West Oregon Electric Cooperative, Inc

A Touchstone Energy® Cooperative
The power of human connections®

June 28th, 2022

Oregon Public Utilities Commission

PO Box 1088

Salem, OR 97308-1088

To Whom it May Concern,

The West Oregon Electric Cooperative Board of Directors approved West Oregon Electric's Wildfire Risk Mitigation Plan during it's June 28th, 2022 board meeting.

Sincerely,

Erika Paleck

Chair, WOEC Board of Directors

2022 WILDFIRE MITIGATION PLAN

WEST OREGON ELECTRIC CO-OP

DATE: JUNE, 2022

REVISION: V0

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1 Introduction/Executive Summary

Oregon has experienced some of the most devastating and catastrophic wildfires in the country. These unusually large wildfires are on the rise in the PNW with an increase in fires in west-side conifer forests. In the western U.S. region encompassing the PNW, the annual probability of very large fires is projected to increase by a factor of 4 in 2041-2070 compared to 1971-2000[1].

As a result of this increased wildfire danger the Oregon legislature passed Senate Bill 762 which Gov. Kate Brown signed into law in 2021. SB 762 establishes new programs to fight and mitigate wildfires, bolster recovery, help communities adapt to smoke, and implement changes to the state's building code for structures within high-risk areas in the wildland-urban interface (WUI). It also requires consumer owned electric utilities develop risk-based wildfire mitigation plans and submit them to the Oregon Public Utility Commission (OPUC) by June 30, 2022.

For WOEC, which aims to protect public safety and preserve the reliable delivery of electricity, wildfire mitigation is without question a top priority. While an electric utility can never fully eliminate the risk of fire, WOEC is committed to taking all practical actions available to it to prevent the devastation that a wildfire could bring to the people and communities we serve. This wildfire mitigation plan lays out the steps we are taking to do so.

[1] Northwest Climate Adaptation Science Center

1.1 Purpose of the Plan

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

WOEC's Board of Directors reviews and approves the Plan as needed, while the Engineering and Operations Manager (EOM) is responsible for its implementation.

1.2 Objectives of the WMP

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

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

1.3 Utility Profile and History

The history of West Oregon Electric is one of the finest examples of the cooperative spirit; the spirit of determination. The West Oregon Electric Cooperative was formed as a not-for-profit, member-owned corporation founded on March 9, 1944, with a meeting of seven men in Vernonia's Bush Hall. With Rural Utility Service (RUS) loans, the seven men combined several small electric cooperatives in the Nehalem Valley and Timber areas. They also purchased the Oregon Gas & Electric Company that served the Vernonia area and even bought facilities from the Clatskanie People's Utility District (PUD).

As a utility cooperative, WOEC is governed by a seven-member popularly elected Board of Directors that determines policy and appoints the General Manager who is responsible for WOEC's overall management and operations. WOEC owns, operates, and has ownership interests that are critical to maintaining the flow of power through the transmission lines to WOEC's service area.

WOEC was formed to meet the needs of the people in our communities, and we continue to build new lines to growing membership. Although the electric needs of our members have changed dramatically since the 1940's, we will continue to meet the challenges of a twenty-first

century membership, while providing a resourceful and reliable system at the lowest possible cost.

With a total annual retail load of approximately 66 million kilowatt hours (kWh) for the year ending December 31, 2019, WOEC's annual peak load has averaged 15,677 Megawatts (MW) over the last three years. WOEC is an "All Requirements Customer" of Bonneville Power Administration (BPA) through PNGC Power[2]. This arrangement allows WOEC to purchase carbon free power wholesale from BPA.

1.4 The Service Area

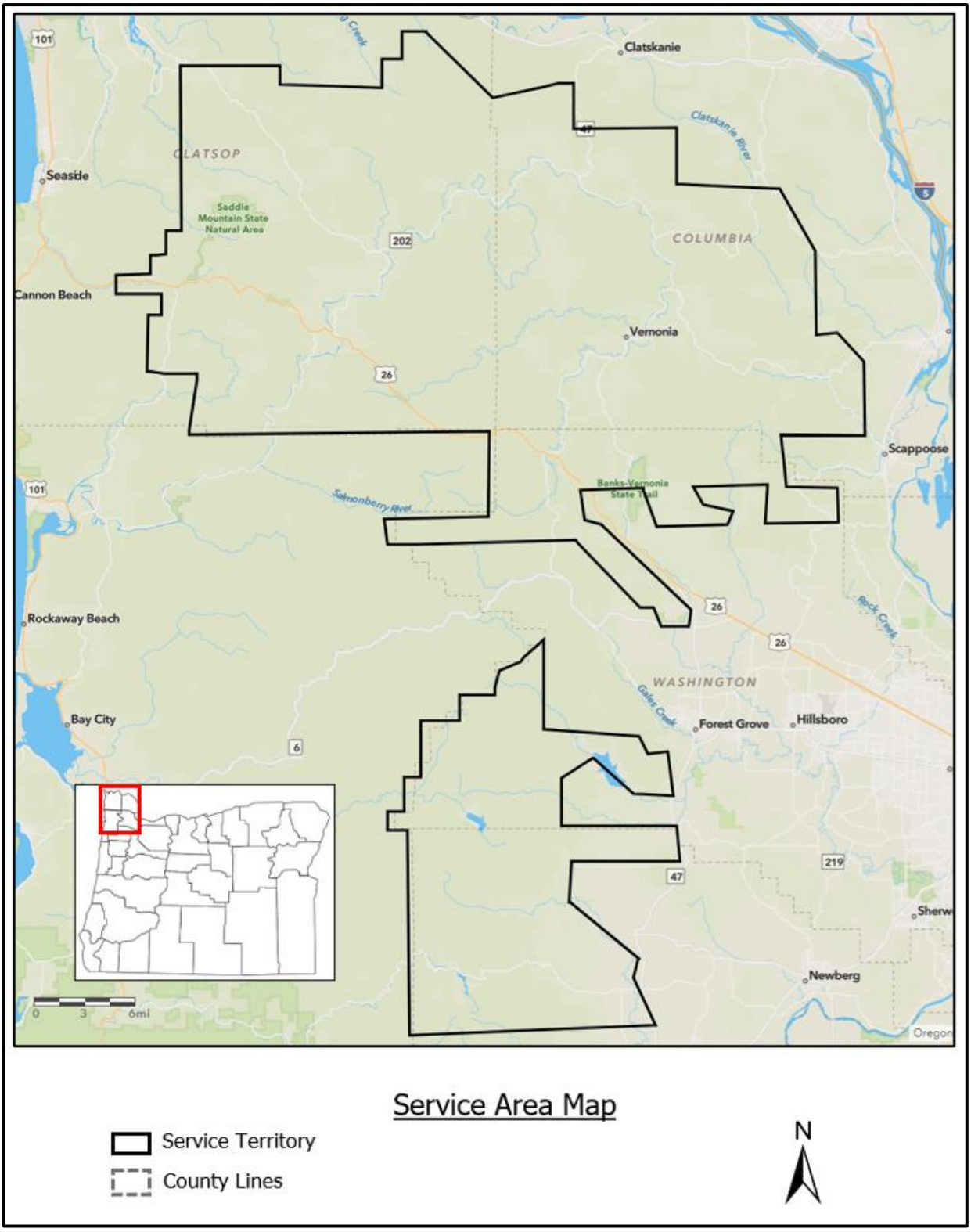
Operating from office and storage facilities located in Vernonia, Oregon, WOEC transmits and distributes electricity within a 1,224 square-mile territory made up of a rugged, very rural, and forested landscape. The overall distribution system spans 55 miles north to south, and approximately 50 miles east to west, with an elevation range from ~175 feet near the coast to ~1,200 feet in the mountains in the easter region.

The majority of the service area consists of a rural environment with private tree farm properties, and small, family farms. Rugged, heavily treed topography and poor access in some areas can make outage restoration and asset inspection difficult.

The warm season lasts for 3.1 months, from June 21 to September 24, with an average daily high temperature above 69°F. The hottest month of the year in Vernonia is August, with an average high of 74°F and low of 51°F. The dry season lasts 5.2 months, from May 7 to October 12. The month with the fewest wet days is July, with an average of 2.5 days with at least 0.04 inches of precipitation. The windier part of the year lasts for 4.6 months, from October 31 to March 17, with average wind speeds of more than 4.7 miles per hour. The windiest month of the year in is December, with an average hourly wind speed of 5.4 miles per hour.

