

06/01/2026

BLACK HILLS ELECTRIC COOPERATIVE INC.

2026 Wildfire Mitigation Plan



Black Hills Electric Cooperative, Inc.

P.O. Box 792
Custer, SD 57730


® A Touchstone Energy® Cooperative 

Table of Contents

Table of Contents	ii
1 Introduction/Executive Summary	7
1.1 Purpose of the Plan	7
1.2 Objectives of the Wildfire Mitigation Plan	7
1.3 Utility Profile and History	8
1.4 The Service Area	8
2 Overview of Utility’s Fire Prevention Strategies	10
2.1 Strategy and Program Overview	10
2.2 Timeframes of Preventative Strategies and Programs	11
3 Utility Demographic	13
3.1 Service Area Description	13
3.1.1 Location	13
3.1.2 Climate	14
3.1.3 Population	14
3.1.4 Economy	15
3.1.5 Transportation Facilities	16
3.1.6 Transmission & Distribution	16
3.2 Black Hills Electric Cooperative’s Asset Overview	16
4 Risk Analysis and Risk Drivers	17
4.1 Fire Risk Drivers Related to Construction and Operations	17
4.1.1 Foreign Contact	18
4.1.2 Equipment Failure	18
4.1.3 Wire to Wire Contact	18
4.1.4 Standard Fuses	19
4.2 Topography and Climate	19

4.2.1	Drought.....	19
4.2.2	Vegetation Type	19
4.2.3	High Winds.....	19
4.2.4	Lightning.....	20
4.2.5	Red Flag Warning Conditions.....	20
4.2.6	Wildland Urban Interface (WUI)	20
4.2.7	Access.....	23
4.2.8	Other Potential Risk Factors.....	23
4.3	Key Risk Impacts.....	23
4.4	Wildfire History and Outlook.....	24
4.5	Fire Threat Assessment Mapping.....	26
5	Wildfire Prevention Strategy and Programs	29
5.1	Transmission and Distribution System Operational Practices.....	31
5.1.1	Situational Awareness Tools.....	31
5.1.2	Fire Precautionary Period	31
5.1.3	Recloser Operational Practices	32
5.1.4	Public Safety Power Shutoffs.....	32
5.2	Infrastructure Inspections and Maintenance	34
5.2.1	Definition of Inspection Levels	34
5.2.2	Detailed Patrol Inspections	35
5.2.3	GIS Mapping.....	36
5.2.4	Wood Pole Testing and Treatment.....	36
5.2.5	Substation Inspections	37
5.2.6	Prioritization of Repairs	37
5.3	Vegetation Management (VM).....	38
5.3.1	Black Hills Electric Cooperative Tree Trimming and Removal Guidelines.....	38

5.3.2	Black Hills Electric Cooperative Priorities	38
5.3.3	Hazard Trees.....	38
5.3.4	ROW Trimming Specifications	39
5.3.5	Clear Cut ROW Specifications.....	39
5.3.6	Slash Treatment.....	39
5.3.7	T&D System Vegetation Management Standards	39
5.3.8	Black Hills Electric Cooperative/Contractor Tools and Equipment	40
5.4	Vegetation Management Trimming and Inspection Schedule	40
5.5	Fire Mitigation Construction.....	41
5.5.1	Avian Protection Program.....	41
	• Raptor Framing	41
	• Insulated Equipment.....	41
	• Wildlife Protective Guards	41
	• Perches	41
	• Nest Platforms.....	41
5.5.2	Undergrounding Conductor	41
5.6	Emerging Technologies	42
5.7	Workforce Training.....	42
6	Emergency Response	43
6.1	Preparedness and Response Planning	43
6.1.1	Crisis Communication Plan	43
6.1.2	Crisis Communications Team.....	43
	• Manager of Operations	43
	• System Coordinator	43
	• Director of Communications and Member Services.....	43
	• Other designated members as deemed appropriate.....	43

6.1.3	Jurisdictional Structure.....	43
6.1.4	Public and Member Communications for Outages.....	45
6.1.5	Community Outreach	45
6.1	Restoration of Service	46
6.2.1	Service Restoration Process	46
7	Performance Metrics and Monitoring	47
7.1	Plan Accountability	47
7.1.1	Operating Unit Responsibility	47
7.2	Monitoring and Auditing of the Wildfire Mitigation Plan	49
7.2.1	Metrics and Assumptions for Measuring Wildfire Mitigation Plan Performance	49
7.2.2	Programmatic Metrics	51
7.3	Monitoring and Auditing of the Wildfire Mitigation Plan	53
7.3.1	Accountability.....	53
7.3.2	Identify Deficiencies in the Wildfire Mitigation Plan	53
7.3.3	Monitor and Audit the Effectiveness of Inspections.....	54
7.3.4	Written Processes and Procedures.....	54
7.4	Programmatic QA/QC processes	54
7.4.1	Distribution System Inspections.....	54
7.4.2	Vegetation Management (VM)	55
Appendix A:	Plan and Mapping Disclaimers	56

Table of Tables

Table 1. Mitigation Strategies/Activities	11-12
Table 2. Asset Description	17
Table 3. Activities That Address Wildfire Risk Factors	30
Table 4. Inspection Program Summary	34
Table 5. Vegetation Management Schedules	40
Table 6. Accountability of Plan Implementation	48
Table 7. Performance Metrics	50
Table 8. Programmatic Metrics	52

Table of Figures

Figure 1. Service Area	9
Figure 2. Wildland Urban Interface	22
Figure 3. Historic Wildfire Perimeters 2000-2021	25
Figure 4. Wildfire Hazard Potential	28
Figure 5. General Land Ownership	44

1 Introduction/Executive Summary

Wildfire mitigation is essential in Black Hills Electric Cooperative's (BHEC's) operational practices. We may sell electricity, but the main reason for our existence is to provide service to our members. A significant part of providing service to our members is taking all practical actions available to prevent the devastation that a wildfire could bring to the members and communities we serve. BHEC's Wildfire Mitigation Plan, with its goals and metrics, takes an active approach in achieving these goals. The Plan formalizes the co-op's ongoing vegetation management, asset inspection and maintenance, communications plans, and restoration processes.

1.1 Purpose of the Plan

The Plan describes BHEC's strategies, programs, and procedures to mitigate the threat of electrical equipment ignited wildfires, and addresses the unique features of its service territory, such as topography, weather, infrastructure, grid configuration, and areas most prone to wildfire risks. This includes the maintenance of its transmission and distribution (T&D) assets as well as the management of vegetation in the ROWs that contain these assets.

BHEC's Board of Directors reviews, and approves the Plan as needed, while the System Coordinator is responsible for its implementation. The Wildfire Mitigation Plan is a living document that will receive regular reassessment as projects and initiatives are completed. Primary accountability for plan implementation resides with the System Coordinator.

1.2 Objectives of the Wildfire Mitigation Plan

The main objective seeks to implement an actionable plan to create increased reliability and safety while minimizing the likelihood that BHEC's assets may be the origin or contributing factor in the ignition of a wildfire. This plan was developed to be consistent with current industry best management practices and comply with current South Dakota State law and National Electric Safety Code (NESC) regulations and guidelines. To help develop the Plan, BHEC compared emerging technologies that not only reduce the likelihood of a service interruption, but also minimize the risk of ignition from the fault causing the outage.

The secondary objective is to measure, through the annual evaluation of certain performance metrics, the effectiveness of the specific wildfire mitigation strategies. Where a particular action, program component or protocol proves unnecessary or ineffective, BHEC will assess whether modification or replacement is suitable.

1.3 Utility Profile and History

Black Hills Electric Cooperative has been a part of Custer and southwestern South Dakota since 1940. When Dakota Power Company of Rapid City refused to serve people outside of towns and cities and in areas they considered non-profitable loads, Fred Root from rural Hill City organized a meeting of rural people on Jan. 17, 1940, to discuss forming an electric cooperative and that night, Black Hills Electric Association came to life. The association was non-profit and member-owned. It was controlled by its members and had no outside shareholders.

Black Hills Electric Cooperative has had steady growth over the years. From a few hundred members in 1946 to more than 8,800 members today, and is still non-profit and member-owned and controlled.

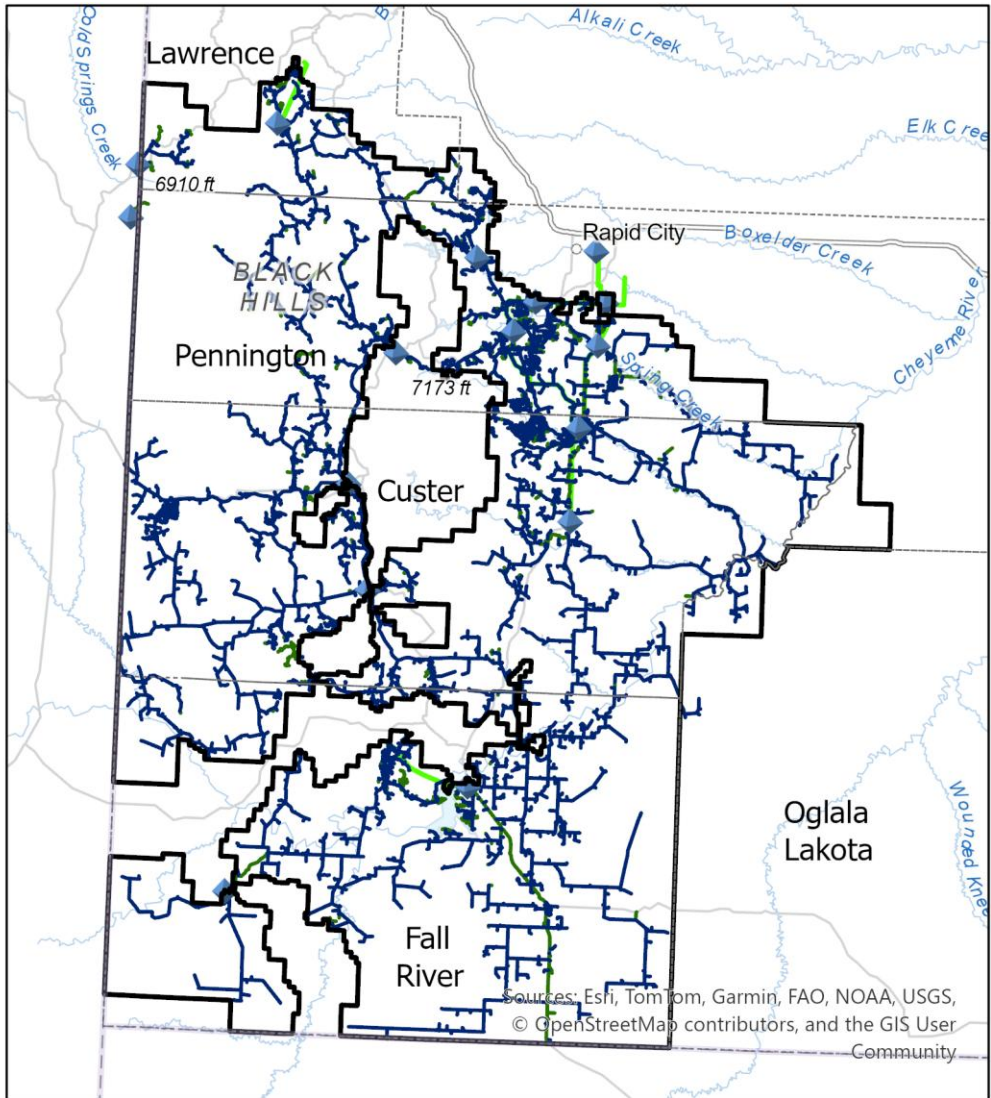
A seven-member board of directors, elected by the members, governs BHEC. The Board determines policy and selects the CEO responsible for the co-op's overall management and operations.

