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Wildfire Mitigation Plan

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CONSUMERS POWER INC.

2022 WILDFIRE MITIGATION PLAN

Consumers Power Inc.

DATE: JUNE, 2022

REVISION: 1

BKI ENGINEERING SERVICES

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1 Introduction/Executive Summary

The Pacific Northwest has recently experienced some of the most devastating and tragic wildfires in the country. Warm, dry weather is becoming more common in Oregon. On average Oregon's Fire season has increased by 78 days compared to 30 years ago. Oregon's 2020 wildfire season was the most destructive in the state's history, burning more than 1.5 million acres. The Beachie Creek Fire and Lionshead Fire destroyed a significant portion of Consumers Power's system in the Santiam Canyon.

CPI's core mission is to provide safe, reliable, and affordable power to our members. Given the increased risk of wildfires in our region, CPI's mission has become inseparable from wildfire mitigation efforts. Although no electrical utility can eliminate the risk of fires, CPI is committed to taking any feasible actions we can to prevent the devastation that wildfires can bring to the members and communities we serve. This wildfire mitigation plan lays out the steps CPI is taking to do so.

1.1 Purpose of the Plan

CPI'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, CPI will assess, enhance, and refine its practices. The Plan formalizes the co-op's communication plan, vegetation management plan, asset inspection and maintenance, system protection, system hardening, and restoration of service processes. Additionally, the WMP outlines the implementation of public safety power shutoffs during extreme events.

1.2 Objectives of the WMP

The main objective of the WMP is to enable CPI to fulfill its core mission of providing safe, reliable, and affordable power to our members. The plan was developed to be consistent with utility best practices and comply with current Oregon State law, National Electrical Safety Code (NESC) regulations and guidelines. In order to meet this goal, CPI constructs, maintains, and operates its electrical lines and equipment in a manner that minimizes the risk of wildfire posed by its electrical lines and equipment.

1.3 Utility Profile and History

Consumers Power, Inc. incorporated in 1939, is a privately owned not-for-profit rural electric cooperative serving over 23,000 members in parts of six counties in Oregon: Benton, Lane, Lincoln, Linn, Marion, and Polk. CPI's service territory covers more than 3,500 square miles and is divided into nine zones containing approximately the same number of members in each. CPI is governed by a nine-member board of directors, one from each zone, elected by the members to serve a three-year term. Elections for directors take place each year at the Cooperative's annual

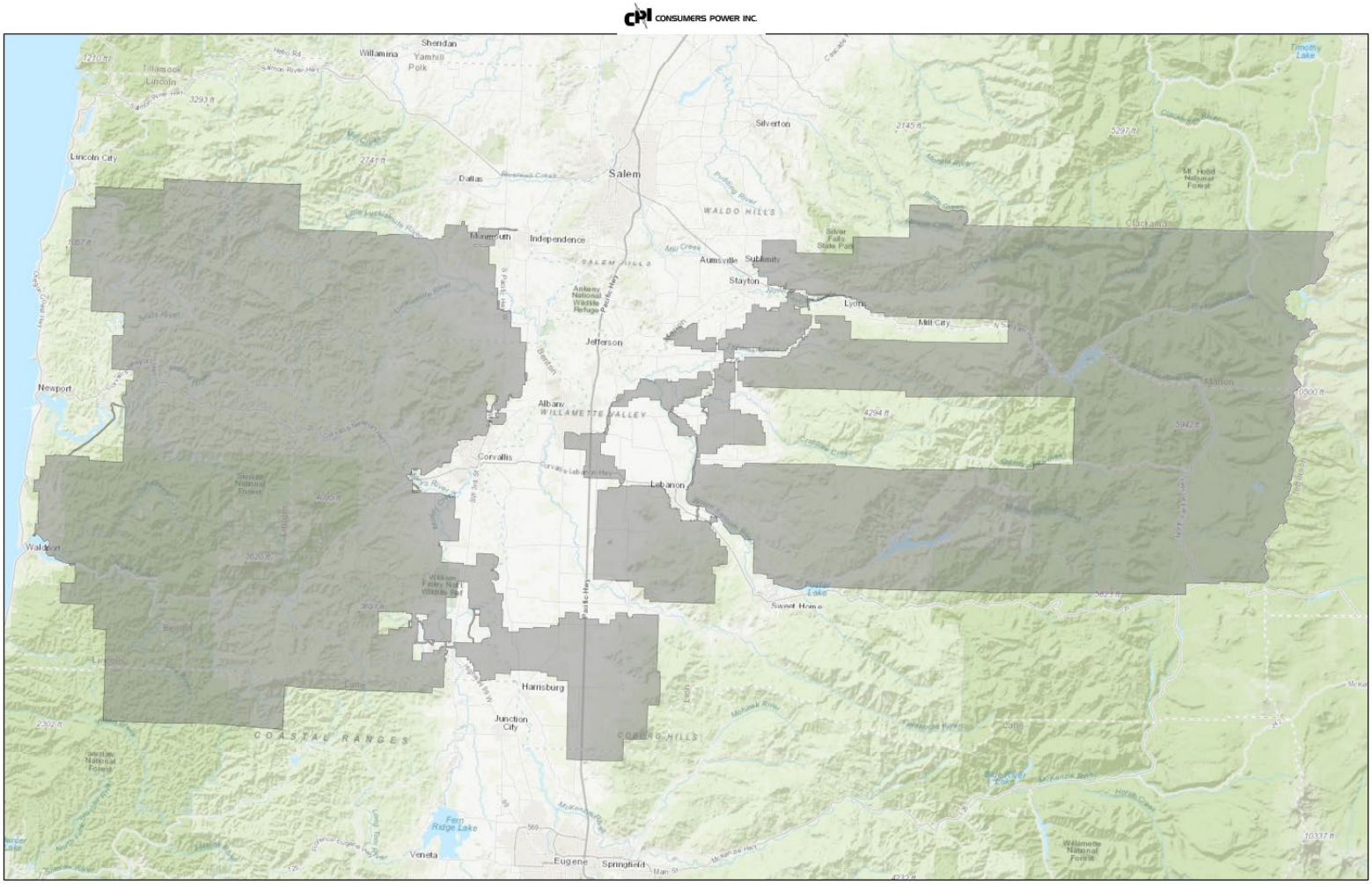
meeting, which is usually held at CPI Philomath headquarters in September. CPI has more than 3,000 miles of transmission and distribution line with approximately 7.2 customers per mile.

1.4 The Service Area

At 3,500 square miles, CPI's service area is geographically large. This service area is a complicated mix of diverse landscapes. Coastal mountain forests, rich agricultural areas, and the slopes of dormant volcanoes dominate CPI's landscape and contain myriad microclimates that all respond and react to fire danger stressors in different ways. The following facts and figures are intended to demonstrate the breadth and scope of detail that CPI's wildfire mitigation plan must account for.

- CPI's main office is in Philomath Oregon. There is also a satellite office or "outpost" in Lebanon Oregon.
- CPI serves parts of 6 counties in northwestern Oregon. The counties include Marion, Polk, Lincoln, Linn, Benton, and Lane counties.
- CPI's service area is 3,500 square miles of noncontiguous territory within an area measuring approximately 4,500 square miles.
- CPI service area characteristics:
    - The three major geographical features in CPI's service area are the Oregon Coast Range, the Willamette Valley, and the western slopes of the Cascade Range.
    - Access to CPI facilities and poles reflects the diversity of the landscape. Some areas can be reached by motor vehicle. Other areas can only be reached by boats, all-terrain vehicles, or on foot with significant effort.
    - CPI's service territory contains 9 distinct Ecoregions. This ecoregion diversity leads to an extremely diverse range of vegetation. There are dozens of species of coniferous and deciduous trees within CPI's service territory. Additionally, there are hundreds of species of other wild and agricultural plant types.
    - Most of CPI's service area falls into the Köppen Climate type "warm-summer Mediterranean". This climate is characterized by hot, dry summers and cool, wet winters. This means that CPI's service territory sees energetic plant growth in the spring which turns into dense, dry underbrush in the summer.
    - Temperatures vary widely in the service area due to the mixture of terrain and influence of the Pacific Ocean. CPI personnel can expect to encounter temperatures over 100 degrees Fahrenheit in the summer and below freezing in the winter.
    - The Pacific Ocean provides CPI's service area with copious amounts of moisture throughout the year. The amount of precipitation that falls is heavily dependent on terrain effects and proximity to the coast. Generally, the Coastal Range will experience up to 200 inches of rain a year, the Willamette Valley will see about 40 inches of rain a year, and the Cascade Range areas will receive roughly 100 inches of precipitation a year.

Figure 1. Service Area



2 Overview of Utility's Fire Prevention Strategies

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

Table 1 summarizes CPI's mitigation programs and associated activities that support CPI's ongoing commitment to wildfire prevention and mitigation.

Table 1. Mitigation Strategies/Activities

DESIGN AND CONSTRUCTION
Strategic undergrounding of distribution lines
Fire resilient structures and covered conductors
Field hydraulic recloser to solid dielectric recloser replacement program
Covered jumpers and animal guards
Increased remote system control capabilities
Avian protection construction standards
Increase overhead wire spacing to reduce wire to wire contact
INSPECTION AND MAINTENANCE
Infrared inspections of substation equipment
Unmanned Aerial Vehicle (UAV) & Helicopter T&D line inspections
UAV IR and LiDAR inspection program
Wood pole intrusive inspection and testing
Enhanced T&D vegetation right-of-way maintenance
T&D system detailed inspections
T&D system vegetation management program
Increased removal rate of hazard trees

INSPECTION AND MAINTENANCE (cont.)
Enhanced vegetation management prior to fire season
Thermal imaging cameras
Annual T&D line patrols in High-Risk Areas
OPERATIONAL PRACTICES
Wildfire Prevention & Suppression 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
Alternative system protection practices during high-risk weather conditions
Fire suppression equipment on worksite during fire season
Provide liaison to county offices of emergency management (OEM) during wildfires
Annual de-energization of nonessential line sections & idle facilities
SITUATIONAL AWARENESS
Weather monitoring in the service area
Following IFPL changes in service area
Monitoring active fires in the local region
RESPONSE AND RECOVERY
Pre-emptive member and emergency management partner notifications
Public Safety Power Shutoff (PSPS) protocols
Coordination with local Departments of Emergency Management
Member assistance projects for post-disaster recovery
Line patrols before re-energization
Emergency Restoration Plan

3 Utility Asset Overview

CPI has a large service area which necessitates a large amount of assets in relation to the size of the organization. In order to provide prompt service to our members, CPI maintains two facilities that our crews operate from. CPI's main office is in Philomath Oregon. The other office is a satellite or "outpost" facility in Lebanon Oregon. Having locations on either side of the I-5 corridor means that line crews can reach any of our members relatively quickly compared to the response time from a single location. Both locations have storage yards for parts and equipment, but the Philomath location is the main yard where most freight is received.