[2] PNGC Power is an Oregon-based electric generation and transmission (G&T) cooperative owned by 16 Northwest electric distribution cooperative utilities with service territory in 7 western states.

Figure 1. Service Area



1.5 Utility Asset Overview

WOEC's electric system supplies power to approximately 4,450 meters and 3,800 members in portions of five counties in northwest Oregon.

WOEC has 65 miles of transmission line operating at 34.5kV, 471 miles of 12.5kV/7.2kV overhead (OH) distribution line and 169 miles of 12.5kV/7.2kV underground (UG) line. The distribution system is comprised 4, 34.5kV and 2, 115kV substations.

WOEC is an "All Requirements Customer" of Bonneville Power Administration (BPA) through PNGC Power. This arrangement allows WOEC to purchase carbon free power wholesale from BPA. This power supplied to WOEC bulk power substations through a 115kV transmission system and is distributed throughout parts of Clatsop, Columbia, Tillamook, Washington, and Yamhill Counties.

Table 2 provides a high-level description of WOEC's T&D assets.

Table 1. Asset Overview

ASSET CLASSIFICATION	ASSET DESCRIPTION
Transmission Line Assets	Approximately 65 miles of conductor, transmission structures and switches at 34.5 kilovolt (kV).
Distribution Line Assets	Approximately 471 miles of overhead (OH) and 169 miles of underground (UG) conductor, cabling, transformers, voltage regulators, capacitors, switches, lined protective devices operating at or below 12.5kV.
Substation Assets	Major equipment such as power transformers, voltage regulators, capacitors, reactors, protective devices, relays, open-air structures, switchgear, and control houses in 6 substation/switchyard facilities.

WOEC Substation

2 Overview of Utility's Fire Prevention Strategies

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

Table 1 summarizes WOEC's five mitigation components with associated programs and activities that support WOEC's ongoing commitment to wildfire prevention and mitigation.

Table 2. Mitigation Strategies/Activities

DESIGN AND CONSTRUCTION
Strategic undergrounding of distribution lines
Field recloser to vacuum-type breaker change-out program
Animal guards
Increase overhead wire spacing to reduce wire to wire contact
Substation perimeter fencing for security and protection
INSPECTION AND MAINTENANCE
Infrared inspections of substation equipment
Unmanned Aerial Vehicle (UAV) T&D line inspections
Wood pole intrusive inspection and testing
Enhanced T&D vegetation right-of-way maintenance (Mowing)
Distribution system line patrols and detailed inspections
T&D system vegetation management program
Increased removal rate of undesirable vegetation on right-of-way
Enhanced awareness and removal of danger trees within and outside of the ROW
Enhanced line patrols during fire season

OPERATIONAL PRACTICES
Work procedures and Fire Hazard training for persons working in locations with elevated fire risk conditions
Community outreach/wildfire safety awareness
Contractor/staff safety training and orientation for vegetation management work
Alternate recloser practices during fire weather
Fire suppression equipment on worksite during fire season
Provide liaison to county offices of emergency services (OES) during fire event
SITUATIONAL AWARENESS
Weather Monitoring in the service area
Utility-owned weather stations (2023)
Monitoring active fires in the PNW
RESPONSE AND RECOVERY
Pre-emptive de-energization protocols
Coordination with local Department of Emergency Management, ODF
Line patrols before re-energization

3 Risk Analysis and Risk Drivers

In order to establish a baseline understanding of the risks and risk drivers involved, WOEC looked at all aspects of WOEC's exposure to fire related hazards. Although there are inherent risks in the operation of an electric utility, it is possible to put in place strategies and processes to better manage them. The overall goal is to determine the residual risk level after all mitigation factors have been applied to the initial inherent risk. After identifying key risk factors, WOEC incorporated best available utility practices where necessary to bolster existing mitigation strategies and programs. Most WOEC outages are either tree related or from underground primary circuit failure due to aging infrastructure.

3.1 Fire Risk Drivers Related to Construction and Operations

WOEC staff evaluated other utility's fire causes and applied its own field experience to determine the critical potential risk drivers. The categories listed below were identified as having the most potential for causing powerline ignitions in the WOEC service area:

- Animal contact, especially squirrels
- Age of assets
- Third party contact
- Car-pole contact

3.2 Fire Risk Drivers Related to the Service Area

WOEC serves customers across rugged terrain with millions of trees and connected in some cases by gravel roads. All conductor in the service area is bare wire; there is no covered or tree wire currently in use. Although there are no wide-spread forest health issues affecting trees in the service area, tree failure is their primary cause of outages.

Within the WOEC service area, the following risk drivers are noted:

- Tree and limb failure
- High winds
- Occasional lightning
- Occasional Red Flag Fire Weather conditions
- At times, limited accessibility due to road conditions, topography, and weather

3.3 Key Risk Impacts

Ignitions caused by the aforementioned Risk Drivers 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
- Damage and loss of WOEC owned infrastructure and assets
- Impacts to reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to WOEC's reputation and loss of public confidence
- Environmental damage from wildfires
- Air quality impacts from going wildfires

3.4 Climate Change

The Fourth National Climate Assessment, published in 2018, states that 2015 temperatures were 3.4°F above normal (as compared to the 1970-1999 average) with winter temperatures 6.2°F above normal. The warm 2015 winter temperatures are illustrative of conditions that may be considered "normal" by mid or late century. The lack of snowpack in 2015 in concert with extreme spring and summer precipitation deficits led to the most severe wildfire season in the Northwest's recorded history with more than 1.6 million acres burned across Oregon and Washington[3].

Climate change can affect forests by altering the frequency, intensity, duration, and timing of fire, drought, introduced species, insect and pathogen outbreaks, windstorms, ice storms, or landslides (Dale et al. 2001). Potential climate change effects on this ecosystem would likely include a shift to plant species more common on hotter, drier sites. The average annual temperature is projected to continue to increase in the Pacific Northwest along with the increasing number and severity of wildfires and insect outbreaks[4]. Rising temperatures are likely to increase bark beetle survival (WOEC has not seen any issues related to bark beetles), but climate-induced changes to other insects and forest pathogens are more varied and less certain. Increased temperatures will have positive or negative effects on individual trees and forest-wide processes, depending on local site and stand conditions, but impacts from increased extreme heat will be negative.

[3] NCEI, 2018: Climate at a Glance. Regional Time Series: Northwest Climate Region, Average Temperature, January–December 2015

[4] (McKenzie et al. 2004, 2008, Westerling et al. 2006, Mote et al. 2014, Shafer et al. 2014)

3.5 Wildfire History and Outlook

A query of historic fire data proximate to the WOEC service area indicates that the predominant cause of fires is Debris Burning, followed by Equipment Use (machinery), and Campfires. This information comes from a collection of fire data compiled from multiple sources including USFS, ODF, and others. In this data set, there were no ignitions within the bounds of the WOEC service area attributed to "powerlines"[5].

Through a climate change shift, the fire risk season has extended in Oregon. It is now typical to enter a higher risk of fire in June and can easily extend through October. Although WOEC is not known to have been the source any wildfires, the potential is present, and due to changing weather conditions, increasingly possible. Utility caused wildfires have occurred near the WOEC service area, highlighting the fact that the risk is present.

Fire suppression is provided by ODF, the Bureau of Land Management (BLM) and several local Fire Protection Districts including:

- Clatskanie Fire Protection District
- Vernonia Fire Protection District
- Columbia County Fire Protection District
- Clatsop County Fire Protection District
- Washington County Fire Protection District
- Mist Birkenfeld Rural fire Protection District

[3] Interagency Fire Perimeter History - All Years | Interagency Fire Perimeter History - All Years | National Interagency Fire Center (arcgis.com)

3.5.1 Wildland Urban Interface

The United States Forest Service (USFS) defines the wildland urban interface (WUI) as a place where humans and their development meet or intermix with wildland fuel. Communities that are within 0.5 miles of the zone are included. According to the USDA Forest Service, the area considered WUI has expanded 39% in Oregon from 1990 to 2010, with the number of homes increasing by 53.6%[6]. There are now over 595,000 homes in Oregon located in the WUI[7].

