CENTRAL ELECTRIC COOPERATIVE, INC.

2020 WILDFIRE MITIGATION PLAN

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BKI
BROWN & KYSAR, INC.

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1 Introduction

The Pacific Northwest experiences some of the most devastating and catastrophic wildfires in the country. Wildfires in Oregon and Washington burned more than 1.1 million acres in 2017 and another 1.3 million acres in 2018.[1] Despite a mild fire season in 2019 due to cooler temperatures, Oregon's 2020 wildfire season became the most destructive in the state's history, burning more than 1.5 million acres. [2]

Wildfire mitigation plays an essential role in Central Electric Cooperative's (CEC's) operational practices. The co-op's existing policies, programs, and procedures directly or indirectly manage or reduce this risk. Over the years, CEC implemented additional wildfire mitigation programs to adapt to evolving fire-related conditions, adopted technological advances, and improved operational practices to mitigate further the potential for ignitions and more effectively respond to high wildfire risk conditions.

CEC's Wildfire Mitigation Plan (WMP or Plan), with its goals and metrics, takes an active approach to reduce fire-related risks for its members while allowing for retooling and improvement over time. As new technology and information emerge, CEC will assess, enhance, and refine its practices. The Plan formalizes the co-op's ongoing vegetation management, asset inspection and maintenance,

[1] The Oregonian 10/20/19
[2] The Oregon Department of Forestry; https://apps.odf.oregon.gov/DIVISIONS/protection/fire_protection/fires/dailyFireReps.asp

recloser setting protocols, public safety power shutoffs, communication plans, and restoration of service processes. Additionally, the WMP outlines roles and responsibilities for its implementation, performance metrics, deficiency identification, and the audit process.

1.1 Purpose of the Plan

The Plan describes the co-op's strategies and programs 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.

CEC's Board of Directors reviews and approves the Plan's adoption as needed, while the President and CEO and Director of Operations and Engineering (DOE) oversee its implementation.

1.2 Objectives of the WMP

The main objective is to implement an actionable plan to increase reliability and safety while minimizing CEC assets probability as the origin or contributing factor in a wildfire's ignition. All programs and strategies will comply with current and anticipated Oregon Public Utility Commission (OPUC) and National Electric Safety Code (NESC) regulations and guidelines. To enhance the Plan, CEC continually assesses new industry practices and technologies, which will reduce the likelihood of an interruption in service and reduce an outage's duration.

The secondary objective is to measure the wildfire mitigation strategies' effectiveness as applicable to CEC through its matrix's annual evaluation. Where a particular action, program component, or protocol proves unnecessary or ineffective, CEC will modify the Plan.

1.3 CEC Profile and History

Central Electric Cooperative Inc. (CEC) is a not-for-profit, member-owned corporation founded on March 29th, 1940, with the mission to make electricity available to its members at the lowest cost consistent with a sound economy and good management. In May of 1941, CEC energized its Deschutes Junction Substation and began delivering electricity to 11 Redmond area rural farms. By September 1941, the co-op membership grew to 415, and the Board of Directors borrowed additional funds from the Rural Electrification Administration to construct a network of distribution lines west of Redmond. As of June 2020, the cooperative serves 27,501 members holding more than 35,500 accounts, and its service territory includes seven counties throughout

Central Oregon. CEC owns and operates its transmission and distribution system critical to maintaining electric service to its members.

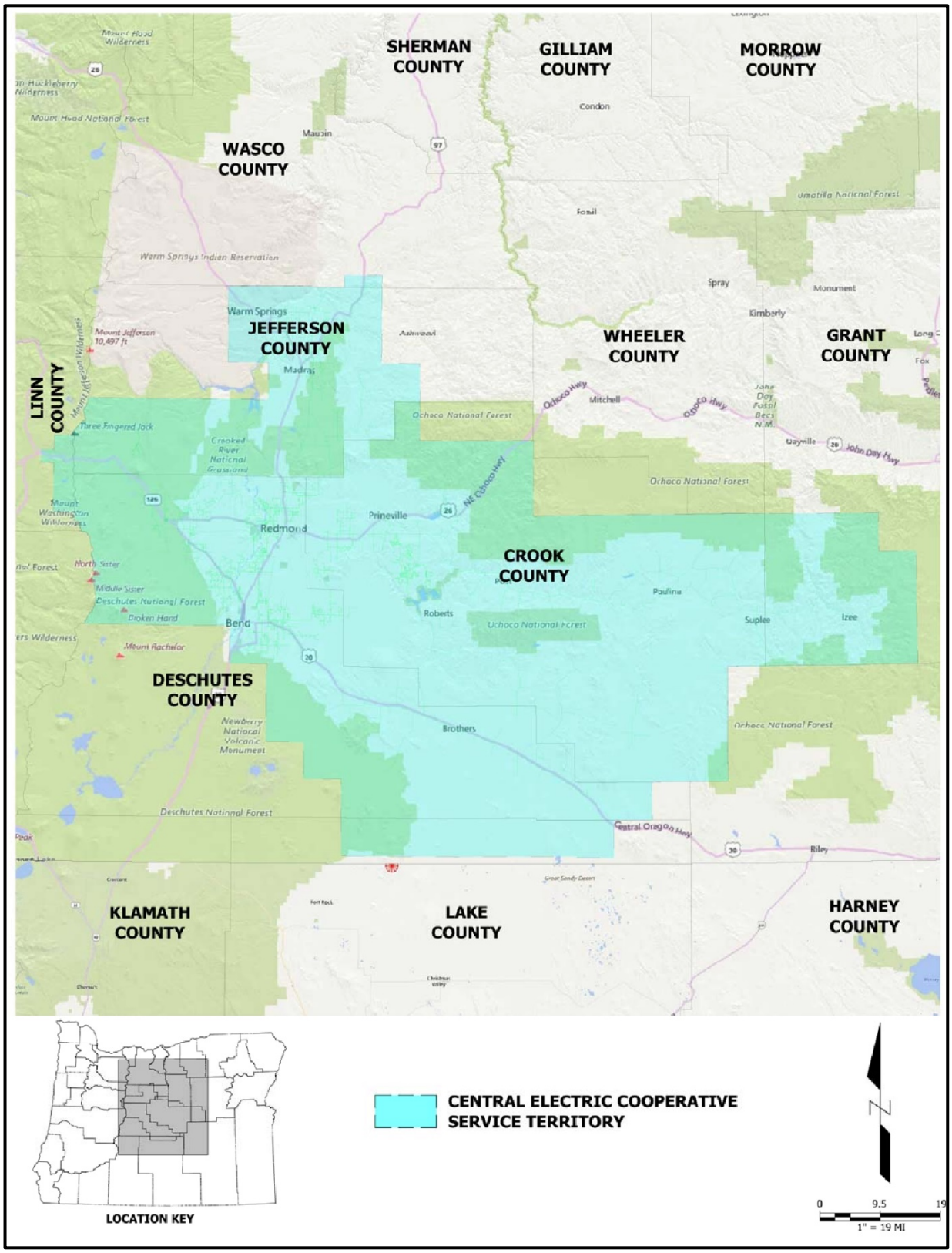
A nine-member, popularly elected by geographic district, the Board of Directors governs CEC. The Board determines policy and appoints the President and CEO responsible for the co-op's overall management and operations.

1.4 The Service Area

Headquartered in the city of Redmond, CEC also operates service centers in the cities of Bend and Sisters. CEC transmits and distributes electricity within a 5,300 square-mile territory in Central Oregon, which includes Deschutes, Crook, Jefferson, Grant, Linn, Wasco, and Lake counties. Approximately 80% of the members reside in Deschutes County. Except for the city of Sisters, CEC serves portions of the city of Bend and the outlying areas of Madras, Prineville, and Redmond. In contrast, the investor-owned utility Pacific Power serves those cities' urban cores. CEC owns no physical assets within Linn or Lake counties.

The service territory, shown in Figure 1, stretches between the Cascade Mountains in the west and the Ochoco Mountains in the east. In the Cascade's western foothills sit the City of Sisters, Black Butte Ranch, and Camp Sherman communities, ranging in elevation of 3,000 to 3,400 feet. The southeastern region consists of semi-arid desert plateaus, with elevation from 3,000 to 4,000 feet, punctuated with high buttes. The northern part of the service territory—Madras and Gateway areas—sits at a lower elevation (2,300), with its flat landscape highly conducive for farming and ranching.

Figure 1. CEC Service Area



1.5 The Electric System

CEC owns and operates an electric system, including transmission and distribution facilities, which delivers more than 95% carbon emission-free energy to its members. A majority of this carbon-free electricity is clean, renewable hydropower generated by the Federal Columbia River Power System's hydroelectric dams, purchased from the federal Bonneville Power Administration (BPA).

CEC and eleven other cooperative members of the Power Resources Cooperative, in 1995, built the 2.5 megawatts (MW) Coffin Butte landfill gas-to-electricity renewable energy facility. In 2007, the facility expanded to 5.66 megawatts.

Due to member requests to participate in a local renewable energy program, CEC constructed the largest community solar project in Oregon in 2017. Members voluntarily participate in the Green Power or Shared Solar programs, paying for the energy produced by 700, 285-watt solar panels located at the Bend Service Center. The Community Solar Project generates approximately 305,600 kilowatt-hours (kWh) annually.

CEC's electric system supplied more than 747 million kWh in total annual retail electricity for the year ending December 31, 2019. CEC's 2019 summer peak load was 129 MW and 210 MW for its winter peak load[3].

CEC has 187 miles of transmission line, 2,046 miles of distribution line, and 1,528 miles of underground line. CEC is an "All Requirements Customer" of PNGC Power, a "Joint Operating Entity," who is a BPA "Load Following Customer." This arrangement allows CEC to purchase, through PNGC Power, BPA's clean, renewable carbon-free wholesale hydroelectricity, and market purchases to meet electricity demands beyond what BPA provides. BPA imports the electricity to its Redmond substation, where CEC takes delivery at 115kV and 69kV. In Bend, CEC takes delivery of BPA's power at 69kV from Pacific Power's Pilot Butte Substation. The power transmits through CEC's 115kV and 69kV transmission system to its 24 bulk power substations and then distributed via a 7.2 kV – 24.9 kV overhead and underground distribution system.

[3] CEC 2019 Fact Card

1.6 Mission

CEC's Board of Directors established the following mission and vision statement: The aim of Central Electric Cooperative, Inc. is to make electric energy available to its members at the lowest cost consistent with sound economy and good management. The cooperative will always represent its membership's best interests. CEC's values include a commitment to continuous improvement in:

- Workplace safety
- Member Satisfaction
- Employee Success

To this end, CEC employs construction, maintenance, and operational practices that minimize the risks of catastrophic wildfire posed by its electrical system.

1.7 Goals and Objectives

For nearly eighty years, CEC has provided its members safe, reliable, affordable electricity, excellent customer service, community value, innovation, and environmental leadership.

CEC operates according to the 7 Cooperative Principles:

- **Voluntary and Open Membership**: Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination.
- **Democratic Member Control:** Cooperatives are democratic organizations controlled by their members, who actively participate in setting policies and making decisions. The elected representatives are accountable to the membership.
- **Members' Economic Participation**: Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative.
- **Autonomy and Independence**: Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy.
- **Education, Training and Information**: Cooperatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their cooperatives. They inform the general

public, particularly young people and opinion leaders, about the nature and benefits of cooperation.

- Cooperation Among Cooperatives: Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional, and international structures.
- Concern for Community: While focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members.

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2 Overview of CEC's Fire Prevention Strategies

2.1 Strategy and Program Overview

Five main components comprise the proposed wildfire prevention strategies, which align with CEC'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:** CEC'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 CEC's electrical system's risk of becoming an ignition source. Examples include wildlife guards and insulated equipment, and conductor spacing to reduce contacts.
- **Inspection & Maintenance:** CEC's inspection and maintenance strategies consist of diagnostic activities and various maintenance methods to ensure all equipment and infrastructure are in excellent working condition.
- **Operational Practices:** Pro-active, day-to-day actions include safety training and involvement as a member of the Deschutes County Sheriff's Emergency Management Planning Committee. Measures to mitigate wildfire risks are taken to ensure preparedness in high-risk situations, such as dry and windy climatological conditions.
- **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, CEC monitors numerous websites, including the National Weather Service (NWS), Oregon Department of Forestry (ODF), Central Oregon Interagency Dispatch, and InciWeb. Also, CEC monitors its weather stations located at its substations to enhance situational awareness.
- **Response & Recovery:** This strategy consists of CEC's procedures in response to wildfire, de-energization, and other emergency events. This component aims to formalize protocols for these situations for thorough and efficient communications, emergency response, and recovery efforts. Table 1 summarizes CEC'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. Targets, scheduled timeframes, and programmatic metrics are in Chapter 8. The strategies and programs below fall into one or more of the five implementation timeframes:

- A: Currently implemented
- B: Implemented before the upcoming fire season
- C: Completed annually or on schedule per relevant code
- D: In the evaluation stage
- E: Implemented on as-needed basis/protocols in place
- * Ongoing program with no defined completion date

Table 1. Mitigation Programs/Activities

DESIGN AND CONSTRUCTION	TIMEFRAME
Underground distribution lines	A*
Field recloser to vacuum-type breaker change out program	A*
Increased phase spacing reduces wire to wire contact	A*
New controls for breakers and update older relays in substations to modern relaying schemes and relays	A*
Distribution Fault Anticipation technology	B
INSPECTION AND MAINTENANCE	
Infrared inspections of electrical equipment	C
Transmission line ground patrols	C
Transmission & Distribution (T&D) wood pole intrusive inspections	C
T&D vegetation right-of-way maintenance	C
Distribution system line patrols and detailed inspections	C
Drone inspection program	E

OPERATIONAL PRACTICES	TIMEFRAME
T&D system vegetation management program	C
Supervisory Control and Data Acquisition	A
Work procedures and training for persons working in locations with elevated fire risk conditions	A
Safety and physical security protection teams	A
Increased staff for line and vegetation management crews in preparation of wildfire	A*
Existing relationship with local government and fire safety councils	A
Increased community outreach/wildfire safety awareness	B
Avian protection program	A*
SITUATIONAL AWARENESS	
Emergency management planning team member	A
Contractor/staff safety training and orientation for T&D vegetation management work	A
Weather Monitoring (USFS-WFAS, NWS)	A
RESPONSE AND RECOVERY	
Public Safety Power protocols	E
Critical event communications process and procedures	A
Line patrols before re-energization	A
Crisis Communication Plan	A
Customer assistance programs for post-disaster recovery	A

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3 Risk Analysis and Risk Drivers

To establish a baseline understanding of the risks and risk drivers involved, CEC examined its exposure to all fire-related hazards. Although inherent risks exist in operating an electric utility, there are strategies and processes to better plan and manage them. Enterprise Risk Management is a tool to help anticipate and manage risks while also considering how multiple risks can pose even more significant challenges. The overall goal seeks to determine the residual risk level after applying all mitigation factors to the initial inherent risk.

3.1 Enterprise Risk Management (ERM)

The ERM process (Figure 2)is not a periodic "Risk Assessment" but an ongoing and forward-looking management discipline enabling CEC to analyze risks continually and adapt to changing conditions. The key or critical risks affect the entire community and are interrelated. Therefore, they are managed holistically with a structured approach. Figure 3, on the next page, describes the objective of each step.

