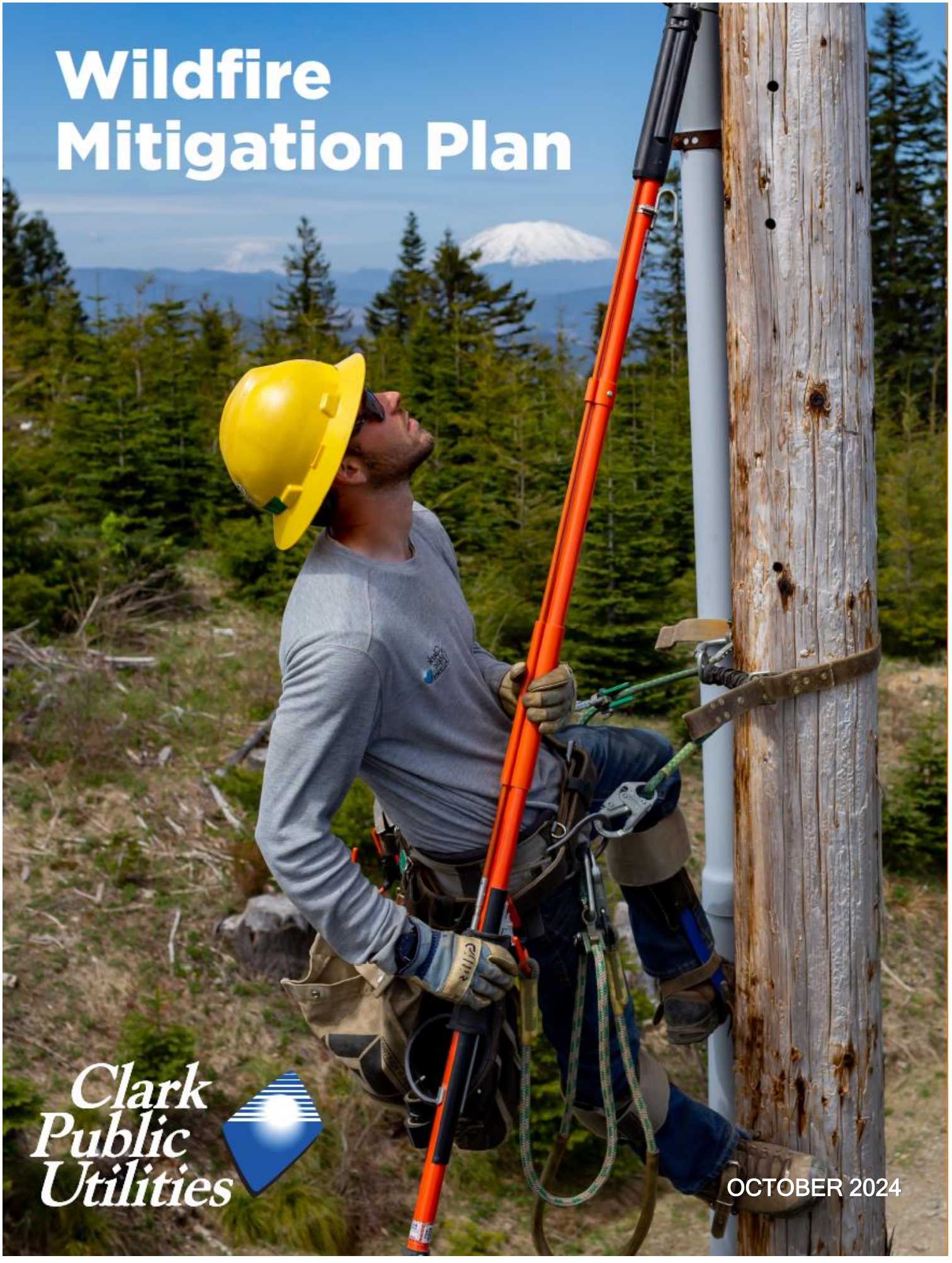
Wildfire Mitigation Plan



Clark Public Utilities

OCTOBER 2024

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WILDFIRE MITIGATION PLAN DISCLAIMER

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1 Introduction

Unusually large wildfires are on the rise in the Pacific Northwest, with an increase in fires in west-side conifer forests including a 170-day event in the Queets Rainforest on the Olympic Peninsula[1]. In the western U.S. region encompassing the Pacific Northwest, the annual probability of very large fires is projected to increase by a factor of 4 in 2041-2070 compared to 1971-2000[2]. As a result of this increased wildfire risk, Washington State legislation was enacted requiring utilities to put practices in place aimed at reducing the risk of wildland fire, damage, and losses resulting from those fires through the development of Wildfire Mitigation Plans (HB-1032). By October 31, 2024, and every three years thereafter, each consumer-owned utility and investor-owned utility must review and adopt its wildfire mitigation plan. The plan must be submitted to the utility wildland fire prevention advisory committee created in RCW 76.04.780 to be posted on their website. The legislation is intended to direct utilities to develop operational policies and practices to mitigate, prepare for and respond to wildfires using accepted best practices.