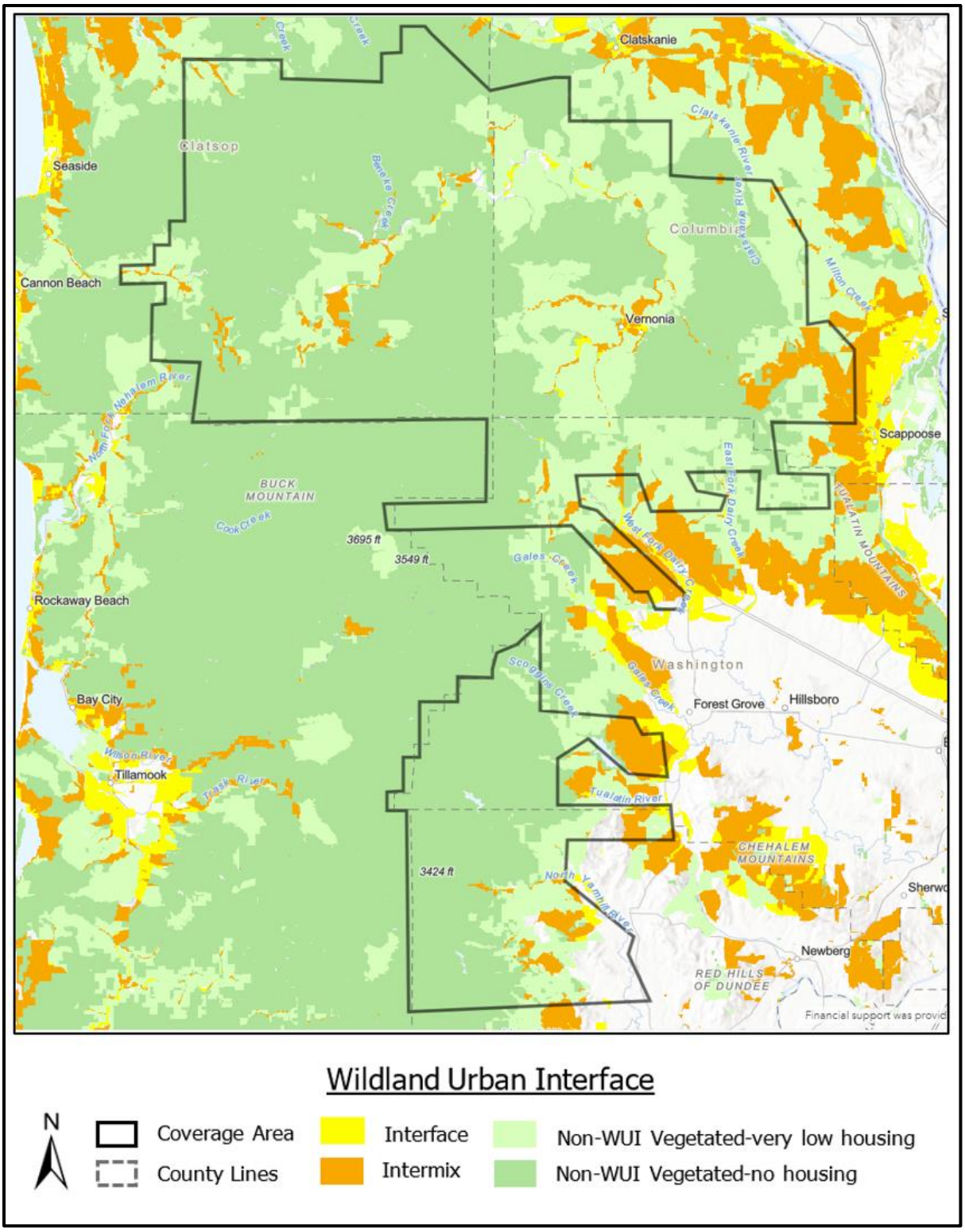
The WUI is composed of both interface and intermix communities. The distinction between these is based on the characteristics and distribution of houses and wildland vegetation across the landscape. Intermix WUI refers to areas where housing and wildland vegetation intermingle, while interface WUI refers to areas where housing is in the vicinity of a large area of dense wildland vegetation. Figure 2 illustrates the distribution of WUI areas in the service area.

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

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

[6] https://www.nrs.fs.fed.us/data/wui/state_summary/
[7] https://www.nrs.fs.fed.us/data/wui/state_summary/

Figure 2. Wildland Urban Interface



3.6 Fire Threat Assessment Mapping

The Wildfire Hazard Potential (WHP) map[8] (figure 3) is derived from a 270-meter resolution raster geospatial dataset produced by the USDA/USFS, Fire Modeling Institute that can help to inform evaluations of wildfire risk or prioritization of fuels management needs across very large landscapes.

The specific dataset used in this plan is the Wildfire Hazard Potential[9] Version 2020, which is the third edition of the WHP product and depicts landscape conditions of the conterminous United States as of the end of 2014. WHP was built upon spatial datasets of wildfire likelihood and fire intensity using the Large Fire Simulator (FSim), as well as spatial fuels and vegetation data from Landfire 2014, and point locations of historic fire occurrence (ca. 1992-2015).

The specific objective of the WHP map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain. Areas mapped with higher WHP values represent fuels with a higher probability of experiencing torching, crowning, and other forms of extreme fire behavior under conducive weather conditions, based primarily on landscape conditions at the end of 2014.

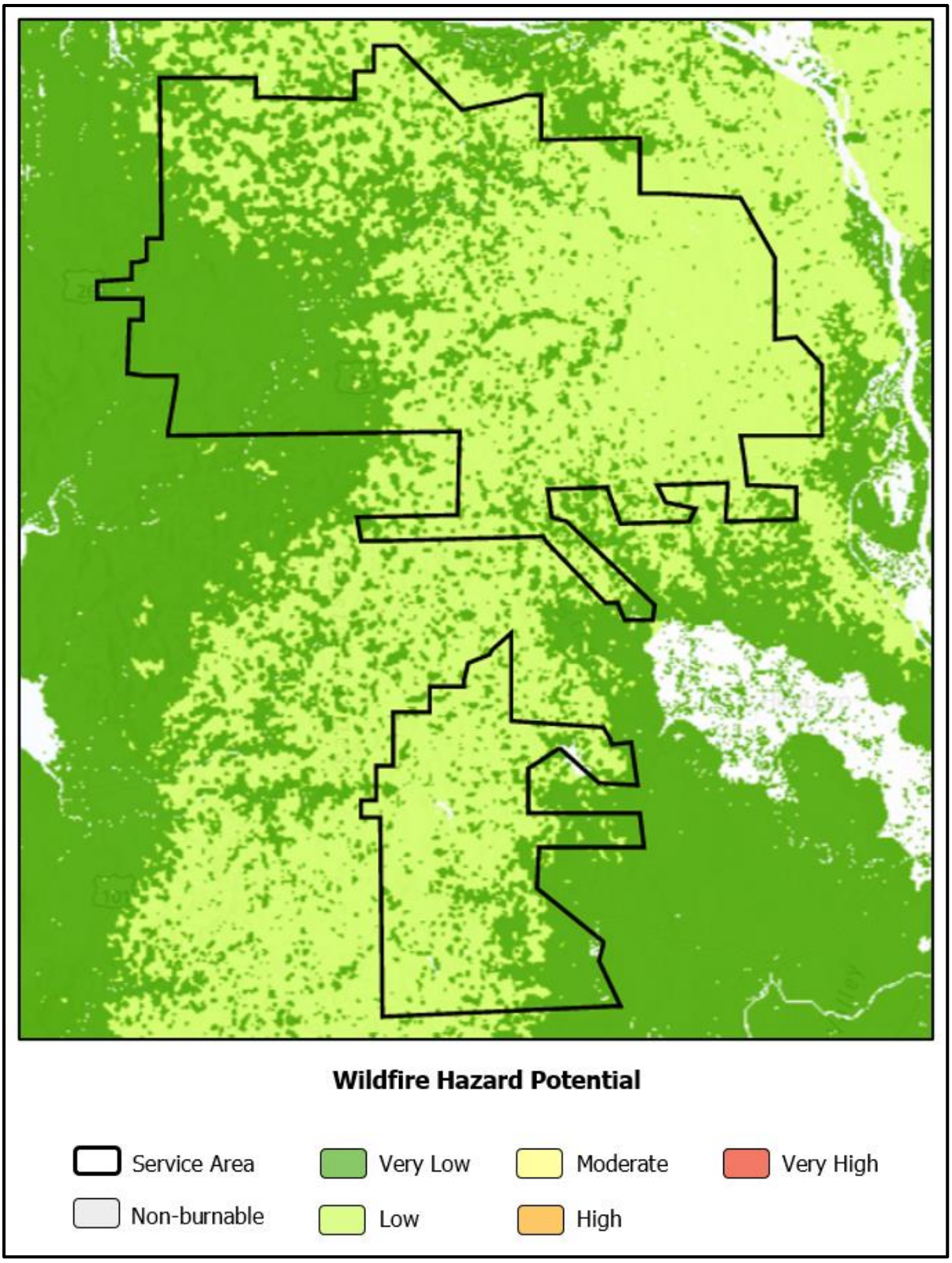
Risk levels vary across the service area landscape, but on a scale of 1 (lowest) to 5 (highest), the highest WHP score for any location in the service area is 2-Low. The average risk score is 2-Low.