Figure 2. CEC Enterprise Risk Management Process

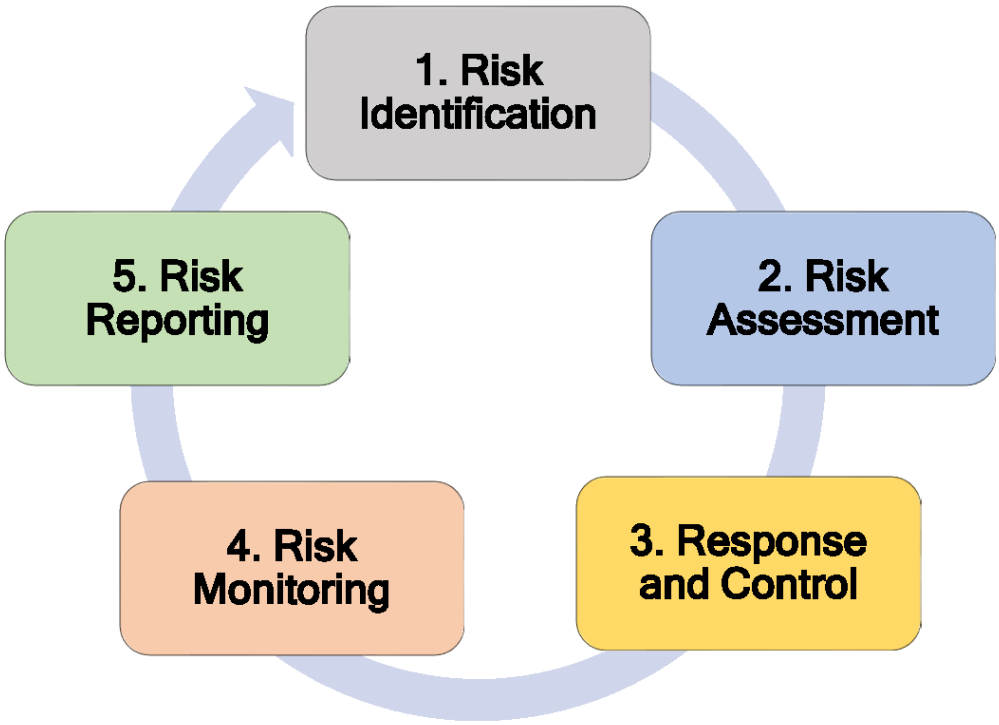
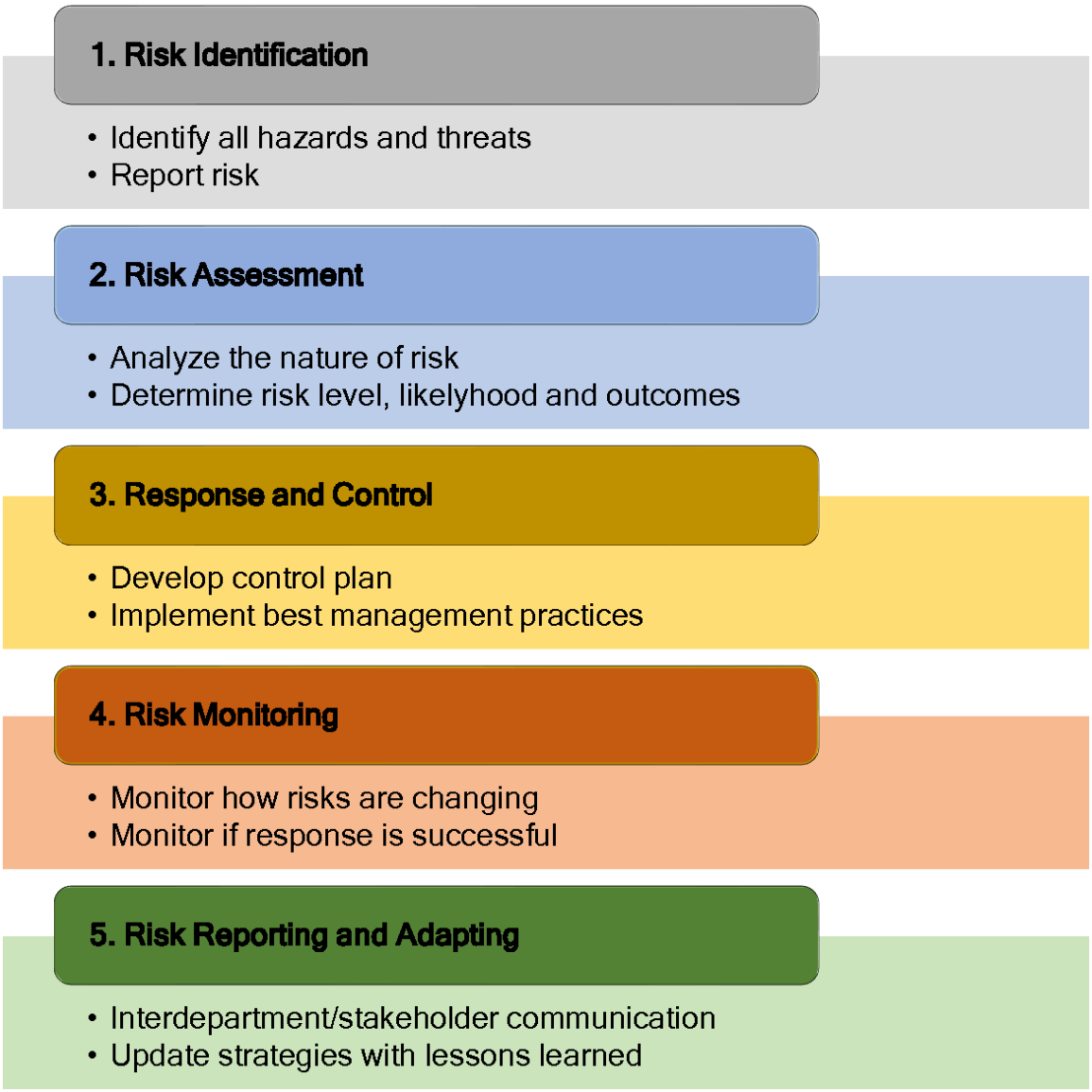


Figure 3. 5-Step Process Risk Assessment Process



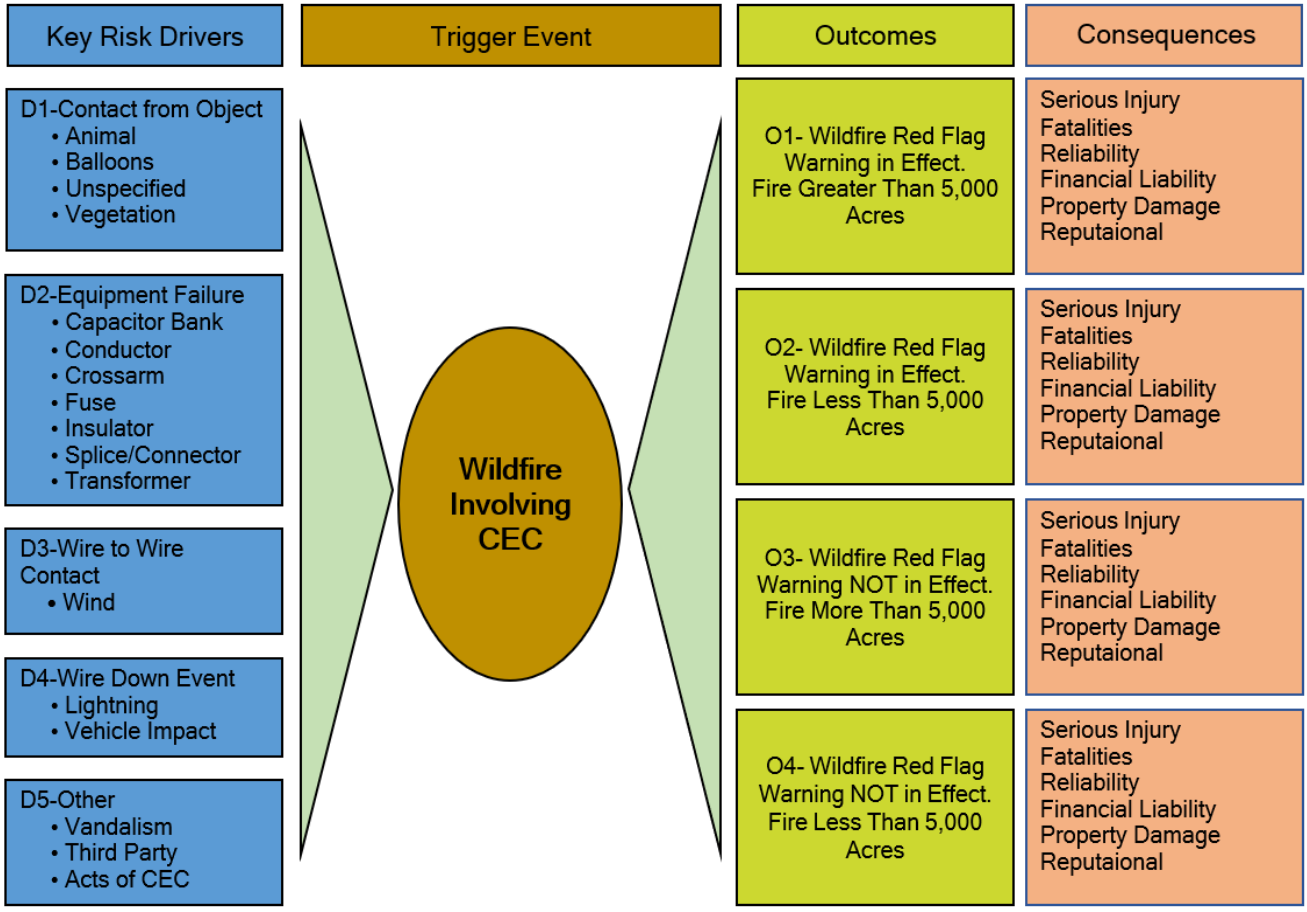
The Risk Assessment process begins with the Director of Operations and Engineering (DOE), key staff, and stakeholders working together to collect information on all potential and perceived risks. Relevant local plans, such as the East and West Deschutes County and Greater Bend Community Wildfire Protection Plans, were reviewed for additional data. Also analyzed were the risks, drivers, key impacts, mitigations, controls, and CEC's policies and procedures. A root cause analysis, a commonly used risk assessment tool known as the bow-tie method framework, was used. This method provides a visual representation of the key risk drivers' causal relationships, trigger events, outcomes, and impacts on CEC and its communities. The

bow-tie framework considers the key effects on CEC's reputation, public and employee safety, financial liability, operations, and property damage.

3.2 Enterprise Safety and Wildfire Risk

The following list included in the bowtie diagram below focuses on hypothetical causes of powerline ignition, which could potentially start a fire. The bowtie diagram below aims to identify the key root cause/risk drivers and exposure to wildfire impacts and identify the possible consequences. Figure 4 displays the risk bowtie analysis, which summarizes the assessment process.

Figure 4. Wildfire Risk Bow Tie Analysis



3.3 Climate Change

The *Fourth Oregon Climate Change Assessment* concluded climate change would make forests more susceptible to extreme wildfires due to overall warming in the Pacific Northwest. The years from 2016-2018 were all warmer than the 1970-1999 average, and 2015 still stands as Oregon's warmest year on record. Fire is the most obvious impact of climate change in recent years, with the extreme wildfires occurring extensively in hot and dry summers. Record-breaking catastrophic fires in California and Oregon in 2020 highlight increased vulnerability in a warming climate. The report projects fire risk will only increase across the entire state by midcentury, especially in eastern Oregon and the Willamette Valley[4].

3.3.1 Terrain and Fire History

Historically, the Central Oregon area included a mix of open stands of Western Juniper, conifer forests, bitterbrush, sage, and grasslands maintained by frequent low to moderate intensity fires. The effective wildland fire suppression policies of the last decade, combined with increased housing development in the wildland-urban interface (WUI), has resulted in an overgrowth of trees and ladder fuels within proximity to people and infrastructure needed to support them. Large stand replacement fires and the more frequent low-intensity fires have not been allowed to burn, causing overly dense conditions and high severity fires[5]. The well-documented high frequency of lightning strikes in Central Oregon and its surrounding landscape has played a role in the fire frequency.

3.4 Fire Risk Drivers

CEC staff evaluated other utilities' fire causes and applied their field experience to determine the critical potential risk drivers. Identified were six likely categories for causing powerline sparks and ignitions:

- Foreign Contact
- Equipment/Facility Failure
- Wire to Wire Contact/Contamination
- Vehicle Impact
- Expulsion Fuses
- Other

[4] Fourth Oregon Climate Assessment Report 2019. Oregon Climate Change Research Institute
[5] Greater Redmond CWPP 2017

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

3.4.1 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.

3.4.2 Equipment Failure

Equipment malfunction can occur during its service life for many reasons. Most equipment requires regular maintenance for optimal performance. Even though CEC'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.

3.4.3 Wire to Wire Contact/Contamination

High wind events are potential causes of wire-to-wire contact during fire season, referred to as contamination. 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 contamination.

3.4.4 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.

3.4.5 Topography and Climate

Within CEC'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

3.4.5.1 Drought

Central Oregon's high desert can experience abnormally dry conditions during late summer and fall, quickly exacerbating prolonged periods of drought. At this writing, large portions of the State of Oregon, including CEC's service territory, are categorized as having D3 (Extreme Drought) conditions. These conditions contributed to the state's record-breaking fire season in 2020.

3.4.5.2 Vegetation Type

The service area topography ranges from dense pine forests—Ochoco National Forest on the eastern side and the Deschutes National Forest on the west—to vast open range areas characterized by widespread stands of dense western juniper, bitterbrush, sage, and grasses. Portions of the service area have steep and rugged terrain with thick vegetation and a high tree mortality rate, while other regions are heavily populated residential neighborhoods.

3.4.5.3 High Winds

Central Oregon can experience 30 to 40 mph winds throughout the year with sporadic higher-speed gusts. CEC's infrastructure can withstand Category 2 winds, which may exceed 56 mph. 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.

3.4.5.4 Lightning

Twenty million lightning strikes hit the ground in the U.S. every year[6]. 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. CEC 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. Lighting arrestors have been installed on most of the distribution system.

3.4.5.5 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, CEC 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 water backpacks, shovels, and fire rakes. After crews leave a remote or high-risk area, designated staff remain behind on fire-watch for up to three hours to ensure no ignition occurs.

3.4.5.6 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. Central Oregon's recent population growth has led to an increase in residential development in wildland areas. Approximately 50% of CEC'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. CEC has made significant efforts to underground much of its distribution lines where feasible.

3.4.5.7 Other Potential Risk Factors

Construction projects by non-CEC crews are another possible cause of ignition. Construction equipment, vehicles, and non-utility personnel working near power lines can contact

[6] National Lightning Detection Network (NLDN)

conductors, causing a faulted condition. Excavation work performed without locating underground utilities is another hazard.

CEC 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, CEC equips its vehicles with fire suppression equipment and trains its staff to respond to fires and properly use fire suppression equipment.

3.4.5.8 Risk Drivers Associated with Design, Construction and Operation

- Expulsion type fuses
- Flammable mineral transformer cooling oil
- Aging wood poles
- Narrow ROWs in certain areas
- Overhead distribution lines in high fire-threat areas

3.5 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 CEC owned infrastructures and assets
- Impacts on reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to CEC's reputation and loss of public confidence

4 CEC's Asset Overview

Due to CEC'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 187 miles of conductor, transmission structures, and switches at 69 kV to 115 kV.
Distribution Line Assets	Approximately 2,265 miles of overhead (OH) conductor, cabling, transformers, voltage regulators, capacitors, switches, and line protective devices operating at or below 24.9 kV. Approximately 1,543 miles of underground (UG) conductor, cabling, transformers, voltage regulators, switches, and line protective devices operating at or below 24.9 kV
Substation Assets	Major equipment such as power transformers, voltage regulators, capacitors, reclosers, relays, open-air structures, switchgear, and control houses in 24 substation facilities. Also, there are two mobile substations.

4.1 Fire Threat Assessment in CEC Service territory

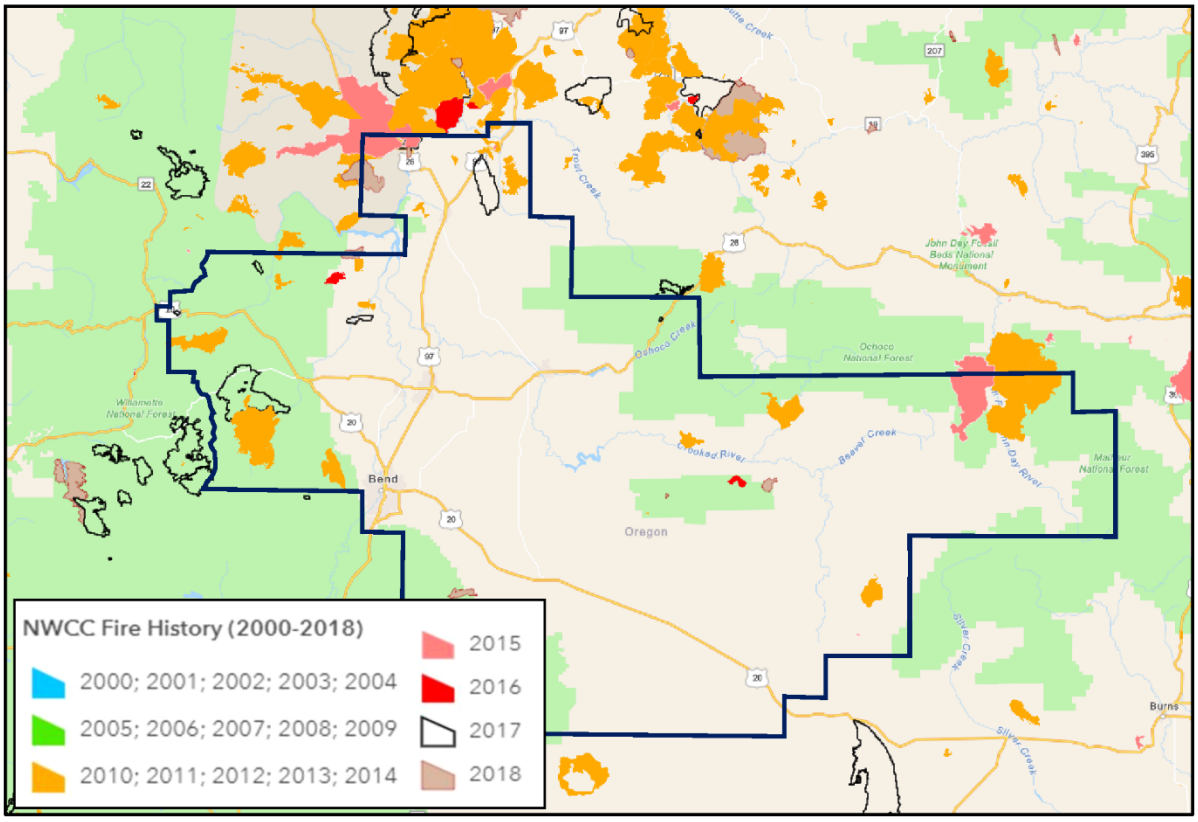
CEC examined its asset locations to identify risks unique to its service area as part of the risk analysis process. This section provides an overview of the service area properties and associated risks, which factor into the wildfire mitigation strategy. The cooperative's service area extends from the Cascade Range on the west to the high-desert on the east. Ponderosa pine forest transitions into arid land occupied by juniper, sagebrush, and bitterbrush. In the Cascade Range's rain shadow, it experiences greater temperature extremes and receives less precipitation than on its west side. High summer temperatures reach 87 degrees on average

during July and August, with occasional peaks over 100 degrees. Figure 5 shows the major fires from 2010 through 2018.