Clark Public Utilities believes the development of a thorough Wildfire Mitigation Plan to be a prudent and responsible effort to prepare for increased wildfire occurrence in Clark County. For the utility, which aims to protect public safety and preserve the reliable delivery of electricity, wildfire mitigation is a top priority. While an electric utility can never fully eliminate the risk of fire, Clark Public Utilities is committed to taking practical actions to reduce the devastation that a wildfire could bring to the people and communities we serve. The Wildfire Mitigation Plan lays out the steps we are taking to do so. This document is available on the utility website at: ClarkPublicUtilities.com/WMP.

[1] https://outdoor-society.com/as-seen-from-space-the-2015-paradise-fire-in-olympic-national-park/
[2] Northwest Climate Adaptation Science Center

1.1 Purpose of the Wildfire Mitigation Plan

Reducing the risk of utility-caused wildfire plays an essential role in Clark Public Utilities' operational practices. Its existing policies, programs, and procedures, as well as the incorporation of emerging technologies are intended to directly or indirectly manage or reduce the risk of its utility infrastructure originating or contributing to wildfire.

The utility believes the strategies and activities described in this plan, with associated goals and metrics, are an effective approach to reduce fire-related risk for customers in the near-term and will allow for refinement and improvement over time. As Clark Public Utilities gains experience implementing the mitigation programs outlined, and as new information emerges, the utility will assess, evaluate, enhance, and refine its practices.

This Wildfire Mitigation Plan describes vegetation management, asset inspection and maintenance, recloser setting protocols, restoration of service processes, and community outreach efforts. Additionally, it spells out plan ownership, performance metrics, deficiency identification, and the plan's audit and approval process. It also addresses the unique features of Clark Public Utilities' service area such as topography, weather, infrastructure, grid configuration and potential wildfire risks. While the utility's Board of Commissioners sets direction for the plan, its implementation primarily resides with the utility's Chief Executive Officer/General Manager and Director of Operations.

1.2 Objectives of the Wildfire Mitigation Plan

The main objective is to identify and outline actions that when implemented:

- Create increased reliability and safety;
- Prevent, mitigate, respond/assist, and recover from wildfires;
- Comply with current and anticipated Washington State law, and National Electric Safety Code (NESC) regulations and guidelines;
- Allow for continuous evaluation and improvement.

1.3 Mission Statement

Clark Public Utilities is a customer-owned electric and water utility serving the residents and businesses of Clark County, Washington, with reliable electricity, clean water, stable rates, and exceptional customer service while ensuring resource sustainability in conjunction with environmental stewardship. To this end, the utility employs construction, maintenance, and various practices intended to minimize the risk of catastrophic wildfire through operation of its electrical system.

1.4 Clark Public Utilities Profile and History

Formed as a Public Utility District by a vote of the people in 1938, Clark Public Utilities is one of 28 not-for-profit public utilities in the State of Washington and provides electricity to approximately 233,000 customers throughout Clark County, and water service to more than 40,000 homes and businesses in unincorporated areas. This customer base is roughly 92%

residential and 8% commercial/industrial. For more than 85 years, the utility has been committed to bringing our community the most reliable and affordable electricity and water services possible. These principal focuses are further enhanced with innovative energy solutions and a deep-rooted involvement in the communities we serve.

The headquarters office is located in Vancouver, Washington and the Operations Center is located in the Orchards area. The utility is governed by a three-member elected Board of Commissioners. Commissioners serve six-year terms and together determine policy for the organization and appoint the CEO/General Manager who is responsible for the utility's management and operations.

1.5 The Service Area

Clark Public Utilities is the southernmost Public Utility District in the State of Washington and serves a diverse area, transmitting and distributing power within a 628 square mile service area (Figure 1) covering the entirety of Clark County[3]. The service territory is positioned along the Columbia River and borders Cowlitz and Skamania Counties to the north and east respectively. It is bound on two sides by the Columbia River and on the north by the North Fork of the Lewis River.