Most of the energy that CPI transmits and distributes is generated by BPA (Bonneville Power Administration) at hydroelectric dams on the Columbia River. This hydroelectric power is transmitted by BPA to local substations in the region. CPI transmission lines tie into these BPA substations and connect them to CPI substations which step the power down for transmission and distribution to our members. In addition to hydroelectric power, CPI transmits and distributes smaller amounts of power generated by solar, wind, and gas facilities through the same system.

To transmit and distribute power to our members CPI maintains a network of power lines and substations throughout the service area. Since the service area is so large this requires CPI to maintain a relatively large amount of assets for the modest size of the organization. CPI has 5 points of generation delivery that supply energy to 134 miles of transmission lines operated at 115 or 69 Kilovolts. CPI also maintains 26 substations throughout the service territory. These substations supply distribution energy through 2,100 miles of overhead lines, and 938 miles of underground lines. CPI is selectively undergrounding portions of the system and over the next several years the mileage of overhead lines will shrink, and the amount of underground mileage will increase.

Table 2 on page 7 provides a high-level description of CPI's T&D assets.

Table 2. Asset Overview

ASSET CLASSIFICATION	ASSET DESCRIPTION
Transmission Line Assets	Approximately 134 miles of conductor, transmission structures and switches at 115 and 69 kilovolts (kVs).
Distribution Line Assets	Approximately 2,100 miles of overhead (OH) and 927 miles of underground (UG) conductor, cabling, transformers, voltage regulators, capacitors, switches, line protective devices operating at or below 25kV.
Substation Assets	Major equipment such as power transformers, circuit switchers, voltage regulators, capacitors, protective devices, relays, open-air structures, switchgear, and control houses in 26 substation/switchyard facilities.

4 Risk Analysis and Risk Drivers

4.1 Fire Risk Drivers Related to Construction and Operations

CPI personnel evaluated other utilities' fire causes and applied its own field experience to determine the critical potential risk drivers. The categories listed below were identified as having the potential for causing powerline sparks and ignitions:

- Equipment/facility failure
- Tree falling from outside of ROW
- Vehicle impact
- Standard expulsion fuses
- Cross-phasing
- Communications attachments with improper ground clearance
- Communications attachments with broken lashing
- Crime (vandalism, theft, terrorism, etc.)
- Solar flare
- 3rd party damage to system

4.2 Fire Risk Drivers Related to the Service Area

CPI's large and diverse territory means that there are many factors to consider when assessing wildfire ignition risk. The level of risk on any given day during fire season is highly variable across the service area. This remains true even during extreme weather events affecting the entire region. CPI's service area has three large geographical features, and each must be considered separately from the others when assessing fire risk. Each of those geographical areas must also be further assessed based on conditions peculiar to different areas lying within them. This complicated mixture of variables results in an extremely uneven level of risk to CPI's system which makes an accurate assessment more important. CPI's fire risk assessment map and Feeder Risk Analysis table (below) illustrate the variable fire danger that CPI must contend with.

The western slopes and foothills of the Cascade Mountains within CPI's service territory are extremely susceptible to fire hazards. These mountains are extinct volcanos and are very rugged. There are many areas where there are no roads and fire service personnel may find it impossible to effectively fight fires in the area. In recent years several fires near or in CPI's service area burned for many weeks while fire fighters held fire lines in areas where there was road access. The fire that burned Detroit and Northfork in 2020 is an example of a fire that was burning in an area where it couldn't be controlled and burned until a strong wind event pushed it past road bound fire lines. This part of the service area is heavily wooded and receives abundant rain and snowfall in the fall, winter, and spring which drives vegetation growth that provides fresh fuel for fires each summer. The steep slopes of these mountains provide orographic lift and enhance

atmospheric instability in the area. It is common in the summer for a moisture laden westerly wind from the coast to hit the slopes of the Cascades and be forced upwards. Such forced convection often results in small thunderstorms that produce a lot of lightning but very little rain. Lightning from such storms often starts fires, and gusty winds from collapsing storms cause them to spread quickly. The Bull Complex fire in 2021 was caused by such a storm and its isolated location meant that it was eventually extinguished by fall rains rather than fire service personnel. These factors of weather, vegetation growth, and vehicle access mean that the fire threat in this area cannot be overstated, and it will only grow as climate change worsens.

The Coastal Range of CPI's service area becomes fire hazardous relatively later in fire season due to proximity to the Pacific Ocean. The western portion of the Coastal Range is cooler and more humid than inland parts of the Coastal Range. This means that fire danger tends to escalate from east to west for that portion of the system as the fire season progresses. The terrain of the Coastal Range is rugged which creates a complicated patchwork of microclimates. The same ruggedness means it can be difficult to access. Some areas of the system in the coastal range are not accessible by vehicle and must be accessed by foot, boat, or ATV which makes firefighting a challenging endeavor. Fire danger may develop later in the Coastal Range, but the high rates of rainfall in the fall, winter, and spring ensure plenty of fuel is available later in fire season. When the coastal range does become fire hazardous, the amount of fuel available leads to extremely energetic fire behavior. A root cause behind the burning of the town of Otis in 2020 was due to this fuel/energy interplay causing a fire which overwhelmed a well-staffed and capable local fire agency during their initial attack operations.

The central part of CPI's service area is the least fire hazardous of the three geographical areas. The dominant features are the I-5 corridor, several small cities, many medium sized towns, a network of rivers, and thousands of acres of agricultural land. None of these features are drivers of wildfires and they are all excellent fire breaks. The area is well served by many fire agencies from several levels of local government. Additionally, ODF fire fighters tend to operate from bases at the fringes of this area. Nevertheless, even relatively small fires can damage and destroy property or harm people, so CPI does not take it for granted that there is no level of fire danger present in this area. During times of heightened risk, such as extreme heat events, CPI enacts fire prevention protocols in this area to ensure that we help protect the people, communities, and businesses of the Willamette Valley.

It is relatively easy to state the pertinent major risk factors in the different areas of CPI's service area. It is much more complex to express the different levels of risk within each area. Particularities of terrain, human habitation, microclimates, rural economic activities, weather, and climate change add too many variables to convey easily. For instance, it is common for different parts of a same small valley to have functionally different levels of fire risk throughout the course of any single day. The readily apparent diversity of fire risk in CPI's service area means that

graphical products are necessary to convey the perceived danger quickly and easily in any area. For a holistic, graphical representation of the fire hazard levels of CPI's service area please see Figure 5 in section 4.5 below.

Figure 2. CPI Circuit Risk Analysis

Feeder Risk	Key
3	Extreme Fire Risk
2	Moderate Fire Risk
1	Low Fire Risk

Feeder	Level of Risk	Feeder	Level of Risk
AD3	2	NB2	3
AD2	3	NB1	3
AD1	3	OC1	3
AD4	2	OC2	2
AP1	1	OC3	2
AP2	1	PH1	3
BV1	3	PH2	1
BV2	3	PH3	3
BW1	3	PH4	3
BW2	3	PH5	1
BW3	3	SC1	3
CV1	2	SC2	3
CV2	3	SC3	3
CV3	2	SH1	1
CV4	2	SH2	3
FR1	2	SH3	1
FR2	1	SM1	3
FR3	3	SM2	3
FR4	2	ST1	1
GB1	3	ST2	3
GB2	3	ST3	3
GB3	3	ST4	3
GB4	3	TC1	3
HB1	1	TSC	2
HB2	2	TSM	2
HB3	1	WH1	2
KV1	3	WH2	3
KV2	3	WH3	1
LE1	2	WH4	1
LE2	3	WN1	3
LE3	3	WN2	1
LE-SH 115 KV	2	WN3	1
LE-WV 115 KV	2	WN4	3
LN1	1	WCV1	2
LN2	1	WKD1	2
LN3	1	WPD1	2
LN4	1	WV1	3
MB1	3	WV2	3
MB2	3	WV3	3
MB3	3	WV4	3
MN1	3		

4.3 Key Risk Impacts

Ignitions caused by the previously mentioned 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 CPI owned infrastructure and assets
- Impacts to reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to CPI's reputation and loss of public confidence

4.4 Wildfire History and Outlook

The forests of western Oregon have always been subject to summertime fires. Historically, large wildfires mostly occurred in years that were statistically drier than average. In recent decades climate change has made it so that summers in western Oregon are hotter and drier than the climatological record would suggest are normal. Many people term the current summertime fire hazard situation "the new normal" but this term doesn't accurately describe the escalating nature of the threat. The effect that climate change has had on summertime heat and humidity means that fire season is now 4-5 weeks longer than historical average lengths. The increasingly hotter and drier summers are also causing fire hazards to develop in landscapes, such as the western slopes of the coastal range, that previously saw little to no fire activity. The worst fire season during modern times in CPI's service area was in 2020, when several large fires burned in both mountain ranges in the service area at the same time. Since fire danger is escalating it is important to understand both how wildfires start and how effectively they can be fought.