4.1.1 Jurisdictional Structure

CEC's 5,300 square mile service area reaches into seven counties[7]. The public lands in the service area are managed by the Deschutes National Forest, Ochoco National Forest, Prineville Bureau of Land Management, Crooked River National Grasslands, Oregon Department of Forestry, the Oregon Environmental Protection Agency, and Oregon Department of Fish and Wildlife. Pacific Power serves customers in the core areas of Madras, Redmond, Bend, and Prineville. The complex jurisdictional structure is a key consideration when developing or implementing any strategic plan, including those related to wildfires.

Figure 5. Wildfire Perimeters 2010-2018

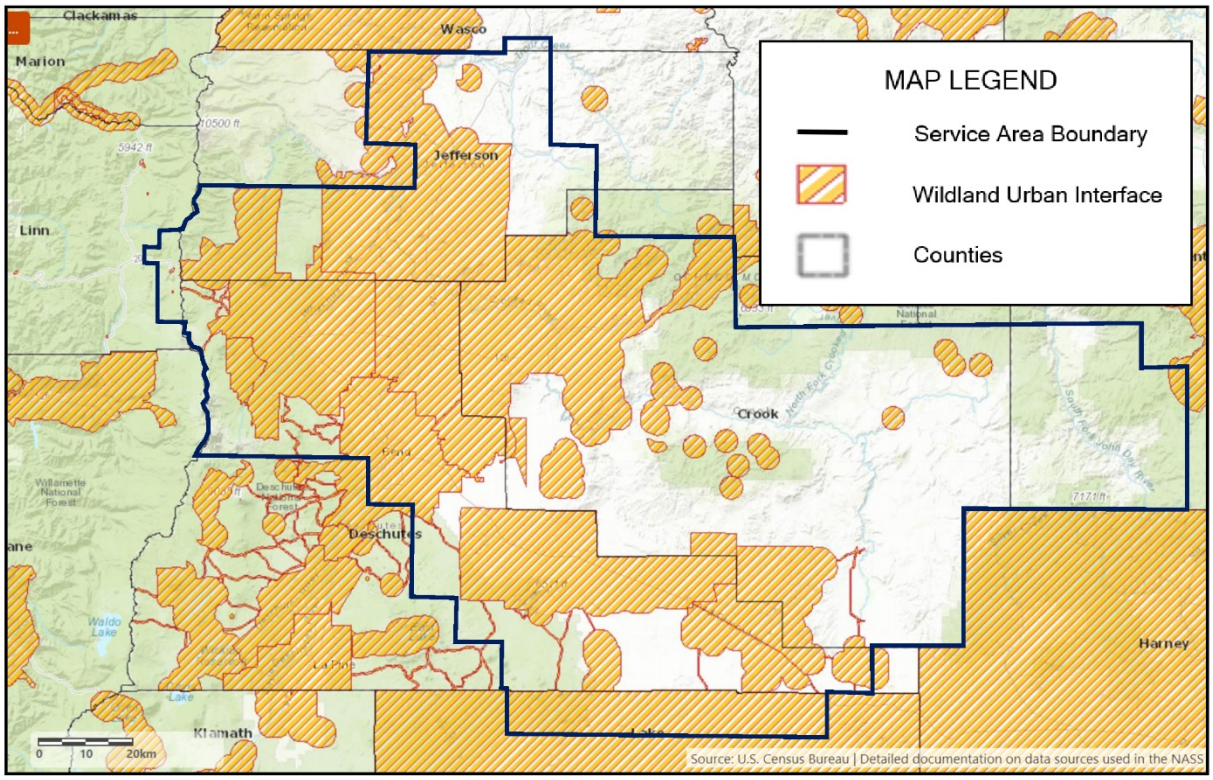


[7] Deschutes, Crook, Jefferson, Grant Linn, Wasco and Lake Counties

4.1.2 Wildland Urban Interface (WUI)

The United States Forest Service (USFS) defines the WUI as a place where humans and their development meet or intermix with wildland fuel, including communities within 0.5 miles of the zone. Between 1990 and 2000, more than 1 million homes were added to WUI in California, Oregon, and Washington combined[8]. As shown in Figure 6, approximately half of CEC's service area is located within the WUI as determined by local Community Wildfire Prevention Plans.

Figure 6. Wildland Urban Interface within CEC Service Area



[8] International Journal of Wildfire 2007

4.1.3 Fire Threat Assessment Mapping

The USDA/USFS Fire Modeling Institute developed the datasets used for the Wildfire Hazard Potential (WHP) maps to evaluate wildfire risk and prioritize fuel management on a national level. The WHP maps serve to depict the relative potential for wildfire areas challenging to suppress or contain.

Spatial datasets for wildfire likelihood and intensity in the conterminous US (2016) were developed using the Large Fire Simulator (FSim), spatial fuels and vegetation data from Landfire 2012, as well as point location of past fire occurrence (1992-2013) to build the 2018 version of the WHP risk maps.

Though the WHP risk map is not a perfectly precise map, when paired with spatial data representing high-value resources, communities, structures, or powerlines, it can approximate relative wildfire risk to those resources and assets. Areas mapped with higher WHP values represent fuels with a higher probability of torching, crowning, and other extreme fire behavior under conducive weather conditions based primarily on landscape conditions at the end of 2012.

To help determine fire threat levels within CEC's service area, the WHP maps, shown in Figures 7 through 13, pgs. 34-40, were overlaid on its electrical system. Transmission and distribution assets and substation locations can be seen in relation to the WHP tiers shown in color-coded overlays. Factors such as fire history, topography, and physical access are considered in the risk analysis.

4.1.4 Identified Risk Data Sources

Wildfire risk designations can derive from many sources depending on the time period the data is to be applied. Analysis for this WMP is for long-term planning; therefore, weather-based mapping was not studied.

Historical fire perimeters from 2010 through 2018[9] helped determine the likelihood, frequency, and cause of wildfires in the service area.

WUI perimeters, as identified in local Community Wildfire Protection Plans, were mapped using the Oregon Explorer web-based mapping portal.

[9] ArcGIS-NWCC Fire History/Fire occurrence Map

For more immediate situational awareness, mapping tools such as the U.S.F.S.-W.F.A.S. (Wildland Fire Assessment System) help determine daily and short-term forecasted risk.[10] CEC generates maps daily, when applicable, to assess short term wildfire conditions.

Weather station data comes from the Western Regional Climate Center[11] (WRCC) weather station data portal. Wind speed and direction, temperature, fuel moisture levels, precipitation, and in some locations, photos and videos are available from hundreds of weather stations throughout Oregon. CEC has installed its weather stations at 22 of its substations to enhance its situational awareness.

[10] https://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/fire-danger-subsets-fire-potential--danger-55
[11] https://wrcc.dri.edu/wraws/orF.html

4.1.5 Assets within Wildfire Hazard Potential Tiers

Table 3 provides a high-level overview of CEC assets' location within the Wildfire Hazard Potential tiers (Figures 7-12).

Table 3. Overview of CEC's T&D Assets within WHP Tiers

Assets	Total	Low		High		Very High	
	Line-miles	Line-miles	%	Line-miles	%	Line-miles	%
115kV OH Transmission	49	2	5%	38	77%	9	19%
69kV OH Transmission	138	75	54%	63	46%	0	0%
7.2-24.9kV OH Distribution	2,265	906	40%	1204	53%	155	7%
7.2-24.9kV UG Distribution	1,543	579	38%	644	42%	321	21%
Totals							
Transmission	187	77	41%	100	54%	9	5%
Distribution	3,808	1485	39%	1847	49%	476	12%
Substations	24	11	46%	11	46%	2	8%

4.1.6 Evaluation of Wildfire Hazard Potential Areas

Figures 7 through 13 provide a high-level diagram of CEC's assets in relation to the Wildfire Hazard Potential (WHP) areas throughout the service area. Approximately half of the transmission and distribution system sit in "High" Hazard Potential (HP) areas, and 40% in "Low" HP regions (see Table 3, pg. 32 for detailed breakdown). Only 5% of the transmission and 12% of the distribution system reside in "Very High" HP regions.

Of CEC's 24 substations, two are in "Very High" HP regions, with the remaining divided equally between "Low" and "High" HP areas.

Identified below are areas having higher risk due to dense vegetation, access, topography, wildfire history, or limited ROW clearance.

- Prineville Area: Northeast of Prineville, 3 miles north of the Ochoco Reservoir, the system transitions from "High" to "Very High" WHP zones as it enters the Ochoco National Forest (WHP Map #4, pg. 38). The Ochoco 7.2 Kv line runs along Mill Creek and within the Ochoco National Forest, with heavily forested land on each side with steep inclines and tall trees in proximity to the overhead lines. This area is remote, with paved road access limited to Mill Creek Road.
- Gateway Area: Portions of the 7.2 kV Gateway line running north and east from the Gateway area traverse the High burn probability zone (WHP Map #2, pg. 36). While this area has a high burn probability and frequent fire occurrence, the vegetation consists of mostly sagebrush with few structures.
- Lone Pine Area: This area, located along Highway 26 Northeast of Redmond (WHP Map #2, pg. 36), contains the 7.2kV Lone Pine circuit and portions of the Madras 7.2 kV line. This area is designated primarily High intermixed with Very High WHP areas with shrubs and grassland as primary vegetation.
- Camp Sherman: The Camp Sherman area, approximately 13 miles north of Sisters (WHP Map #1, pg. 35), is considered a higher risk due to the nature of the vegetation, slope, burn history, and fuel levels in this area, with tall trees in proximity to the overhead lines. The 2020 Green Ridge Incident, which burned 4,338 acres, came within 2 miles of the Black Butte 12.5 kV line feeding Camp Sherman.