On its own, WHP is not an explicit map of wildfire threat or risk, but when paired with spatial data depicting highly valued resources and assets such as structures or powerlines, it can approximate relative wildfire risk to those specific resources and assets. The data described here are derived from wildfire simulation modeling, and their exact accuracy cannot be measured. They are intended to be relative measures of wildfire risk for planning purposes.

[8] https://www.firelab.org/project/wildfire-hazard-potential

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

Figure 3. Wildfire Hazard Potential



Aerial View of WOEC Substation

4 Wildfire Prevention Strategy and Programs

This chapter outlines WOEC's existing fire mitigation efforts and identifies new processes and new programs WOEC may employ moving forward. Some of these programs are multi-year and programmatic, while others are situational and based on environmental conditions such as Red Flag Warnings or other high fire risk conditions. WOEC's community outreach efforts are also discussed. WOEC continues to explore new technologies and approaches to determine their ability to reduce the probability of an ignition and improve system reliability. WOEC updates its practices as new information emerges and then adopts improved strategies.

WOEC will employ the following practices and protocols to minimize its risk of causing wildfire ignitions.

- PSPS per request by ODF
- Recloser operational practices
- High impedance fault protection
- Pilot programs
    - Currently in the process of siting six Remote Automated Weather Stations (RAWS) in conjunction with Clatskanie, Vernonia, Columbia County Fire and ODF. WOEC is providing property suitable for RAWS siting and will have full access to the weather data when it becomes available, possibly by the 2023 fire season.
- Inspection programs including reduced intervals, tracking, record keeping, etc.
- Pole testing
- Vegetation management provided by contractors

4.1 Transmission and Distribution System Operational Practices

4.1.1 De-energization – Public Safety Power Shutoff

In the past, WOEC has been responsive to ODF requests to de-energize electric facilities. During one such event, power was turned off overnight, back on during daylight hours and then turned off again the following night. Patrols were conducted and vegetation issues resolved in each case prior to re-energization. There were no ignitions resulting from any WOEC electric facilities during this time.

On a case-by-case basis, WOEC 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 key local partner agencies; however, the final determination is made by WOEC.

4.1.2 Recloser Operational Practices

When high fire risk conditions exist in the service area, such as during Red Flag Warnings or when a declaration of Extreme Fire Danger is declared by ODF, WOEC disables automatic reclosing throughout the system as a risk reduction measure.

Reclosers are set to "one-shot" or non-reclose at substations level. As WOEC does not have remote recloser setting capability, these operations are manual and take a full day to complete. This practice increases the risk for power to be interrupted for longer than usual, but significantly decreases the risk of fire posed by auto reclosing, or manual testing.

Historically, ODF has called WOEC with these requests, or if time allows sends an email requesting an adjustment of recloser settings.

4.1.3 Situational Awareness

Situational assessment is the process by which current operating conditions are determined. Situational Awareness is the understanding of the working environment, which creates a foundation for successful decision making and the ability to predict how it might change due to various factors.

Examples of situational assessment sources are; remote automatic weather stations (RAWS), daily web-based fire weather monitoring, Industrial Fire Precaution Level monitoring, current fire incident tracking (InciWeb), NWS forecasting for wind and temperature, USFS-Wildland Fire Assessment System, and Red Flag Warning alerts.

The OEM relies on various resources to monitor evolving fire weather, climatological conditions that may lead to fire events, as well as ongoing fires in the region that may affect the service area. Sources for weather information include, but are not limited to the following:

- **USFS-Wildland Fire Assessment System (WFAS):** For immediate and short-term situational awareness, mapping tools from the USFS-WFAS help determine daily and short-term forecasted risk, with daily or weekly fire weather status maps produced as needed to assess PNW wildfire conditions.
- **The National Weather Service (NWS):** The NWS provide on-line predictive fire weather forecasting tools in the form of a current fire-weather outlook, 2-day, and a 3-8 day outlook.
- **NOAA Weather and Hazards Data Viewer:** This on-line map provides historic or real-time surface observations including wind speed and direction, wind gust, dew point, relative humidity, and sea level pressure collected from remote automated weather stations (RAWS). Extreme-weather alerts such as fire weather watch, high wind watch, and red flag warning are provided from this resource.
- **WOEC Weather Stations:** ODF and other local agencies are working with WOEC to cite and install six new remote automated weather stations throughout the service area.

These stations will be monitored remotely and provide temperature, wind speed, wind direction, barometric pressure, and relative humidity. RAWS are expected to be operational by 2023.

4.1.4 Remote Automated Weather Stations

Remote Automatic Weather Stations (RAWS) are self-contained, portable, and permanent, solar powered weather stations that provide timely local weather data used primarily in fire management. Although there are over 100 RAWS strategically located throughout the Oregon, there is a very limited number located in and around the WOEC service area. The Oregon Department of Forestry (ODF), along with Columbia County Fire, Columbia County, City of Clatskanie, and the City of Vernonia, is working in coordination with the WOEC to locate and install 6 RAWS on WOEC property in the northwest Oregon area. The new weather stations, which are anticipated to be operational by 2023, will provide WOEC real-time weather data to improve its situational awareness and assist in making operational decisions. RAWS stations generally provide the following information:

- Air temperature
- Relative humidity
- Wind speed and direction
- Fuel moisture and temperature
- Precipitation
- Dew point

4.2 Infrastructure Inspections and Maintenance

Recognizing the hazards of equipment that operate high voltage lines, WOEC maintains a formal inspection and maintenance program for distribution, transmission, and substation equipment which play an essential role in wildfire prevention. WOEC currently patrols its system regularly and is increasing the frequency of inspections in high-risk areas.

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

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

Table 3 summarizes the inspection schedule for all assets, while the following sections outline inspection practices for the utility.

Table 3. Inspection Program Summary

ASSET CLASSIFICATION	INSPECTION TYPE	FREQUENCY
Transmission	Routine Safety Patrol Inspection	2 years
	Detailed Inspection	5 years
	Wood Pole Testing	10 years
Overhead Distribution	Routine Safety Patrol Inspection	2 years
	Detailed Inspection	5 years
	Wood Pole Testing	10 years
Underground Distribution	Routine Safety Patrol Inspection	2
Substation	Routine Inspection	3
	Detailed Inspection	3 months

4.2.1 Definition of Inspection Levels

1. **Routine Safety Patrol Inspection:** A simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.

2. **Detailed Inspection:** Individual pieces of equipment and structures are carefully examined visually, or through use of routine diagnostic testing.

3. **Intrusive Pole Inspection:** Inspections involving the movement of soil, taking samples of the wood pole for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections.

4.2.2 Routine Safety Patrol Inspections

Electric utility operators must perform Public Safety patrol inspections of overhead electric supply lines and accessible facilities as established in OAR 860-0240-0011 (2)(c). WOEC meets or exceeds this requirement by using personnel trained in the identification of safety hazards and NESC rules associated with utility assets.