1.4 The Service Area

Black Hills Electric Cooperative's headquarters is located in the Black Hills of western South Dakota near the town of Custer. The cooperative provides electricity to more than 8,800 rural and suburban members and more than 11,500 metered services in six counties in southwestern South Dakota. The co-op's 5,000 square mile service territory includes mountains, foothills, and plains. Black Hills Electric Cooperative maintains 2,700 miles of overhead, underground, and transmission lines with an average of 4.1 active services per mile of line. The co-op purchases its power from Basin Electric Power Cooperative and is a member of the National Rural Electric Cooperative Association.

The service territory, shown in figure 1, stretches from the northern point of the Black Hills National Forest to the Wyoming and Nebraska borders.

Figure 1. Service Area



Service Area Map

- ◆ Substations
- OHDistribution
- UGDistribution
- Transmission
- ⋯ Counties
- ▭ Service_Boundary



2 Overview of Utility's Fire Prevention Strategies

This Wildfire Mitigation Plan integrates and interfaces with Black Hills Electric Cooperative's existing operations plans, asset management, and engineering principles, which are themselves subject to change. Future iterations of the Wildfire Mitigation Plan will reflect any changes to these strategies and will incorporate new best management practices as they are developed and adopted.

2.1 Strategy and Program Overview

Five main components comprise the proposed wildfire prevention strategies, which align with Black Hills Electric Cooperative's best practices. Together, they create a comprehensive wildfire preparedness and response plan with a principal focus on stringent construction standards, fire prevention through system design, proactive operations and maintenance programs, specialized operating procedures, and staff training.

- **Design & Construction:** Black Hills Electric Cooperative's design and construction consist of system equipment, infrastructure design, and technical upgrades. These practices aim to improve system hardening to prevent contact between infrastructure and fuel sources to minimize Black Hills Electric Cooperative's electrical system's risk of becoming an ignition source. Examples include wildlife guards and insulated equipment to reduce contacts.
- **Inspection, Maintenance, and Record Keeping:** Black Hills Electric Cooperative's inspection and maintenance strategies consist of pro-active line patrol, diagnostic activities, and various maintenance methods to ensure all equipment and infrastructure are in excellent working condition. Line patrol and inspection, deficiencies, corrections and maintenance are documented to ensure accountability and compliance.
- **Operational Practices:** Pro-active, day-to-day actions include safety training. Black Hills Electric Cooperative reviews system interruptions and voltage reports weekly to proactively identify any issues on equipment or lines that could result in a fire ignition.
- **Situational & Conditional Awareness:** This component consists of methods to improve system visualization and awareness of environmental conditions. The practices in this category aim to provide tools to strengthen the Plan's other features. For example, Black Hills Electric Cooperative monitors numerous websites, including the National Weather

Service (NWS), InciWeb, and Great Plains Dispatch @ wildcad.net.

- **Response & Recovery:** This strategy consists of Black Hills Electric Cooperative’s procedures in response to wildfire, de-energization, and other emergency events. This component aims to formalize protocols for these situations and efficient communications, emergency response, and recovery efforts. Table 1 summarizes Black Hills Electric Cooperative’s programs and activities that support wildfire prevention and mitigation, along with a timeframe for implementation.

2.2 Timeframes of Preventative Strategies and Programs

The five components have several strategies and programs, most already implemented. The remaining are situational and not limited to any timetable, scheduled for completion over several years, under evaluation, or in the initial stages. The strategies and programs below fall into one or more of the five implementation timeframes:

- 1) Currently implemented
- 2) Implemented before the upcoming fire season
- 3) Completed annually or on schedule per relevant code
- 4) In the evaluation stage
- 5) Implemented on as-needed basis/protocols in place
- * Ongoing program with no defined completion date

Table 1. Mitigation Strategies/Activities

DESIGN AND TIMEFRAME	
Strategic undergrounding of distribution lines	1*
Field recloser to vacuum-type breaker change-out program	4
Covered jumpers and animal guards	1*
Non-expulsion fuses in select high-risk areas	4
Avian protection construction standards	1*
Substation perimeter fencing for security and protection	1
INSPECTION AND MAINTENANCE	

Infrared inspections of substation equipment	3
Unmanned Aerial Vehicle (UAV) T&D line inspections	4
Wood pole intrusive inspection and testing	1
INSPECTION AND MAINTENANCE (cont.)	
T&D system vegetation management program	1
Enhanced T&D vegetation right-of-way maintenance	1
Distribution system line patrols and detailed inspections	1
Enhanced line patrols prior to fire season	1
OPERATIONAL PRACTICES	
Work procedures and Fire Hazard training for persons working in locations with elevated fire risk conditions	2
Community outreach/wildfire safety awareness	1*
Staff safety training and orientation for vegetation management work	1
Fire suppression equipment on worksite during fire season	5
Provide liaison to county offices of emergency services (OES) during fire event	5
SITUATIONAL AWARENESS	
Weather Monitoring in the service area	1
Monitor weather stations	5
Monitor active fires in service area	1
RESPONSE AND RECOVERY	
Coordination with local Department of Emergency Management	5
Customer assistance programs for post-disaster recovery	5
Line patrols before re-energization	1

3 Utility Demographic

3.1 Service Area Description

3.1.1 Location

Black Hills Electric Cooperative, Inc., with headquarters at Custer, South Dakota, serves a rural area consisting of portions of Fall River, Custer, Pennington, Meade, Lawrence, and Oglala Lakota counties in western South Dakota.

BHEC serves the small towns of Fairburn, Hermosa, Oelrichs, Pringle, Red Shirt Village, Rochford, Rockerville, and Smithwick. In recent years the greatest growth has occurred near Rapid City. As the boundaries of Rapid City expand, large residential developments and commercial accounts are more and more likely. In recent years BHEC added two apartment complexes within the city limits of Rapid City. There has also been significant growth around Hermosa, Custer, Hill City, Lead, and Hot Springs.

In South Dakota, utility territories are established by statute. New loads of 2,000 kilowatts or more of contracted minimum demand may be served by any utility chosen by the consumer, and approved by the South Dakota Public Utility Commission regardless of territory.

BHEC serves three resale loads, two for Powder River Energy Corporation of Sundance, Wyoming, and one for Northwest Rural Public Power of Hay Springs, Nebraska. Because of the proximity to our service area, we have extended our lines to serve those loads. The consumers in these load areas are billed by their respective utilities.

BHEC's source of power is Rushmore Electric Power Cooperative (Rushmore), which presently consists of eight participating distribution cooperatives. Rushmore is a participating member of Basin Electric Power Cooperative (Basin). Rushmore purchases approximately 13% of its power from the Western Area Power Administration (Western) and the balance from Basin. Western rate increases (including the adder for low water levels) impact BHEC's total power costs. The loss of allocation and reliance on an ever-increasing proportion of Basin power impacts power costs at the Rushmore level. Unpredictable national political activities involving coal and natural gas generation, carbon taxes, and/or the sale or restructuring of the power marketing administrations or their allocations, will have a substantial impact on BHEC's rates.

A significant portion of the wholesale power cost is the result of the demand component of the rate. Black Hills Electric Cooperative has adopted a strategic demand rate to benefit members that control demand

during peak times. Black Hills Electric Cooperative's goal is to empower members to lower their individual monthly bills and at the same time maintain the kWh sales, which result in lower wholesale power costs.

3.1.2 Climate

Elevations range from 2,500 to 7,200 feet in the Black Hills. The average annual precipitation in the area ranges from 7 to 22 inches. Temperatures in the Black Hills can vary, with extremes of minus 40 degrees to 110 degrees above zero. Average winter low is 15 degrees with average high of 34 degrees. The average high temperature in summer is 87 degrees. Water is not usually plentiful because of the average annual precipitation.

The types of predominate vegetation in the Black Hills consist of pine, spruce, and aspen trees. Grasses are primarily native. Cultivated types include western wheat and blue stems. Water sources consist of streams, springs, man-made dams, and lakes.

Vegetation types are varied in the remainder of our service area. Grasses consist of both native and cultivated types. Most trees have been planted, with the exception of those occurring naturally along streams. Water levels are often minimal in the summer months, with some streams being depleted. Water quality and quantity vary considerably within the area. Well depths vary from shallow to over 2,500 feet. Water temperatures are high enough in some areas to offer geothermal possibilities. However, the water is very corrosive, which would preclude its potential use as a heating source. Temperature extremes are much like those in the Black Hills area, with a somewhat higher summer average.

3.1.3 Population

Population projections for the area served by BHEC show an increased rate of growth starting in 2021. CEO of Elevate Rapid City, Tom Johnson, says nearly 30,000 to 40,000 people are expected to be moving to the Black Hills within the next 10 years. It would be estimated that about a quarter of these would be in BHEC territory. The greatest center of growth continues to be in the area surrounding Rapid City. The influx of new industry there has contributed to a housing shortage. Much of the new home construction is occurring in the cooperative's service area. The selection of Ellsworth Air Force Base for the new B-21 bomber base has increased construction in the area. The expansion of Rapid City into the cooperative's service area has resulted in a growing opportunity for commercial and industrial development.

Other areas within the Black Hills have shown considerable residential growth during the last decade. “Country-living” continues to be a popular lifestyle choice. Several new rural subdivisions have been platted during the past few years and they filled with new homes almost immediately. Retirees and commuters form a substantial portion of the residential growth in the Black Hills. Some commercial and industrial development is occurring outside of the Rapid City area. The potential for growth within the cooperative’s service area outside the Black Hills is not as great. It is primarily a farming and ranching region with a slow growth rate. Construction of the “Heartland Expressway” (Highway 79) from Rapid City through Nebraska to has been completed to the Nebraska state line. It is expected some additional growth as commercial and industrial development expands down the corridor.

3.1.4 Economy

Although agriculture continues to be the cornerstone of the rural economy, the scenic Black Hills and the growth of the Rapid City metropolitan area contribute to an increasing economic diversity. Although seasonal in nature, tourism in the area continues to grow. Legalization of gambling in Deadwood has spurred development in the northern hills and the Sturgis Motorcycle Rally has increased August loads. Recreational businesses at Angostura Reservoir, Hart Ranch, and along the Highway 16 corridor continue to expand.