Figure 7. CEC Service Area and Wildfire Hazard Potential Overview

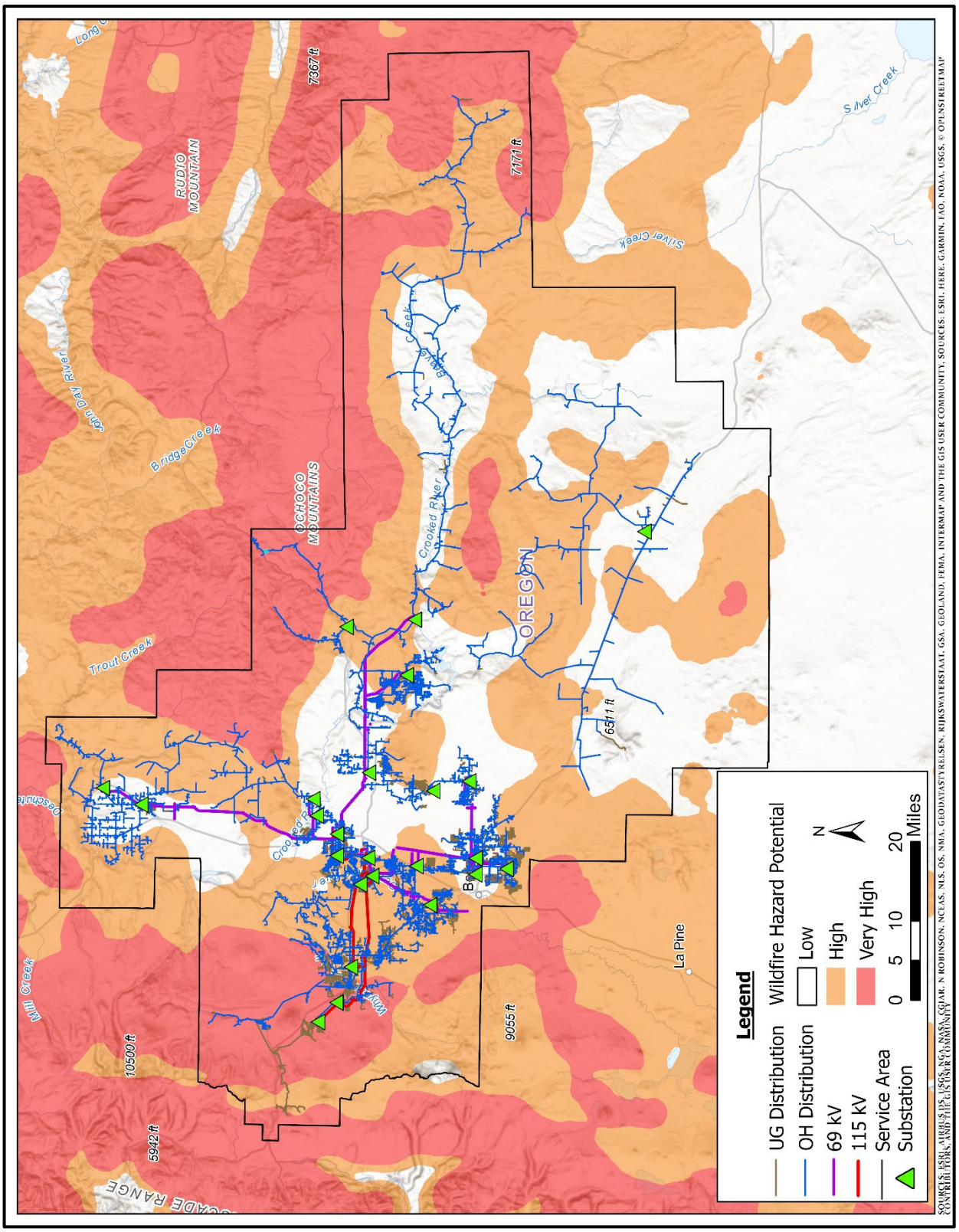


Figure 8. Wildfire Hazard Potential Map #1

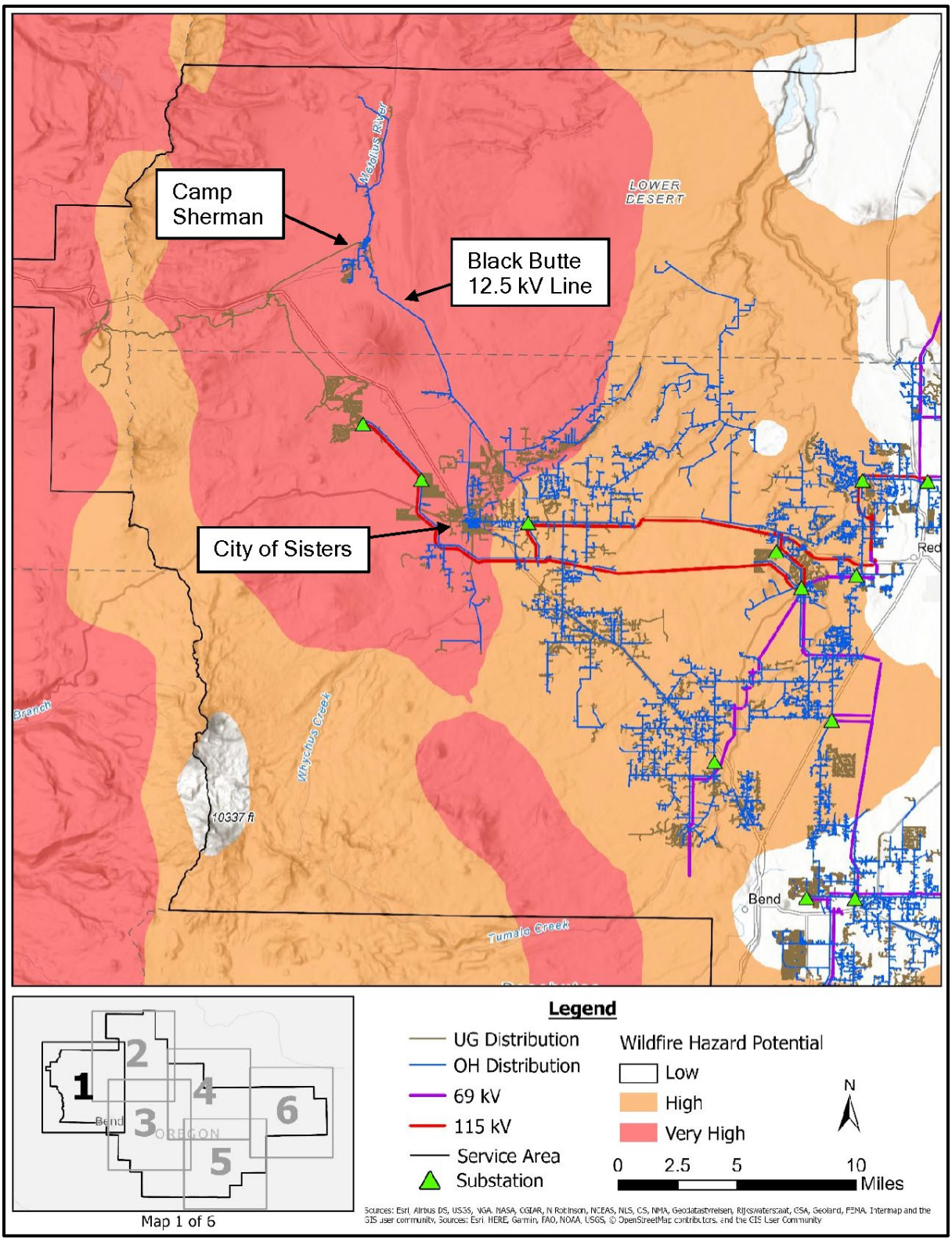


Figure 9. Wildfire Hazard Potential Map #2

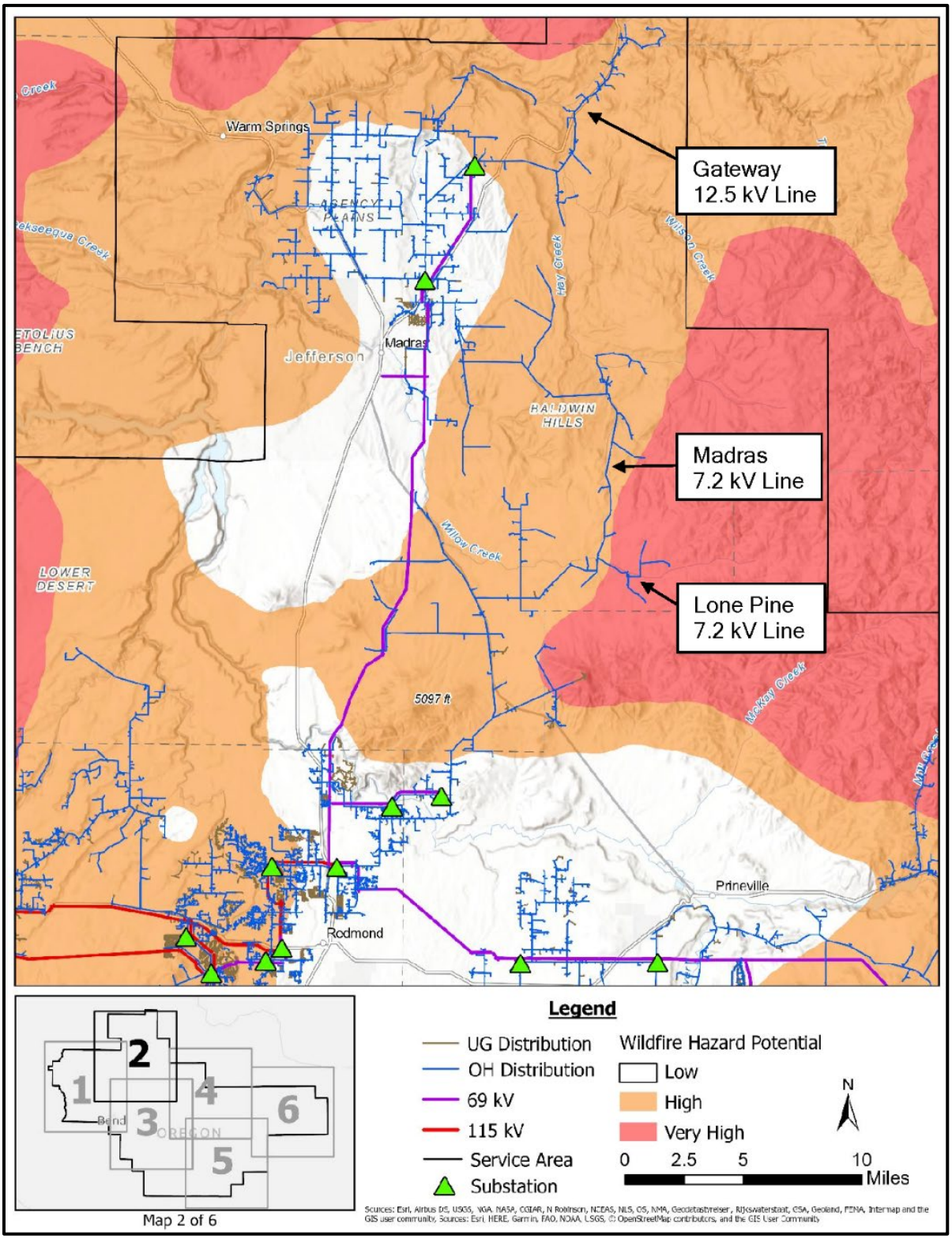


Figure 10. Wildfire Hazard Potential Map #3

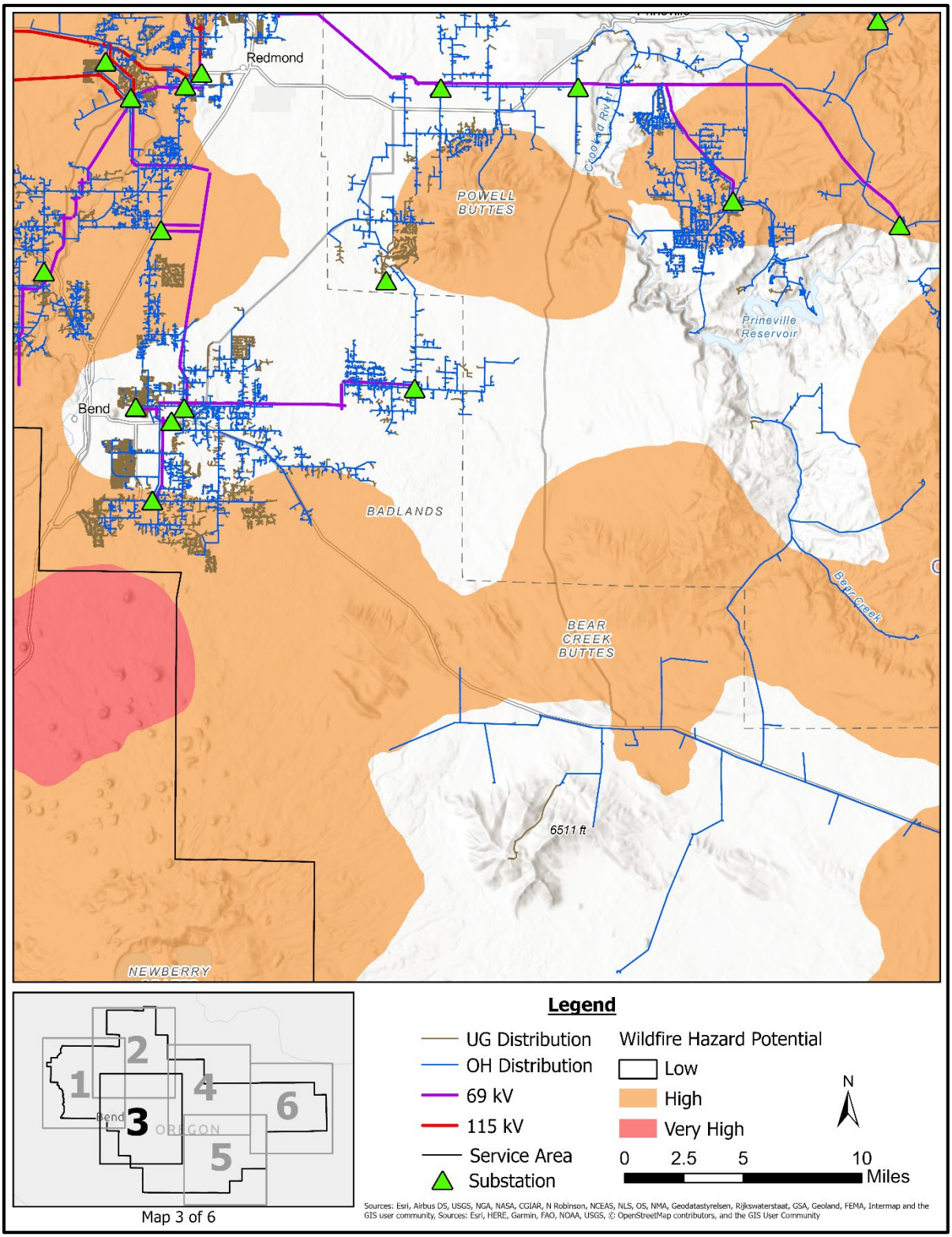


Figure 11. Wildfire Hazard Potential Map #4

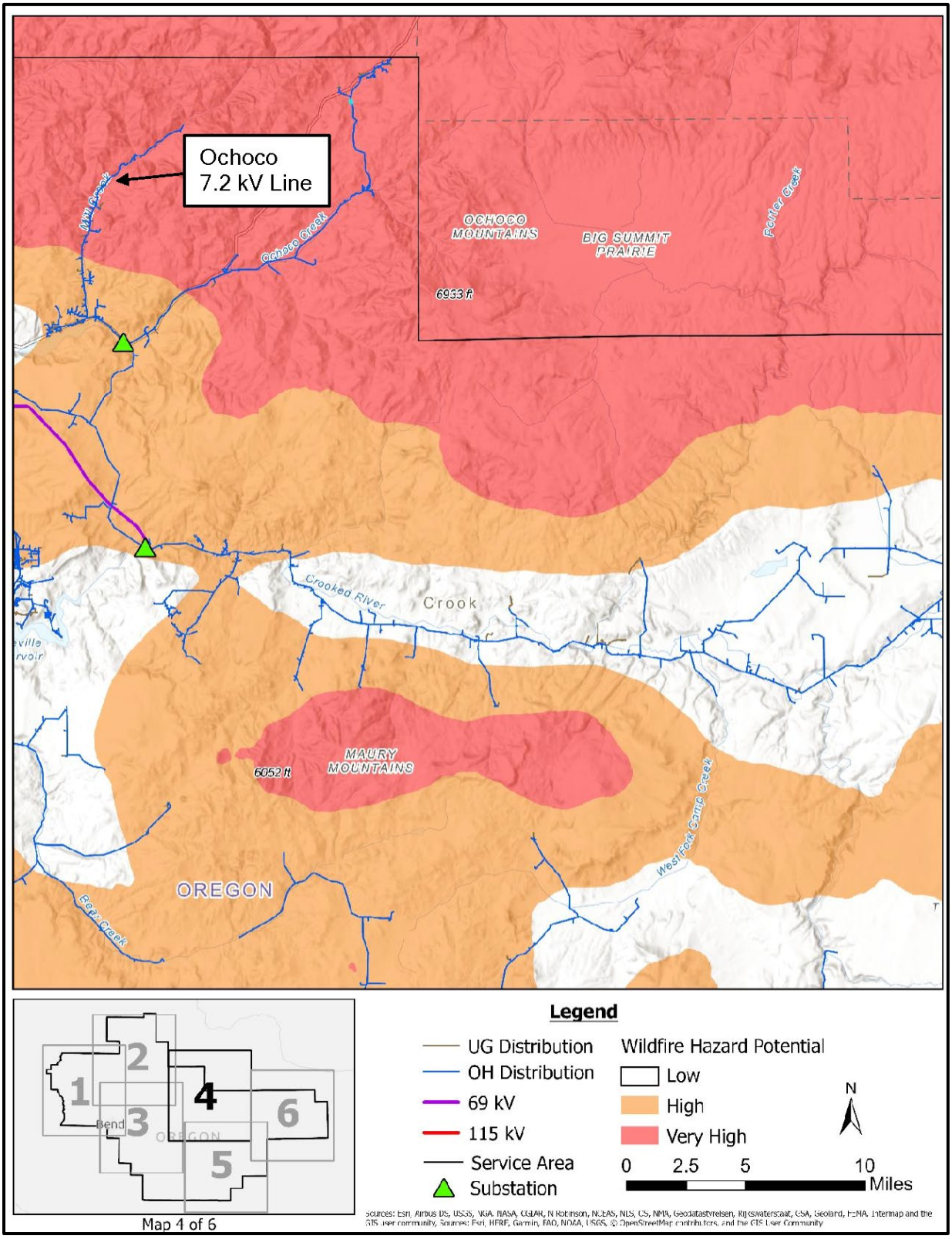


Figure 12. Wildfire Hazard Potential Map #5

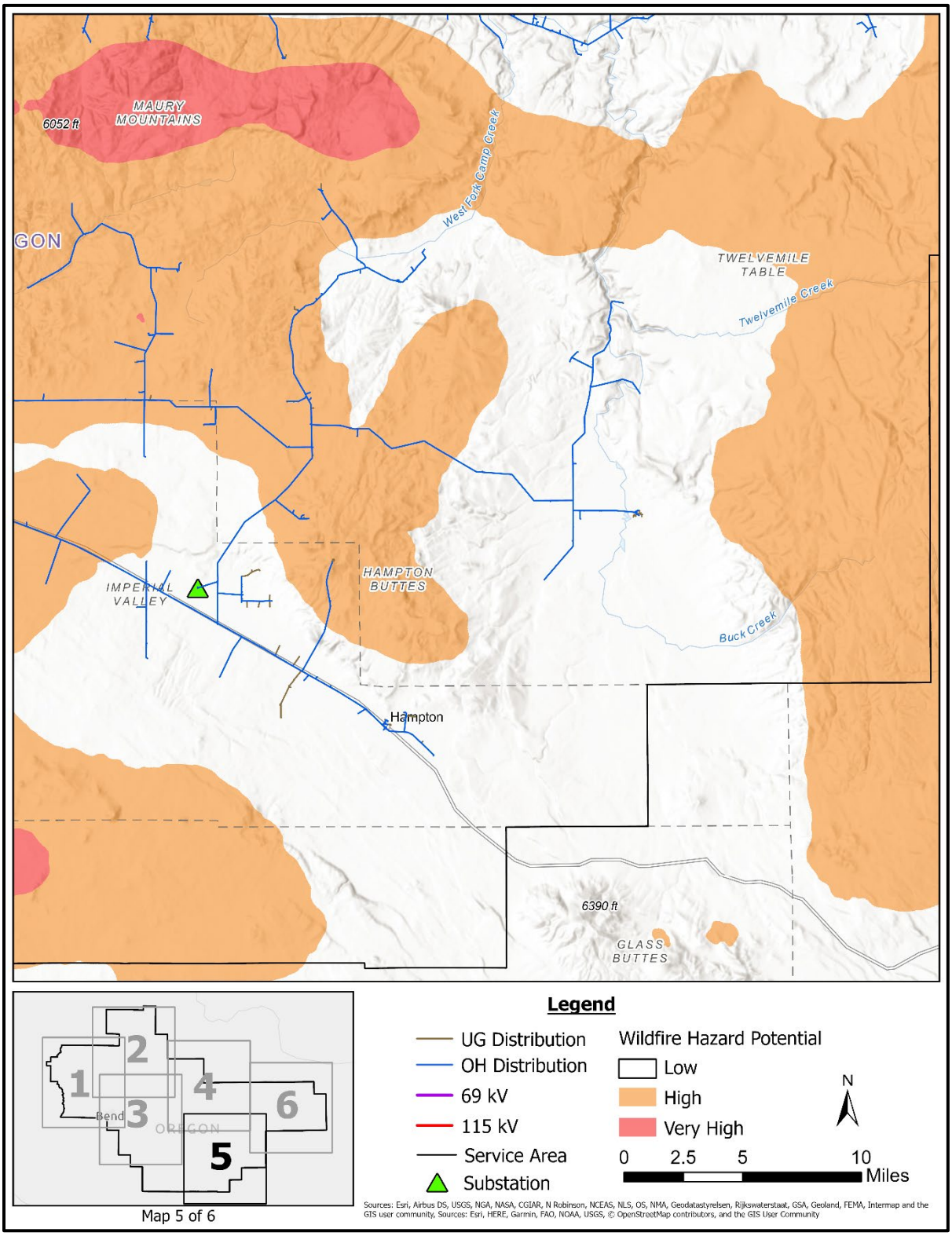
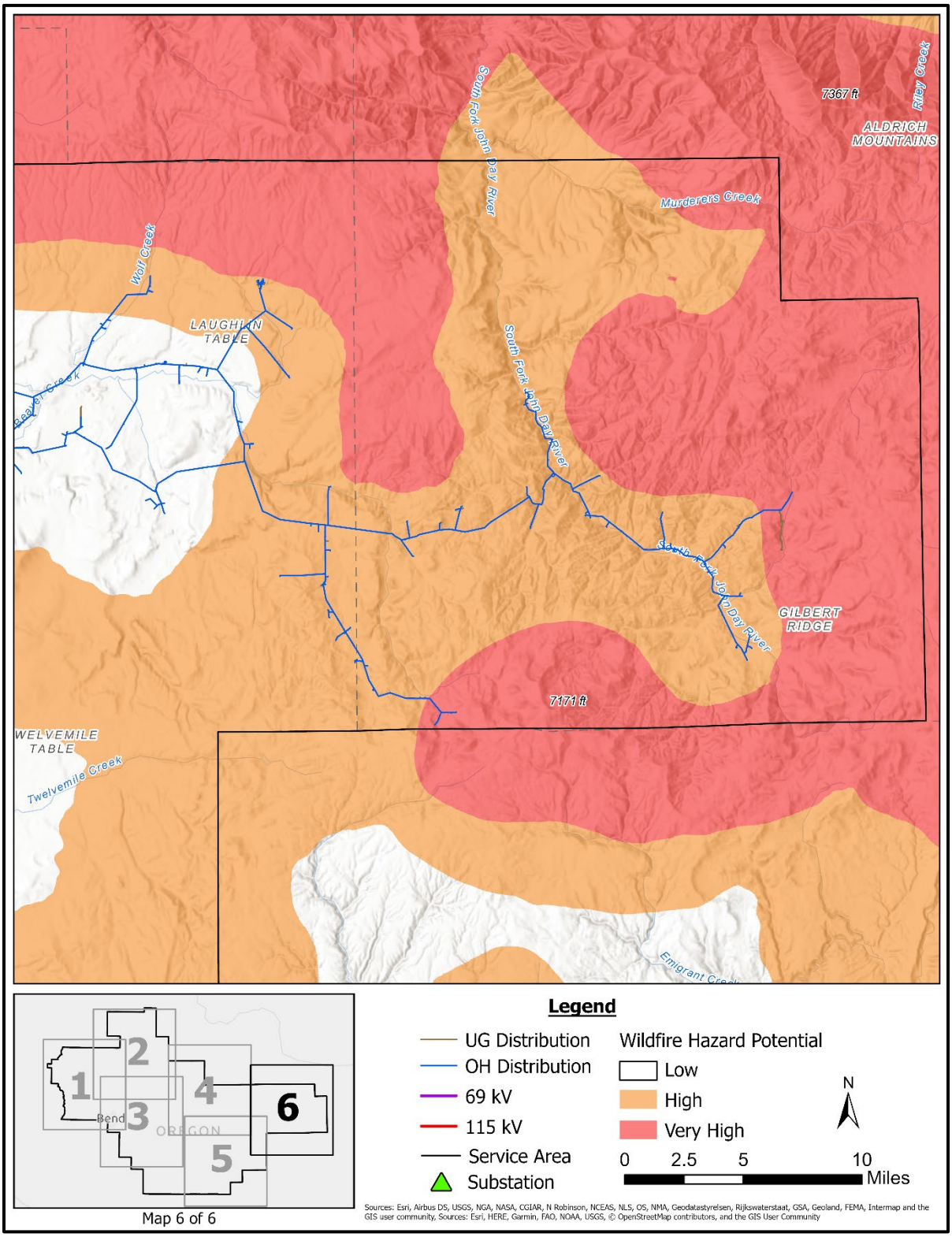