Currently, inspection tracking is done using spreadsheets, billing documents and paper maps. Deficiencies are corrected according to a hazard classification schema.

The following is a listing of items checked while performing routine safety inspections:

- Low clearance of primary conductor, secondary wires, and service drops
- Objects too close to electric lines
- Encroachments
- Physical damage to facilities
- Deterioration of facilities

4.2.3 Detailed Inspections of Transmission and Distribution Lines

Detailed inspections are performed by WOEC personnel trained in the identification of safety hazards and NESC rules associated with an electric utility's assets. These inspections meet or exceed the detailed inspection schedule established in OAR 860-0240-0011(b) (A), which has a requirement of a minimum 10% of system coverage on an annual basis

Inspection of areas considered at higher fire risk near the wildland urban interface receive enhanced patrol on a biannual schedule. All primary UG connections and elbows receive a detailed inspection including visual and infra-red inspection of components.

When issues are found during these inspections, they are identified to Operations for correction. When "immediate hazard" issues are identified, they prompt an immediate response and correction.

Line Inspections consist of UAV footage, foot patrols, and all-terrain vehicle patrols to examine WOEC poles, crossarms, conductors, and equipment. Visual aids assist with evaluating and detecting potential damage to above-ground components. Inspectors look for visible signs of defects, structural damage, broken hardware, abnormally sagging lines, and wildlife contacts. Any anomalies found are addressed based on the severity of the defect. The T&D line inspection also provides ground-level evaluation of ROWs, access roads, and vegetation-to-conductor clearances. The information accumulated informs planning and scheduling of future maintenance to avoid major faults and ignition potential.

WOEC considers and prioritizes maintenance work by assessing the most urgent needs. The inspectors will document the overhead systems' condition, recording defects, deterioration, safety concerns, or any other factors requiring attention on the inspection records. The inspections focus on any hazards that could affect the system's integrity or the safety of line workers and the public. Detailed recordkeeping of areas inspected, violations or hazards identified, and corrections performed are retained in electronic and hard-copy format.

4.2.4 Wood Pole Testing and Inspection

To maintain WOEC's wood poles, a formal Wood Pole Assessment Plan was initiated. Wood pole inspections are carried out on a planned basis to determine whether they have degraded below National Electric Safety Code (NESC) design strength requirements with safety factors.

A third-party contractor inspects and tests all poles on a 10-year cycle meeting the interval recommended in RUS Bulletin 1730B-121. Circuits are identified, mapped, and scheduled for inspection and testing using latest industry standards and practices. If a pole must be replaced or reinforced for any reason, a priority code is assigned and entered into records for correction.

In addition to the condition of the wood poles, contractors are also looking for visible signs of defects, structural damage, broken hardware, abnormally sagging lines, damage or missing guys and bracing, and wildlife contacts.

4.2.5 Substation Inspections

The Preventive Maintenance Plan provides for regular inspections of WOEC substations on a 90-day cycle. Qualified personnel will use prudent care while performing inspections following all required safety rules to protect themselves, other workers, the general public, and the system's reliability.

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

4.2.6 Unmanned Arial Vehicle Inspections

Many of WOEC's T&D lines and structures are quite remote and access can be difficult. Due to the cross-county alignment and difficulty in accessing many of WOEC's T&D lines, unmanned aerial vehicles (UAVs) have been integrated into the asset inspection program. In-house WOEC pilots conduct UAV inspections on T&D ROWs using high-resolution cameras allowing for detailed examinations of structures and equipment not easily visible from the ground.

The height and voltage levels of the equipment as well as conditions on the ground limit how close an inspector can approach without de-energizing the lines. UAV inspection does not require de-energizing, bucket trucks, foot or ATV patrols or linemen to climb structures. The result is a faster, more detailed inspection process that improves worker safety and system reliability while reducing man hours and overall maintenance cost.

The Co-op has acquired 2 UAVs equipped with high-resolution cameras allowing for detailed inspections of crossarms, pole tops, hardware, and equipment not visible from the ground. WOEC-owned UAVs, piloted by in-house operators, are used for routine asset inspection, post storm inspection, trouble-shooting outages and a general enhancement of the situational information gathering ability of the operations department. Four WOEC crew members are FAA 14 CFR Part 107 Remote Pilot Certified UAV operators in compliance with all FAA regulations.

The VM program has benefited as well, as this technology greatly expedites inspection cycles and hazard tree identification, especially in the areas with limited access and steep terrain. A

visual record of ROW conditions is created during the inspection process enabling WOEC to audit tree work and monitor changes in vegetation profiles.

4.2.7 Prioritization of Repairs

WOEC prioritizes maintenance work for public safety and reliability; this process follows OPC guidelines. The inspector will document the overhead and underground system condition, recording defects, deterioration, violations, safety concerns, or any other factors requiring attention on the inspection records. The inspection should focus on any hazards that could affect the system's integrity or the safety of line workers and the public.

Inspection data (overhead & underground) will be prioritized and issued as follows per OAR 860-024-0012[10] 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.
- **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.
- **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 until the next major work activity.

4.2.8 Industrial Fire Precaution Levels

When conditions of fire hazard exist each summer, Oregon Department of Forestry, United States Forest Service, or the Bureau of Land Management declare fire season to be in effect. Title 36 of CFR 261.50(a) gives each Forest Supervisor the authority to issue orders which close or restrict use of the area over which he/she has jurisdiction. As conditions warrant, the forester will issue an Industrial Fire Precaution Level[11] (IFPL) at one of four levels. The declaration of fire season affects utility and other commercial operations and as well as recreational activities by the public. Fire season remains in effect until terminated by each Agency or by reducing the IFPL until conditions for fire hazard no longer exist. WOEC does operate within state or federally protected lands, and many portions of the distribution system are directly adjacent to public lands. To maintain safety during maintenance and VM work, the Operations Department monitor IFPL levels (during fire season) and direct staff and VM crews to take the necessary precautions and deploy available fire suppression equipment to job sites.

[10] Stat. Auth.: ORS 183, 756, 757 & 759 Stat. Implemented: ORS 757.035
[11] https://fortress.wa.gov/dnr/protection/ifpl/

4.3 Vegetation Management (VM)

WOEC does not currently have a formal, written VM plan, although one is currently in development. The WOEC EOM interacts with two VM contractors and oversees all VM work. These two VM contractors work year-round and cover all of WOEC VM needs.

Approximately 10% of the system has been mapped for VM purposes; this is a new and ongoing effort.

The entire system is visited annually, and the EOM identifies circuits to be trimmed. Paper maps are used to track areas that have been identified for trimming, and then record progress as the work is completed.

Transmission and Distribution ROWs are mowed on a 10-year cycle The Co-op owns two mulching mowers which are operated by contractors. Mulched biomass is returned to the ROW. The company has found this to be an effective way to limit vegetation growth in the ROW.

4.3.1 Vegetation to Conductor Clearance

WOEC has an operational and management responsibility and is required by State and Federal Agencies to maintain the right of way under or around its power lines. WOEC will meet or exceed the minimum standards for conductor clearances from vegetation to provide safety for the public and utility workers, reasonable service continuity and fire prevention.
Vegetation management (WM) operations are scheduled to ensure all lines are cleared of vegetation hazards on a cyclical basis. During tree work, contractors aim to achieve the clearance specifications described below, which meet or exceed OAR 860-024-0016 clearance guidelines.

- **OH Distribution:** 10 feet from the conductor

- **Roadside Transmission with distribution under-build:** 10 feet from the lowest conductor
- **Transmission ROW (defined width):** 50 feet between the conductor and the rooted tree stem.
- **Trees Under Conductors:** Trees that are under conductors should have crowns reduced to a height 10 feet below the primary conductors or be removed.
- **Overhanging Branches:** Removed to a height of 10 feet above all distribution conductors and from conductor to sky on transmission lines where feasible.
- **Secondary Conductor:** Trees near open wire secondary are pruned to provide a minimum of 10 feet of clearance.
- **Service Wire:** Branches that deflect or weigh heavily upon service or other secondary wires beyond the last WOEC pole are pruned. Some situations require rerouting of the service.
- **Pole Base:** A 3-foot radius area around the base of all poles is cleared of vegetation that would prevent the pole from being safely accessed and climbed.
- **Brush removal (mowing):** 10 feet either side of conductor.