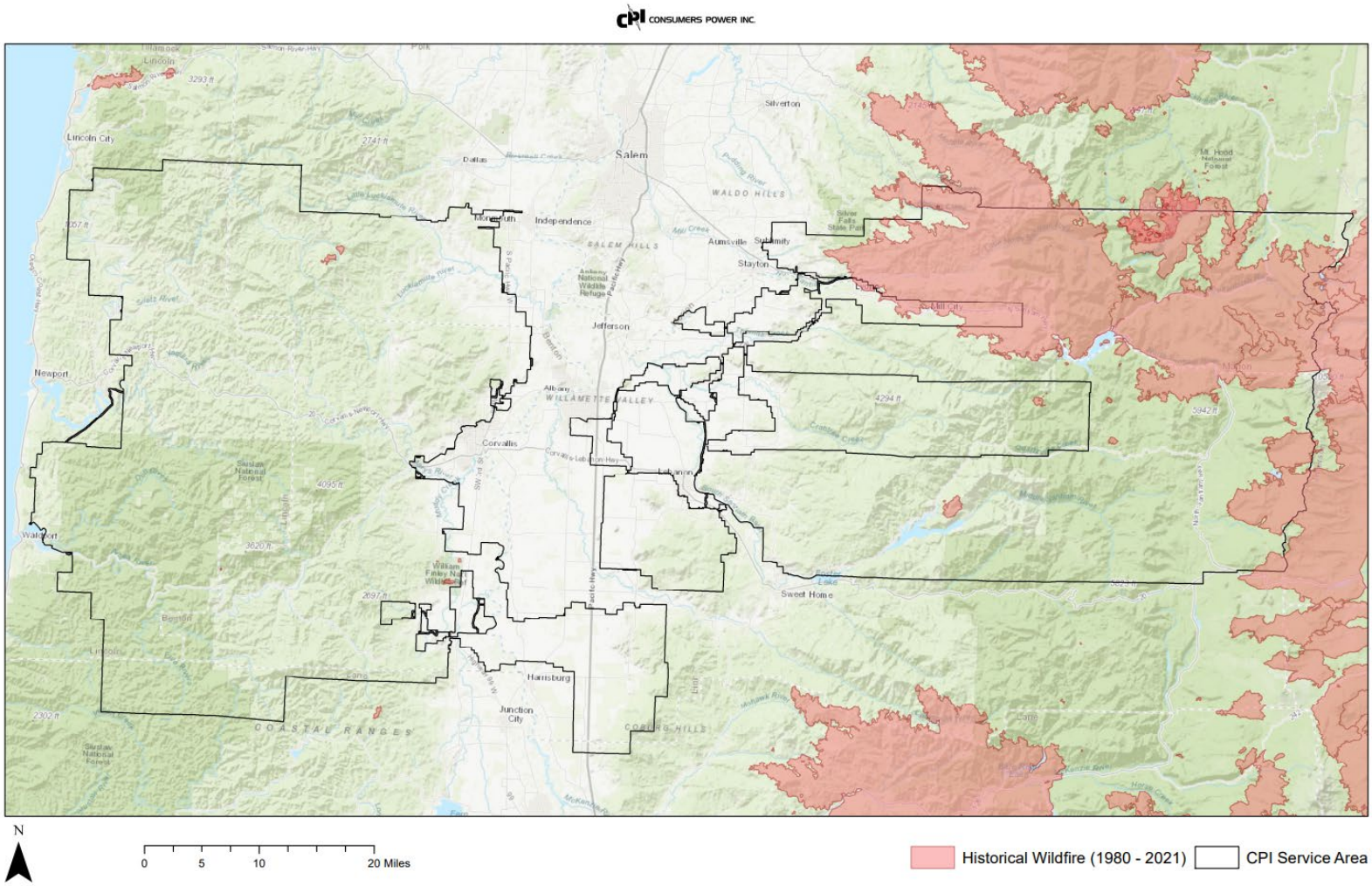
In Oregon, human activity causes approximately 68% of forest fires while lightning strikes account for the remainder. In the past, most human caused fires were started on Federally managed lands such as national parks which are typically open to visitors for uses such as camping and recreation. The expansion of wildland urban interface zones means that human caused fires are being started nearer to inhabited areas, where they can quickly threaten communities and infrastructure. Thunderstorms are relatively rare in most of CPI's service territory in the summer. There are almost never thunderstorms over the coastal mountain ranges due to a combination of pressure patterns, the thermal influence of the Pacific Ocean, and the short stature of the mountains. Likewise, the Willamette Valley sees very little thunderstorm activity during the summer. This is because the Willamette Valley contains no terrain that can force convective activity and significant low level atmospheric instability rarely occurs at the same time there is significant low-level moisture. The Cascade Range sees much more lightning than the other two geographical areas in CPI's service area. These storms are most often caused by local effects of temperature, terrain, and lack of atmospheric support. Consequently, the

thunderstorms over the Cascade Range tend to form quickly and produce many lightning strikes before dying without providing much precipitation. During the 2021 fire season the only two fires of note in CPI's service area were both caused by lightning strikes in isolated areas of the Cascade Range.

Fire suppression resources are spread unevenly in CPI's service territory. Generally, most fire suppression resources in the service area are concentrated in the Willamette Valley. These resources are largely made up of an interlocking patchwork of city and county services along the I-5 corridor. Further into the wildland urban interface areas, volunteer firefighting organizations of varying capability provide services to smaller communities. The forest lands in both the Cascade and Coastal ranges are protected by Oregon Department of Forestry fire suppression services. These services are highly mobile and are often sent to other districts in the state if needed. One thing that makes the IFPLs such an important decision-making tool for CPI, is the fact that fire suppression resource availability is factored into the ODF foresters thinking when they set IFPLs. CPI decisionmakers do not often have to consider fire suppression resources during operational planning. They can be confident that the Willamette Valley is always well protected, and they know that they can rely on the IFPLs to reflect the influence that ODF suppression resources have on local wildfire risk.

CPI views wildfire danger as an escalating threat that demands action. CPI personnel know that it is impossible to properly react to threats that you do not understand. Consequently, CPI operations personnel study the threat environment each day. They look for changing patterns in how and where fires start. They liaise with ODF foresters to help understand local risk drivers. Understanding the evolving threat environment allows CPI to devise proper protective procedures and know when to enact them. The threat of wildfire in CPI's territory is dire and will only worsen in coming years. It is inevitable that there will be large fires that start within CPI's service area in the future. Understanding this, CPI personnel are determined to ensure they are not caused by CPI's system, and that CPI will be poised to help with recovery efforts.

Figure 3. Historic Wildfire Perimeters



4.4.1 Wildland Urban Interface

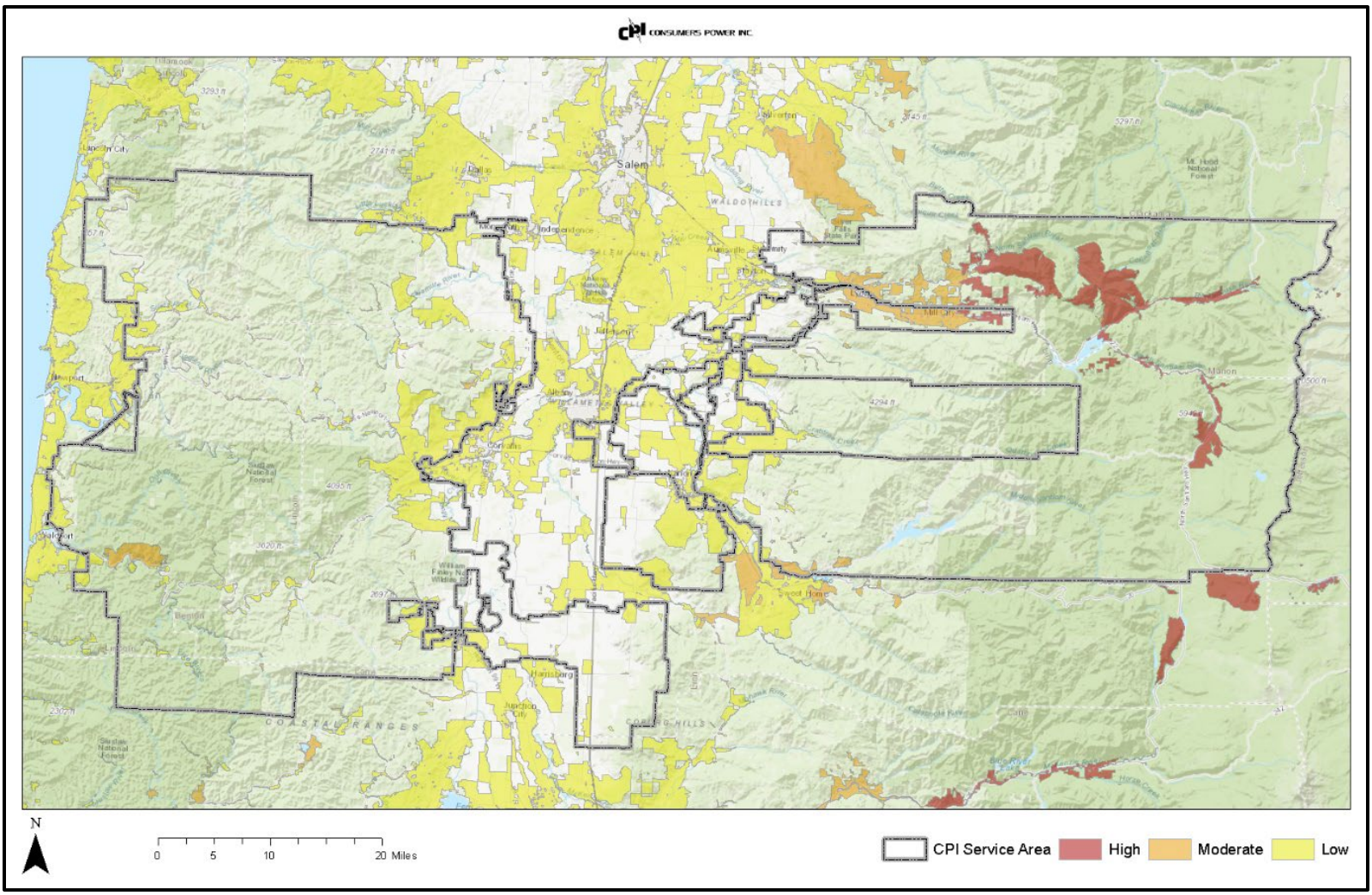
The United States Forest Service (USFS) defines the wildland urban interface (WUI) as a place where humans and their development meet or intermix with wildland fuel. Communities that are within 0.5 miles of the zone are included. According to the USDA Forest Service, the area considered WUI has expanded 39% in Oregon from 1990 to 2010, with the number of homes increasing by 53.6%. There are now over 615,000 homes in Oregon located in the WUI.

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.

In order to produce the map in Figure 3. CPI relied heavily on WUI mapping data disseminated by the Oregon Department of Forestry (ODF). The ODF data contains detailed information about WUI composition regarding population and vegetation density. It also contains overall wildfire risk to different WUI areas as assigned by the ODF. The information is based on data from 2017 but the “High” risk level areas correlate very well to where consequential fires occurred during the 2020 fire season. Since CPI’s wildfire mitigation plan does not change with WUI composition, and the risk level data was unfortunately validated by real life experience in 2020, CPI has chosen to rely on ODFs overall risk data. This approach has the unique benefits of being both easy to interpret and derived by subject matter experts in the field of wildfire behavior.

Figure 4 on page 15 illustrates the distribution of WUI areas and their ODF assigned risk levels in the CPI service area.