Figure 13. Wildfire Hazard Potential Map #6



5 Wildfire Prevention Strategy and Programs

CEC has proactively implemented many measures to address potential wildfire risks over the years. The WMP outlines existing fire mitigation efforts and identifies new processes CEC may employ moving forward.

Generally, the WMP describes specific programs CEC 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. CEC is currently looking into pilot programs, including an aerial patrol program utilizing a drone employing infrared (IR) technology and high-resolution photography. Under consideration, also, is the use of Distribution Fault Anticipation technology.

Several of CEC'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 2020 or within five years). Similarly, CEC'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 WMP occur at regular or annual intervals. The following table shows activities that will address key wildfire risk factors.

Table 4. Activities That Address Wildfire Risk Factors

RISK FACTOR	PROPOSED MITIGATION
Fuel Source	• Vegetation Management • Fuels Reduction • Line Inspections • ROW Maintenance • Enhanced inspection intervals in high-risk areas
Wire to Wire Contact	• National Weather Service monitoring • Increased inter-phase line spacing • Undergrounding of distribution lines
Contact from Objects	• Wildlife guards • Increased vegetation clearances • Avian protection program • Insulated equipment • Helicopter inspection of transmission lines
Equipment Failure	• Routine maintenance • Focused design and construction standards to reduce ignition sources • Transmission and distribution line detailed inspections and bi-annual patrols • Intrusive pole testing • De-energizing of lines during certain conditions • SCADA monitoring of substation equipment • Infrared inspections of substation equipment • Pole replacement program • Helicopter inspections of transmission lines
Field Work	• CEC worker/contractor education on fire ignition sources • Fire watch up to 3 hours after work completed in high-risk areas • Tailgate meetings before fieldwork • Land agencies fire season requirements

5.1 T&D Operational Practices

5.1.1 Situational Awareness Tools

CEC 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, Central Oregon's fire season occurs between July and September, with mid-to-late August most vulnerable to extreme fire conditions. For this WMP, the Fire Precautionary Period is April 1st to November 1st of any year.

During this Fire Precautionary Period, CEC and Contractor crews shall:

- Abide by the requirements of this WMP 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 WMP 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 100 reclosers on various distribution lines in CEC's system. CEC 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 are 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. CEC 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. CEC, in consultation with the local Public Safety Providers, evaluates the efficacy of a PSPS. When considering a PSPS, CEC also examines the impacts on fire response, water supply, public safety, and emergency communications.

CEC 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, CEC reserves the option of implementing a PSPS when conditions dictate. While CEC 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, CEC 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, CEC's DOE has the authority to de-energize select distribution circuits. A decision is based on multiple triggers accompanied by the CEC system's unique understanding, including any enterprise risks involved. No single element is determinative. CEC relies on weather data from various sources, including the National Weather Service, NDFRS, and CEC 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 CEC or other agency field staff
- Active wildfire in the service area

CEC will monitor the evolution of PSPS implementation by other Oregon electric utilities to continue to refine its evaluation of this vital topic.

5.2 Infrastructure Inspections and Maintenance

CEC 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, CEC maintains a formal inspection and maintenance program for distribution, transmission, and substation equipment. CEC currently patrols its system regularly and is increasing the frequency of inspections in high-risk areas. The following sections outline inspection practices for CEC assets. Table 5 summarizes the inspection schedule for all assets.

Oregon Administrative Rules Chapter 860-024-0011 provides inspection schedule requirements for electric distribution and transmission facilities. These standards require that an operator of electric supply facilities to:

- Construct, operate, and maintain its facilities in compliance with the Commission Safety Rules.
- Conduct detailed inspections of its overhead facilities to identify violations of the Commission Safety Rules.

Table 5. Inspection Program Summary

ASSET CLASSIFICATION	INSPECTION TYPE	FREQUENCY
Overhead Transmission	Safety Patrol Inspection	Max. interval: once every 2 years
	Detailed Inspection	Max. interval: once every 10 years[12]
	Intrusive Pole Test	Every 10 years
Overhead Distribution	Safety Patrol Inspection	Max. interval: once every 2 years
	Detailed Inspection	Max. interval: once every 10 years
	Intrusive Pole Test	Every 10 years
Underground Distribution	Safety Patrol Inspection	Max. interval: once every 2 years
	Detailed Inspection	Max. interval: once every 10 years
Substations	Detailed Inspection	Every 45 days

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

[12] Recommended inspection rate of 10% per year. Applies to OH and UG transmission and distribution line inspections.

(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 Routine Safety Patrol Inspections

CEC has a system patrol process complying with OAR 860-024-0011 requirements, including bi-annual patrol inspections for the system infrastructure. Manual checks include system and vegetation patrols. CEC monitors vegetation during its system patrols and directs a contractor to conduct additional inspections and vegetation management. 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, with a recommended rate of 50 percent of lines and facilities per year. Inspection of substations must occur within a 45-day maximum schedule.

CEC 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.

5.2.3 Detailed T&D Inspections

Detailed inspections of the overhead transmission, overhead, and underground electric distribution system fall within a 10-year cycle to ensure all equipment's assessment on a regular schedule. Inspections and maintenance employ measures intended to protect the worker, the general public, and the system's reliability. The inspection cycles seek to ensure safety and reliability based on standards in the Oregon Administrative Rules (OAR) 860-024-0011.

Qualified personnel perform all inspections. System equipment found in need of maintenance or repair is categorized depending on the severity of the condition. Repairs are done in order of rating per OAR 860-024-0012.

A record of the inspections and maintenance performed will be submitted to the OPUC when requested and maintained by the appropriate office personnel. The maximum interval between detailed inspections of overhead and underground facilities is ten years, with a recommended inspection rate of 10 percent per year. During the fifth year of the inspection cycle, the operator must:

- Report to the Commission that 50 percent or more of its total facilities inspections are complete.
- Report to the Commission that less than 50 percent of its total facilities have been inspected pursuant to this rule. Provide a plan for Commission approval to inspect the remaining percentage within the next five years. The Commission may modify the plan or impose conditions to ensure satisfactory inspection for safety purposes.

5.2.3.1 Detailed Line Inspection Description

Detailed Line Inspections (DLI) consist of walking and driving to examine all CEC 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. All transmission lines are inspected by helicopter annually, in addition to regional scheduled 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

DLIs happen on a 10-year schedule on all overhead and underground distribution equipment.

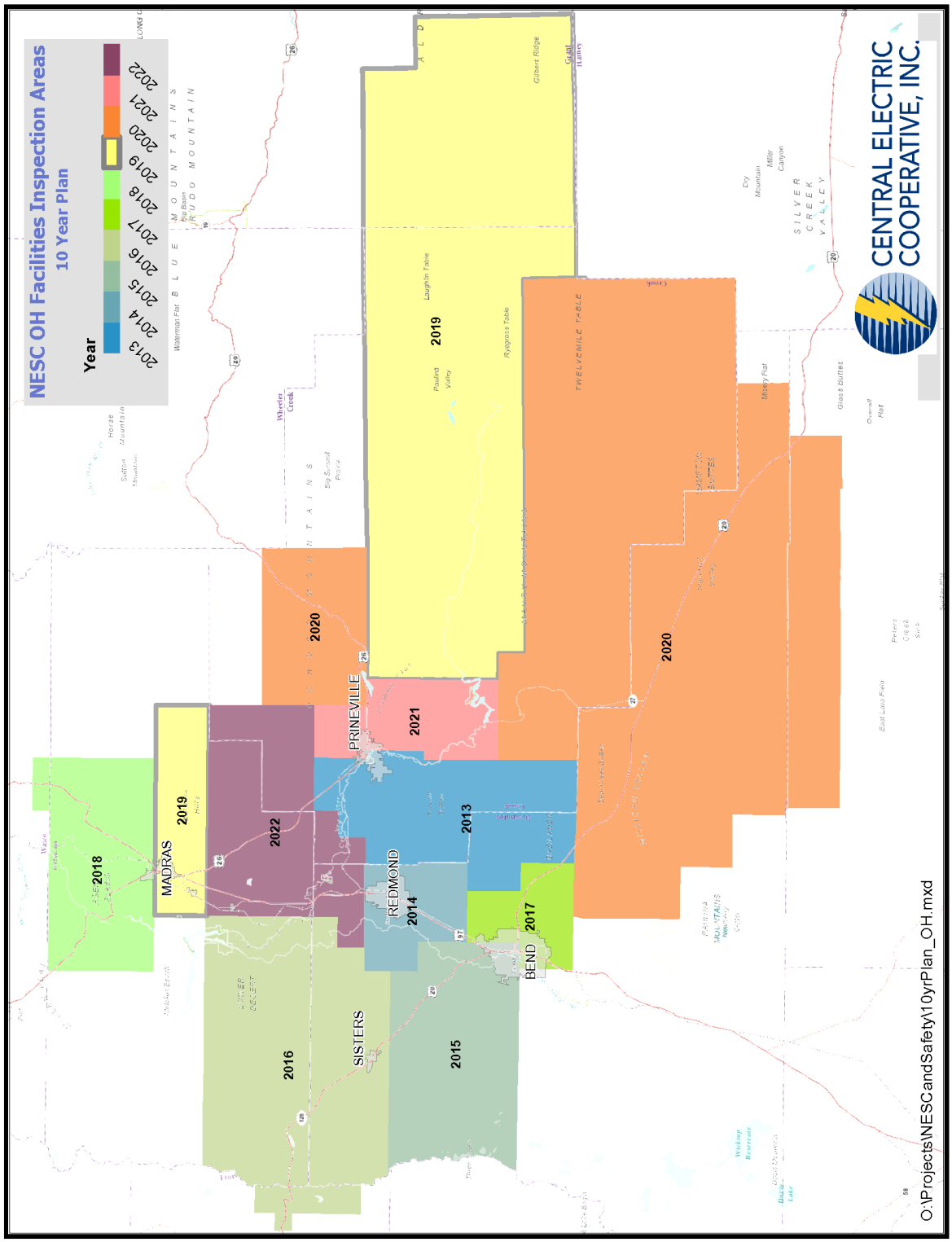
5.2.4 GIS Mapping

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. CEC 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.

5.2.5 Inspection Areas

The service area is divided into inspection areas to efficiently implement, track, and detail the inspection process. Figure 14 on the following page provides an example of the GIS-based mapping of the inspection areas.

Figure 14. NESC[13] OH Facilities Inspection Areas



[13] National Electric Safety Code

5.2.6 Instructions to Inspectors

The Preventive Maintenance Plan, as designed, provides safe, reliable service based on sound industry principles and practices. It considers and prioritizes maintenance work as the most urgent need due to potential compromised safety and reliability.

The inspector will document the overhead and underground systems' condition, recording defects, deterioration, violations, safety concerns, or any other conditions requiring attention on the inspection data. The inspection should focus on any hazards that could affect the system's integrity or the safety of line workers and the general public.

Inspection data (overhead & underground) will be prioritized and issued as follows per OAR 860-024-0012 safety standards:

- Priority # 1 – Immediate hazard: A violation of the Commission Safety Rules posing imminent danger to life or property must be repaired, disconnected, or isolated by the operator immediately after its discovery. Also, any conditions that may affect the system's integrity or present a hazard to workers or the general public pose an immediate hazard. All Priority #1 repairs will be responded to immediately, and appropriate action taken until the hazardous condition is remedied.
- Priority # 2 – Non-emergency repair condition: Except as otherwise provided by this rule, the operator must correct violations of Commission Safety Rules no later than two years after discovery. These are conditions requiring maintenance, which can be scheduled to maintain the system's integrity. Priority #2 repairs will be prioritized by urgency and scheduled to have appropriate repairs to correct the condition within one year where practicable.
- Priority # 3 – Non-emergency repair condition: An operator may elect to defer correction of violations of the Commission Safety Rules that pose little or no foreseeable risk of danger to life or property to correction during the next major work activity. Conditions that do not present a situation could jeopardize the system's safety, line workers, and the general public. Priority #3 repairs are completed within the time interval recommended.

In no event shall a deferral under section 860-024-0012 extend for more than ten years after discovery. The operator must develop a plan detailing how it will remedy each such violation. If a deferral affects more than one operator, all affected operators must agree to the plan. If any affected operators do not agree, the correction of the violation(s) may not be deferred.

5.2.7 Standards for Record-Keeping and Reporting

General Instructions: Facilities meeting standards, and do not require maintenance, will be recorded and filed for future reference with no further documentation needed. Conditions other than satisfactory go into CEC's asset management database, and General Foreman (GF) generates a list of deficiencies and monitors the completion of repair works. Photos of the asset accompany the inspection record.

The inspector collects the following information at the time of inspection:

- Item inspected
- Name of inspector
- Date of inspection
- Location of asset
- Facility ID (Pole #)
- Damaged (yes/no)
- Work order priority #1,2,3
- Notes regarding damage (if applicable)
- Pole clearing required (yes/no)
- Vegetation notes (if applicable)
- Height of pole
- Joint owner facility

OAR 860-024-0011(d) establishes records retention requirements for each level of inspection. The Utility must maintain adequate written records of policies, plans, and schedules to show inspections and corrections meet compliance with this rule and OAR 860-024-0012. CEC makes these records available to the Commission upon its request.

5.2.8 Wood Pole Intrusive Inspection and Replacement

CEC has over 45,500 wood poles in its system and replaces approximately 1 percent of these poles each year. Wood poles are subjected to an intrusive inspection to identify rot and decay problems during the detailed inspection cycle. Poles determined to have a 5-7 year lifespan are replaced preemptively for safety.

5.2.9 Substation Inspections

The Preventive Maintenance Plan provides for regular inspections of substations. 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.

CEC performs various inspections on substations to ensure safety and reliability. A "Detailed" inspection, defined as where an individual piece of equipment and or structures receives a

careful visual examination and a routine diagnostic test, as appropriate. When applicable, an infrared camera is used during the inspection process to detect equipment operating at above-normal temperatures. Substations receive a detailed inspection within the prescribed timeline.