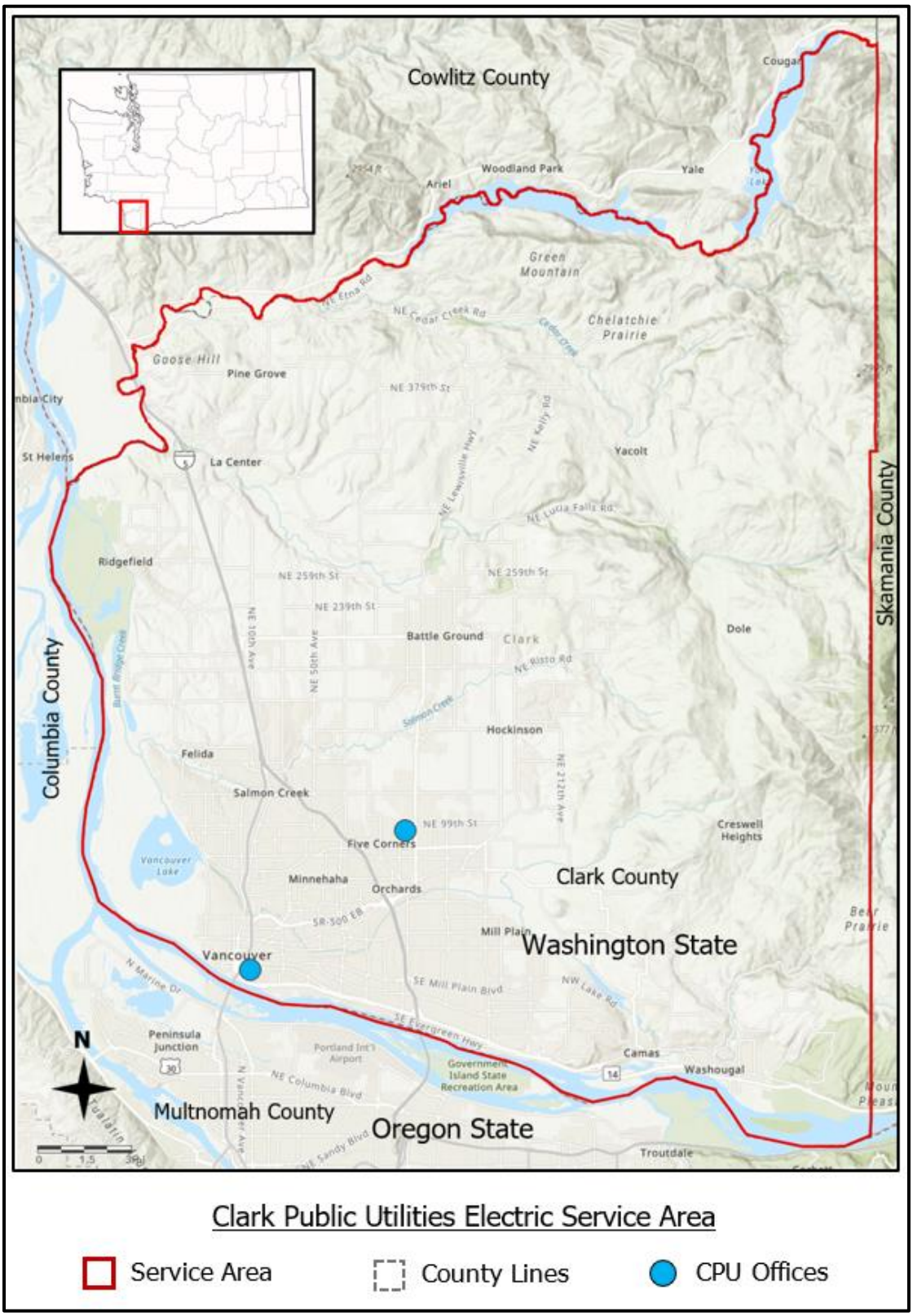
The service territory is made up primarily of agricultural and pasture lands, but also serves forested areas to the east as well as densely populated city-suburbs along the I-5 and Hwy 205 corridors. The system averages approximately 46 customers per mile of line spread throughout approximately 70% of the county land area, with the majority of the customers and service load located in the southwest corner of the county.

The utility serves light industrial, urban, and suburban residences and businesses in and around the cities of Vancouver, Battle Ground, Camas, La Center, Ridgefield, Woodland, Washougal and the town of Yacolt. Clark Public Utilities' rights-of-way (ROW) are located on privately-owned properties and within various road ROWs, with a small portion located on state and federally held lands.

The relatively flat landscape of the west-side of the county transitions into the heavily wooded cascade foothills to the east. While the elevation above mean sea level varies from ~30 feet at the Columbia River, to ~2,500 feet in the Gifford Pinchot National Forest, the majority of the distribution system lies at ~250 feet.

[3] Clark Public Utilities does not serve the Georgia-Pacific Camas Paper Mill in the City of Camas

Figure 1. Utility Service Area



1.5.1 Service Area Climate

Clark County has a cool oceanic climate, where summers are short, warm, and dry, and mostly clear. The winters are cold, wet, and overcast with average precipitation of 51 inches annually[4]. Over the course of the year, the average high temperature typically varies from 47°F to 82°F and is rarely below 24°F or above 96°F, though extremes can range from subzero to over 100°F. The summer dry season is generally from mid-May to mid-October with the average daily high temperatures above 77°F. The hottest month of the year is August, with an average high temperature of 83°.