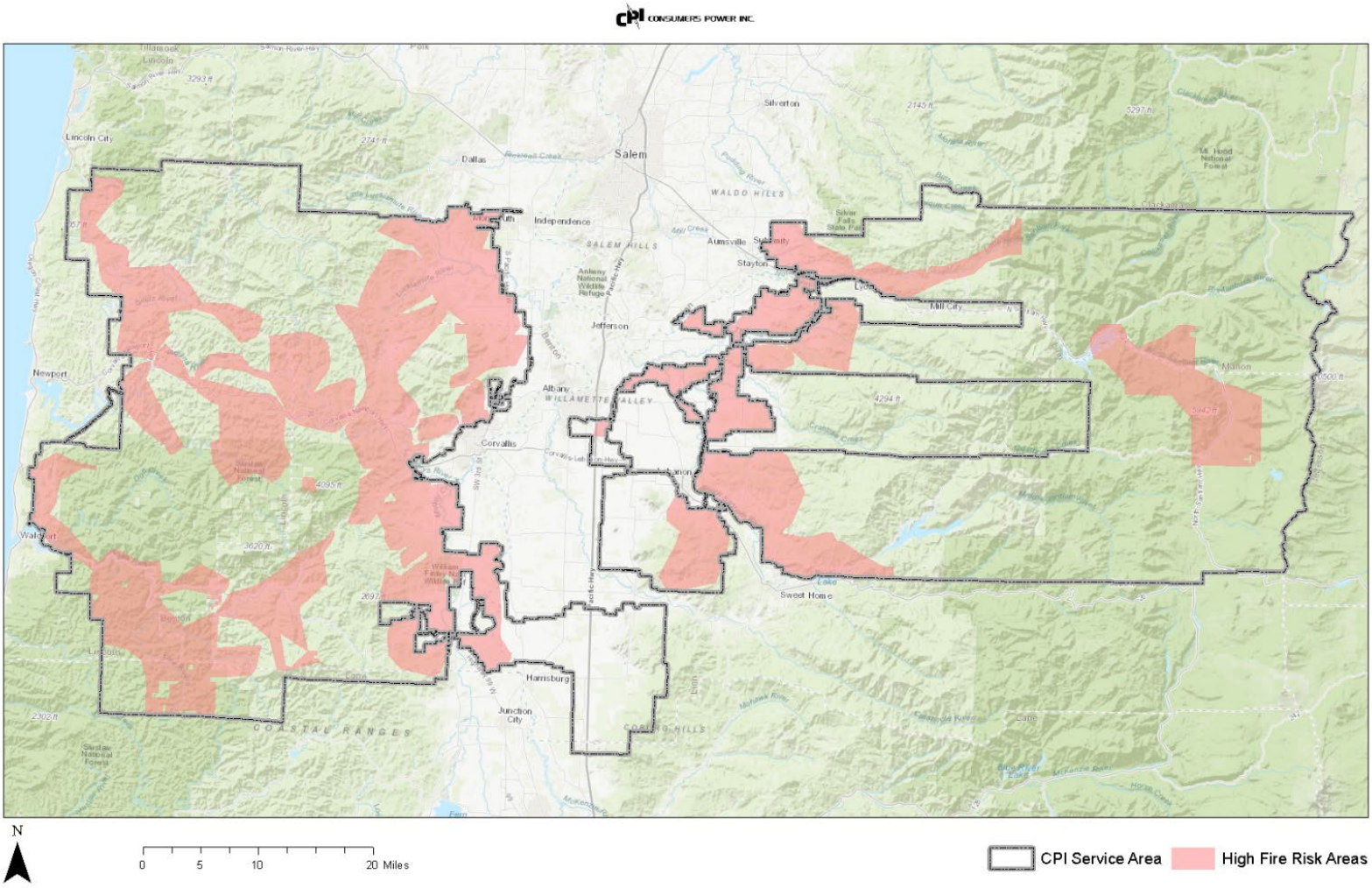
Figure 4. Wildland Urban Interface Risk Levels



4.5 Fire Threat Assessment Mapping

The map in figure 4 on page 17 below, is based on CPI staff assessments of fire hazards related to our system and its environment. This map is not meant to represent all fire hazard areas related to all potential fire ignition sources within the CPI service area. The specific methodology used to produce this map was simple but rests on a solid bedrock of system knowledge, pattern recognition, and professional experience. In order to define these areas CPI operations staff judged which parts of the system are most threatened by ignition hazards. An example of such a hazard would be trees falling through the lines from outside of the right of way. Such hazard areas are well known because damage from trees occurs in similar areas every winter due to storm activity. The map provides CPI decisionmakers an area guide to facilitate preplanning efforts. If a thunderstorm with gusty winds is likely to occur outside of these areas, then the direct danger to CPI's system is low even though the storm does pose an ignition threat. If a storm is likely to collapse over one of these areas and cause damage that could lead to ignition, then CPI personnel can plan for actions such as changing recloser settings or even implementing a PSPS to help protect the area from wildfire ignition and spread. This map therefore is a simple but powerful tool that CPI utilizes to protect our system and our communities from wildfire.

Figure 5. Wildfire Hazard Potential



5 Wildfire Prevention Strategy and Programs

5.1 Transmission and Distribution System Operational Practices

5.1.1 De-energization – Public Safety Power Shutoff

A Public Safety Power Shutoff (PSPS) preemptively de-energizes power lines during times of extreme fire danger. When considering de-energization, CPI examines the impacts on fire response, water supply, public safety, and emergency communications. The following factors are among those considered when CPI considers implementing a PSPS.

- Red Flag Warnings issued by the National Weather Service.
- Low relative humidity levels.
- High winds and gusty winds.
- Wildland fuel moisture levels.
- Circuit risk analysis.
- Potential loss of water supply to fight wildfires due to loss of production wells and pumping facilities.
- Negative impacts to emergency response and public safety due to disruptions to the internet and mobile phone service during periods of 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, CPI reserves the option of implementing a PSPS when conditions dictate. While CPI 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 mitigation option in a potential crisis.

On a case-by-case basis, CPI will consider de-energizing appropriate portions of its system in response to a known public safety issue or in 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 CPI.

5.1.2 Recloser Operational Practices

Adjusting recloser settings is a cornerstone of CPI's fire mitigation efforts. During times of elevated fire risk CPI changes all affected field devices to either "hot line tag" or "non-reclose" status to help prevent fire ignition. "Non-reclose" status means that if a field device is exposed to a fault current (perhaps from system damage) it will cut power to a section of line until manually switched back on. This contrasts with the normal operating mode which allows field devices to attempt to reenergize the line several times in case the cause of the fault condition clears up. CPI sets field devices to "non-reclose" in areas that are naturally less fire hazardous such as the agricultural lands of the Willamette Valley. "Hot line tag" settings are used in areas that are more fire hazardous such as the Santiam Canyon. "Hot line tag" settings use substation equipment to cut power to vast sections of line if fault current is detected. "Hot line tag" is considered the more protective setting because it cuts power to such large tracts of line, and because it does so very quickly ($1/20^{th}$ of a second). After switching, the affected devices are kept at their more protective settings until the risk of fire has abated. Some field devices can be remotely operated and put into protective status quite quickly. Other devices must be manually changed by line crews. The work to coordinate this means that recloser status decisions must be made before elevated fire danger conditions exist. CPI's operations personnel rely on several sources of information to help determine when and where to put field devices into "hot line tag" or "non-reclose".

A major driver for recloser setting decision making is provided by a mixture of environmental situational awareness resources. CPI personnel review weather forecast data each day to assess potential fire weather threats. The weather forecast resources CPI utilizes are too numerous to list and primary sources change based on the state of the atmosphere. In broad terms, CPI follows established DOD (Department of Defense) procedures for assessing and predicting the state of the atmosphere. There is an information gathering hierarchy that relies primarily on government resources such as the NWS (National Weather Service), secondarily on educational resources such as the University of Washington Department of Atmospheric Sciences, and lastly on commercial resources such as Wunderground.com. Using these resources CPI personnel assess the state of the atmosphere using "the forecast funnel". The "forecast funnel" is a concept whereby the atmosphere is first assessed hemispherically, then regionally, and then locally with higher level effects informing expected local conditions. This methodology provides a holistic look at the current and forecasted local environment and can alert CPI to hazardous conditions up to several days before they occur. This warning time allows CPI decisionmakers to integrate recloser setting changes into normal operations which enhances operational efficiency and safety.

Another very important decision-making resource for recloser setting changes are the IFPLs (Industrial Fire Protection Levels) implemented by ODF (Oregon Department of Forestry) foresters. The ODF foresters monitor weather, fuel moisture, and other factors to assess fire danger in the local districts they manage. When the threat of fire is elevated, ODF foresters will

raise IFPL levels to restrict forest activities. IFPL levels are set on a four-part scale from IFPL 1 (fire season-baseline) to IFPL 4 (all operations prohibited) with higher numbers assigned to higher risk areas. In setting IFPLs the ODF foresters have access to hazard information, such as fire apparatus availability, that CPI does not. This means that CPI personnel pay a great deal of attention to IFPLs. It is common for CPI to implement recloser protocols when the IFPL is set to 3 but may do so during an IFPL of 2 if weather conditions are hazardous or other information indicates it is prudent to do so. For reference the IFPL areas in CPI's service territory are depicted in Figure 6 on page 21 below.

An additional important recloser decision-making resource are NOAA Fire Weather Zones. Locally forecasts for these zones are provided by the Portland field office of the NWS. The NWS forecasters provide several fire weather services to the public, including Red Flag Warnings. Red Flag Warnings are issued when NWS forecasters are confident that weather conditions and dry fuels will combine to pose a high level of fire danger within 48 hours or less. When the NWS forecasters issue a Red Flag Warning for a designated high fire risk area, CPI personnel assess the threat in reference to the CPI system. Red flags trigger an automatic recloser status change to Hotline Tag or Non reclose and System Operators monitor controls during the duration of the event. One unique aspect of CPI's plan is that CPI configures recloser settings on all circuits in the red flag area regardless of risk assessment. For reference the NOAA Fire Weather Zones are depicted in figure 7 on page 22 below.

Relying on a mixture of situational awareness tools, IFPLs and NWS warnings for recloser decisions provides a protective synergy. CPI personnel assess threats to our system, ODF foresters assess threats to forests that contain parts of the CPI system, and the NWS warns of threats to life and property in geographically defined forecast areas. These entities have different missions and assess threats differently. By relying on all these sources to inform threat assessments, CPI builds layers of environmental intelligence to base decisions on. This thorough threat assessment allows CPI operations personnel to make sound decisions on recloser settings. This helps prevent system caused wildfires which protects our members and our communities.