5.2.9.1 Substation Detailed Inspection Description

Inspectors visit each substation to inspect the facility and its equipment on a timely basis. A detailed inspection involves a thorough look at the system to confirm no structural or mechanical problems, hazards, or tree trimming requirements. Detailed inspections of substation assets include, but are not limited to, all items listed below:

- Broken or loose hardware
- Vandalism or damage to any equipment
- Oil or gas leaks
- Perimeter fence security
- Condition of the buss
- Insulators and other hardware
- Condition of the control house
- Condition of the poles/structures and lines exiting the substation
- Condition of the disconnects and fuses for signs of damage and connectivity
- Insulators /Bushing/Arrestors
- Risers and Conduits
- Transformers
- Reclosers
- Batteries
- Capacitor Bank
- Circuit Breakers
- Fire Detection and Suppression System (Where Applicable)
- Grounding System
- Voltage Regulators

Annually, CEC uses infrared detection technology to assess the condition of substation equipment. Detailed inspections capture the status of all equipment inspected and any deficiencies found.

5.3 Vegetation Management

CEC has contracted tree trimming crews who maintain vegetation on all CEC transmission and distribution power lines following ANSI C2, National Electrical Safety Code (NESC)[14], and OPUC OAR 860.024.0016/0017 requirements for public safety and fire prevention. Vegetation in proximity to power lines is systematically trimmed on a ten-year cycle. 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, CEC makes efforts to identify and remove high-risk fuel sources as needed. CEC crews also address vegetation concerns in response to service calls or identify at-risk vegetation while performing day-to-day operations.

5.3.1 CEC Tree Trimming and Removal Guidelines

CEC 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, CEC's Vegetation Management (VM) program keeps appropriate records to ensure that timely trimming occurs to maintain the designated minimum clearances. These records are made available to the OPUC upon request.

5.3.2 CEC Priorities

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

- Mill Creek and Ochoco National Forest
- Sisters/Tumalo
- Camp Sherman

5.3.3 Hazard Trees

A subset of Danger Trees[15], 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 or trees leaning toward transmission and distribution facilities. These trees sometimes sit outside the easement or

[14] Rules 012,013 and 218
[15] As defined by ANSI 300 Part 7 standards

ROW. CEC 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 removed as needed. CEC crews make an ongoing effort to clear any such hazard by removing any tree or brush directly under the power line.

The following are optimal clearance dimensions, which meet or exceed OPUC and NESC guidelines, or trimming operations:

- 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 for transmission line routes

5.3.5 Clear Cut ROW Specifications

All stumps are cut as 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.

All firewood-sized lumber is cut to a usable length not more than four feet long. Lumber and brush are stacked to the side of ROW suitable to the landowner, but away from poles, roadways, and water routes.

5.3.6 Chipping Brush and Removal of Lumber or Firewood

All reasonably accessible brush is chipped and blown into a truck equipped with a chip dump box or other similar conveyance and hauled away and properly disposed of. When the brush and limbs are inaccessible for chipping and cannot be stacked, crews use lop and scatter techniques to reduce the brush and limbs into the smallest size possible.

5.3.7 Slash Treatment

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

- CEC works with private landowners and government agencies to determine the collection and disbursement of slash and debris.

- If the area is accessible, chip all wood less than 6 inches (including limbs and tops from larger material) into a chip truck. If not, drag brush to chipper location when chipper is in reasonable proximity (within 150 feet) of line clearance tree work. When slash is not in reasonable proximity of a chipper, crews lop and scatter the slash out of the right-of-way.

5.3.8 T&D System Vegetation Management Standards

CEC personnel and contractors 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 a ten-year timeline. The patrols produce targeted areas for vegetation pruning or removal. Bi-annual ground-based field patrols ensure compliance with state and federal regulatory requirements and alignment with standards in OAR 860-024. Contractors aim to achieve up to 10 feet of clearance during tree work unless otherwise directed by CEC. The contractor also clears vegetation from CEC's secondary voltage, service drops, and pole climbing space as needed. CEC's contractors follow the American National Standards Institute (ANSI) A300 concepts and utility directional pruning, supporting proper pruning/tree health while maximizing the pruning cycle.

5.3.9 Fire Season

When conditions of fire hazard exist each summer, the Oregon Department of Forestry, United States Forest Service, Bureau of Land Management, and Crooked River National Grasslands (together "Agencies") declare fire season to be in effect. They issue an Industrial Fire Precaution Level (IFPL) at one of four levels. Because conditions vary across the state, each protection district will declare fire season separately, and the Agencies impose restrictions on public and work-related activities. The declaration of fire season affects forest and other commercial operations and the general public. Fire season remains in effect until terminated by each Agency by reducing the IFLP until conditions of fire hazards no longer exist.

5.3.10 CEC/Contractor Tools and Equipment

Fire Tools and Equipment: During the fire season, CEC and its contractors meet the relevant OAR and Agencies regulations' minimum requirements while working on public lands. Fire tools are present on all vehicles and operating sites per Agency requirements.

5.3.11 IFPL Waiver

CEC is granted a Waiver of Fire Restrictions (during Industrial Fire Protection Levels[16]1, 2, and 3 only) from the Agencies to conduct power line maintenance each year. Waivers, written in advance, might be granted for certain activities, with special restrictions.

5.4 Fire Mitigation Construction

CEC 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. CEC'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.

5.4.1 Avian Protection Program

Since 2005, CEC has employed design and construction standards in mind to protect raptor and migratory birds. Efforts include the deployment of perches, longer crossarms, and lowering the placement of crossarms on the poles to increase the distance between phases. 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
- Increased phase spacing

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.

[16] Industrial Fire Precaution Levels pertain to permitted activities on federal lands.

5.4.2 Steel Transmission Poles

CEC has upgraded several of its transmission lines with steel poles to improve reliability and reduce the system's susceptibility to wind and fire hazards. All new construction and upgrades of existing transmission facilities utilize steel poles when practical.

5.4.3 Insulated Equipment

Insulated wire is used within substations and throughout the distribution system with bird/squirrel guards on any new installations or when work occurs on any existing infrastructure. Also, fiber-glass cross-arms and conductor guards reduce foreign contacts.

5.4.4 Electronic Vacuum Reclosers

Electronic reclosers utilize a vacuum bottle to interrupt fault current. Modern electronic reclosers are programable and have control modules giving them the potential to be controlled remotely using SCADA technology. CEC changes out oil-filled reclosers when needed with the vacuum type breakers (includes line and substation reclosers) to improve sectionalizing capabilities and allow for a non-reclose setting. CEC is adding new SEL controls for reclosers and is updating 10-year and older relays in substations to modern protection schemes.

5.4.5 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. CEC is currently replacing almost 1,400 miles of direct-buried underground distribution line with a vault and duct system. The new EPR cabling provides increased reliability and should have a lifespan of 75 to 100 years.

5.4.6 Weather Stations

CEC has installed 22 weather stations within its service territory. These weather stations, installed at its substations, transmit data to the operations center via the supervisory control and data acquisition (SCADA) system. This data helps monitor real-time weather conditions, improve situational awareness, and inform the implementation of mitigation measures such as de-energization of circuits.

5.4.7 Defensible Space Requirements

The Oregon Legislature passed the Oregon Forestland-Urban Interface Fire Protection Act (Senate Bill 360) in 1997. Administered by the Oregon Department of Forestry (ODF), this law recognizes homeowners need to actively protect their home from wildfire by reducing fuel around their home and driveway. SB-360 applies only to interface areas on private land within the boundary of an Oregon State Department of Forestry District. The law requires property owners in identified areas to reduce excess vegetation around structures and along driveways. In some cases, depending on the property's rating classification, it is also necessary to create additional fuel breaks along property lines and roadsides.

The defensible space law provides guidance on clearance around homes and structures. Proper clearance to 100 feet dramatically increases the chance of a structure surviving a wildfire. As part of its overall approach to wildfire mitigation, CEC supports and promotes public awareness and adherence to these safety requirements. A compliance checklist with diagrams is listed in Appendix C.

5.5 Pilot Projects

CEC initiates pilot projects to explore new technologies and practices, which help CEC staff to evaluate their effectiveness and benefits. CEC may elect to integrate the technologies or practices into its various ongoing maintenance programs based on the outcomes.

5.5.1 Drone Inspection Program

CEC is evaluating additional drone technology, which may enhance its asset inspection program. The drone, equipped with a high-resolution camera, allows for detailed inspections of crossarms, hardware, and equipment not visible from the ground. The technology would benefit the Avian Protection Program to detect nesting sites and whether eggs or baby birds occupy the nest.

The drone may also employ infrared imaging and LIDAR technology used to identify potential problem areas and equipment. Identification of vegetation clearance issues and hazard trees may be more efficient than traditional foot patrols.

5.5.2 Non-Reclose Settings

Historically, CEC has not changed recloser settings based on weather conditions. Due to the changing climate and new development in the wildland urban interface, it may be necessary to adopt the practice in some high-risk areas to maintain a balance between reliable service and

community safety. CEC seeks to determine the conditions and triggers to meet the threshold for setting a recloser to “one-shot” mode.

5.6 Workforce Training

CEC 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 WMP
- 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 WMP and bring such information to management

6 Emergency Response

6.1 Preparedness and Response Planning

CEC 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 CEC's emergency preparedness and response planning involves a Crisis Communication Plan (CCP), which outlines the actions the co-op's Member and Public Relations department takes during a crisis. The plan presents scenarios accompanied by checklists to follow. Useful tools include templates for 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.

The CCP must:

- Guide co-op management to more effectively manage an unusual situation to prevent confusion and misunderstanding.
- Provide a framework for prompt, accurate, and effective communications with key audiences, including employees, members, and the news media during crises.

The CCP receives an annual review and is updated accordingly. The Member and Public Relations department leads a post-crisis review to determine what worked or needs improvement and recommends, as required, revisions to the CCP. Management plans and conducts emergency management drills when appropriate.

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:

- Director of Member and Public Relations
- Director of Operations and Engineering
- Communications Coordinator
- 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 Public Agency and Member Communications for Outages

CEC has a comprehensive plan for communicating with its members before outages and during unplanned outages. CEC provides as much notice as possible to inform affected members, ten to 14 days before, for scheduled maintenance outages. The Director of Member and Public Relations (DMPR), having confirmed relevant details with the DOE, calls key stakeholders and accounts, including health care facilities affected by a de-energization of the power lines.

Depending on the number of members affected and the amount of time there is before the outage, affected members receive a written notification via U.S. mail and at least two telephone calls advising of the planned outage. CEC contracts with an outside vendor who can make 500 calls simultaneously to contact members. Outage information is posted on the CEC Facebook

and Twitter pages and the “Outage Center” on CEC’s website. If warranted, messages also scroll across the top of CEC’s website.

For unplanned outages, the Member and Public Relations department uses the same channels of communication. Information, including the number of members affected and geographical location, is posted along with local agency updates. The president/CEO and the DMPR decide on the issuance of a public announcement.

6.1.3 OEM Communication and Coordination

CEC coordinates with its local emergency response agencies and other relevant local and state agencies as peer partners. In response to all emergency events, CEC collaborates with the counties’ Office of Emergency Management (OEM) to ensure effective communication and coordination. CEC’s three primary coordination points are Deschutes County OEM, Jefferson County OEM, and Crook County OEM.

The DMPR acts as the communications officer in an emergency and contacts the local OEMs to establish themselves as the duty officer for coordination.

Reporting Fires: CEC or their contractors shall call 911, and then CEC Dispatch. CEC will then notify the proper fire department entities or Forest Service of any fires in the operating area or along the roads used by the operators. Operators report all fires as soon as possible to any of the personnel listed in Table 6 on the following page.

When reporting a fire, CEC staff or Contractors are to provide the following information:

- Name
- Call back telephone number
- Project Name
- Location: Legal description (Township, Range, Section); and Descriptive location (Reference Point)
- Fire information: Including Acres, Rate of Spread, and Wind Conditions.

Table 6. Sheriff's Office / Dispatch Center

NAME	EMERGENCY AREA	TELEPHONE
Sheriff Dispatch Center	Pineville / Crook County	541-447-4168
Sheriff Dispatch Center	Deschutes County	541-693-6911
Sheriff Dispatch Center	Grant County	541-575-1131
Sheriff Dispatch Center	Jefferson County	541-475-2201
Sheriff Dispatch Center	Linn County	541-967-3907
Sheriff Dispatch Center	Lake County	541-947-6027
Sheriff Dispatch Center	Wasco County	541-506-2580

Table 7, on the following page, provides a list of emergency services providers and stakeholders that should be contacted secondarily in the event of a wildfire emergency, depending on the area of the fire.

Table 7. Emergency Services Contact List

REGION	AGENCY	CONTACT/TITLE	TELEPHONE	ADDRESS
Crook County	Office of Emergency Management	Michael Ryan, Emergency Manager	541-416-3969	308 NE 2nd St. Prineville, OR 97754
Deschutes County	Sheriff's Office	Sgt. Nathan Garibay, Emergency Svcs. Manager	541-617-3303	6333 W. Hwy 20 Bend, OR 97703
Deschutes County	Deschutes County	Ed Keith, County Forester	541-322-7117	61150 SE 27th St Bend, OR 97702
Grant County	Grant County Government	Ted Williams, EM Coordinator	541-575-0990	201 S Humbolt Canyon City, OR 97820
Jefferson County	Sheriff's Office	David Pond, Emergency Mgmt. Coordinator	541-475-6520 X4345	675 NW Cherry Lane Madras, OR 97741
Jefferson County	Confederated Tribes of Warm Springs	Carmen Smith, Public Safety GM	541-553-1171	PO Box "C," Warm Springs, OR 97761
Jefferson County	Confederated Tribes of Warm Springs	Danny Martinez, Tribal Emergency Manager	541-553-3345	PO Box "C," Warm Springs, OR 97761
Linn County	Office of Emergency Management	Joe Larsen, Coordinator	541-812-2272	1115 Jackson St. SE Albany, OR 97322
Lake County	Office of Emergency Services	Daniel Tague, Coordinator	541-947-6027 X 1204	513 Center Street, Lakeview, OR 97360
Wasco County	Office of Emergency Management	Sheridan McClellan, Emergency Manager	541-506-2790	511 Washington Street, Suite 102 The Dalles, OR 97058
Central Oregon	Central Oregon Interagency Dispatch Center[17]	Maria Maragni, Center Manager	541-316-7710 541-316-7700 (24hr)	1605 SE Ochoco Way, Redmond, OR 97756
East Oregon Area	Oregon Department of Forestry	Gordon Foster, Unit Forester	541-447-5658	3501 E. 3rd St, PO Box 670 Prineville, OR 97754
Sisters	Oregon Department of Forestry	Chris Dayton, Forest Officer	541-549-2731	19721 Pine Tree Ln. Sisters, OR 97759

[17] Participating agencies are BLM-Prineville District, Deschutes NF, Ochoco NF and Oregon Dept. of Forestry

6.2 Coordination with Stakeholders

CEC understands the importance of proactive planning and coordinating closely with local governments, critical agencies, first responders, and key accounts. Table 8 lists the identified key accounts and stakeholders in the CEC service area.

Table 8. CEC Emergency Preparedness and Response Stakeholder List

STAKEHOLDER GROUP	DESCRIPTION
Critical Agencies	• Schools • Public Safety Dispatch Centers • Local Emergency Planning Committees • Oregon Department of Transportation • OPUC Safety and Enforcement Division • Saint Charles Medical Center • Local county road departments • Oregon Department of Corrections
Communications	• Telecommunications companies • Local news stations • Local radio stations
First Responders	• Deschutes, Jefferson and Crook County Sheriff's Office • Local Fire Districts • USFS (U.S Forest Service-Pacific Northwest) • Oregon Department of Forestry • Bureau of Land Management
Local Government	• Cities/Towns: Bend, Redmond, Madras, Sisters, Prineville • County Government: Crook, Deschutes, Grant, Lake, Linn and Wasco Counties
Utilities	• Cascade Natural Gas • Pacific Power • Local Water Districts • Local Irrigation Districts • Local Communication Providers
Safety Councils	• Deschutes County Wildfire Mitigation Advisory Committee • Oregon Department of Forestry
Customers	• Any person, organization, or critical facility receiving electricity from CEC

6.2.1 Evacuation Levels

With large wildland fire events occurring nearly every summer, evacuation from neighborhoods has become commonplace during these events. The Central Oregon area (Crook, Deschutes, and Jefferson Counties) has adopted the following evacuation levels. Local fire agencies determine when the need for evacuation exists, and the Deschutes County Sheriff's Department and other law enforcement agencies carry out an ordered evacuation. Please refer to the following descriptions below of evacuation terminology that Deschutes County OEM currently uses[18]:

- **Level 1**: Means **"BE READY"** for potential evacuation. There is a danger in your area. Monitor emergency service websites and local media outlets for information. If conditions worsen, emergency services personnel may contact you.
- **Level 2**: Means **"BE SET"** to evacuate. You must prepare to leave at a moment's notice. There is significant danger in your area. This may be the only notice you receive from emergency personnel. If you feel threatened by the situation, evacuate immediately.
- **Level 3:** Means **"GO"** evacuate now. Leave immediately! Danger to your area is current or imminent, and you should evacuation immediately. If you choose to ignore this advisement, you must understand that emergency services may not be available to assist you further. DO NOT delay leaving to gather any belongings or make efforts to protect your home. This will be the last notice you receive.

6.2.2 Work Crew Communications

CEC or its contractors maintain reliable communications (e.g., cell phone, satellite phone, or radio) on job sites. All communications equipment must be operable at all times.