Within the Black Hills area, lumber and mining are important but declining industries. Commercial service industries around Rapid City, Hot Springs, Custer, and Lead-Deadwood are expanding into BHEC territory. The Rapid City metropolitan area offers the greatest opportunity for increases in both commercial and industrial growth within BHEC’s service territory. Ellsworth Air Force Base outside Rapid City is the area’s largest employer.

The Black Hills area has become a popular retirement destination for many. Substantial growth in the retirement community may lead to development in the service sector. Rapid City continues to experience substantial growth in most sectors.

The cooperative’s service area outside the Black Hills is largely a farm and ranch economy. Price improvements for agricultural products during the past few years contributed to a rejuvenation of this important economic sector. However, Ag prices can be up or down on any given year.

3.1.5 Transportation Facilities

Surface transportation facilities in the cooperative's service territory meet present needs. Extensive rebuilding of major highways in the Black Hills began in the early 1990s and is continuing. Improved highways have reduced commuter time to Rapid City and have promoted the expansion of "bedroom communities" in the Black Hills. Conversion of Highway 79/385 south of Rapid City into a four-lane expressway has resulted in better truck access to the area. Rapid City Regional Airport provides commercial service to hubs in Denver, Minneapolis, Salt Lake City, Dallas, Los Angeles and Chicago. Deregulation of the airline industry has resulted in less competition, fewer carriers and flights, and higher prices. Intrastate and regional flights, if available, are costly compared to similar routes from metropolitan airports.

3.1.6 Transmission & Distribution

Black Hills Electric Cooperative utilizes the Common Use Transmission system operated by Black Hills Energy as well as its own transmission lines. The transmission is 69kv sub transmission. The distribution system is operated at 7.2 kV.

3.2 Black Hills Electric Cooperative's Asset Overview

Due to Black Hills Electric Cooperative's service territory's size, the co-op has a vast number of substations, miles of overhead transmission lines, and overhead/underground distribution line assets to deliver power to its members. Table 2 depicts a high-level description of its assets.

Table 2. Asset Description

ASSET CLASSIFICATION	ASSET DESCRIPTION
Transmission Line Assets	Approximately 88 miles of conductor, transmission structures and switches at 69 kilovolt (kV).
Distribution Line Assets	Approximately 2,318 miles of overhead (OH) and 350 miles of underground (UG) conductor, cabling, transformers, voltage regulators, capacitors, switches, lined protective devices operating at or below 7.2 kV.
Substation Assets	Major equipment such as power transformers, voltage regulators, capacitors, reactors, protective devices, relays, open-air structures, switchgear, and control houses in 12 substation/switchyard facilities.

4 Risk Analysis and Risk Drivers

To establish a baseline understanding of the risks and risk drivers involved, Black Hills Electric Cooperative examined its exposure to known fire-related hazards. Although inherent risks exist in operating an electric utility, there are strategies and processes to better plan and manage them. The overall goal seeks to determine the residual risk level after applying all mitigation factors to the initial inherent risk.

4.1 Fire Risk Drivers Related to Construction and Operations

Black Hills Electric Cooperative staff evaluated other utility’s fire causes and applied its own field experience to determine the critical potential risk drivers. The categories listed below were identified as having the potential for causing powerline sparks and ignitions:

- Foreign contact
- Equipment/facility failure
- Vehicle impact
- Standard expulsion fuses
- Cross-phasing

These drivers associated with each category are discussed below but may not be limited to the following:

4.1.1 Foreign Contact

Utilities typically install bare wire conductors supported by insulators on overhead powerlines. The benefits include a much lighter and easier conductor to work with and a more cost-effective method to deliver energy than insulated/covered wire. However, a bare wire is more susceptible to contact from foreign objects such as wildlife, vegetation, and third-party equipment. Protection equipment helps isolate faults, but there are time delays associated with circuit breakers, reclosers, and fuses. These time delays are not fast enough, in many cases, to prevent all sparking before tripping. Ejected molten metal, sparks, or burnt foreign objects can potentially ignite any fuels in the vicinity of the fault. Any foreign objects, such as vehicles, animals, or debris that come in contact with conductors, poles, or guy wires, can create a faulted condition and potentially emit sparks.

4.1.2 Equipment/facility Failure

Equipment malfunction can occur during its service life for many reasons. Most equipment requires regular maintenance for optimal performance. Even though Black Hills Electric Cooperative's qualified personnel do regularly scheduled inspection and maintenance on all system equipment, internal defects not visible or predictable can cause destructive equipment failure resulting in the ejection of sparks and/or molten metal. The failure of hotline clamps, connectors, and insulators can result in wire failure and wire to ground contact. Transformers and capacitor banks can have internal shorts, potentially resulting in the ejection of materials, which could be an ignition source.

4.1.3 Wire to Wire Contact

High wind events are potential causes of wire-to-wire contact during fire season. Conductors can sway under these conditions, and if extreme, wire-to-wire contact can occur. When two or more energized conductors touch, they can emit sparks or cause fuses to open, emitting sparks and ejecting material. A vehicle impacting a pole, or livestock rubbing on guy wires, and re-energizing conductors can cause a "galloping" condition, resulting in wire to wire contact.

4.1.4 Standard Fuses

The utility industry typically installs expulsion fuses on the transformer and tap-lines to protect and isolate parts of the system that have experienced a faulted condition. Expulsion fuses utilize a tin or silver-link element in an arc-tube that vents gas and potentially molten metal to the atmosphere to extinguish an arc created by a faulted condition. The molten metal, however, can be a source of ignition for fire.

4.2 Topography and Climate

Within Black Hills Electric Cooperative's service territory and the surrounding areas, the following are additional risk drivers for wildfire:

- Drought
- Vegetation Type
- High Winds
- Lightning
- Red Flag Warning Conditions
- Wildland Urban Interface
- Access

4.2.1 Drought

The Black Hills of South Dakota can experience abnormally dry conditions during late summer and fall, quickly exacerbating prolonged periods of drought.

4.2.2 Vegetation Type

The service area topography ranges from dense pine forests in the Black Hills National Forest to vast open range areas characterized by widespread stands of sage and grasses.

4.2.3 High Winds

The Black Hills of South Dakota can experience 30 to 40 mph winds throughout the year with sporadic higher-speed gusts. However, these winds may cause tree branches to break free and come into contact with an electric conductor or blow trees outside the right-of-way (ROW)

into the power lines. High wind gusts may also blow objects such as tarps and lawn furniture into the conductors. Vegetation and foreign objects in the lines can result in faults, arcing, or downed lines, sometimes causing an ignition.

4.2.4 Lightning

Twenty million lightning strikes hit the ground in the U.S. every year¹. Many possible effects of a direct strike to power lines or structures include flashovers, ignition of the wood pole, melted and broken conductor, or ground wire damage. Black Hills Electric Cooperative has taken steps to mitigate the damaging effects of lightning on its system by installing shield wire above on most of the existing transmission line and all new transmission line construction. Lightning arrestors have been installed on most of the distribution system.

¹ National Lightning Detection Network (NLDN)

¹ Product citation: *Dillon, Gregory K. 2015. Wildfire Hazard Potential (WHP) for the conterminous United States (270-m GRID), version 2020 classified. 3rd Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2015-0047-3>*

4.2.5 Red Flag Warning Conditions

The National Weather Service issues different warnings at the onset or possible onset of critical weather and dry conditions, which could rapidly increase wildfire activity. A Red Flag Warning, the highest alert, is released when weather events may result in extreme fire behavior within 24 hours. A Fire Weather Watch, one level below an RFW, goes out when weather conditions over the next 12-72 hours put fire danger at a high level.

During an RFW, Black Hills Electric Cooperative crews limit activities in elevated fire risk areas. If critical work must happen in an elevated fire risk area, vegetation management and line crews have fire suppression equipment on-site, including fire extinguishers, water tank, and shovels.

4.2.6 Wildland Urban Interface (WUI)

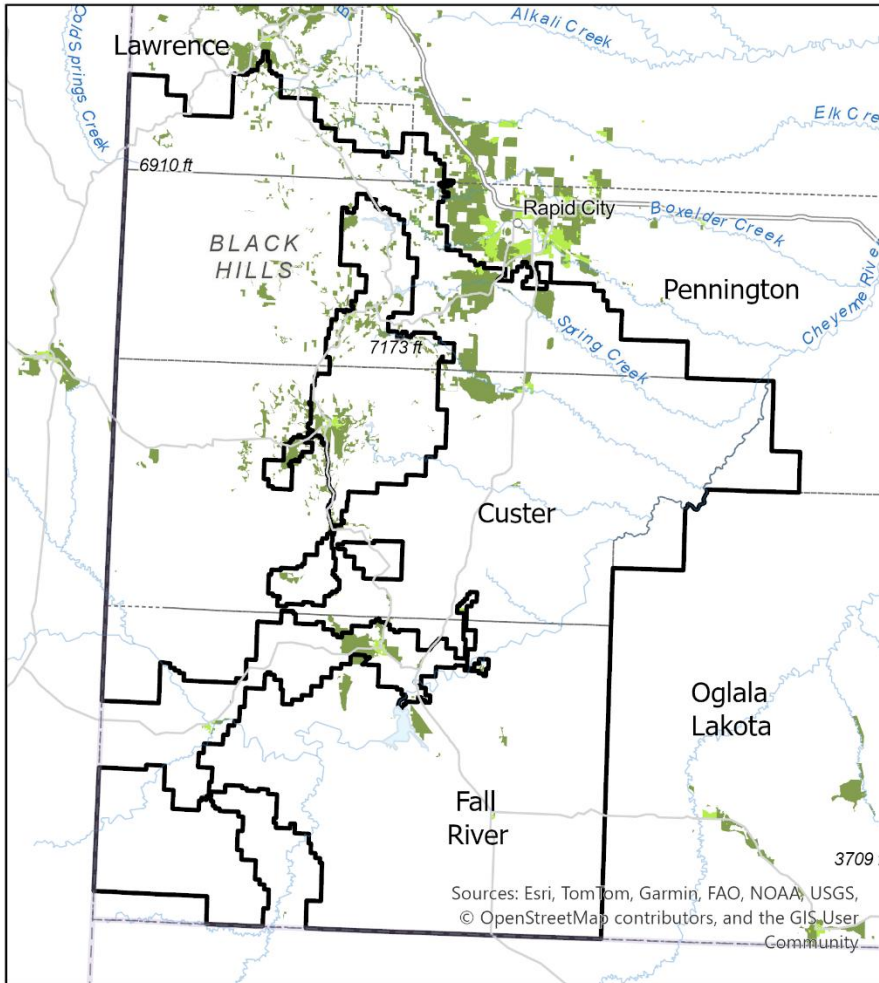
The wildland-urban interface defines an area where houses and other infrastructure are in or

adjacent to areas prone to wildfire. Black Hills' recent population growth has led to an increase in residential development in wildland areas. Approximately 10% of Black Hills Electric Cooperative's service area is comprised of WUI area as designated by the Community Wildfire Protection Plans. Growth in WUI designated areas results in an increased chance of more wildfire ignitions since electrical powerlines must traverse these wildlands to reach customers. Figure 2 shows areas of WUI throughout our service territory.