Figure 6. Industrial Fire Protection Areas

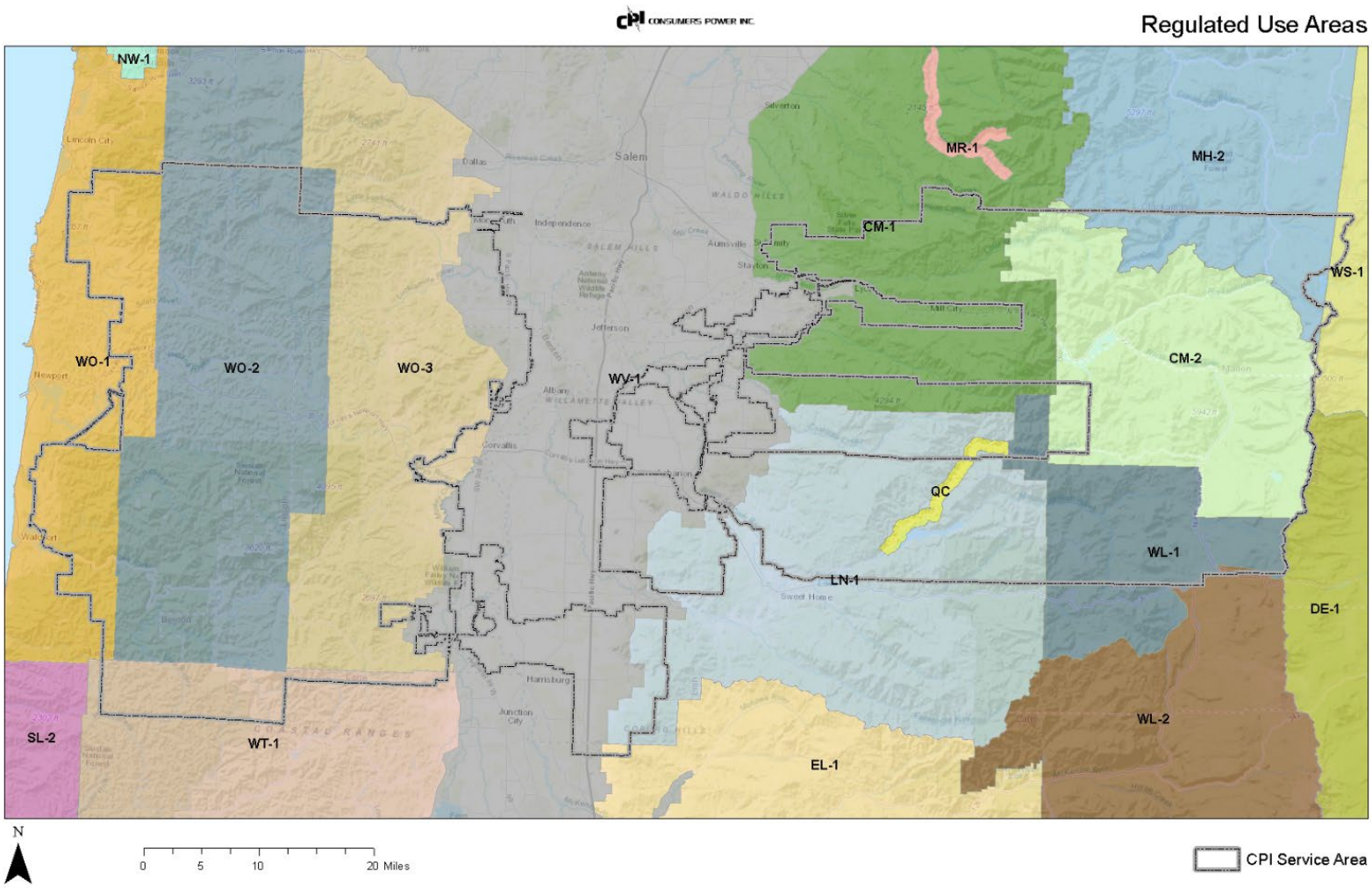
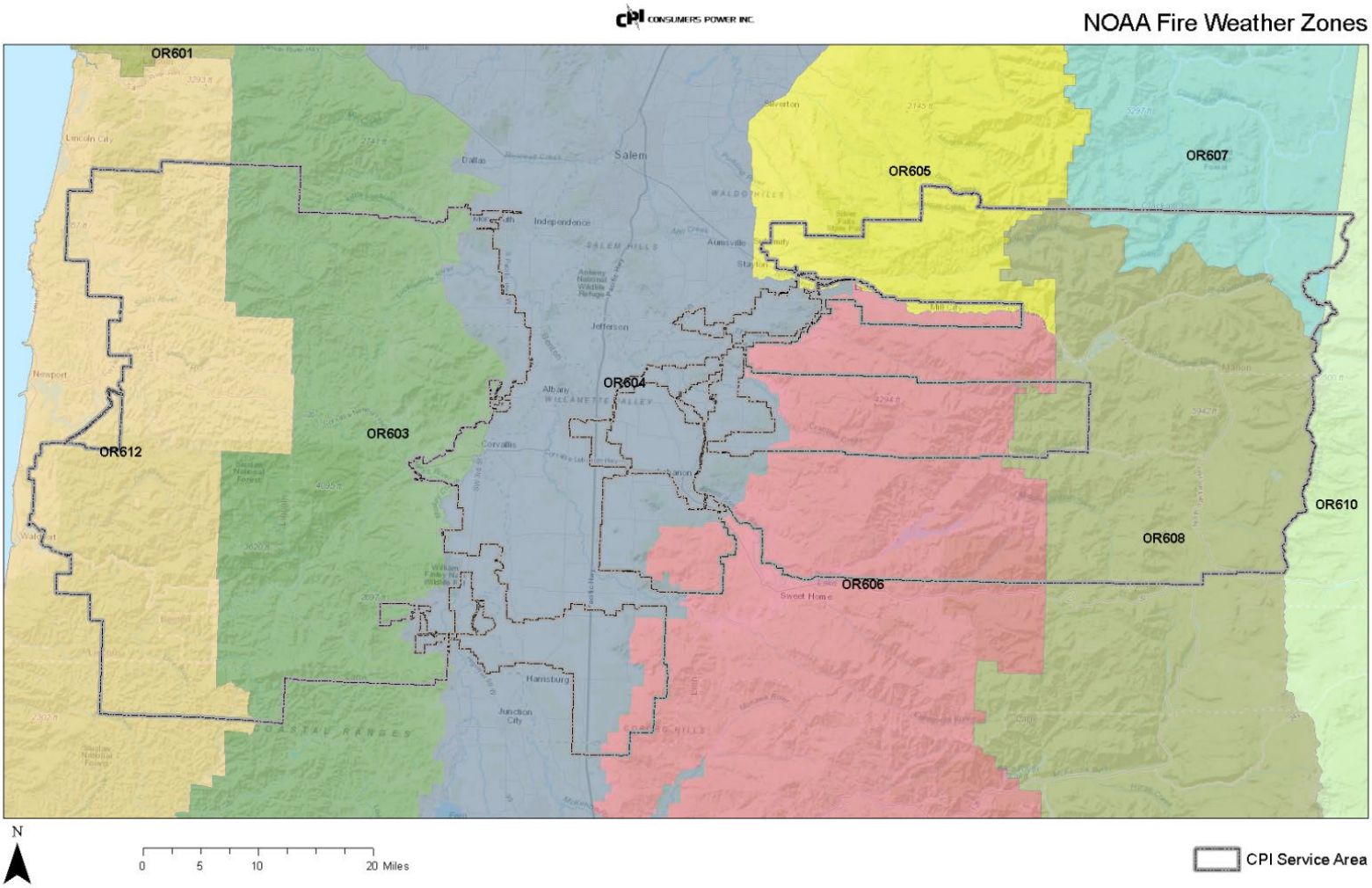


Figure 7. NOAA Fire Weather Zones



5.1.3 Situational Awareness

CPI personnel depend on reliable information to make sound wildfire prevention decisions. Meteorological forecasts and climatological projections play a crucial role in fire prevention efforts. By understanding the current and forecasted state of the atmosphere, CPI can plan when and where to enact protective protocols. This allows CPI to ensure actions, such as putting an area on "non-reclose" are completed before they are necessary. CPI can also provide more warning to our members and emergency management partners if a PSPS must be implemented.

CPI System Operators rely on various resources to monitor evolving weather and climatological conditions that may lead to fire events. 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. (https://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/fire-danger-subsets-fire-potential--danger-55)
- **The National Weather Service (NWS):** The NWS provides on-line predictive fire weather forecasting tools in the form of a current fire-weather outlook, 2-day, and a 3-8 day outlook. (https://www.spc.noaa.gov/products/fire_wx/)
- **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. (https://www.wrh.noaa.gov/map/?wfo=psr)
- **Local NWS Forecasts:** Local NWS forecast pages provide information on current and forecast conditions and timeframes. These forecasts provide more information on how fire weather will develop in different locales in a region. (Portland, OR (weather.gov))

5.2 Infrastructure Inspections and Maintenance

Recognizing the hazards of equipment that operate high voltage lines, CPI maintains a formal inspection and maintenance program for distribution, transmission, and substation equipment which play an essential role in wildfire prevention. CPI currently patrols its system regularly and has increased the frequency of inspections in high-risk areas. Table 3 summarizes the inspection schedule for all assets, while the following sections outline inspection practices for the utility.

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 on page 25 below, 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	Biennially
	Aerial & High Risk Circuit Patrols	Annually
	Detailed Inspection & Wood Pole Testing	Decadal
Overhead Distribution	Routine Safety Patrol	Biennially
	High Risk Circuit Patrol	Annually
	Detailed Inspection & Wood Pole Testing	Decadal
Underground Distribution	Routine Safety Patrol	Biennially
	Detailed Inspection	Decadal
Substation	Detailed Inspection	Monthly
	Infrared Inspection	Annually

5.2.1 Definition of Inspection Levels

1. **Aerial Inspection:** A system inspection carried out by a drone or a helicopter. This type of inspection can reveal system damage or degradation not apparent to an observer on the ground.

2. **Routine Safety Patrol:** A simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards in the system. They also identify hazards or potential hazards to the system from the local environment. Safety patrol inspections may be carried out during other company business. These inspections are conducted on a two-year cycle in less fire hazardous areas.

3. **High Risk Circuit Patrol:** This inspection is conducted exactly like the Routine Safety Patrol Inspection. These inspections take place each spring in areas with a heightened risk of wildfire in the summer.

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

5. **Infrared Inspection:** Facilities and equipment are photographed by a camera that operates in the infrared range of the electromagnetic spectrum. This inspection method can reveal damage or degradation that is not visible to the human eye. Infrared inspections are a crucial component of effective preventative maintenance.

6. **Wood Pole Testing:** Inspections involving the movement of soil, taking samples of the wood pole for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections. Intended to discover if a pole is serviceable or must be replaced. Wood pole testing may be part of a *Detailed Inspection* (defined above) but the inspections do not always coincide.

5.2.2 Aerial Inspection

CPI utilizes helicopters and drones to conduct inspections from vantage points not available to people on the ground. Helicopter patrols are conducted annually on all CPI transmission lines. CPI linemen ride in the helicopter and make notes of system damage observed during the flight. These notes are used to generate work orders so line crews can make necessary repairs. Drones are used to inspect roughly 10,000 structures a year. The drones utilize a mixture of infrared, visual cameras, and LiDAR to collect data. Drone derived data is analyzed and used to assign maintenance work to powerline and tree trimming crews to help assure the system is operating safely.

5.2.3 Routine Safety Patrol Inspections

CPI personnel conduct routine safety patrols of the system in accordance with OAR 860-024-0011(2)(c). That OAR calls for overhead electric supply lines and accessible assets to be inspected for hazards to the public. The OAR requires that these inspections must be conducted on a two-year cycle with roughly half the system inspected in any given year. CPI goes beyond this requirement by also inspecting underground facilities as part of the same inspection process. During these inspections CPI personnel assess the system itself for failing components, missing warning signs, or anything else that could pose a hazard. CPI personnel also assess the environment around the system to discover potential or emerging hazards that must be addressed for system and public safety.

5.2.4 High Risk Circuit Patrols

These patrols are akin to the Routine Safety Patrols in section 5.2.2. with a crucial difference. The high-risk circuit patrols are conducted every spring in fire hazardous areas. This ensures that system defects that could cause a fire ignition are found and corrected before each fire season. In effect, CPI conducts safety patrols twice as often as required on two thirds of its system.