6.2.3 Community Outreach

Public outreach to the community on the importance of wildfire mitigation helps reduce wildfire risk. CEC features articles in its Ruralite magazine on wildfire preparedness and residential fire preventive measures before every fire season. The community's involvement can play an important and significant role. As part of its holistic approach, CEC 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, CEC provides

[18] https://www.deschutes.org/sheriff/page/emergency-information

information on prevention and mitigation on its website and social media (Facebook and Twitter) and works with public entities and homeowners associations regarding vegetation management.

Members can find useful information regarding:

- Defensible Space regulations, which require property owners in certain counties to maintain a wildfire resistant perimeter around their home of business.
- National Weather Service alerts
- Fire Season Preparation
- Fire Protection in the Wildland Urban Interface

6.2.4 Deschutes County Emergency Alert Program

The Deschutes Alert System can be used to notify members of important information during an emergency. Emergencies happen with little or no notice at any time of the day or night. With DAS, the Office of Emergency Management can relay critical information to members about natural disasters or other emergencies that require immediate attention. DAS's service area includes Deschutes County, Crooked River Ranch, and Camp Sherman in the State of Oregon.

Until recently, emergency personnel would use DAS to call land-line telephones but could not include Wireless (cellular) or Voice over Internet Protocol (VoIP) telephone numbers. Now, owners of VoIP or cellular phone lines can receive the same emergency message as those with land-line phones. Deschutes County residents must register to participate in the notification system.

6.3 Restoration of Service

CEC 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. CEC sends out member and media updates before de-energizing and will post update status reports when restoration efforts are underway and completed.

6.3.1 Service Restoration Process

CEC work crews take the following steps before restoring electrical service after a de-energization event. These measures intend to protect the worker, members, the general public, and the system's reliability.

- **Patrol:** If the de-energization was a PSPS, crews patrol every 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. CEC 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, CEC supervisors, managers, and engineers 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 reenergize 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 CEC'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.

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7 Performance Metrics and Monitoring

CEC 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 CEC's management responsibilities for overseeing this WMP, 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 WMP.

7.1 Plan Accountability

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

7.1.1 Operating Unit Responsibility

Table 9, on the following page, identifies the Departments responsible for tracking and implementing the various components of the WMP.

Table 9. Accountability of Plan Implementation

MITIGATION ACTIVITIES	RESPONSIBLE DEPARTMENT AND WORKGROUP
Risk Analysis	Director of Operations and Engineering
Wildfire Prevention Strategy Programs	
• T&D line patrols • 115 kV & 69 kV transmission line inspections • Wood pole intrusive inspections • Detailed line inspections • Arial transmission line patrols • Substation detailed inspections • Infrared inspections • Disable reclosers • Planned de-energization • Vegetation management • Accelerated inspection schedule	Operations and Engineering
Fire Mitigation Construction	
• Electronic reclosers • Wood pole replacement program • Undergrounding of distribution lines • Steel pole replacement • Avian protection program	Operations and Engineering
Pilot Projects	
• Drone enabled inspections • Distribution Fault Anticipation • Remote Operations SCADA	Operations and Engineering
Emergency Preparedness	
• Public and agency communications during emergencies • Community outreach • Wildfire awareness content on the website • Crisis Communication Plan	Director of Member and Public Relations

7.2 Performance Metrics

Metrics to gauge the success or shortcomings of the WMP 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 WMP Performance

CEC uses the metrics listed in Table 10 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 High and Very-High Fire Threat Tiers.

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

Table 10. 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
Ignitions on Circuits in WHP Tiers (See figures 7-12)	Demonstrates the effectiveness of the overall plan	Sum of acres affected	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
Bare Line Contact with Vegetation	Assess Vegetation Management Program	Number of contacts recorded	Reduction of vegetation contacts
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 High or Very High WHP[19] Tiers	Assigns risk to the root cause	Count of events	Reduction in the general trend of events

[19] Wildfire Hazard Potential

7.2.2 Programmatic Metrics

CEC 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 11, on the following page, depicts the completion targets for various inspection and maintenance operations.

Table 11. Programmatic Metrics

PROGRAM	TARGET	METRIC DESCRIPTION
Distribution Line Inspections	95-100%	Perform all detailed line inspections within the compliance period set in OAR 860-024, and inspections completed within the specified time intervals set for each inspection type. (Chapter 5)
Distribution Wood Pole Intrusive Tests	95-100%	Perform all wood pole invasive tests scheduled for the year. CEC's goal is to perform wood pole tests within 15 years of installation and every ten years after that. (Chapter 5)
Distribution Bi-Annual Line Patrol	95-100%	Perform all annual distribution line patrols within the compliance period set in OAR 860-024. See Chapter 5 for a detailed description of the program.
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 ensure compliance with OAR 860-024 to prevent ignition and propagation of fire caused by CEC electric assets.
Transmission Vegetation Pruning/Clearing	95-100%	Complete scheduled respective tree work to ensure compliance with OAR 860-024 and NERC FAC-003-4 to prevent ignition and propagation of fire caused by CEC electric overhead assets.

7.3 Monitoring and Auditing of the WMP

The CEO and DOE monitor the WMP and report its effectiveness to the Board of Directors on a bi-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 DOE, or their designee, updates leadership with recommendations or proposed action in enhancing the Plan's objectives over time.

The WMP annual review aligns with CEC's existing business planning process. This review includes a yearly assessment of the WMP programs and performance.

CEC's business planning process includes budgeting and strategic planning for a 3-5 year planning horizon.

7.3.1 Accountability

The DOE monitors the WMP's implementation and audits the specified objectives.

7.3.2 Identify Deficiencies in the WMP

The DOE is responsible for ensuring the WMP meets all the State of Oregon guidelines to 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 WMP are reported to the Board of Directors in the form of an updated WMP on a bi-annual basis.

The DOE and designated personnel are responsible for spearheading discussions on addressing deficiencies and collaborating on solutions when updating the WMP. When deficiencies are identified, DOE, 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

CEC's compliance with Commission regulations ensures facilities are inspected and repaired per OPUC and NESC standards. Any issues found impacting safety and reliability are addressed as outlined in those regulations. In addition to the maintenance program, CEC 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. The DOE supervises the General Foreman and reviews concerns found during routine fieldwork and equipment and line inspections. CEC uses this information as a method to assess the effectiveness of inspection procedures. The review process occurs annually, where reviews of inspection records, identification of deficiencies, and corrective actions are determined. An internal report provides the utility's leadership in the deliberation of future strategies. Related strategies to mitigate wildfire risk are identified and proposed within the Plan's next iteration. Aggregating this data guides future decision-making on the direction of wildfire mitigation strategy with the intention that incidents will occur less frequently.

CEC 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

CEC 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 DOE 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 and state 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. CEC follows the best industry practices to develop its maintenance programs.

CEC's Operations group administers the inspections and corrective maintenance. Upon the discovery of deficiencies, the General Foreman 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, severity, and HFTA rating. Work orders are monitored throughout the year to ensure timely completion via regular internal reports.

7.4.2 Vegetation Management (VM)

Contractors perform CEC's VM and clearing work. Distribution system-related VM work and contractors are field audited, and approximately 10-15 percent of the tree work (pruning and removal) is reviewed. Quality control efforts monitor program effectiveness and overall tree work performance. GIS-based tools track the quality assurance work to monitor the VM program's effectiveness. The quality control results go under review, and deficient work is reissued to the contractor for corrective action.

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Appendix A: Definitions

Commission: Oregon Public Utility Commission

Fire Hazard[20]: "Hazard" is based on the physical conditions that give a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts.

Fire Risk: "Risk" is the potential damage a fire can do to the area under existing conditions, including any modifications such as defensible space, irrigation and sprinklers, and ignition resistant building construction, which can reduce fire risk. Risk considers the susceptibility of what is being protected.

Flashover: A type of fault or short circuit caused by a lightning strike to a live electrical system. Faults can occur anywhere along power lines- at transformers, poles, towers, and substations. Arcing from flashovers can cause extensive damage to electrical equipment, even more so than the lightning that caused them.

Hardening: Modifications to electric infrastructure to reduce the likelihood of ignition and improve electrical assets' survivability.

High Fire Threat Area (HFTA): The HFTA identifies areas of an elevated and high fire risk related to electric utility facilities:

Industrial Fire Precaution Level (IFPL): Industrial Fire Precaution Level. Activated when needed during the summer fire season, IFPL is an activity closure system to reduce wildfire risk. By law, it applies to workers in the woods and other industrial forest users on 13 million acres of unimproved private and state forestlands protected by the Forest Service. Levels range from Level-1 to Level-4.

Readily Climbable: Vegetation having both of the following characteristics

a) Low limbs, accessible from the ground and sufficiently close together to climb by a child or average person without using a ladder or other special equipment; and
b) A main stem or major branch that would support a child or average person either within arms' reach of an uninsulated energized electric line or within such proximity to the electric line that the climber could be injured by direct or indirect

[20] Source: http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview_Glossary.pdf

contact with the line.

Recloser: Recloser is a device used in electric distribution systems to interrupt the circuit to clear faults. Automatic reclosers may have electronic controls and vacuum interrupters that automatically recloses to restore service if a fault is temporary. Several attempts may be made to clear and re-energize the circuit, and if the fault still exists, the recloser locks out. Reclosers are made in single-phase and three-phase versions and use oil or vacuum interrupters.

Red Flag Warning (RFW)[21]: A term used by fire-weather forecasters to call attention to limited weather conditions of importance may result in extreme burning conditions. It is issued when it is an on-going event, or the fire weather forecaster has a high degree of confidence that Red Flag criteria will occur within 24 hours of issuance. Red Flag criteria can happen whenever a geographical area is in a dry spell for a week or two, or a shorter period if before spring green-up or after fall color. Also, when the National Fire Danger Rating System (NFDRS) is high to extreme, and the following forecast weather parameters met:

- A sustained wind average of 15 mph or greater
- Relative humidity less than or equal to 25 percent and
- A temperature of greater than 75 degrees F

In some states, dry lightning and unstable air are criteria. A Fire Weather Watch may be issued before the RFW.

Readily Climbable: Vegetation having both of the following characteristics:

- Low limbs, accessible from the ground and sufficiently close together so that a child or average person can climb the vegetation without using a ladder or other special equipment; and
- The main stem or major branch would support a child or average person either within arm's reach of an uninsulated energized electric line or within such proximity to the electric line that the climber could be injured by direct or indirect contact with the line.

SCADA: SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA generally refers to an industrial computer system that monitors and controls a process. In the transmission and distribution elements of electrical utilities, SCADA will monitor substations, transformers, and other electrical assets. It is possible to control or reset equipment remotely using SCADA.

[21] Source: https://w1.weather.gov/glossary/index.php?word=Red%20Flag%20Warning

Substation: Part of the electrical generation, transmission, and distribution system, substations transform voltage from high to low, or the reverse, or perform any other essential functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels. A substation may include transformers to change voltage levels between high transmission voltages and lower distribution voltages or at the interconnection of two different transmission voltages.

Transmission and Distribution (T&D): At CEC, for line maintenance purposes, the transmission system includes 69 kV and 115kV lines tied to points of delivery. The distribution system includes 12 kV and 24 kV lines not connected to points of delivery.

Utility Cooperative: A cooperative tasked to deliver utilities such as electricity, water, or telecommunications to its members. Profits are either reinvested for infrastructure or distributed to members in the form of "patronage" or "capital credits," which are dividends paid on a member's investment in the cooperative.

Each customer is a member and owner of the business, meaning all members have equal individual authority, unlike investor-owned utilities. The number of shares held governs the extent of individual authority.

Vegetation: Trees, shrubs, and any other woody plants.

Vegetation Management: A broad term that includes tree pruning; brush removal through the use of power saws and mowers; the judicious use of herbicides and tree growth regulators; hazard tree identification and removal; the implementation of strategies to minimize the establishment of incompatible species under and near power lines; and the control of weeds.

Wildfire[22]: "Also called wildland fire, uncontrolled fire in a forest, grassland, brushland or land sown to crops." "Fire danger in a wildland setting varies with weather conditions: drought, heat, and wind participate in drying out the timber or other fuel, making it easier to ignite. Once a fire is burning, drought, heat, and wind all increase its intensity. Topography also affects wildfire, which spreads quickly uphill and slowly downhill. Dried grass, leaves, and light branches are considered flash fuels. They ignite readily, and fire spreads quickly in them, often generating enough heat to ignite heavier fuels such as tree stumps, heavy limbs, and the forest floor's

[22] Source: https://www.britannica.com/science/wildfire

organic matter. Such fuels, ordinarily slow to kindle, are difficult to extinguish. Green fuels—growing vegetation—are not considered flammable, but an intense fire can dry out leaves and needles quickly enough to allow ready ignition. Green fuels sometimes carry a special danger: evergreens, such as pine, cedar, fir, and spruce, contain flammable oils that burst into flames when heated sufficiently by the searing drafts of a forest fire."

Wildfire Mitigation Plan (WMP): A comprehensive plan to reduce the threat and severity of wildfire within an electric utility's service area. A WMP includes preventive strategies and programs adopted by the utility to minimize the risk of its facilities causing wildfires and emergency response and recovery procedures.

Wildlands: forests, shrublands, grasslands, and other vegetation communities have not been significantly modified by agriculture or human development*. Fire managers follow the National Wildfire Coordinating Group (which coordinates programs of participating wildfire management agencies nationwide) more specific definition. It refers to an area in which development is nearly non-existent (except for roads, railroads, power lines, and similar transportation facilities); structures, if any, are widely scattered.

Appendix B: Acronym Glossary

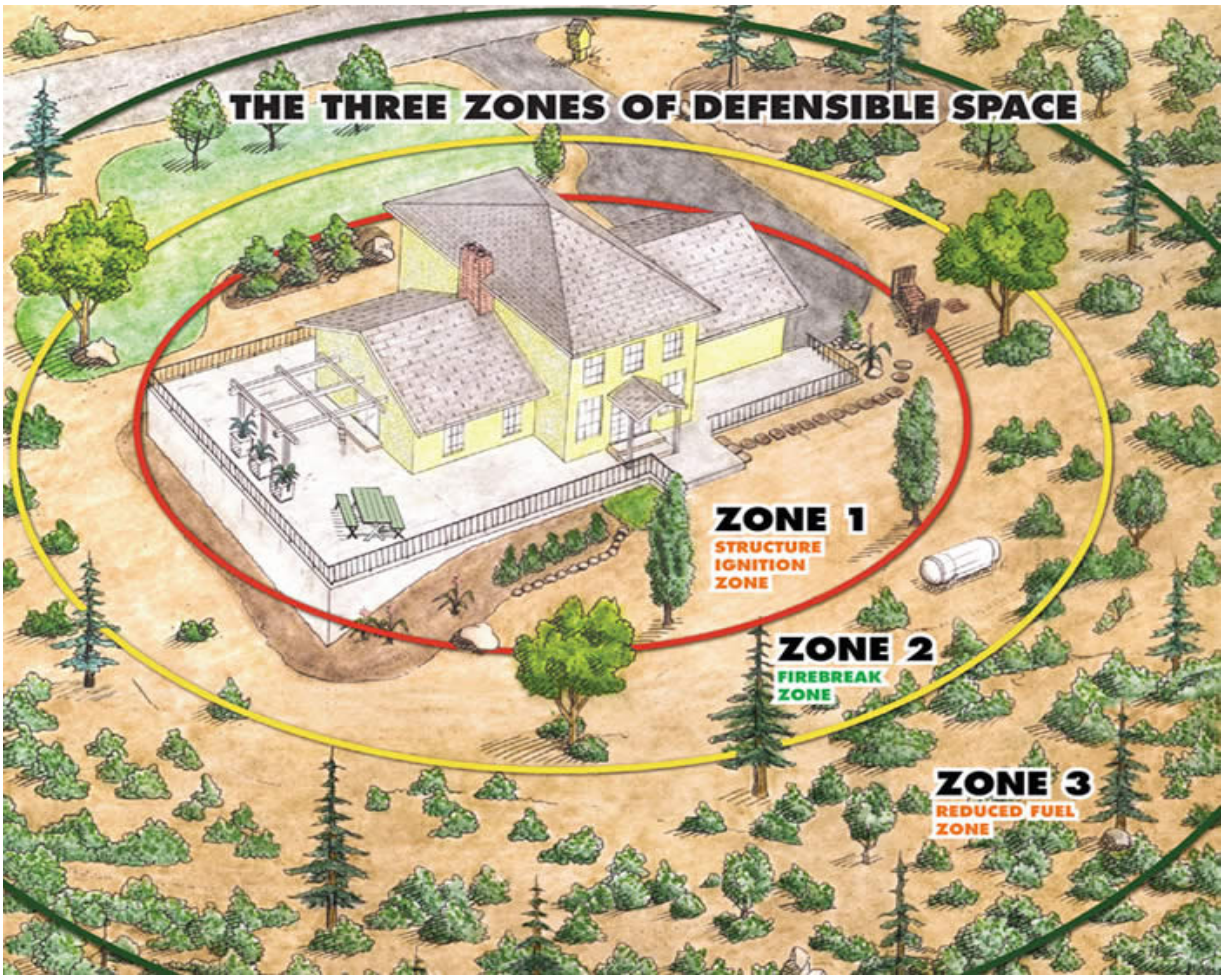
ANSI	American National Standards Institute
AQS	Audit and Quality Services.
BLA	Bureau of Indian affairs
BMP	Best management practices
BOF	Board of Forestry
BPA	Bonneville Power Administration
CA	California
CCR	California Code of Regulation
CDF	California Department of Forestry
CEC	Central Electric Cooperative
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CPUC	California Public Utilities Commission
DBH	Diameter at Breast Height
DMPR	Director of Member and Public Relations
DOE	Director of Operations and Engineering
DLI	Detailed Line Inspections
EAM	Enterprise Asset Management
EOC	Emergency Operation Center
EM	Emergency Manager
ERM	Enterprise Risk Management
FAC	Facilities Design, Connections, and Maintenance
GF	General Foreman
GO	General Order
HFTA	High Fire Threat Area
ICS	Incident Command System
IFPL	Industrial Fire Protection Level
KV	Kilovolt
KWH	Kilowatt Hours
LF	Line Foreman
LMU	Lassen-Modoc Unit
LS	Line Superintendent