The USFS has established five classes of WUI in its assessment:

- **WUI Intermix:** Areas with ≥ 16 houses per square mile and ≥ 50 percent cover of wildland vegetation
- **WUI Interface:** Areas with ≥ 16 houses per square mile and < 50 percent cover of vegetation located < 1.5 miles from an area ≥ 2 square miles in size that is ≥ 75 percent vegetated
- **Non- WUI Vegetated (no housing):** Areas with ≥ 50 percent cover of wildland vegetation and no houses (e.g., protected areas, steep slopes, mountain tops)
- **Non-WUI (very low housing density):** Areas with ≥ 50 percent cover of wildland vegetation and < 16 houses per square mile (e.g., dispersed rural housing outside neighborhoods)

Figure 2. Wildland Urban Interface



Wildland Urban Interface Map

- Service_Boundary
- Counties
- Interface
- Intermix



4.2.7 Access

Portions of the service area have steep and rugged terrain with thick vegetation making access to certain areas of the cooperative service territory difficult to access. Other portions of our service territory are gentle rolling hills and grassy plains that are much more accessible.

4.2.8 Other Potential Risk Factors

Construction projects by non-Black Hills Electric Cooperative crews are another possible cause of ignition. Construction equipment, vehicles, and non-utility personnel working near power lines can contact conductors, causing a faulted condition. Excavation work performed without locating underground utilities is another hazard.

Black Hills Electric Cooperative employs an appropriately trained and well-informed workforce. Crews regularly perform switching, construction, and maintenance activities. The tools and vehicles can be sources of sparks or ignition as well. For example, a vehicle driven over dry grass/brush can cause ignition when vegetation comes into contact with a hot surface of the vehicle's undercarriage. For these reasons, Black Hills Electric Cooperative equips its vehicles with fire suppression equipment and trains its staff to respond to fires and properly use fire suppression equipment.

4.3 Key Risk Impacts

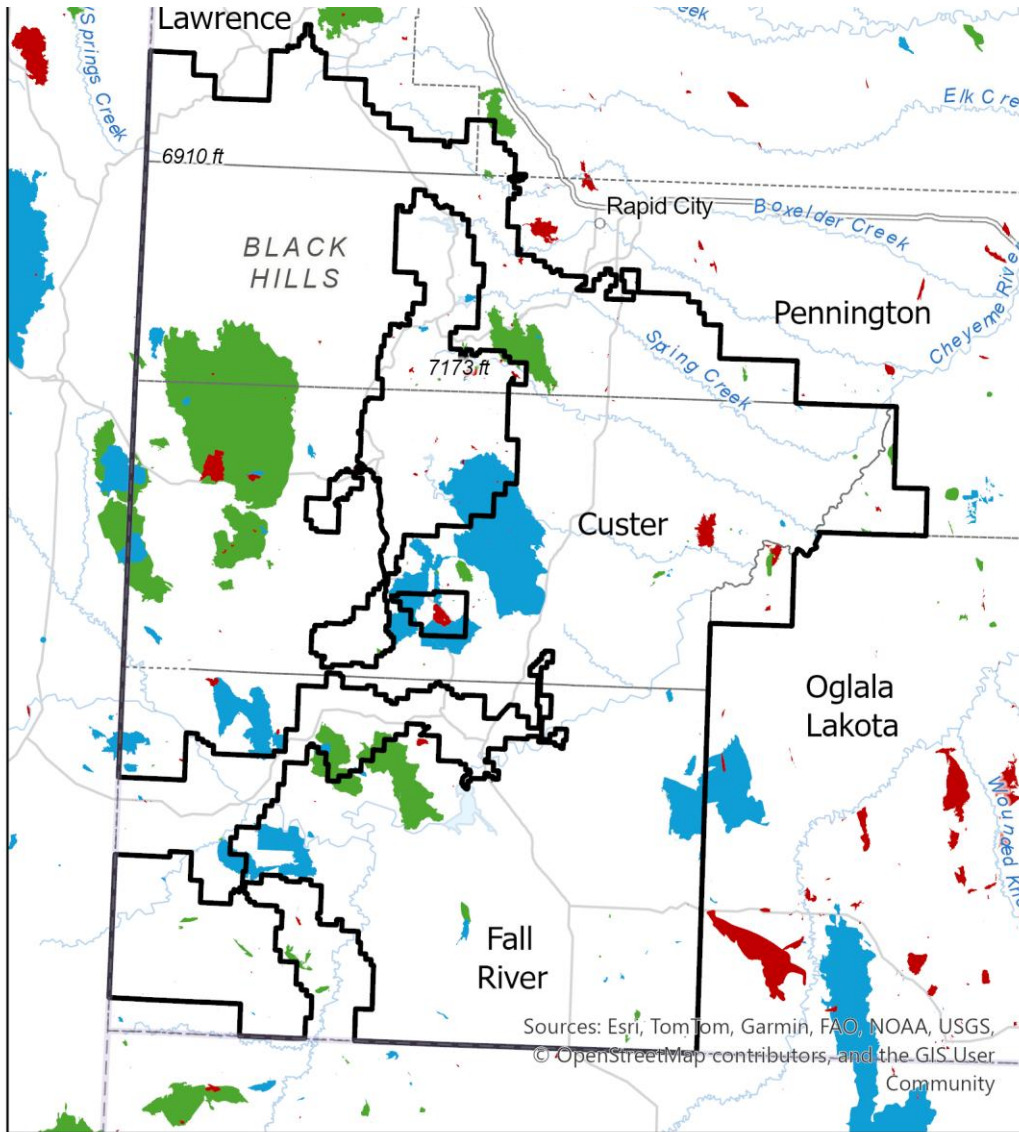
The aforementioned risks have many possible outcomes. The list below outlines some of the worst-case scenarios and consequences:

- Personal injuries or fatalities to the public, employees, and contractors
- Damage to public and/or private property (structures, equipment, livestock, etc.)
- Damage and loss of Black Hills Electric Cooperative owned infrastructures and assets
- Impacts on reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to Black Hills Electric Cooperative's reputation and loss of public confidence

4.4 Wildfire History and Outlook

Historically fire seasons in the Black Hills National Forest are the months of June, July, August, and September. The last several years have trended towards “year-round” fire season with fires occurring in every month of the year. Lightning is the leading cause of the majority of fires in the Black Hills and human caused are the second largest contributor. In the last 30 years, the Black Hills National Forest has averaged 99 wildfires per year that have burned 7,902 acres per year. Approximately 75% of fires are lightning caused with the remainder being human caused. Figure 3 shows the perimeter of large wildfires from the past 20 years.

Figure 3. Historic Wildfire Perimeters 2000-2021



Historic Wildfire Perimeter Map

- 2000-2009
- 2010-2019
- 2020-2025
- Counties
- Service_Boundary



4.5 Fire Threat Assessment Mapping

The Wildfire Hazard Potential (WHP) risk map is derived from a 270-meter resolution raster geospatial product created by the USDA/USFS/Fire Modeling Institute. The specific dataset used is the Wildfire Hazard Potential¹ Version 2020, which is the third edition of the WHP product and depicts landscape conditions of the conterminous United States as of the end of 2014.

WHP was built upon spatial datasets of wildfire likelihood and fire intensity using the Large Fire Simulator (FSim), spatial fuels and vegetation data from Landfire 2014, and point locations of historic fire occurrence (ca. 1992-2015). The objective of the map was to depict relative potential for wildfire that would be difficult for suppression resources to contain and for long-term strategic fuels management planning. On its own, WHP is not an explicit map of wildfire threat or risk, but when paired with spatial data depicting highly valued resources and assets such as structures or powerlines, it can approximate relative wildfire risk to those specific resources and assets.

The data described here are derived from wildfire simulation modeling, and their exact accuracy cannot be measured. They are intended to be relative measures of wildfire risk for planning purposes.

The Wildfire Hazard Potential (WHP) map used in this plan is a raster geospatial dataset produced by the USDA Forest Service, Fire Modeling Institute (FMI). It is intended to inform evaluations of wildfire risk or prioritization of fuels management needs across large landscapes. The specific objective of the WHP map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain.

The WHP-2020 dataset was built upon:

- Spatial vegetation and wildland fuels data from *LANDFIRE 2014* (version 1.4.0). The *LANDFIRE* Fire Behavior Fuel Models layer is a primary input to the FSim Burn Probability (BP) and Fire Intensity Level (FIL) datasets and forms the foundation for WHP. Historically, this model has been updated every 4-6 years, but developers are working to accelerate the process.
- Spatial datasets of wildfire likelihood and intensity were generated for the conterminous U.S. with the *Large Fire Simulator* (FSim). FSim simulates the growth and behavior of hundreds of thousands of fire events for risk analysis across large land areas using geospatial data on historical fire occurrence, weather, terrain, and fuel conditions. Effects of large-fire suppression on fire duration and size are also simulated. This research aims to

develop a practical method of quantifying geospatial wildfire impacts, including annual probabilities of burning and fireline intensity distributions at any point on the landscape.