4.3.2 Vegetation Trimming Standards

WOEC's contractors follow American National Standards Institute (ANSI) A300 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the pruning cycle. The VM program was developed with RUS, ANSI A300, National Electrical Safety Code (NESC)[12], and OAR 860-024-0017 requirements.

Work performed to the above guidelines provides reasonable service continuity, public safety, and guards against wildfire damage caused by supply conductors. Consideration is given to the impact of pruning on power line reliability, individual tree condition, and tree aesthetics. All work is conducted in a safe manner in accordance with the work rules set forth in OR-OSHA 1910.269.

4.3.3 VM Trimming and Inspection Schedule

WOEC personnel and contractors perform annual, ground-based inspections of tree conductor clearances and hazard tree identification for WOEC ROWs and easements. WOEC contracts full-time tree trimming crews for year-round vegetation management work. WOEC line crews also address vegetation concerns in response to service calls or field observations. Proactive maintenance during routine operations and prompt action during emergency events maintain system reliability, a safe work environment, and reduces fire danger. Scheduled patrols ensure all lines are inspected for vegetation hazards and systematically trimmed. On-going, year-round field patrols identify targeted areas for vegetation pruning or removal and ensure compliance with state and federal regulatory requirements.

[12] Rules 012,013 and 218

4.3.4 Hazard Trees

A subset of Danger Trees[13], A Hazard Tree is defined as any tree, or portion of a tree that is dead, rotten, decayed, or diseased and which may fall into or onto the overhead lines or trees leaning toward transmission and distribution facilities. These trees are sometimes located beyond the easement or ROW. Any tree that is located outside of the ROW and is deemed a hazard tree will be removed or topped to make safe for conductors.

A hazard tree will have one or more of the following characteristics:

- Dead or dying - all dead or dying trees along, or outside the WOEC right-of-way may be removed depending on the height of tree and the direction of the lean.
- Leaning trees - trees that have such a lean toward the right-of-way that they cannot be trimmed without removing the tops and slanting the tree back. Removal depends on height and species of the tree and direction of the lean.
- When hazard trees outside the ROW are encountered, the landowner is contacted and permission to remove the tree is sought. Refusals are documented and presented a bill if damages are incurred when a previously identified hazard tree fails and causes damage to WOEC facilities.

4.3.5 Controlling Incompatible Vegetation

In addition to the annual patrols by WOEC field staff observing and reporting on incompatible uses and encroachments, WOEC make efforts to educate public and private landowners about incompatible vegetation that can pose risks if planted under or near conductors. WOEC's website provides guidance on planting trees, bushes, and shrubs near overhead powerlines, and also discourages planting in close proximity to underground circuits.

4.4 Fire Mitigation Construction

WOEC is taking 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. WOEC'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 (WUI), and climate change. Some of these strategies include, but are not limited to:

- Polymer Crossarms, which greatly reduces the possibility of pole-top fires
- Larger conductor to improve resilience and reliability
- Greater phase spacing to reduce the likelihood of cross-phasing in windy conditions

[13] As defined by ANSI 300 Part 7 standards

4.4.1 Underground Conductor

WOEC routinely undergrounds portions of its system in an effort to reduce wildfire likelihood and increase customer reliability. Many circuits are converted to underground due to limited access and excessive exposure to damage from vegetation.

The undergrounding of overhead distribution lines provides several benefits for utility operations and functions as an effective tool in WOEC's wildfire mitigation strategy. Not only does it improve the aesthetics of the service area, but it also alleviates several negative aspects of bare wire overhead conductor.

Aside from significantly reducing the risk of wildfire ignition, underground distribution lines typically eliminate:

- The need for VM work in the ROW
- Damage from ice loading
- Risk of vegetation contact which can result in ignitions
- Galloping conditions due to high wind
- Electrocution and resultant risk of ignition due to bird and wildlife contact.
- Risk of tree caused outages

WOEC has approximately 365 miles of 12.5kV UG distribution line on its network. There are many benefits to undergrounding distribution lines and some drawbacks; undergrounded facilities have less capacity, and they can take longer and are more costly to troubleshoot and repair. Additionally, underground cabling can be vulnerable to the effects of soil chemistry, aging, landslides, and dig-ins. The co-op is currently working to replace older, direct-buried UG lines with conductor housed within conduit.

5 Emergency Response

5.1 Preparedness and Response Planning

In an emergency, which could consist of a wide range of events and conditions including wildfire, multiple WOEC departments will have to work together in gathering and disseminating information to the media and public. WOEC is currently using Incident Command System (ICS) principles to organize and communicate during fire and other emergency events.

WOEC coordinates with state and local fire and emergency managers as appropriate both before and during emergency events and is responsive to requests from emergency management jurisdictions.

Internally, a "Mayday" emergency procedure had been developed for use in crisis communication. Radio technology has recently been upgraded for improved emergency communications across the service area.

5.1.1 Emergency Management Communication and Coordination

When emergencies arise in the WOEC service area, the GM or EOM acts as the single point of contact for utility operations and decision support. WOEC staff are currently working to bring Incident Command System training to utility personnel.

The utility uses Facebook and Twitter to communicate outage and other urgent utility-related information to its customers.

There are plans in development that will add information on going fires, fire safety and fire prevention to the WOEC website.

WOEC interacts with these external partners during routine business and during emergency events such as wildfires:

- ODF and other fire agencies
- Columbia County
- Local Emergency Planning committee
- Oregon Department of Transportation
- Local and state police

In response to active emergencies, WOEC coordinates and collaborates with the local Department of Emergency Management (DEM) and relevant state agencies as a peer partner. During such emergencies, WOEC provide a utility representative to the county and/or city DEM to ensure effective communication and coordination.

WOEC's primary coordination point is the state of Oregon Office of Emergency Management (OEM). The state of Oregon OEM contacts affected county OEM during an emergency. WOEC's EOM is the contact for the state OEM, and also acts as the communications officer during an emergency.

5.1.2 Jurisdictional Structure

WOEC has considered the jurisdictional structure of the service area when developing or implementing its strategic plan, including those related to wildfires. WOEC coordinates with various land ownership and management entities such as ODF, BLM, Counties, and others as needed. The majority of the land in service area is privately owned, followed by state lands, then federal, then county land. Figure 4 illustrates the land ownership within the service area. The following describes the various stakeholders or districts with management responsibilities.

WOEC serves areas in the following counties:

- Clatsop, OR
- Columbia, OR
- Tillamook, OR
- Washington, OR
- Yamhill, OR

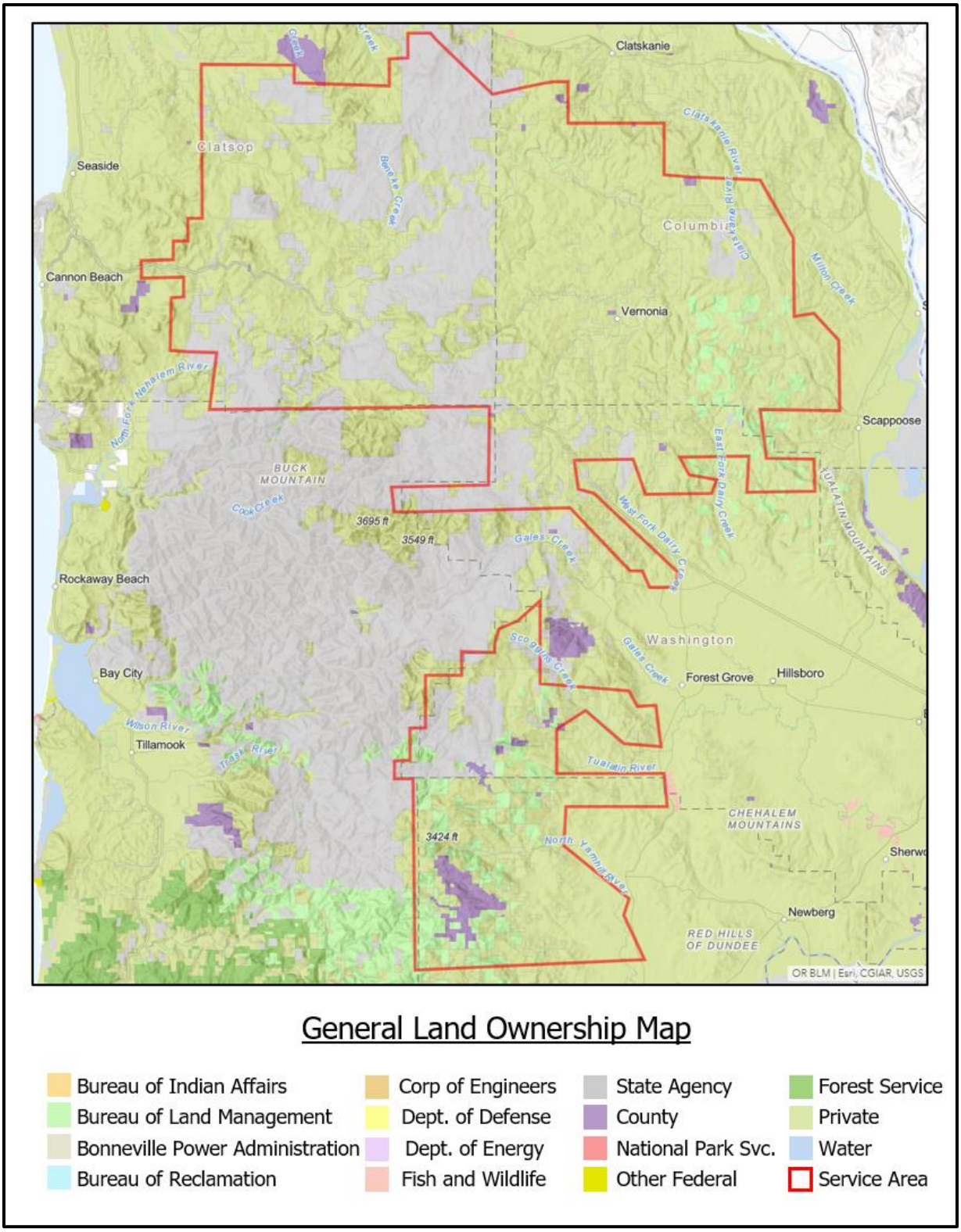
Federal Lands:

- Bureau of Land Management

State Lands

- Oregon Department of Forestry

Figure 4. General Land Ownership



5.1.3 Public Agency and Customer Communications for Outages

WOEC endeavors to notify customers as soon as possible once outages are imminent. There is no outage map on the company website. WOEC will use Facebook, Twitter, and the Outage Dispatch Center to notify customers of planned and unexpected outages.

Forms of communication may vary slightly for planned versus unplanned events.

Planned power outages:

- Review of critical care customer list for needed adjustments
- Minimum of 48 hours of notification whenever possible
- Personal door-to-door notifications
- Notice of planned outage form left if no contact made
- Contact made with communications providers
- Customer phone calls made if deemed appropriate
- Notice to internal communications team of planned power outage
- Social media pages noted if deemed appropriate
- Notice to city communications team if deemed appropriate

Unplanned power outages:

- Internal communications team notified, and outage protocols enacted
- Governmental communications team notified, and outage protocols enacted
- Contact made with communications providers
- Enhanced call takers placed for extra volume
- All social media outlets kept updated with latest information
- Constant interaction with Operations providing real-time information

5.1.4 Community Outreach

Fuel reduction projects and vegetation treatments have been identified as an effective means of mitigating wildfire hazards. Each year, wildland fires consume hundreds of homes in the Wildland-Urban Interface. Studies show that as many as 80% of the homes lost to wildland fire could have been saved if their owners had only followed a few simple fire-safe practices[14]. Projects of this type include fuel breaks, thinning, pruning, landscape modifications, etc. Homeowners and local government bear much of the responsibility for improving the defensibility of homes in the WUI but may lack knowledge and information regarding what needs to be done and how to do it.

Defensible Space is often defined as an area around a home or outbuilding, where the flammable vegetation is modified and maintained to slow the rate and intensity of an advancing wildfire. In practice, this is an area with a minimum of 30 to 100 feet around a structure that is cleared of flammable brush or vegetation. This area would also provide room

[14] http://dnrc.mt.gov/divisions/forestry/fire-and-aviation/fire-prevention-and-preparedness

for firefighters to work to protect a structure from advancing wildfire as well as protect the forest from a structure fire.

WOEC encourages its members to take proactive measures to safeguard their homes from wildfire danger and to prepare for emergency events. To help create an awareness of fire danger in the service area, and what homeowners can do to minimize it, WOEC provides information on prevention and mitigation on its website and social media platforms.

Members will also find links to the following information on the WOEC website:

- Tree Planting Guidelines
- What to do during an outage
- Downed powerline safety
- Home ignition zone
- How to prepare your home for wildfire

5.2 Restoration of Service

If an outside emergency management/emergency response agency requests a power shutdown, or if WOEC elects to de-energize segments of its system due to extreme weather, WOEC staff will patrol the affected portions of the system before the system is re-energized.

Suspect equipment or distribution lines that cannot immediately be patrolled will remain de-energized until WOEC staff can do so. Poles and structures damaged in a wildfire must be assessed and rebuilt as needed prior to re-energization. Periodic customer and media updates of restoration status prior to full restoration will be made through Facebook, Twitter, etc.

5.2.1 Service Restoration Process

After an outage, WOEC work crews take the following steps before restoring electrical service. These measures intend to protect the worker, members, the public, and the system's reliability.

- **Patrol:** Crews patrol every de-energized line to ensure no hazards have affected the system during the outage. If an outage is due to wildfire or other natural disasters, as soon as it is deemed safe by the appropriate officials, crews inspect lines and equipment for damage, foreign contacts and estimate equipment needed for repair and restoration. Lines located in remote and rugged terrain with limited access may require additional time for inspection. WOEC 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, WOEC staff meet to plan the needed work. Rebuilding commences as soon as the affected areas become safe. Repair plans prioritize substations and transmission facilities, then distribution circuits serving the most critical infrastructure needs. While the goal to 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 WOEC'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.

Aerial View of WOEC Substation and Transmission Lines

6 Performance Metrics and Monitoring

This chapter identifies WOEC's management responsibilities for overseeing the WMP and for carrying out the various activities discussed in the previous chapters. Chapter 6 also identifies the metrics used to track the effectiveness of the mitigation strategies and the success of the overall plan.

6.1 Plan Accountability

Staff responsibility for plan implementation and general communications is described below:

- The Board of Directors makes policy decisions relative to the utility – they will be responsible for approving and adopting the Wildfire Mitigation Plan.
- The EOM directs management staff responsible for operations, customer service.
- The GM supervises the EOM and CFO.
- The GM is responsible for the overall execution the WMP. Staff will be directed as to their roles and responsibilities in support of the plan.
- The GM is responsible for communicating with public safety, media outlets, public agencies, first responders, local Office of Emergency Management, and health agencies during an emergency or planned maintenance outages.
- The GM determines when and how to notify outside agencies in cases of wildfire emergency events.
- WOEC's GM will be responsible for monitoring and auditing the targets specified in the WMP to confirm that the objectives of the WMP are met, as well as the implementation of the plan in general.

6.2 Monitoring and Auditing of the WMP

The WMP will be reviewed annually for the purpose of updating the plan as needed to reflect knowledge gained in the preceding year and modified accordingly.

6.2.1 Identifying Deficiencies in the WMP

The EOM will be responsible for ensuring that this WMP meets all public agency guidelines to mitigate the risk of its assets becoming the source or contributing factor of a wildfire. Staff responsible for assigned mitigation areas have the role of vetting current procedures and recommending changes or enhancements to build upon the strategies in the WMP. Either due to unforeseen circumstances, regulatory changes, emerging technologies or other rationales, deficiencies within the WMP will be sought out and reported to the Board of Directors in the form of an updated WMP on an annual basis.

The GM or their designee will be responsible for spearheading discussions on addressing any plan deficiencies and collaborating on solutions when updating the WMP. At any point in time when deficiencies are identified, the Supervisors or their delegates are responsible for making the appropriate policy adjustments. WOEC staff and qualified stakeholders are encouraged to bring any potential deficiencies to the attention of the GM. The GM, along with the appropriate

staff, will evaluate each reported deficiency, and if determined to be valid, shall record the deficiency for further action.