5.2.5 Detailed Inspections of Transmission and Distribution Lines

CPI conducts a detailed inspections on the ten-year cycle described in OAR 860-024-0011(1)(b)(A). CPI conducts these inspections with a mixture of specialized CPI personnel and qualified contractors. Detailed inspections are coordinated by CPI's compliance manager. They are tracked through a system called Varraset which allows CPI to track each inspection from the moment it is entered until any needed corrective actions are completed. The system allows CPI to store and generate reports from past years for company purposes or regulatory reporting. Detailed inspections are very thorough and should identify any National Electric Safety Code violation present at a location. Personnel take detailed notes, measurements, and pictures during every asset inspection. Every violation, whether it is due to an electric safety code change, equipment defects, or deterioration of facilities is tracked and assigned a priority code for correction. Any violation that could foreseeably result in a fire ignition is assigned a high priority code with imminent danger conditions remedied immediately.

5.2.6 Infrared Inspections

Infrared inspections are used to find "hot spots" or areas of irregular thermal radiation emanating from CPI electrical equipment. These "hot spots" correlate to equipment that needs maintenance or may be slowly failing. Additionally, "hot spots" are indicative of system inefficiencies related to the First Law of Thermodynamics wherein useful electrical energy is being turned into waste heat. By conducting infrared inspections and making repairs based on the findings, CPI is making the system safer, more reliable, and conserving energy.

5.2.7 Wood Pole Testing and Inspection

To maintain CPI's wood poles, a formal Wood Pole Inspection & 'Test and Treat' program was initiated with the goal to inspect 10% of the system each year. Wood pole inspections are carried out on a planned basis to determine whether they have degraded below National Electric Safety Code (NESC) design strength requirements with safety factors.

A third-party contractor inspects and tests all poles on a cycle meeting the interval required by Oregon Public Utility Commission regulations. Circuits are identified, mapped, and scheduled for inspection and testing using latest industry standards and practices. If a test shows that a pole is serviceable the inspectors treat the pole with chloropicrin to help preserve it. If a pole test reveals a pole is unserviceable, it is given a priority work order code and replacement work is scheduled to occur as soon as feasible.

5.2.8 Substation Inspections

Substations are among the most important assets an electrical utility owns. The equipment in a substation is both very expensive and difficult to replace. This is especially true of substation transformers which take 36-48 months to receive after ordering. In order to ensure the safety and functionality of these assets CPI conducts an extremely robust substation inspection program.

CPI's substation inspection program operates on a higher tempo than required by regulations. OAR 860-024-0011(2)(d) calls for an inspection cycle of no more than 45 days. CPI conducts substation inspections each month. This means CPI conducts approximately 30% more substation inspections each year than required.

During substation inspections, qualified personnel follow all required safety rules and policies to protect themselves, other workers, the general public, and the system's reliability. The substation inspection involves a thorough examination of the facility to confirm that there are no structural or mechanical deficiencies, hazards, or tree trimming requirements. Each piece of equipment receives a careful visual examination and diagnostic tests are performed. Inspection results are reported to Apparatus Maintenance personnel who review them for any indications that preventative maintenance is necessary. Infrared inspections are an important part of preventative maintenance planning. Infrared inspections can reveal "hot spots" or areas where there is too much resistance in the system and could indicate imminent failure. Equipment that has "hot spots" will be repaired or replaced to protect the system and the public.

CPI performs annual oil samples of all equipment in the substation including transformers and Load Tap Changers (LTC). Oil sampling helps identify issues before there is a major problem.

CPI has a five-year Construction Work Plan (CWP) for each Substation. The plan is reviewed and modified annually to adjust for areas of maintenance that may need to be accelerated.

5.2.9 Prioritization of Repairs

CPI considers and prioritizes maintenance work by assessing the most urgent needs. The inspector will document the overhead and underground systems' condition, recording defects, deterioration, violations, safety concerns, or any other factors requiring attention on the inspection records. The inspections consider all facets of the National Electric Safety Code but put a special focus on discovering hazards that could affect the system's integrity or the safety of line workers and the public.

Inspection findings (overhead & underground) are prioritized and corrected as follows:

- **Priority # 1** – Immediate Hazard: A violation of the National Electric Safety Code posing imminent danger to life or property must be repaired, disconnected, or isolated by the operator immediately after its discovery. These will often be discovered and immediately corrected in the field, and then tracked after the fact by line crews.
- **Priority # 2** – Urgent Repair Condition: When an inspection reveals a deficiency that needs an accelerated repair beyond normal protocol. This repair is usually completed within a month.
- **Priority # 3** – Non-emergency repair condition: These are inspection findings that pose no foreseeable risk to people or property. CPI will correct them within 2 years of discovery.

5.3 Vegetation Management (VM)

5.3.1 Vegetation to Conductor Clearance

CPI 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. CPI 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 (VM) activities are scheduled to ensure all lines are cleared of vegetation hazards. The base CPI VM program is a 4-year trim cycle with a 2-year inspection cycle. The shorter inspection cycle helps CPI guarantee that clearances are maintained and out of cycle trimming is done if inspections indicate that encroachment may occur in an area before the 4-year trim cycle repeats. During VM work tree trimmers will achieve the clearance specifications described below, which meet or exceed OAR 860-024-0016 clearance guidelines. CPI assures that clearances are maintained between VM cycles by positively identifying tree species and taking growth rates into account (see Table 4 page 30) during trimming activities.

- **OH Distribution:** 5 feet from the conductor
- **Trees Under Conductors:** Trees that are under conductors should have crowns reduced to a height 5 feet below the primary conductors or be removed.

- **Overhanging Branches:** Overhang will be removed to the point of hinge on species with likelihood to break during snow and ice loading.
- **Secondary Conductor:** Trees near open wire secondary are pruned to provide a minimum of 5 feet of clearance.
- **Service Wire:** Branches that deflect or weigh heavily upon service or other secondary wires beyond the last CPI pole are removed, but not pruned in their entirety without specific direction by CPI operations
- **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.
- **Triplex and guy wires:** Vegetation near these asset types will be pruned of limbs putting pressure on them.

Table 4. Tree Growth Rates

Tree growth rates for trees on the CPI system			
Slow <1ft/year	Moderate 1-3 ft./year		Fast 3ft/year
Colorado Blue Spruce	Douglas-fir	Ash	Bigleaf Maple
Juniper spp.	Western Red Cedar	Northern Red Oak	Birch spp.
Oregon white oak	Cherry spp.	Tulip tree	Black Cottonwood
Arborvitae	Sweetgum	Callery pear	Red & Silver maple
Low vigor trees	Western Hemlock	Pacific madrone	Black locust
	Norway maple	Red alder	Walnut spp.
	Western larch	Apple	Catalpa
	Cascara	Incense cedar	Lombardy poplar
	Locust spp.	Ponderosa pine	Silver poplar
	Deodar cedar	Scotch pine	Willow spp.
	English laurel	Filbert/Hazelnut	Boxelder
	Grand fir	Ginkgo	Siberian elm
	Pin oak	Vine maple	Leyland Cypress
	Quaking aspen	Hawthorne spp.	Giant Sequoia
	Crimson King maple	Norway maple	

5.3.2 Vegetation Trimming Standards

CPI's personnel and 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, ANSI C2, National Electrical Safety Code (NESC)[1], and OAR 860-024-0017 requirements.

Work performed to the above guidelines helps to ensure reasonable service continuity, public safety, and prevention of 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 and CPI's Technical Guidelines.

5.3.3 VM Inspection and Trimming Schedules

CPI operates in a region that is quite rainy part of the year and very fire hazardous in the summer. Winter and spring rains lead to fast vegetation growth rates that can be somewhat unpredictable from year to year. In the summer, warm temperatures and clear skies predominate in the region causing forest fuels to dry and become volatile. In order to meet these local environmental challenges and help ensure public safety and system reliability, CPI has developed a two-tier VM system. This two-tiered system consists of pre-cycle VM activities conducted on a 2-year cycle and a Right-of-Way management program conducted on a 4-year cycle.

The VM Pre-cycle inspection and maintenance program is designed to maintain required vegetation clearances by inspecting each circuit on a 2-year cycle. Inspections primarily focus on identifying dead and danger trees and trees that may have grown too close to the power lines since the last VM clearing cycle. The circuit inspections are done by CPI linemen and facility inspectors. The Right-of-Way Department then checks, prioritizes, and assigns trimmers to locations identified by inspectors. Pre-cycle contract line clearance tree crews work on this program year-round.

Tree crews participating in CPI's Right-of Way management program systematically assess and clear CPI's Right-of-Way circuit by circuit on a 4-year schedule. Utilizing systematic vegetation management cycles helps to reduce tree-related outages and expedites service restoration during storms or inclement weather. Like the pre-cycle program, the Right-of-Way vegetation management program tree crews clear and prune vegetation year-round. CPI also utilizes a designated "Hot Spot" crew to address immediate areas of concern. This crew's focus is to address areas that have been identified through inspections. This allows for the remaining crews to continue with normal "cycle work" and stay on the four-year schedule.

[1] Rules 012,013 and 218

The combination of these two programs conveys a sense of urgency and thoroughness to CPI's VM activities. The year-round nature of the two programs reinforces those aspects by adding operational flexibility. By creating this two-tiered program CPI has managed to accumulate an impressive public and wildfire safety record, while also maintaining excellent system reliability.

5.3.4 Hazard Trees

A subset of Danger Trees[2], 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.

Dead and danger trees cut along the edge of, and adjacent to, rights-of-way in improved areas, such as yards and lawns, will be cut down and left on-site. CPI will give notification, if possible, to the property owners before cutting and leaving dead and danger trees in improved areas. Dead and danger trees cut in unimproved areas, such as woods and areas not maintained, will be cut down and left on-site.

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

- Dead or dying - all dead or dying trees along, or outside the CPI 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.

5.3.5 Controlling Incompatible Vegetation

CPI supports the philosophy of "The Right Tree in the Right Place" as a means of having a more attractive community to live in and a more dependable electrical system to serve its members. Members of the public should always look up before planting trees and should not plant trees if power lines are overhead. The public may request help in selecting tree species and determining the correct distance to plant trees from the power line right-of-way, by visiting the CPI website at www.CPI.coop.

5.4 Fire Mitigation Construction

CPI experienced a significant loss of system assets due to the September 2020 fires. In the areas where fire destroyed the system CPI is taking advantage of a gamut of fire mitigation construction strategies. These same strategies are being applied to rebuilt and newly built

[2] As defined by ANSI 300 Part 7 standards

infrastructure in high fire risk areas outside of the 2020 fire areas. CPI expects to gain two large benefits from utilizing fire mitigation construction methodologies and materials. Firstly, CPI is building a safer or "hardened" system that is less likely to ignite a fire if damaged. Secondly, CPI expects that the system will be more survivable if a wildfire sweeps through an area occupied by system components. This survivability will preserve CPI's economic and material resources because they will not be burned to uselessness by fire. They will also make recovery easier and faster for our members by limiting the amount of work and material needed to reconnect their property to the electrical grid after a fire or other widespread disaster. CPI is at the forefront of fire mitigation construction and expects to remain there by adopting new technologies and techniques as they mature in coming years.