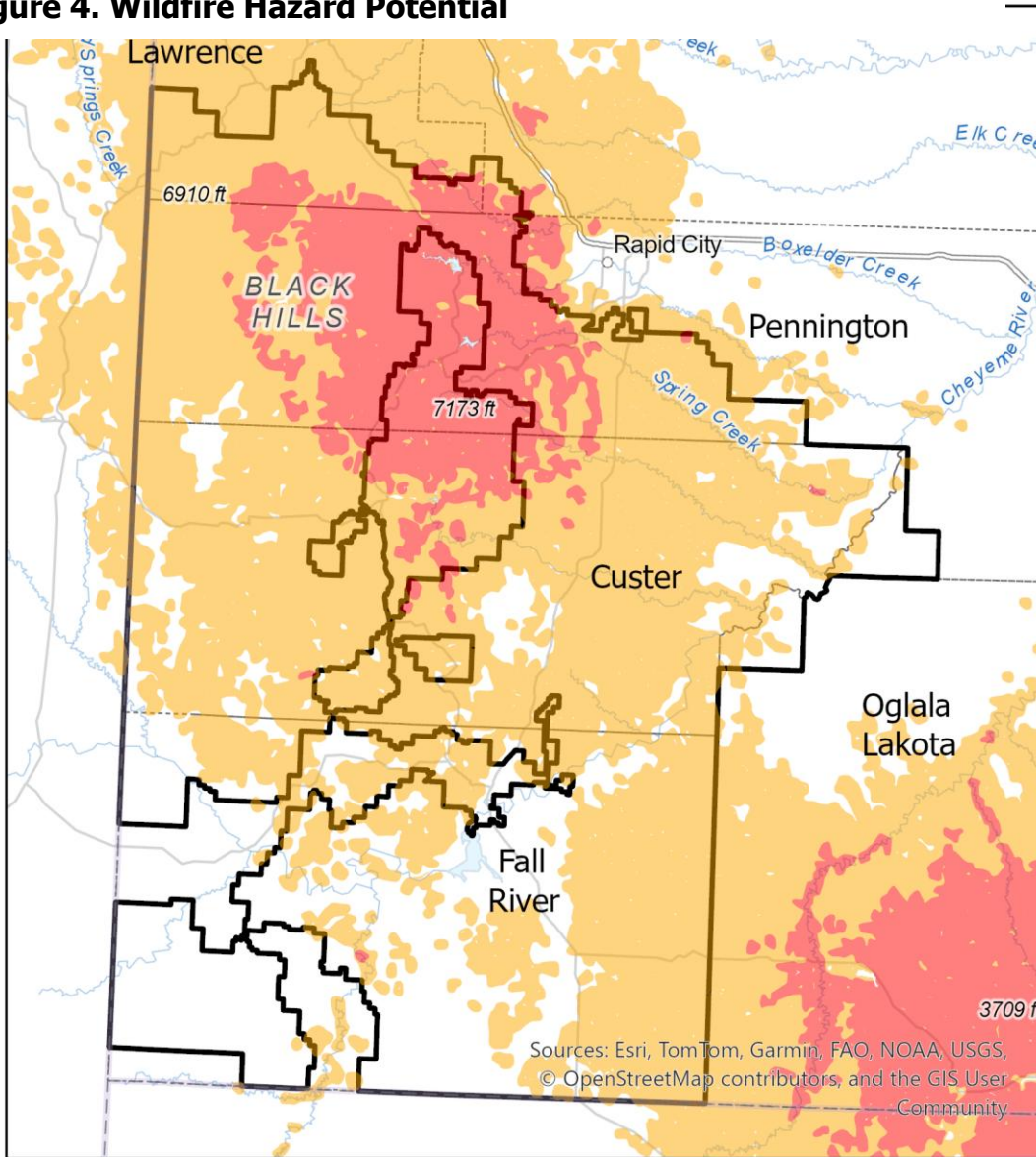
- Point locations of past fire occurrence from 1992 through 2015

Areas mapped with higher WHP values represent fuels with a higher probability of experiencing torching, crowning, and other extreme fire behavior under conducive weather conditions. An essential aspect of the WHP method is the use of "resistance to control weights" at the end of the mapping process. This serves to reduce the WHP index in areas with light fuels, such as grass and shrubs. This helps to inform where forest fuel reduction treatments might be most needed. It is anticipated that the WHP dataset will be updated approximately every two years.

On its own, WHP is not an explicit map of wildfire threat or risk, but when paired with spatial data depicting highly valued resources and assets such as communities, structures, or powerlines, it can approximate relative wildfire risk to those resources and assets. WHP is not a forecast or wildfire outlook for any particular season as it does not include any information on current or forecasted weather or fuel moisture conditions.

The WHP map is used to prioritize vegetation management activities, inspections, field work scheduling, and future sectionalizing studies and associated remedial actions. See Figure 4.

Figure 4. Wildfire Hazard Potential



Wildfire Hazard Potential Map

- WHP_High
- WHP_Moderate
- Service_Boundary
- Counties



5 Wildfire Prevention Strategy and Programs

Black Hills Electric Cooperative has proactively implemented many measures to address potential wildfire risks over the years. The Wildfire Mitigation Plan outlines existing fire mitigation efforts and identifies new processes Black Hills Electric Cooperative may employ moving forward.

Generally, the Wildfire Mitigation Plan describes specific programs Black Hills Electric Cooperative has embarked on to mitigate wildfire risks. Many of the programs, however, are multi-year and programmatic. While some have an immediate startup period, full implementation may occur when processes and methods mature. Black Hills Electric Cooperative is currently looking into pilot programs, including an aerial patrol program utilizing a drone employing infrared (IR) technology and high-resolution photography.

Several of Black Hills Electric Cooperative's current strategies and programs do not fall within any timeframe but remain situational based on certain real-world events. These conditions are predominantly weather and vegetative fuel-related and not associated with time periods (e.g., in 2023 or within five years). Similarly, Black Hills Electric Cooperative's emergency preparedness and response plans, post-incident recovery, restoration, and remediation activities and programs to support customers impacted by a wildfire are event-driven and are not timeframe-dependent. The co-op updates these practices as new information emerges and then adopts improved practices. Furthermore, all administrative-related programs such as risk analyses, performance metrics, and monitoring of this Wildfire Mitigation Plan occur at regular or annual intervals. The following table shows activities that will address key wildfire risk factors.

Table 3. Activities That Address Wildfire Risk Factors

RISK FACTOR	PROPOSED MITIGATION
Fuel Source	<ul style="list-style-type: none"> • Vegetation Management • Line Inspections • ROW Maintenance • Enhanced inspection intervals in high-risk areas
Wire to Wire Contact	<ul style="list-style-type: none"> • National Weather Service monitoring • Undergrounding of distribution lines
Contact from Objects	<ul style="list-style-type: none"> • Wildlife guards • Increased vegetation clearances • Avian protection program • Insulated equipment • Coordination with USFS on timber sales
Equipment Failure	<ul style="list-style-type: none"> • Routine maintenance • Focused design and construction standards to reduce ignition sources • Transmission and distribution line detailed inspections and biennial patrols • Intrusive pole testing (cycle) • Pole replacement program • De-energizing of lines during certain conditions • SCADA monitoring of substation equipment • Infrared inspections of substation equipment
Field Work	<ul style="list-style-type: none"> • Black Hills Electric Cooperative worker/contractor education on fire ignition sources • Tailgate meetings before fieldwork • Land agencies fire season requirements

5.1 Transmission and Distribution System Operational Practices

5.1.1 Situational Awareness Tools

Black Hills Electric Cooperative utilizes various operational and situational awareness tools to determine when de-energization or alternative operational practices are appropriate. They are listed below:

- Weather data such as wind speed, wind direction, air temperature, barometric pressure, and relative humidity.
- US Forest Service - Wildland Fire Assessment System
- Red Flag Warning Map
- National Weather Service
- National Oceanic and Atmospheric Administration, Fire Weather Outlook

5.1.2 Fire Precautionary Period

Historically, Black Hills fire season occurs between July and September, with mid-to-late August most vulnerable to extreme fire conditions. For this Wildfire Mitigation Plan, the Fire Precautionary Period is April 1st to November 1st of any year.

During this Fire Precautionary Period, Black Hills Electric Cooperative and Contractor crews shall:

- Abide by the requirements of this Wildfire Mitigation Plan and be responsible for patrolling and preventing fires caused by vegetation management activities.
- Take all steps necessary to ensure co-op employees, subcontractors, and their employees prevent ignitions directly or indirectly during their work activities and operations.
- Permit and assist with periodic testing and inspection of required fire equipment. Operators shall certify compliance with specific fire precautionary measures in this Wildfire Mitigation Plan before beginning operations during the Fire Precautionary Period and shall update such certification when operations change.
- Equipment service areas, parking areas, and gas and oil storage areas shall be cleared of all flammable material for a radius of at least 10-feet unless otherwise specified.

5.1.3 Recloser Operational Practices

There are over 240 reclosers on various distribution lines in Black Hills Electric Cooperative's system. Black Hills Electric Cooperative does not typically disable automatic reclosing functions at its substations nor in the field due to weather-related conditions. Before line work or clearing operations, the reclosers may be set to the "one-shot" alternate setting to block the reclosing function. To disable, co-op personnel will physically go to each recloser to change the setting. Black Hills Electric Cooperative continues to assess resetting reclosers in high-risk areas to "one-shot" mode when conditions suggest imminent fire danger. By placing reclosers in "one-shot" mode, they are more sensitive to line disruptions and protect the system with rapid disconnect/de-energization of power lines.

5.1.4 Public Safety Power Shutoffs

Public Safety Power Shutoffs (PSPS) are a recent development in the strategies used by electric utilities to help keep people and communities safe. A PSPS preemptively de-energizes power lines during high wind events combined with hot and dry weather conditions. Black Hills Electric Cooperative, in consultation with the local emergency managers and USFS officials, evaluates the efficacy of a PSPS. When considering a PSPS, Black Hills Electric Cooperative also examines the impacts on fire response, water supply, public safety, and emergency communications.

Black Hills Electric Cooperative considers the external risks and potential consequences of a PSPS while striving to meet its main priority of protecting the communities and members we serve. They include:

- Potential loss of water supply to fight wildfires due to loss of power at production wells and pumping facilities.
- Negative impacts on emergency response and public safety due to disruptions to the internet and mobile phone service during extended power outages.
- Loss of key community infrastructure and operational efficiency that occurs during power outages.
- Medical emergencies for members of the community requiring powered medical equipment or refrigerated medication. Additionally, the lack of air conditioning can negatively impact medically vulnerable populations.

- Negative impacts on medical facilities.
- Traffic congestion resulting from the public evacuation in de-energized areas can lengthen response times for emergency responders.
- Negative economic impacts from local businesses forced to close during an outage.
- The inability to open garage doors or motorized gates during a wildfire event can lead to injuries and fatalities.

The risks and potential consequences of initiating a PSPS are significant and extremely complex. Based on the above considerations, Black Hills Electric Cooperative reserves the option of implementing a PSPS when conditions dictate. While Black Hills Electric Cooperative believes the risks of implementing a PSPS far outweigh the chances of its electric overhead distribution system igniting a catastrophic wildfire, the PSPS provides a last resort tool and another option in a crisis.

On a case-by-case basis, Black Hills Electric Cooperative has historically and will continue to consider de-energizing a portion of its system in response to a known public safety issue or response to a request from an outside emergency management/response agency. Any de-energizing of the lines is performed in coordination with critical local partner agencies keeping all parties' best interests in mind. If conditions on the ground indicate that a wildfire threat is imminent, Black Hills Electric Cooperative's personnel has the authority to de-energize select distribution circuits. A decision is based on multiple triggers accompanied by the Black Hills Electric Cooperative system's unique understanding, including any enterprise risks involved. No single element is determinative. Black Hills Electric Cooperative relies on weather data from various sources, including the National Weather Service, and NDFRS weather station data.

Risk triggers for the potential to de-energize circuits:

- Imminent fire danger
- Critically dry vegetation that could serve as fuel for a wildfire
- High temperatures/Low humidity levels
- RFW declaration by the NWS
- Projected high wind events in high-risk areas
- Mandatory fire orders in effect (as directed by any Agency Incident Commander)
- On-the-ground observations from Black Hills Electric Cooperative or other agency field staff
- Active wildfire in the service area

Black Hills Electric Cooperative will monitor the evolution of PSPS implementation by other area electric utilities to continue to refine its evaluation of this vital topic.

