides to destroy the stand and return to cropping. Third, as

is increasingly observed across the state, CRP fields (including grassland CRP) become infested with woody species and ultimately become either unavailable to grassland birds or serve as population sinks as invading trees replace grasslands.

In all cases, objectives-based timing of growing season prescribed fire can mitigate degradation of grassland bird habitat in CRP and other grasslands. It has been proposed by a host of organizations that South Dakota could improve overall management of CRP by allowing prescribed burning during the Primary Nesting Season. This simple adjustment could result in improved habitat, safety, and social acceptance of prescribed fire and improved relationships/perceptions between VFDs, county weed agents, landowners, and USDA.

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