The following bullets provide an overview of the current state of CPI's fire mitigation construction efforts:

- Fire Resilient structures
    - Steel
    - Composite
    - Ductile iron
- Increased conductor spacing
    - Increasing space between conductors protects the system from damaging contacts from trees and wildlife.
- Covered conductors
    - Covering conductors prevents trees or other objects that touch the lines from grounding and causing sparks that can lead to wildfire ignition.
- Undergrounding of distribution lines
    - Underground lines typically sustain minimal damage from weather-related events.
    - Underground lines are largely protected from fires burning above ground.
    - Minimizes the potential for utility-caused ignitions.
- High impedance fault detection
    - Exploring the use of new relay technology that will help determine a problem on the line before an outage happens.
- Enhanced remote system control
    - Remote system control allows for faster protective responses to potentially damaging events.
        - PSPS events will be of shorter duration since lines can quickly be deenergized with less lag time before the triggering condition develops.
        - The system can be deenergized faster to respond to emergencies.
- Fiberglass crossarms
    - Fiberglass crossarms resist damage from impacts and heat better than wooden ones.

    - Fiberglass crossarms are less susceptible to “tracking” which can lead to infrastructure fires.
- Polymer insulators
    - Polymer insulators are less susceptible to damage than glass or ceramic insulators.
    - Polymer insulators hold conductors more securely than glass or ceramic insulators.

5.4.1 Avian Protection Program

CPI utilizes industry standards for Avian Protection when building new infrastructure. If there is a bird kill or other wildlife issue with legacy infrastructure, then CPI rebuilds it to current standards for avian protection. CPI conducts these rebuilds regardless of the state of the existing infrastructure and will often replace equipment that would otherwise be serviceable for many more years. By conducting the Avian Protection Program this way CPI takes advantage of a synergy that reduces fire ignition danger in two distinct ways with the same work activities. The first ignition reduction benefit is provided through protecting wildlife. If birds or other wildlife cannot engage in activity that completes circuits and leads to electrocution, then CPI has mitigated the chances of sparks from animal electrocutions causing wildfires. The second wildfire protection benefit is due to the nature of Avian Protection Program industry standards. Actions such as spacing conductors further apart or covering jumpers protect wildlife, and also protect the system itself. This means that a branch falling onto a structure that is built to modern Avian Protection Program standards will be less likely to cause damage that could result in wildfire ignition. The benefits of following avian protection program standards means that CPI will continue to meticulously apply these standards.

5.5 Emerging Technologies

CPI has initiated various pilot projects to explore new technologies and best management practices. These pilot projects serve to evaluate the effectiveness of emerging technologies while controlling unwarranted expenditures on unproven methods. CPI has elected to integrate the following technologies on a limited but growing basis. These technologies may be adopted for routine use soon but are still being evaluated for effectiveness and safety.

- Drone Operations: 2 CPI Personnel will be FAA licensed drone pilots by June 2022.
    - During the 2022 fire season CPI will utilize company-owned drones for the first time. These drones will be used for line patrols and will incorporate Artificial Intelligence enhancements to allow quicker flights and faster data analysis.
- Brains for Drones: CPI has partnered with the DOE’s Office of Energy award recipient Brains for Drones to develop the installation of artificial intelligence (AI) on drones.
- High impedance fault detection: Testing relays in high-risk areas for Down Conductor Settings (DCD) and alternate settings.

- Complete relay replacement program: Systematic upgrading all system protection relays within the 26 substations. The new relays will allow for:
    - Downed conductor settings
    - Alternate programming
    - High impedance fault detection
- Hydraulic Reclosure Replacement: Upgrade all hydraulic field reclosers to new solid dielectric reclosures with relay controls.

6 Emergency Response

6.1 Preparedness and Response Planning

CPI staff understands that it is crucial to meet our emergency response partners before an emergency commences. In order to build relationships before emergencies occur, CPI staff engages in constructive communication with our county emergency managers, fire service and law enforcement organizations, and local forestry officials on a year-round basis. Interactions with these partners include joint planning, tabletop exercises, and interagency training events. These events and interactions serve a wide variety of discrete purposes, with the additive effect of improving emergency response times, enhancing response effectiveness, and improving safety skills for field personnel from all partner organizations. Some examples of preparedness and response planning include the following activities.

- Oregon Department of Forestry personnel provide wildfire prevention, suppression, and evacuation training to CPI field personnel.
- The CPI Safety Specialist provides outreach training about downed powerline safety to local first responders.
- CPI operations personnel are actively involved in FEMA Natural Hazard Mitigation Planning with county emergency managers.
- The CPI Safety Specialist is certified to work in county emergency management EOCs (Emergency Operations Centers).

During an active emergency CPI staff respond in the way that most effectively mitigates the hazards involved. The specific activities required of CPI staff will heavily depend on the situation at hand and will be scaled and tailored to meet any specific emergency. The following emergencies and response activities are illustrative of the spectrum of CPI emergency response capabilities.

- During a small-scale event, such as a house fire, CPI linemen will conduct appropriate activities such as deenergizing distribution lines to protect fire fighters.
- Some emergencies like damaging storms affect CPI and its members specifically, and do not require close interagency coordination. During these types of emergencies CPI stands up its own EOC to coordinate restoration activities. During these events the Safety Specialist sends situational updates to emergency managers in affected counties and maintains open communication in case interagency coordination becomes necessary.
- During large scale events such as a damaging wildfire the Safety Specialist will embed in the EOC of the affected county. From a county EOC the Safety Specialist will work to coordinate CPI personnel and resources to meet the immediate needs of the emergency manager's staff. This level of coordination works to best protect life and property during a large-scale event by enhancing speed and clarity of interagency communications.

6.1.1 Emergency Management Communication and Coordination

During active emergencies, CPI coordinates and collaborates with our emergency response partners at an appropriate level. A small-scale emergency requires less resources and coordination than a large-scale event. This means that a two-tiered approach to emergency management communication and coordination is sensible.

During small scale emergencies, CPI's dispatch personnel will coordinate recovery efforts with first responders. This coordination will be maintained until first responders declare the emergency over. This coordination and the resources involved are considered routine by CPI and our emergency response partners.

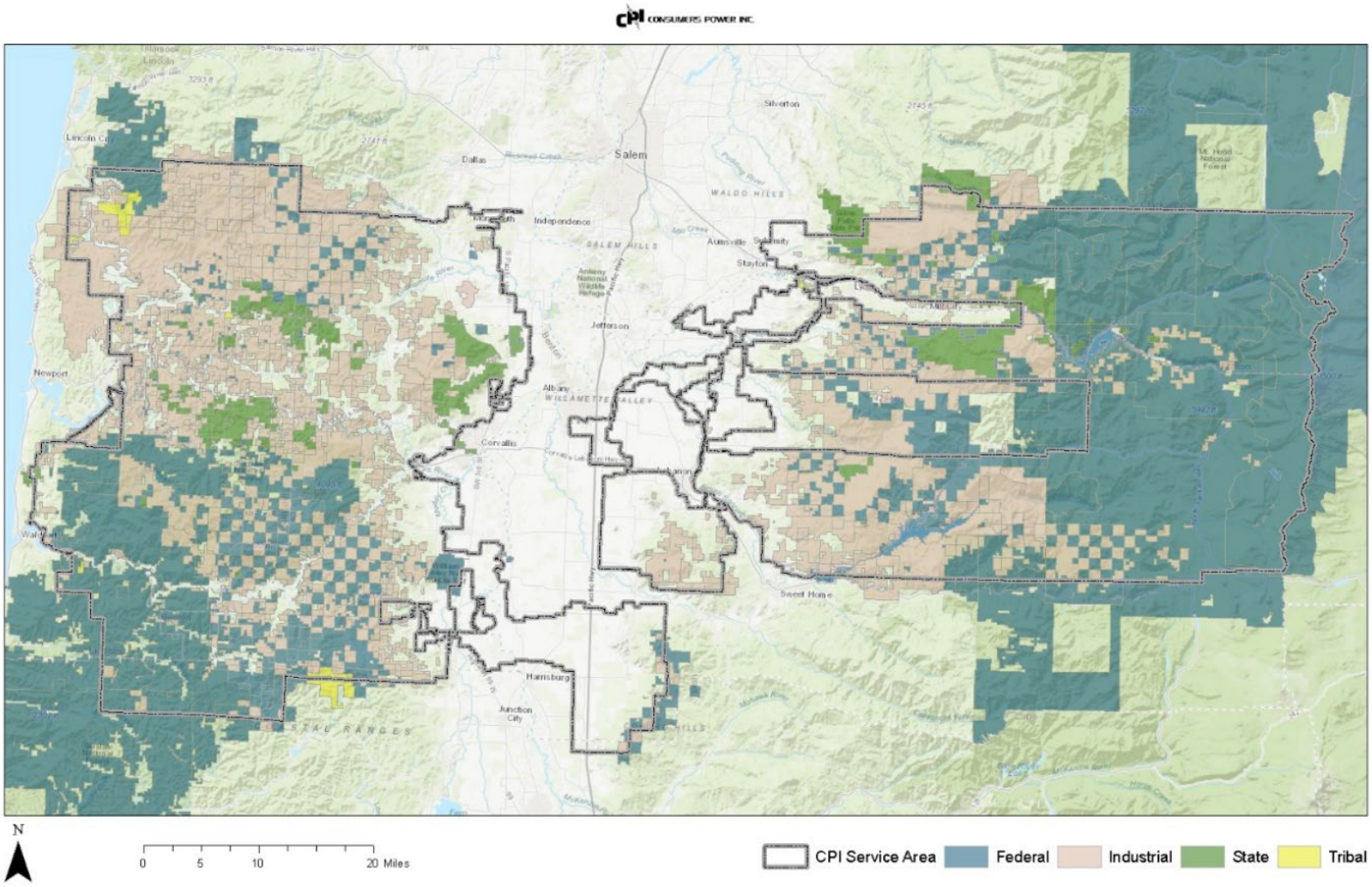
When a large-scale emergency causes a county emergency manager to stand up their EOC it means that many diverse resources are needed. During such events CPI's Safety Specialist will coordinate directly with emergency management staff to ensure CPI is contributing the necessary resources to areas where they are needed. Depending on circumstances this coordination may be via telephone, email, face to face, or any other effective method.