5.2 Infrastructure Inspections and Maintenance

Black Hills Electric Cooperative performs multiple time-based inspections on its T&D facilities, which play an essential role in wildfire prevention. Recognizing the hazards of equipment that operate high voltage lines, Black Hills Electric Cooperative maintains a formal inspection and maintenance program for distribution, transmission, and substation equipment. Black Hills Electric Cooperative currently patrols its system regularly and is increasing the frequency of inspections in high-risk areas. The following sections outline inspection practices for Black Hills Electric Cooperative assets. Table 4 summarizes the inspection schedule for all assets.

Table 4. Inspection Program Summary

ASSET CLASSIFICATION	INSPECTION TYPE	FREQUENCY
Overhead Transmission	Detailed Patrol Inspections	Every 2 years
	Intrusive Pole Test	Every 15 years
Overhead Distribution	Detailed Patrol Inspections	Every 2 years
	Intrusive Pole Test	Every 15 years
Underground Distribution	Safety Patrol Inspection	As needed
	Detailed Inspection	Every 5 years
Substations	Detailed Inspection	Monthly
	Infrared Inspection	Annually

5.2.1 Definition of Inspection Levels

1. **Safety Patrol Inspection:** A simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may occur during other company activities.

2. **Detailed Inspection:** Individual pieces of equipment and structures receive a careful visual examination, and through the use of routine diagnostic testing, as appropriate, and (if practical and if useful information gathered) opened and the condition of each rated and recorded.
3. **Intrusive Inspection:** Involving the movement of soil, boring holes in the pole above and below the ground line, checking for decay, and installing a fumigant.

5.2.2 Detailed Patrol Inspections

Detailed checks include system and vegetation patrols and inspections. Black Hills Electric Cooperative monitors vegetation during its system patrols and performs vegetation management. Inspections and maintenance employ measures intended to protect the worker, the general public, and the system's reliability. Any deficiencies are reported and corrected.

Electric utility operators must perform routine safety patrols of overhead electric supply lines and accessible facilities. The maximum interval between safety patrols is two years. Inspection of substations must occur within a 45-day maximum schedule.

Black Hills Electric Cooperative personnel look for visible signs of defects, structural damages, broken hardware, sagging lines, and vegetation clearance issues. Any anomalies found are addressed based on the severity of the defect. Patrol inspections happen during a two-year cycle on all transmission and distribution lines and equipment. In higher risk areas and before fire season, routine safety inspections transpire annually.

5.2.2.1 Detailed Line Inspection Description

Detailed Line Inspections (DLI) consist of walking and driving to examine all Black Hills Electric Cooperative poles, conductors, and equipment. Visual aids assist with evaluating and detecting potential damage to above-ground components. "Sound" and intrusive tests on the wood poles detect decay or rot during detailed inspections.

Inspectors are looking for:

- Mechanical damage
- Loose hardware

- Guy wire and anchor condition
- Disconnects and fuse holder condition
- Insulators and conductor condition
- Condition of transformers and reclosers
- Ground conductors and moldings
- Pole ID signs and other minor hardware
- Raptor nests
- Wood rot
- Fire damage
- Third-party attachments

5.2.3 GIS Mapping

An electric distribution utility uses a network of physical facilities to provide electric power and energy to customers connected to those facilities throughout a geographical area. Each component of the distribution system (i.e., asset) and each meter have an approximate physical location and associated data. To plan, construct, maintain, operate, and manage the electric distribution network, it is necessary to create, manage, and utilize this geospatial data. Black Hills Electric Cooperative has integrated GIS mapping technology into its inspection and maintenance program and records and maps all inspections and service work to ensure all assets are inspected and repaired on the prescribed schedule.

5.2.4 Wood Pole Testing and Treatment

To maintain Black Hills Electric Cooperative wood poles, a formal Wood Pole Assessment Plan was initiated with the goal to inspect 10% of the system each year. Wood pole inspections are carried out on a planned basis to determine whether they have degraded below National Electric Safety Code (NESC) design strength requirements with safety factors.

A third-party contractor inspects and tests all poles on a cycle meeting the interval recommended in RUS Bulletin 1730B-121. Circuits are identified, mapped, and scheduled for inspection and testing using latest industry standards and practices. Poles suspected of deficiencies are subjected to intrusive inspection to determine and identify problems such as rot, decay, or insect damage. All poles that are non-thru bore, as well as thru bore poles older than 20 years are subjected to intrusive inspection. Based on the results of the intrusive test, wood treatments are then administered.

5.2.5 Substation Inspections

Black Hills Electric Cooperative inspects substations on a monthly cycle. Qualified personnel will use prudent care while performing inspections following all required safety rules to protect themselves, other workers, the general public, and the system's reliability.

The substation inspection involves a thorough look at the system to confirm that there are no structural or mechanical deficiencies, hazards, or tree trimming requirements. Individual pieces of equipment and or structures receive careful visual examination and routine diagnostic tests as appropriate.

5.2.6 Prioritization of Repairs

Black Hills Electric Cooperative considers and prioritizes maintenance work by assessing the most urgent needs. The inspector will document the overhead and underground systems' condition, recording defects, deterioration, violations, safety concerns, or any other factors requiring attention on the inspection records. The inspection shall focus on any hazards that could affect the system's integrity or the safety of line workers and the public.

Inspection data (overhead & underground) will be prioritized and issued as follows:

Priority I – Public endangerment is likely.

- 1) Protect the public from the danger by barricading or guarding.
- 2) Repair or replace immediately or within 24 hours.

Priority II – For activities that need material, equipment, or change of conditions where noted deficiencies do not present an immediate hazardous condition.

- 1) Monitor the situation to ensure that it does not deteriorate into a PRIORITY I hazard.
- 2) Repair, replace, or correct within 2 to 4 weeks.

Priority III – Where the deficiencies or exposures require engineering or redesign. (This may include moving or rebuilding a line or other extensive construction.)

- 1) Warn public in the immediate vicinity, (e.g. The owner of a sign under the line.)
- 2) Monitor the situation to ensure that it does not deteriorate into a Priority I hazard.
- 3) Repair, replace, or correct within 4 to 6 weeks.

Other – Repairs are needed but no hazard is present or expected.

- 1) Repair, replace, or correct when convenient or in the area (not to exceed six months).

5.3 Vegetation Management (VM)

Black Hills Electric Cooperative has tree trimming crews who maintain vegetation on all Black Hills Electric Cooperative transmission and distribution power line requirements for public safety and fire prevention. Vegetation in proximity to power lines is systematically trimmed on an ongoing basis. Work performed to the guidelines above provide reasonable service continuity, public safety, and guards against forest fire damage caused by supply conductors.

When conducting routine maintenance of power lines and related equipment, Black Hills Electric Cooperative makes efforts to identify and remove high-risk fuel sources as needed. Black Hills Electric Cooperative crews also address vegetation concerns in response to service calls or identify at-risk vegetation while performing day-to-day operations.

5.3.1 Black Hills Electric Cooperative Tree Trimming and Removal Guidelines

Black Hills Electric Cooperative meets the minimum standards for conductor clearances from vegetation to provide safety for the public and utility workers, reasonable service continuity, and fire prevention. As an operator of electric supply facilities, Black Hills Electric Cooperative keeps appropriate records to ensure that timely trimming occurs to maintain the designated minimum clearances.

5.3.2 Black Hills Electric Cooperative Priorities

The following circuits are given priority in the clearance work schedule. Crews inspect these areas on an annual basis before the fire season.

- Black Hills National Forest
- Other Forested Areas
- Prairie Land

5.3.3 Hazard Trees

A subset of Danger Trees², a Hazard Tree, is defined as any tree or portion of a dead, rotten, decayed, or diseased tree and may fall into or onto the overhead lines. These trees sometimes sit outside the easement or ROW. Black Hills Electric Cooperative works with landowners in removing hazardous trees to help mitigate potential contacts.

5.3.4 ROW Trimming Specifications

State and Federal Agencies require maintenance of the right of way, under or around the co-op's power lines. Trees or vegetation encroaching power lines are trimmed or felled as needed. Black Hills Electric Cooperative crews make an ongoing effort to clear any such hazard by removing any tree or brush directly under the power line.

² As defined by ANSI 300 Part 7 standards

The following are optimal right-of-way dimensions at the time of trimming.

- 10' minimum width for overhead secondary routes
- 10' minimum width for underground routes of all types
- 15' minimum width for overhead single-phase routes
- 20' minimum width for overhead multi-phase and single-phase routes constructed on cross-arms
- 40' minimum width for transmission line routes

5.3.5 Clear Cut ROW Specifications

All stumps are cut close and parallel to the ground level as possible to not leave a "spike" or angle cut stump in the ROW, which can damage tires or equipment.

5.3.6 Slash Treatment

The protocol for the treatment of the slash and debris generated by tree removal is as follows:

- Black Hills Electric Cooperative works with private landowners and government agencies to determine the collection and disbursement of slash and debris.

5.3.7 T&D System Vegetation Management Standards

Black Hills Electric Cooperative personnel perform ground-based inspections of tree and conductor clearances and hazard tree identification. Scheduled patrols ensure all lines are inspected for vegetation hazards and systematically trimmed on an annual basis. The patrols produce targeted areas for vegetation pruning or removal. Biennial ground-based field patrols ensure compliance with state and federal regulatory requirements. Crews aim to achieve up to 10 feet of clearance during

tree work unless otherwise directed by Black Hills Electric Cooperative. The crews also clear vegetation from Black Hills Electric Cooperative’s secondary wires, service drops, and pole climbing space as needed. Black Hills Electric Cooperative strives to maintain a positive relationship with USFS personnel.

5.3.8 Black Hills Electric Cooperative/Contractor Tools and Equipment

Fire Tools and Equipment: During the fire season, Black Hills Electric Cooperative meet the relevant minimum requirements while working on public lands. Fire tools are present on all vehicles and operating sites per Agency requirements.

5.4 Vegetation Management Trimming and Inspection Schedule

Black Hills Electric Cooperative personnel and contractors perform annual, ground-based inspections of tree conductor clearances and hazard tree identification for Black Hills Electric Cooperative ROWs and easements. Proactive maintenance during routine operations and prompt action during emergency events maintain system reliability, a safe work environment, and reduces fire danger. Scheduled patrols ensure all lines are inspected for vegetation hazards and systematically trimmed. On-going, year-round field patrols identify targeted areas for vegetation pruning or removal and ensure compliance with state and federal regulatory requirements.

Table 5 illustrates the vegetation inspection and trimming cycle for the various circuits based on the nominal voltage.

Table 5. Vegetation Management Schedules

ASSET CLASSIFICATION	OPERATION TYPE	FREQUENCY
69 kV Overhead Transmission	Trimming	Annually as needed
7.2 kV Overhead Distribution	Trimming	Annually as needed

5.5 Fire Mitigation Construction

Black Hills Electric Cooperative takes steps to harden the electrical system with several upgrades and design changes. These designs stem from many decades of engineering experience and the adoption of emerging technologies. Black Hills Electric Cooperative's design practices continue to advance with the addition of newer safety and reliability-related technologies. This advancement recognizes the importance of understanding and adapting to the challenges brought on by the use of public land, development in the wildland urban interface, and climate change. The following sections describe these projects.