6.3 Performance Metrics

WOEC will track metrics listed in Table 4 below. These metrics will be collected and used to make year to year comparisons which will inform future mitigation strategies and prioritizations. This list may change as additional metrics are identified.

Table 4. Performance Metrics

METRIC	RATIONALE	INDICATOR	MEASURE OF EFFECTIVENESS
Red Flag Warning (RFW) days in service area	Used to adjust annual variation in criteria	Number of RFWs during analysis cycle	N/A
Utility caused ignitions	Demonstrates the effectiveness of the plan	Count of events	Reduction or no material increase
Vegetation-caused Outage during fire season	Assess VM program work schedules/QC process	Count of events	Reduction or no material increase
Vegetation-caused ignition	Assess VM program work schedules/QC process	Count of events	Reduction or no material increase

Programmatic QA/QC processes

6.3.1 Transmission and Distribution System Inspection QC Process

WOEC's Engineering and Operations Manager pre-checks work tasks to be completed by Operations staff to identify any hazards or potential violations, and also offer input to Engineering regarding construction types and methods.

The Engineering and Operations Manager also performs QA/QC of work that has been completed by Operations staff.

Detailed inspections of WOEC facilities are performed annually according to OAR 860-024-0011.

6.3.2 Vegetation Management QC Process

Once VM trimming is completed on a circuit, the WOEC Engineering and Operations Manager who issued the work also returns to review the work for completeness and compliance. WOEC estimates that 90% of the VM work is "audited" in this fashion. WOEC is working toward a formal scheduling and mapping process for VM work administration. Future WMPs will reflect these changes.

WOEC will maintain adequate written records of policies, plans and schedules to show that inspections and corrections are being carried out in compliance with OAR 860-024-0011 and OAR 860-024-0012.

6.4 Plan Approval Process

6.4.1 Public Comment

There is no public comment planned in the adoption process for this WMP.

6.4.2 Board Presentation

The WOEC Board of Directors will review and adopt the WMP. This will be done at a regularly scheduled meeting prior to the June 30, 2022, OPUC submission deadline.

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Appendix A: Plan and Mapping Disclaimers

WILDFIRE MITIGATION PLAN DISCLAIMER

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Appendix B: Acronym Glossary

ANSI	American National Standards Institute
BLM	U.S. Bureau of Land Management
BMP	Best management practices
BPA	Bonneville Power Administration
DLI	Detailed Line Inspections
EOC	Emergency Operation Center
EM	Emergency Manager
EOM	Engineering and Operations Manager
GM	General Manager
HFTA	High Fire Threat Area
ICS	Incident Command System
IFPL	Industrial Fire Protection Level
KV	Kilovolt
KWH	Kilowatt Hours
LDE	Line Down Event
MW	Mega Watts
MVCD	Minimum Vegetation Clearance Distance
NESC	National Electric Safety Code
NFDRS	National Fire Danger Rating System
NF	National Forest
ODF	Oregon Department of Forestry
ODOT	Oregon Department of Transportation
OEM	Office of Emergency Management

OPUC	Oregon Public Utility Commission
OH	Overhead
OR	Oregon State
PNRA	Pacific Northwest Region Wildfire Risk Assessment
PSPS	Public Safety Power Shutoff
QA	Quality Assurance
QC	Quality Control
RAWS	Remote Automated Weather Station
RFW	Red Flag Warning
ROW	Right of Way
RUS	Rural Utilities Service
SEMS	Standardized Emergency Management System
T&D	Transmission and Distribution
UAV	Unmanned Aerial Vehicle
UG	Underground
USDA	United States Department of Agriculture
USFS	United States Forest Service
VM	Vegetation Management
WHP	Wildfire hazard Potential
WMP	Wildfire Mitigation Plan
WOEC	West Oregon Electric Cooperative
WUI	Wildland Urban Interface

Appendix C: Definitions

Best Management Practices (BMP): Innovative environmental protection practices applied to help ensure that projects or regular operations are conducted in an environmentally responsible or effective manner.

***Burnable fuel*:** Refers to fuel models that are "ignitable" in the fire modeling. Burnable land cover includes grasses, herbs, shrubs, trees, leaf litter, dead-and-down branchwood, etc.

Circuit Breaker: Distribution circuit breaker providing protection for 12.47kV Distribution feeder circuit. Located inside substation.

Commission: PUD-elected board of commissioners.

Danger Tree/Hazard Tree: A danger tree is any tree, on or off the right of way, that can contact electric power lines. A **danger tree** may be completely healthy and intact, or it may be sick or dead. Even a healthy tree could sustain damage in a severe storm and impact nearby power lines, thus the potential for "danger."

Distribution System: The final stage in the delivery of electric power carrying electricity from the transmission system to individual consumers. The CPUD distribution system includes 7.2kV, 12.47kV 13.2kV, and 25kV lines not tied to generation facilities.

Defensible Space: An area around a structure, either natural or manmade, where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildfire and the structure. In practice, it is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Fire Hazard: "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.

Fire Season: 1) Period(s) of the year during which wildfires are likely to occur, spread, and affect resource values sufficiently to warrant organized fire management activities. 2) A legally enacted time during which burning activities area regulated by state or local authority.

Fire Weather Watch: A term used by fire weather forecaster to notify using agencies, usually 24 to 72 hours ahead of the event, that current and developing meteorological conditions may evolve into dangerous fire weather.

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

Hazard Tree: A specific type of danger tree that poses a greater likelihood of causing damage to electric power lines or equipment. In this case, the tree is structurally unsound and positioned in a way that it could fall onto conductors.

Industrial Fire Precaution Level (***IFPL):*** Activated when needed during the summer fire season, IFPL are an activity closure system to reduce wildfire risk. By law (WAC 332-24-301), it applies to woods workers and other industrial forest users on 13 million acres of unimproved private, federal, and state forestlands protected by the BMLM or Forest Service. Levels range from Level-1 to Level-4.

Landscape: Refers generally to the area of interest in a project or study and could refer to modeled or on-the-ground conditions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels. It combines the effects of existing and expected states of selected fire danger factors into one or more qualitative or numeric indices that reflect an area's fire protection needs.

Raster: An array or regular grid of square cells used to store data.

Recloser: Recloser is a device that is used in over-head distribution systems to interrupt the circuit to clear faults. Automatic reclosers have electronic control senses and vacuum interrupters that automatically reclose to restore service if a fault is temporary. There are several attempts that may be made to clear and reenergize 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)[15]: A term used by fire- weather forecasters to call attention to limited weather conditions of importance that 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 occurs whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, if before spring green-up or after fall color, and the National Fire Danger Rating System (NFDRS) is high to extreme and the following forecast weather parameters are forecasted to be met:

- A sustained wind average 15 mph or greater

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

- 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 prior to the RFW.

Remote Automatic Weather Station (RAWS): An apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which that data is retransmitted to an earth-receiving station for use in the national Fire Danger Rating System.

Right of Way (ROW): The corridor of land under (and adjacent to) a transmission or distribution line.

Risk: A measure of the probability and severity of adverse effects that result from exposure to a hazard.

Rural Electric Cooperative (Co-op): Rural electric cooperatives are nonprofit electric utilities. Unlike the big investor-owned utilities, rural electric cooperatives (also called "electric co-ops") are owned by member-owners, the customers for which they provide electricity. They also differ in the fact that electric co-ops sell the majority of their power to households rather than businesses.

Substation: Part of the electrical generation, transmission and distribution system, substations transform voltage from high to low, or the reverse, or perform any of several other important 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 System: The bulk delivery of electrical energy from a generating site to an electrical substation. At CPUD, for line maintenance purposes, the transmission system is comprised of 69kV (sub-transmission), 115kV, and 230kV lines, structures, and switches.

UAV: An unmanned aerial vehicle is a powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely.

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: Also called wildland fire, an unplanned, uncontrolled fire in a forest, grassland, brushland or land sown to crops.

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

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

Wildland Urban Interface (WUI): Line, area, or zone where structures and other human development meet or intermingle