If there is a very serious emergency, the CPI Safety Specialist will be embedded in the affected county's EOC, at the invitation of Emergency Management staff. During such an event, the Safety Specialist will facilitate communications between the county EOC and CPI's Operations department and dispatchers. This communication will be via telephone, email, the CPI 2-way radio network, or any other effective method. This communication scheme ensures two positive results. The first is that CPI personnel and resources will be allocated to areas where they are most needed by emergency managers and first responders. The second is that CPI personnel and resources will benefit from civil authorities' command and control mechanisms and will be kept clear of unnecessary dangers that they may otherwise be unaware of. The CPI Safety Specialist will serve as a liaison until released by the county emergency manager.

6.1.2 Government Agency Land Management Partners

For the majority of CPI's service territory, the most consequential agency partner in terms of fire prevention is the Oregon Department of Forestry (ODF). As discussed in section 5.1.2 the ODF foresters set IFPLs that limit forest activities during fire season. The goal of the IFPLs is to prevent fire ignitions that could lead to wildfires. IFPLs are consequential because they affect all forest lands in the area no matter the manner of ownership. This means that private, public, and commercially managed lands are all subject to the same fire prevention protocols rather than a patchwork of policies and procedures. This homogeneity ensures that protective protocols are understood by all stakeholders in the region and no areas are afforded less protection than others.

Figure 8. General Land Ownership



6.1.3 Public Agency and Member Communications for Outages

CPI personnel understand that poor communication during an emergency can directly contribute to injury, property destruction, and even death. In situations that could lead to a PSPS or other unplanned outage, CPI will convene a Wildfire Crisis Team made up of CPI department heads and other decision makers. This group will work together to ensure that appropriate and actionable information reaches all concerned stakeholders.

Information about a PSPS or other unplanned outages will be shared with stakeholders as soon as practically possible. This will allow stakeholders to have the maximum amount of time to prepare for both the outage and any effects from the conditions leading to the outage. During these times CPI will utilize the following channels of communication.

- Emergency Management agencies in affected counties and contiguous counties.
- Communications companies attached to or collocated with CPI infrastructure.
- News media outlets serving affected areas.
- CPI generated emails.
- CPI's social media accounts.
- Mass phone calls via CPI's IVR (interactive voice response) system.
- Prominent postings on CPI's website.
- Outage reporting and updates via CPI's automated phone system
- Talking points provided to CPI member services representatives.
- Direct face to face contact with affected members if possible.

6.1.4 Community Outreach

It is important that people have access to reliable information that they can use to protect their lives and property from wildfires. CPI distributes wildfire safety information to our members, and the public in general, via the CPI website. CPI also distributes wildfire safety information periodically to members via inserts in their monthly power bills. Additionally, CPI sends a free glossy magazine called Ruralite to CPI members each month. Ruralite contains many types of articles and stories including seasonal safety information.

CPI distributes the following types of wildfire safety information. This list is not exhaustive and is meant to illustrate the breadth and scope of CPI's outreach efforts

- Links to National Fire Protection Association information regarding wildfire safety.
- Contact information for hazard tree abatement via CPI's Right of Way department.
- Tips for extended power outages in case of a PSPS or system damage.
- How to update member contact information so CPI can share emergency information most effectively.
- Information disseminated by emergency management agencies for public consumption via the CPI website.

6.2 Restoration of Service

After nearly any unplanned outage during fire season, whether due to a PSPS or unknown causes, CPI personnel 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 CPI personnel can do so. System components included in an unplanned outage or PSPS must be assessed and repaired as needed prior to re-energization. The CPI Wildfire Crisis Team will provide periodic customer and media updates of restoration status prior to full restoration.

6.2.1 Service Restoration Process

During fire season if there is an unplanned outage with suspected system damage, CPI line crews take the following steps before restoring electrical service. These measures protect CPI personnel, members, the general public, and the system's integrity from wildfire ignitions. These steps may be omitted in part if both the cause of the outage and extent of system damage are known factors.

- **Patrol:** CPI personnel and contractors 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. CPI personnel and contractors assist in clearing downed trees and limbs as needed.
- **Isolate:** Isolate the outage and restore power to areas not affected.
- **Repair:** When the patrols reveal system damage, CPI operations and engineering staff meet to plan the needed work. Rebuilding commences as soon as the affected areas are safe to access. Repair plans prioritize substations and transmission facilities, then distribution circuits serving the most critical infrastructure needs. While the goal is to reenergize all areas as soon as possible, emergency services, medical facilities, and utilities receive first consideration when resources are limited. Additional line crews and equipment are dispatched as necessary, which may include "mutual aid" crews from other utilities in the region if damage is extensive.
- **Restore:** Periodic customer and media updates of restoration status before full restoration are posted on social media platforms, CPI's phone-based outage reporting hotline, and CPI's website. Additionally, member services personnel are given status updates to pass onto members who call for information. After repairs are made, power is restored to homes and businesses as quickly as possible. Members, local news, and other agencies receive notification of restored electric service.

7 Performance Metrics and Monitoring

7.1 Plan Accountability

This section identifies CPI's management responsibilities for overseeing this WMP and includes the operating departments and teams responsible for carrying out the various activities described in the previous chapters.

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

- The Board of Directors makes policy decisions relative to the utility – they are responsible for approving and adopting the Wildfire Mitigation Plan.
- The CEO directs management staff responsible for operations, customer service and finance.
- The COO supervises the Manager of Engineering, Manager of Operations, Dispatchers, Safety Specialist and the ROW supervisor.
- The COO is responsible for the overall execution the WMP. Staff will be directed as to their roles and responsibilities in support of the plan.
- The Marketing & Business Development Manager is responsible for communicating with media outlets, cooperative members, key accounts, and health agencies during an emergency or planned maintenance outages.
- The Safety Specialist is responsible for communicating with public safety, first responders, and local Offices of Emergency Management during an emergency or planned maintenance outages.
- The Safety Specialist determines when and how to notify outside agencies in cases of wildfire emergency events.
- CPI's COO is 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.

7.2 Monitoring and Auditing of the WMP

At the end of each fire season CPI assesses company wildfire mitigation efforts. All known fire starts within CPI's service territory are tracked. Any lessons learned or new best practices are articulated and incorporated into the WMP. The WMP is also reviewed for factual changes such as miles of overhead conductors and updated accordingly. Finally, the WMP is updated to reflect changes in the environment, technology, regulations or any other factors that render portions of the WMP obsolete or lacking. All WMP reviews and updates will be finished prior to June 1st. This schedule allows time for CPI personnel to present the updated WMP to the board for review and comment before the submission deadline to the Oregon PUC.

7.2.1 Identifying Deficiencies in the WMP

The COO is 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 COO or their designee is 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. CPI's staff and qualified stakeholders are encouraged to bring any potential deficiencies to the attention of the COO. The COO, along with the appropriate staff, will evaluate each reported deficiency, and if determined to be valid, shall record the deficiency for further action.

7.3 Performance Metrics

In order to understand whether this Wildfire Mitigation Plan is effective, there must be a basis for measuring success or failure of the plan and its elements. Towards this end CPI has developed several metrics to use in order to assess the performance of different aspects of the plan. These metrics quantify the threat environment that CPI's system operates within and the mitigation responses that CPI employs in response.

- CPI measures the number of Red Flag Warning (RFW) days in order to quantify how hazardous each fire season is. A higher number of RFW days correlates to a more threatening fire season.
- CPI tracks the number of system related ignitions in order to gain a high-level understanding of how effective fire mitigation efforts are.
- CPI measures the number days that the system is in "hotline tag" or "non-reclose" and compares that value to the official length of fire season. This comparison will reveal the level of synchrony between CPIs environmental threat assessment and the threat that ODF foresters perceive.
- CPI records the number of unplanned outages that occur. This helps determine the overall effectiveness of system hardening and reliability efforts.
- CPI tracks the root causes of system outages. This information is used to help determine how CPI should allocate resources to best enhance system reliability.

Table 5. 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, indication of overall threat level for each fire season
Number of system related ignitions	Effectiveness of fire mitigation plan	Count of events	Reduction or no material increase
Number of days system is in hotline tag or non-reclose	Assess practical length of fire season regarding system protective measures	Count of events	Synchrony between length of declared fire season and system effects
Number of Outages	Assess system hardening & overall reliability	Count of events	Reduction in the general trend of events
Causes of Outages	Determine major drivers of system outages	Count of events for each root cause category	Annual reduction in each causal category

7.4 Programmatic QA/QC processes

7.4.1 Transmission and Distribution System Inspection QC Process

Annually, CPI will perform a review of construction/repairs completed by CPI and CPI's contractors. The review is performed by the Operations Manager and/or the Engineering Manager.

- A random 10% sample of completed Work Orders throughout CPI's system will be reviewed for accuracy, construction standards and thoroughness.
- CPI's Operations Manager, General Foreman and Safety Specialist also perform monthly site visits inspecting crew safety, quality control and work practices.

CPI also performs a detailed facility inspection and pole test and inspection (see 5.2.4 and 5.2.5) on 10% of the system. The inspection process is administered by CPI's Compliance Manager and routine field verifications are performed throughout the year.

CPI's insurance carrier *Federated* performs an in-depth annual review of Safety and Loss Preventative measures. The review also includes field visits to inspect ROW Trimming, Crew inspections, and condition of CPI's electrical system.

7.4.2 Vegetation Management QC Process

CPI's vegetation management quality control process is coordinated by the Right of Way Supervisor. The Right of Way Supervisor and a contract arborist work together to review 10% of the work done by tree trimming crews each quarter. Performance discrepancies are quite rare, but when they are discovered the crew responsible is directed to return and complete the job to CPI specifications. Any such return work is audited to ensure proper completion. There are a couple of important records related to tree trimming activities. The first record is service orders, which are generated by the Right of Way supervisor and provided to tree crews to direct work activities. The second is from the tree trimming crews who submit weekly reports of work completed to the Right of Way Supervisor. Both records are stored indefinitely and can be accessed for internal purposes or regulatory reports.

7.5 Plan Approval Process

CPI's policy statement No. 7

Purpose: The President/CEO is responsible to establish and implement plans, procedures, and controls to effectively manage hazards and risks faced by the Cooperative. Effective risk management will enable the Cooperative to provide high quality services to its members, respond quickly and effectively to natural and man-made emergencies and disasters, better manage costs, maintain high employee productivity, and better fulfill its purpose and objective. The Chief Operating Officer will present the WMP to the Board of Directors annually before the beginning of fire season. The board will provide any

necessary feedback. The board will approve the plan after they are satisfied that the plan will be effective at mitigating wildfire risk.

Policy: Wildfire Risk Management

a. The Cooperative shall assess risks posed to its members and operations with regard to powerline-ignited wildfires and develop plans and procedures to mitigate such risks.

b. Wildfire Risk Management plans and procedures will include the following basic elements: vegetation management, system coordination, system hardening, and public safety power shutoffs (PSPS).

c. At least annually the President/CEO will review the effectiveness of Wildfire Risk Management plans and procedures, implement appropriate changes and improvements, and report such findings, changes, and improvements to the board.

Appendix A: Plan and Mapping Disclaimers

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