MW	MegaWatts
NESC	National Electric Safety Code
NFDRS	National Fire Danger Rating System
NF	National Forest
NV	Nevada
OAR	Oregon Administrative Rules
OH	Overhead
OES	Office of Emergency Services
OEM	Office of Emergency Management
ODF	Oregon Department of Forestry
OPUC	Oregon Public Utility Commission
OR	Oregon
PRC	Public Resources Code
PSPS	Public Safety Power Shutoff
PUC	Public Utilities Commission
QA	Quality Assurance
QC	Quality Control
RFW	Red Flag Warning
ROW	Right of Way
SB	Senate Bill
SEMS	Standardized Emergency Management System
SRA	State Responsibility Areas
T&D	Transmission and Distribution
UG	Underground
USFS	U.S Forest Service-Pacific Southwest
VM	Vegetation Management
VRA	Vulnerability Risk Assessment
WHP	Wildfire Hazard Potential
WMP	Wildfire Mitigation Plan

Appendix C: Defensible Space Requirements – 2017 ORS 177.059[23]

Keeping Safe from Wildfire

- Wildfire is a regular and natural occurrence in Central Oregon (just like the winter snow), so we must prepare our homes and lives.
- Have a "Go Kit" (for when evacuation is necessary) and sign up with reverse 911 with Deschutes County 911 for emergency notifications.
- Prepare your home and property to survive a wildfire.
- Below is a guide to assess your home ignition zone and how to limit the spread of wildfire around your home.



[23] Department of Forestry Ch.629 Div. 44

Immediate zone (zone 1)

- The home and area 0-5’ from the home's furthest attached exterior point is defined as a non-combustible area. Science tells us this is the most important zone to take immediate action on, as it is the most vulnerable to embers. START WITH THE HOUSE ITSELF, then move into the landscaping section of the Immediate Zone.
- Clean roofs and gutters of dead leaves, debris, and pine needles that could catch embers.
- Replace or repair any loose or missing shingles or roof tiles to prevent ember penetration.
- Reduce embers that could pass through vents in the eaves by installing a 1/8-inch metal mesh screening.
- Clean debris from exterior attic vents and install 1/8-inch metal mesh screening to reduce embers.
- Keep under decks and eves clear or screened to prevent the entry of fire embers.
- Repair or replace damaged or loose window screens and any broken windows Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustible materials from accumulating.
- Limit the number of trees directly in contact with the home. Limb branches up above the eave line of the house, especially for evergreen trees. Deciduous trees don’t pose as great of a threat as evergreens, especially when well maintained.
- Move any flammable material away from wall exteriors – mulch, flammable plants, leaves and needles, firewood piles – anything that can burn. Remove anything stored underneath decks or porches. The national standard now is to keep mulch at least 5 feet from combustible construction (decks, siding, etc.) At a minimum, ensure mulch and bark does not come in direct contact with combustible construction.

Intermediate zone (zone 2)

- 5-30’ from the furthest exterior point of the home. Landscaping/hardscaping- employing careful landscaping or creating breaks that can help influence and decrease fire behavior
- Clear vegetation from under large stationary propane tanks.
- Keep woodpiles at least 20 feet from structures.
- Create fuel breaks with driveways, walkways/paths, patios, and decks.
- Keep lawns and native grasses mowed to a height of four inches.
- Remove ladder fuels (vegetation under trees and branches) so a surface fire cannot reach the crowns. Prune trees up to six to ten feet from the ground; shorter trees should not exceed 1/3 of the overall tree height.
- Tree placement should be planned to ensure the mature canopy is no closer than ten feet to the edge of the structure.
- Tree and shrubs in this zone should be limited to small clusters of a few each to break up the vegetation's continuity across the landscape.

Extended zone (zone 3)

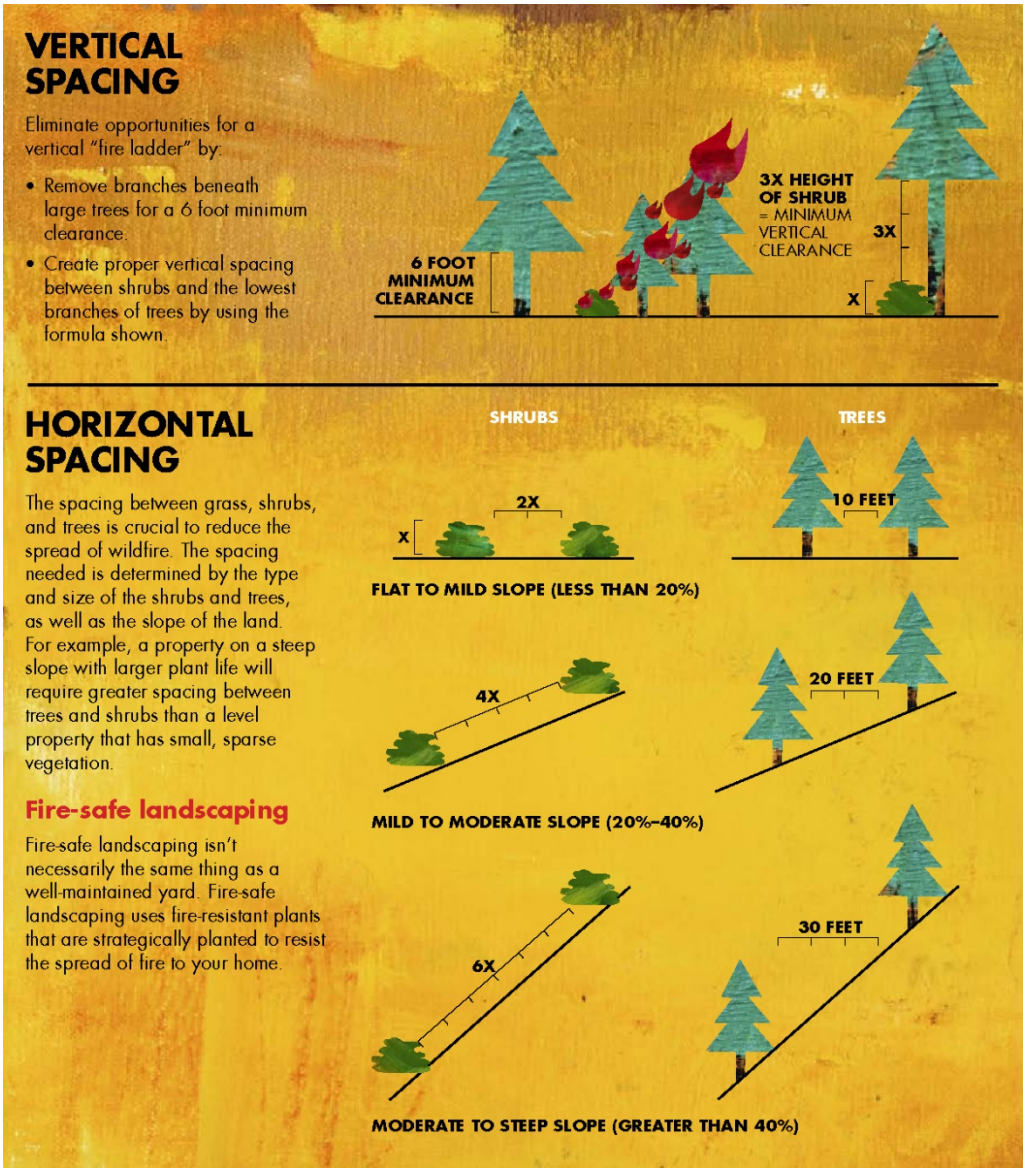
- 30-100 feet, out to 200 feet. Landscaping – the goal here is not to eliminate fire but to interrupt the fire’s path and keep flames smaller and on the ground.
- Dispose of heavy accumulations of ground litter/debris.
- Remove dead plant and tree material.

- Remove small trees growing between mature trees.
- Remove vegetation adjacent to storage sheds or other outbuildings within this area.

Considerations

- The greater the slope of the property, the greater the distances of the zones. If your property is very steep, you may look to increase zone 1 to 10 feet, zone 2 to 60 feet, and zone 3 to 200 feet.
- With a greater slope, the zones may not be equal on all sides of your home. Uphill sides of the house may be less than the downhill sides due to the speed at which fire spreads uphill versus downhill.
- So much of this is a case by case scenario for what is best for each home. Contact your local fire department for an onsite visit and consultation.

Vegetation Spacing Guidelines



Home Ignition Zone Checklist

Appendix D: CEC Trimming and Removal Guidelines

Central Electric Cooperative

Tree to Power Line Clearances

PURPOSE

The purpose of this policy is to comply within the tree trimming rules of ANSI C2, National Electrical Safety Code (NESC) as interpreted by the administrative authority (Reference—NESC Rules 012, 013, and 218 and PUC OAR 860.024.016). This policy is to set forth the specifications and guidelines relating to tree trimming, tree removal, and line clearance to provide for reasonable service continuity, safety to the public, and to guard against forest fire damage caused by supply conductors.

GLOSSARY

1. **Readily climbable** - vegetation having both of the following characteristics:

    a. Low limbs, accessible from the ground and sufficiently close together so that the vegetation can be climbed by a child or average person without using a ladder or other special equipment; and

    b. A main stem or major branch that would support a child or average person either within arms' reach of an uninsulated energized electric line or within such proximity to the electric line that the climber could be injured by direct or indirect contact with the line.

2. **Vegetation** - trees, shrubs, and any other woody plants.

3. **Volts** - nominal voltage levels, measured phase-to-phase.

POLICY

1. Central Electric Cooperative (CEC) will meet 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, CEC's vegetation management program will keep appropriate records to ensure that timely trimming is accomplished to maintain the designated minimum clearances. These records will be made available to the Commission upon request.

2. CEC will trim or remove vegetation to maintain clearances from electric supply conductors.

3. CEC will trim or remove readily climbable vegetation as specified in the specifications section of this rule to minimize the likelihood of direct or indirect access to a high voltage conductor by a member of the public or any unauthorized person.

4. CEC will trim to the extent that the designated minimum clearance area is kept free of new tree growth until the next scheduled trimming cycle. If the trimming cycle is other than three years, as may be needed for fast-growing tree species or where limited trimming is permitted by the tree owner, appropriate records need to be maintained to insure timely trimming is accomplished.

5. Secondary and/or service conductors (600 volts and below) should have at least 1-foot clearance. While extensive tree trimming or tree removal relating to these services is not expected, proper consideration must be given to possible conductor damage and service outages caused by trees, and appropriate measures taken.

6. Tree Removal. Whenever justified, tree removal will be encouraged. Trees should be removed under the following conditions:

   a. Trees located in school yards, playgrounds, parks, backlot construction areas, or other areas and which children may climb easily and contact overhead conductors.

   b. Trees that have been topped under low-level primary and transmission circuits with no chance for a reasonable, natural development.

   c. Trees that are unsightly because of excessive trimming and cannot be economically retrimmed.

   d. Trees in rural areas along county roads and state highways which would eventually reach a primary or transmission line.

   e. Fast-growing tree species located in suburban and urban areas, near homes or in landscaped.

   f. Trees, both live and dead, which are leaning toward the line and which would strike the line when falling.

7. **Specifications**

   Under reasonably anticipated operational conditions, CEC will, as an electric supplier, maintain the following minimum clearances of vegetation from conductors:

   a. Ten feet for conductors energized above 50,000 volts.

   b. Five feet for conductors energized at 600 through 50,000 volts.

   c. Clearances may be reduced to three feet if the vegetation is not readily climbable.

d. Intrusion of limited small branches and new tree growth into this minimum clearance area is acceptable provided the vegetation does not come closer than six inches to the conductor.

e. For conductors energized below 600 volts, an operator of electric supply facilities must trim vegetation to prevent it from causing strain or abrasion on electric conductors. Where trimming or removal of vegetation is not practical, CEC will install suitable material or devices to avoid insulation damage by abrasion.

f. In determining the extent of trimming required to maintain the clearances required in the specifications section of this rule, CEC will consider at minimum the following factors for each conductor:

   i. Voltage;

   ii. Location;

   iii. Configuration;

   iv. Sag of conductors at elevated temperatures and under wind and ice loading; and

   v. Growth habit, strength, and health of vegetation growing adjacent to the conductor, with the combined displacement of the vegetation, supporting structures, and conductors under adverse weather or routine wind conditions.

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Appendix E: Fire Tools Requirements

Hand Tools (ORS 477.655, OAR 629-043-0025)**:** Supply hand tools for each operation site - 1 tool per person with a mix of pulaskis, axes, shovels, hazel hoes. Store all hand tools for fire in a sturdy box clearly identified as containing firefighting tools—supply at least one box for each operating area. Crews of 4 or less are not required to have a fire tools box as long as each person has a shovel suitable for fire-fighting and available for immediate use while working on the operation.

Fire Extinguishers (ORS 477.655, OAR 629-43-0025)**:** Each internal combustion engine used in operation, except power saws, shall be equipped with a chemical fire extinguisher rated as not less than 2A:10BC (5 pounds).

Power Saws (ORS 477.640, OAR 629-043-0036): Power saws must meet Spark Arrester Guide specifications - a stock exhaust system and screen with < .023-inch holes. The following shall be immediately available for prevention and suppression of fire:

- One gallon of water or pressurized container of fire suppressant of at least eight-ounce capacity
- 1 round pointed shovel at least 8 inches wide with a handle at least 26 inches long
- Keep the power saw at least 20' from the place of fueling before started

Spark Arrestors and Mufflers (ORS 477.645, OAR629-043-0015): All non-turbocharged engines must meet the Spark Arrester Guide specifications except:

- Fully turbocharged engines.
- Engines in motor vehicles operating on improved roads equipped with an adequate muffler and exhaust system.
- Engines in light trucks (26,000 GVW or less) equipped with an adequate muffler and an exhaust system.
- Engines in heavy trucks (greater than 26,000 GVW) equipped with an adequate muffler and exhaust system.
- If a truck engine is not fully turbo-charged, then the exhaust must extend above the cab and discharge upward or to the rear of the truck frame.
- Water pumping equipment is used exclusively for fighting a fire.
- Engines of 50 cubic inch displacement or less, except ATV's and motorcycles, shall be equipped with an adequate muffler and an exhaust system.
- ATVs and motorcycles must be equipped with an adequate muffler and exhaust system or an approved screen, which completely encloses the exhaust system.

- Power saws. (See power saw requirements)

Tank Truck or Trailer: During the Fire Precautionary Period, CEC or their contractor will have access to a 300-gallon water tank truck/trailer or similar.

Fire Watch Service: (ORS 477.665, 629-043-0030) Each operation area is to have a Firewatch. A fire watch shall be on duty during any breaks (up to 3 hours), and for three hours, after the operator's power-driven machinery has been shut down for the day[24]. A fire watch shall:

- Be physically capable and experienced to operate firefighting equipment.
- Have facilities for transportation and communications to summon assistance.
- Observe all portions of the operation on which activity occurred during the day. Upon discovery of fire, Firewatch personnel must: First report the fire, summon any necessary firefighting assistance, describe intended fire suppression activities, and agree on a checking system; then, after determining a safety zone and an escape route not cut off if the fire increases or changes direction, immediately proceed to control and extinguish the fire, consistent with firefighting training and safety.

CEC ensures that the following equipment is on-site during VM work:

- One ax not less than 26" in length with a head weight of at least two pounds.
- One shovel not less than 26" in length with a blade at least 8" wide.
- One water container of at least five gallons filled or a five-pound Class A fire extinguisher fully charged.
- One pumper truck with a capacity of 200 gallons and capable of pumping a minimum of 50 gallons per minute. Pumper shall include a minimum of 100' of 1.5" hose. This truck is required when using chippers, chainsaws, or when working with any spark emitting equipment.
- A one-hour fire watch of the project area is required upon completion of the maintenance work.

CEC will notify Central Oregon Dispatch and respective Field Manager before dispatching maintenance crews to an area.

[24] Note: Some ODF districts waive this requirement based on the IFPL in place