5.5.1 Avian Protection Program

Since 2011, Black Hills Electric Cooperative has employed design and construction standards in mind to protect raptor and migratory birds. These measures have substantially reduced the electrocution risk to raptors and the number of injured raptors. Concurrently, these measures have reduced the incidence of fire ignitions too. Crews install wildlife protective devices on the substation and pole-mounted equipment. The following avian protective measures include:

- Raptor Framing
- Insulated Equipment
- Wildlife Protective Guards
- Perches
- Nest Platforms

Linemen are trained in procedures contained in the Avian Protection plan annually. These procedures include step by step instructions on the five primary situations that linemen will encounter in the field regarding eagles, raptors, and their nests.

5.5.2 Undergrounding Conductor

The undergrounding of overhead distribution lines mitigates aesthetic impacts in urban areas and functions as a wildfire mitigation option in high fire risk areas. While undergrounding the system helps reduce the risk of wildfires and increase reliability in high winds, these facilities also take longer and cost significantly more to construct, maintain, and repair. In each four-year work plan, Black Hills Electric Cooperative strives to convert overhead distribution lines to underground where practical. The new EPR cabling provides increased reliability and should have a lifespan of 75 to 100 years.

5.6 Emerging Technologies

Black Hills Electric Cooperative initiates pilot projects to explore new technologies and best management practices, which help Black Hills Electric Cooperative staff to evaluate their effectiveness and Benefits. Black Hills Electric Cooperative may elect to integrate the technologies or practices into its various ongoing maintenance programs based on the outcomes.

5.7 Workforce Training

Black Hills Electric Cooperative has developed rules and complementary training programs for its workforce to reduce the likelihood of an ignition. All field staff is:

- Trained on the content of the Wildfire Mitigation Plan
 - Trained in proper use and storage of fire extinguishers
 - Required, during pre-job briefings, to discuss the potential(s) for ignition, environmental conditions (current and forecasted weather that coincides with the duration of work for the day)
 - Required to identify the closest fire extinguisher and other fire abatement tools
 - Required to report all ignition events to management for follow-up
 - Encouraged to identify deficiencies in the Wildfire Mitigation Plan and bring such information to management
-
- Trained in directional falling of trees
 - Trained in the use of tender and pumps
 - Trained on the maintenance of the equipment of ignition source

6 Emergency Response

6.1 Preparedness and Response Planning

Black Hills Electric Cooperative strives to minimize any disruptive event's impacts regardless of the size or scope while consistently focusing on the community's most critical systems and infrastructure.

6.1.1 Crisis Communication Plan

A critical component of Black Hills Electric Cooperative's emergency preparedness and response planning, which outlines the actions the co-op's Member and Public Relations department takes during a crisis. Useful tools include press releases, website notifications, and social media postings to effectively dispense accurate information to employees, co-op members, the general public, and the news media.

6.1.2 Crisis Communications Team

In a crisis, which can consist of a range of emergency conditions, multiple departments will collaborate to gather and disseminate information to the membership and media. A crisis team helps determine the action plan. Crisis team members include:

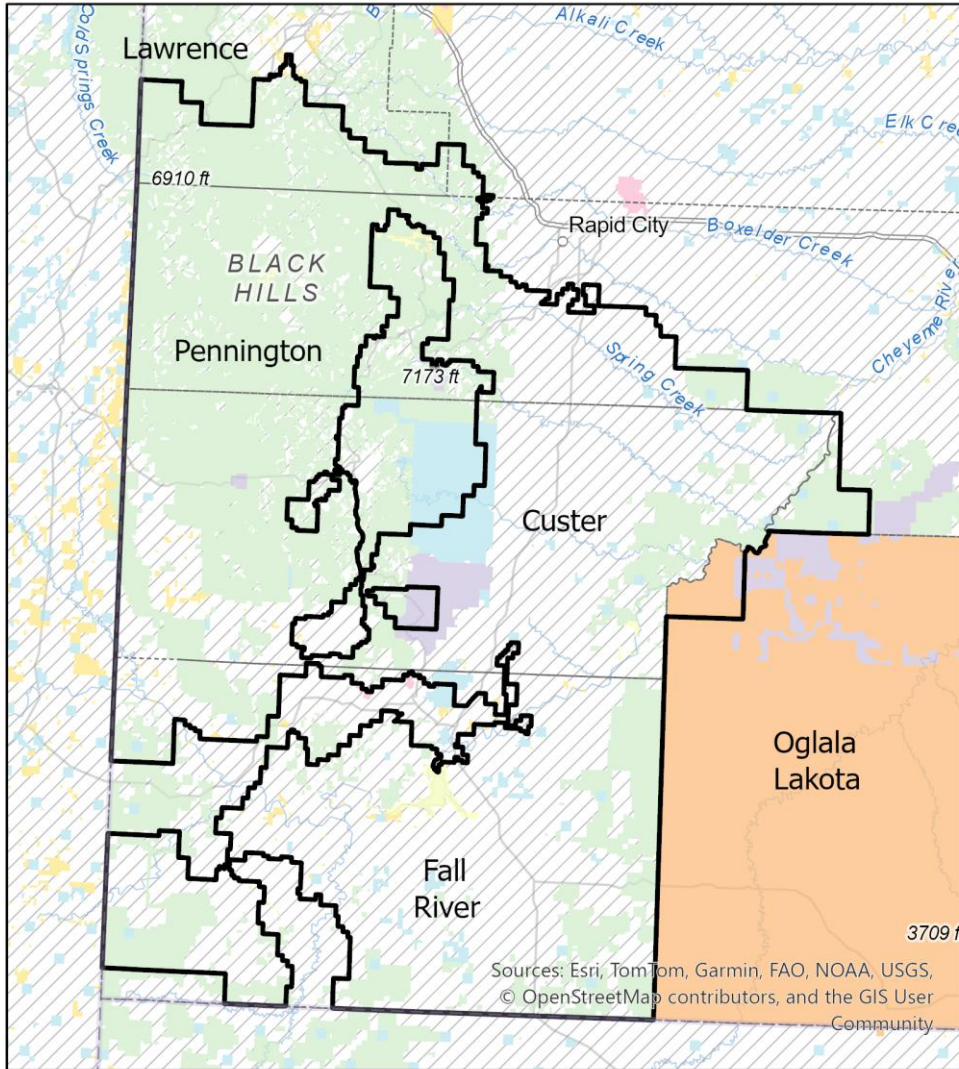
- Manager of Operations
- System Coordinator
- Director of Communications and Member Services
- Other designated members as deemed appropriate

The CEO will determine and declare a crisis and implement the crisis communications plan when necessary. Designated administrative support staff might also assist with the planning and preparation of a response.

6.1.3 Jurisdictional Structure

Black Hills Electric Cooperative has a diverse land ownership within its boundaries. This includes Bureau of Indian Affairs, Bureau of Land Management, Department of Defense, National Forest Service, National Park service, and State Parks. See Figure 5.

Figure 5. General Land Ownership



General Land Ownership Map

- | | | |
|---------------------------|-----------------------|-------------------|
| Bureau of Indian Affairs | National Park Service | US Forest Service |
| Bureau of Land Management | Other Federal | Counties |
| Bureau of Reclamation | Private or Unknown | Service_Boundary |
| Department of Defense | State | |
| Local | US Fish and Wildlife | |



6.1.4 Public and Member Communications for Outages

Black Hills Electric Cooperative has a comprehensive communication plan with its members before and during unplanned outages. In coordination with the Manager of Operations, System Coordinator, and IT Specialist, the Director of Communications and Member Services communicates with members affected by the unplanned power outage through available channels. Black Hills Electric Cooperative provides as much notice as possible to inform affected members of scheduled maintenance outages.

Depending on the number of members impacted and the amount of time before the planned outage, the affected members receive a written notification via U.S. mail and e-mail notice. Black Hills Electric Cooperative also strives to notify members by phone. Outage information is posted on the Black Hills Electric Cooperative webpage, SmartHub®, and Facebook page.

For unplanned outages, the Member Service department uses the same communication channels as necessary.

6.1.5 Community Outreach

Public outreach to the community on the importance of wildfire mitigation helps reduce wildfire risk. Black Hills Electric Cooperative features articles in its Cooperative Connections magazine on wildfire preparedness and residential fire preventive measures. Black Hills Electric Cooperative also takes the opportunity to inform members of fire mitigation at our area meetings, annual meeting, and other community events. The community's involvement can play a significant role. As part of its holistic approach, Black Hills Electric Cooperative encourages its members to take proactive steps to safeguard their homes from wildfire danger and prepare for an emergency event. To help create an awareness of fire danger in the service area, Black Hills Electric Cooperative provides information on prevention and mitigation on its website and social media and works with public entities, including first responders and homeowners, regarding vegetation management.

Members can find useful fire mitigation information regarding:

- National Weather Service alerts
- Fire Season Preparation
- Fire Protection in the Wildland Urban Interface

6.1 Restoration of Service

Black Hills Electric Cooperative may elect to de-energize segments of its system due to extreme weather or by request from emergency responders. Inaccessible equipment or distribution lines will remain de-energized until accessible. Poles and structures damaged in a wildfire are assessed and rebuilt as needed before re-energization. Black Hills Electric Cooperative strives to send out member and media updates before de-energizing and will post update status reports when restoration efforts are underway and completed.

6.2.1 Service Restoration Process

After a wide-spread outage, Black Hills Electric Cooperative work crews take the following steps before restoring electrical service after a de-energization event. These measures intend to protect the worker, members, the public, and the system's reliability.

- **Patrol:** Crews patrol every de-energized line to ensure no hazards have affected the system during the outage. If an outage is due to wildfire or other natural disasters, as soon as it is deemed safe by the appropriate officials, crews inspect lines and equipment for damage, foreign contacts and estimate equipment needed for repair and restoration. Lines located in remote and rugged terrain with limited access may require additional time for inspection. Black Hills Electric Cooperative personnel assist in clearing downed trees and limbs as needed.
- **Isolate:** Isolate the outage and restore power to areas not affected.
- **Repair:** After the initial assessment, Black Hills Electric Cooperative staff meet to plan the needed work. Rebuilding commences as soon as the affected areas become safe. Repair plans prioritize substations and transmission facilities, then distribution circuits serving the most critical infrastructure needs. While the goal to re-energize all areas is as soon as possible, emergency services, medical facilities, and utilities receive first consideration when resources are limited. Additional crew and equipment are dispatched as necessary.
- **Restore:** Periodic customer and media updates of restoration status before full restoration are posted on social media platforms and Black Hills Electric Cooperative's website. After repairs are made, power is restored to homes and businesses as quickly as possible. Members, local news, and other agencies receive notification of restored electric service.

7 Performance Metrics and Monitoring

Black Hills Electric Cooperative continually develops performance metrics to monitor their efforts over time. The metrics provide a data-driven evaluation of performance to determine the Plan's effectiveness and identify areas for improvement. This section identifies Black Hills Electric Cooperative's management responsibilities for overseeing this Wildfire Mitigation Plan, including the operating departments and teams responsible for carrying out the various activities described in the previous chapters. This section also identifies the controllable metrics used to demonstrate compliance with this Wildfire Mitigation Plan.

7.1 Plan Accountability

The Board of Directors reviews and approves the Plan's adoption as needed, while the CEO and the System Coordinator oversee its implementation. The Director of Communications and Member Services communicates with the members, public safety, media outlets, first responders, local Offices of Emergency Management, and health agencies during emergency outages. The CEO and Director of Communications and Member Services determine when and how to notify outside agencies in cases of wildfire emergency events.

7.1.1 Operating Unit Responsibility

Table 6, on the following page, identifies the Departments responsible for tracking and implementing the various components of the Wildfire Mitigation Plan.

Table 6. Accountability of Plan Implementation

MITIGATION ACTIVITIES	RESPONSIBLE DEPARTMENT AND WORKGROUP
Risk Analysis	Manager of Operations or System Coordinator
Wildfire Prevention Strategy Programs	
<ul style="list-style-type: none"> • T&D line patrols • 115 kV & 69 kV transmission line inspections • Wood pole intrusive inspections • Detailed line inspections • Substation detailed inspections • Infrared inspections • Disable reclosers • Planned de-energization • Vegetation management • Accelerated inspection schedule • Maintain positive relationship with government agencies 	Operations and Engineering
Fire Mitigation Construction	
<ul style="list-style-type: none"> • Electronic reclosers • Wood pole replacement program • Undergrounding of distribution lines • Avian protection program 	Operations and Engineering
Pilot Projects	
<ul style="list-style-type: none"> • Drone enabled inspections • Distribution Fault Anticipation • Remote Operations SCADA 	Operations and Engineering
Emergency Preparedness	
<ul style="list-style-type: none"> • Public and agency communications during emergencies • Community outreach • Wildfire awareness content on the website • Crisis Communication Plan 	Director of Communications and Member Services

7.2 Monitoring and Auditing of the Wildfire Mitigation Plan

Metrics to gauge the success or shortcomings of the Wildfire Mitigation Plan and outlined programs follow in this section. As with other aspects of the Plan, these metrics will likely evolve in future iterations.

7.2.1 Metrics and Assumptions for Measuring Wildfire Mitigation Plan Performance

Black Hills Electric Cooperative uses the metrics listed in Table 7 on the following page to measure the Plan's performance and effectiveness. Tracking these metrics will help identify lines most susceptible to unexpected outages, time-of-year risks, and risks in the Moderate and High Fire Threat Tiers.

This Wildfire Mitigation Plan formalizes Black Hills Electric Cooperative's ongoing efforts to execute, measure, maintain, and improve its wildfire mitigation programs included in this document. Black Hills Electric Cooperative will reassess its operations and identify areas for improvement as more data becomes available, and refine the Wildfire Mitigation Plan as needed.

Table 7. Performance Metrics

METRIC	RATIONAL	INDICATOR	MEASURE OF EFFECTIVENESS
Number of Utility Caused Ignitions	Demonstrates the effectiveness of the overall plan	Count of events	No material increase
Events Recorded with Fire Reference	Demonstrates the effectiveness of the overall plan	Count of events	Reduction in the general trend of events
Service Interruption Events with Fire Reference	Assess system hardening efforts	Count of events	Reduction in the general trend of events
Traditional Fuse Trip Event with Fire Reference	Gauge risk level	Count of events	Change in the general trend of events
Number of Customer Service Calls Re: At Risk Vegetation	Assess if VM Program has reduced customer concerns and risk events	Number of calls received	Reduction in the general trend of events
Power Line Down Event in Moderate and High WHP Tiers	Assigns risk to the root cause	Count of events	Reduction in the general trend of events

7.2.2 Programmatic Metrics

Black Hills Electric Cooperative outlines and schedules required work on an annual basis. Any incomplete work behind schedule is flagged for review or field verification. The cooperative aims to complete 100% of the work within the initially scheduled time frame; however, emergencies or other unforeseen contingencies can occur, requiring material and labor resources to be otherwise assigned.

When this happens, the delayed work receives prioritization for future time frames and then completed to allow for the electric system's safe and reliable operation following applicable requirements and industry standards. Table 8, on the following page, depicts the completion targets for various inspection and maintenance operations.

Table 8. Programmatic Metrics

PROGRAM	TARGET	METRIC DESCRIPTION
Distribution Line Inspections	95-100%	Inspections completed within the specified time intervals set for each inspection type.
Distribution Wood Pole Intrusive Tests	95-100%	Perform all wood pole invasive tests scheduled for the year. Black Hills Electric Cooperative’s goal is to perform wood pole tests within 20 years of installation and every ten years after that.
Transmission Structure Patrols	95-100%	Perform all scheduled patrols before the end of the year.
Distribution Vegetation Pruning/Clearing	95-100%	Complete scheduled respective tree work to prevent ignition and propagation of fire caused by Black Hills Electric Cooperative assets.
Transmission Vegetation Pruning/Clearing	95-100%	Complete scheduled respective tree work to ensure to prevent ignition and propagation of fire caused by Black Hills Electric Cooperative overhead assets.

7.3 Monitoring and Auditing of the Wildfire Mitigation Plan

The CEO and Operation and Engineering departments monitor the Wildfire Mitigation Plan and report its effectiveness to the Board of Directors on an annual basis. Annually, reports of the Plan's current progress and risk reduction impact are developed and circulated to appropriate utility staff to engender collaborative discussion to make changes to approved strategies. The System Coordinator, or their designee, updates leadership with recommendations or proposed action in enhancing the Plan's objectives over time.

The Wildfire Mitigation Plan annual review aligns with Black Hills Electric Cooperative's existing business planning process. This review includes a yearly assessment of the Wildfire Mitigation Plan programs and performance.

Black Hills Electric Cooperative's business planning process includes budgeting and strategic planning for a 3-5-year planning horizon.

7.3.1 Accountability

The Operations and Engineering Departments monitor the Wildfire Mitigation Plan's implementation and audits the specified objectives.

7.3.2 Identify Deficiencies in the Wildfire Mitigation Plan

The CEO is responsible for ensuring the Wildfire Mitigation Plan meets guidelines to help mitigate its assets' risk of becoming the source or contributing factor of a wildfire. Staff responsible for assigned mitigation areas must vet current procedures and recommend changes or enhancements to build upon the Plan's strategies. Due to unforeseen circumstances, regulatory changes, emerging technologies, or other rationales, deficiencies within the Wildfire Mitigation Plan are reported to the Board of Directors in the form of an updated Wildfire Mitigation Plan on an annual basis.

The Operations and Engineering personnel are responsible for spearheading discussions on addressing deficiencies and collaborating on solutions when updating the Wildfire Mitigation Plan. When deficiencies are identified staff and qualified stakeholders evaluate each reported deficiency to determine their validity and record for further actions, as needed.

7.3.3 Monitor and Audit the Effectiveness of Inspections

In addition to the maintenance program, Black Hills Electric Cooperative continuously evaluates its facilities while performing other activities such as outage patrols, new business planning, replacements, and related fieldwork.

Monitoring the effectiveness of inspection practices occurs through ongoing tracking and analysis of annual results.

Black Hills Electric Cooperative has quality control processes embedded in its existing general practices. However, for specific programs, there is a formal quality control process. The following depicts a few of these programs.

7.3.4 Written Processes and Procedures

Black Hills Electric Cooperative documents its operational procedures and processes to maintain consistent and thorough implementation at all levels. Processes are reviewed and updated as needed to maintain the most efficient, effective, beneficial, and safety-driven methods and protocols.

7.4 Programmatic QA/QC processes

7.4.1 Distribution System Inspections

The System Coordinator manages the T&D line and substation assets and develops comprehensive inspection and maintenance programs. These programs ensure the safe operation of the T&D line and substation facilities.

Key imperatives are to:

- Reduce the risk of power-related wildfire.
- Meet federal regulatory requirements.
- Achieve reliable performance within mandated limits and to optimize capital and O&M investments.

Also, designated personnel regularly monitor inspection and corrective maintenance records and diagnostic test results to adjust maintenance plans and develop new programs. Black Hills Electric Cooperative follows the best industry practices to develop its maintenance programs.

Black Hills Electric Cooperative's Operations group administers the inspections and corrective maintenance. Upon the discovery of deficiencies, the Operation and Engineering departments creates work orders. The priority for corrective maintenance centers on the immediate removal of hazards and to repair minor deficiencies according to the type of defect. Work orders are monitored throughout the year to ensure timely completion via regular internal reports.

7.4.2 Vegetation Management (VM)

Distribution system-related vegetation management work are field audited. Quality control efforts monitor program effectiveness and overall tree work performance. GIS-based tools track the quality assurance work to monitor the vegetation management program's effectiveness. The quality control results go under review, and deficient work is reissued to the crews for corrective action.

Appendix A: Plan and Mapping Disclaimers

WILDFIRE MITIGATION PLAN DISCLAIMER

The information provided in this report was developed by Black Hills Electric Cooperative staff and is intended for Black Hills Electric Cooperative's internal planning purposes only. Black Hills Electric Cooperative does not warrant the accuracy, reliability, or timeliness of any information in this report, and assumes no liability for any errors, omissions, or inaccuracies in the information provided. Black Hills Electric Cooperative shall not be held liable for losses caused by using this information. Portions of the data may not reflect current conditions. Any person or entity who relies on any information obtained from this report does so at their own risk. This report is presented solely for internal use AS-IS by Black Hills Electric Cooperative staff. Black Hills Electric Cooperative make no representations or guarantees expressed or implied regarding the accuracy or completeness of the report.

WILDFIRE MITIGATION PLAN MAPPING DISCLAIMER

Maps in this report were created from multiple datasets from various, public, and private sector sources and may include utility Geographic Information System (GIS) data. The geographic information contained in the map(s) is not to be used as a "legal description" or for any purpose other than general planning and reference. Every effort has been made to ensure the accuracy of the map(s), but errors in source documents do occur and inherent mapping ambiguities are not shown.

Maps are for information purposes only and may not represent actual current conditions. End users assume all liabilities incurred by them, or third parties, as a result of their reliance on the information contained in the map(s). Black Hills Electric Cooperative, including, without limitation, its employees, agents, representatives, officers, and directors, may not be held responsible or liable in any way for any information and/or data, or lack thereof, provided in the map(s). Information and/or data included in the map(s) is used solely at the discretion of the recipient.

Black Hills Electric Cooperative make no claims, representations, or warranties, expressed or implied, concerning the validity or accuracy of this data. Black Hills Electric Cooperative assumes no liability for any errors, omissions, or inaccuracies in the information provided regardless of their cause. Black Hills Electric Cooperative produced maps are not to be copied or distributed without permission.

5/20/2023 Implemented
5/21/2024 Reviewed
5/20/2025 Reviewed
6/16/2026 Reviewed