1.6 The Electric System

Clark Public Utilities owns and operates an electric system comprised of generation, transmission and distribution facilities which are critical to maintaining electric service to its approximately 233,000 customers.

The local power network is a part of a larger electrical grid serving the greater Pacific Northwest region. Within Clark County, two other utilities, Bonneville Power Administration and PacifiCorp own transmission facilities that carry power into and through the service area.

Approximately 46% of the power for the electrical grid comes from large hydroelectric generation facilities along the Columbia and Snake Rivers. The remaining comes from Clark Public Utilities' natural gas-fired River Road Generating Plant (34%), nuclear (6%), wind power generated at the Combine Hills I and II wind farm near Milton Freewater, OR (4%), and non-federal market purchases (10%). Purchased power is wheeled over BPA and PacifiCorp lines.

The utility owns, operates, or has equipment in 48 substations and maintains over 4,800 circuit miles of distribution lines, 70% of which are underground. There are over 1,400 miles of overhead T&D right-of-way to maintain. Table 1 below provides a high-level overview of the utility's assets.

[4] https://www.bestplaces.net/climate/county/washington/clark

Table 1. Asset Overview

ASSET CLASSIFICATION	ASSET DESCRIPTION
Transmission	135 miles of OH 115kV and 69kV, and 2 miles of UG 115kV transmission line with associated structures, and switches.
Distribution	1,445 miles of overhead (OH) and 3,366 miles of underground (UG) conductor, including cabling, transformers, voltage regulators, capacitors, switches, and line protective devices operating at 12.47kV. 70% of the distribution system is underground.
Substation Assets	Major equipment such as power transformers, voltage regulators, protective devices, relays, open-air structures, switchgear, and control houses in 48 substation facilities and 6 switching stations.

2 Fire Prevention Strategies

The proposed wildfire prevention strategies can be categorized into five main mechanisms that align with Clark Public Utilities' best practices. Together, the five components create a comprehensive wildfire preparedness and response plan with a principal focus on stringent construction standards, fire prevention through system design, proactive operations and maintenance programs, and specialized operating procedures and staff training.

- **Design & Construction:** Clark Public Utilities' design and construction consist of system, equipment, infrastructure design and technical upgrades. These practices aim to improve system hardening to prevent contact between infrastructure and fuel sources to minimize the risk of systems becoming a source of ignition.
- **Inspection & Maintenance:** The utility's inspection and maintenance strategies consist of diagnostic activities as well as various methods of maintaining and ensuring all equipment and infrastructure is in proper working condition.
- **Operational Practices:** Comprised of proactive day-to-day actions taken to mitigate wildfire risks and to ensure preparedness in high-risk situations, such as dry and windy climatological conditions.
- **Situational & Conditional Awareness:** This component consists of methods to improve system visualization and awareness of environmental conditions. The practices in this category aim to provide tools to improve the other components of the plan.
- **Response & Recovery:** This strategy consists of Clark Public Utilities' procedures in response to wildfire, de-energization, and other emergency events. This component aims to formalize protocols for these situations for thorough and efficient communications, emergency response and recovery.

2.1 Preventative Strategies and Programs

The components described above have several strategies and programs, most of which have already been implemented. Some are situational, and are not limited to any timeframe, or are scheduled to be completed over several years, while others are in the evaluation or proposal stages. Table 2 provides a summary of utility programs and activities that support wildfire prevention and mitigation.

Table 2. Mitigation Programs/Activities

DESIGN AND CONSTRUCTION
Underground distribution lines
Supervisory Control and Data Acquisition (SCADA)
Modernized recloser control
Covered jumpers and animal guards
Avian protection construction standards
Overhead wire replacement
Underground construction in new developments
Tree wire for applicable new overhead construction
INSPECTION AND MAINTENANCE
Infrared inspections of substation and line equipment
Wood pole inspection program
UAV assisted vegetation inspection
Transmission line ground patrols
Helicopter assisted inspections
Quarterly substation inspections
Annual inspection and ROW maintenance program
GIS assisted asset maintenance and VM work tracking
T&D system vegetation management program
Vegetation cycle trimming
Tree trim request form on utility website
Tree assessment and safety trimming for customers

OPERATIONAL PRACTICES
Work procedures and Fire Hazard safety training
Community outreach / tree planting guide
Fire suppression equipment on company trucks during fire season
Wildfire protection recloser settings during red flag warnings
Hazard tree removal and trimming specifications
Special work procedures for high Industrial Fire Precaution Levels
100% tree work audits
De-energization notifications (internal, field crews, Dispatch and OEM)
Coordination with county offices of emergency services
Pre-emptive public safety power shutoffs
SITUATIONAL AWARENESS
Contractor/staff safety tailboard meetings prior to field work
Monitoring of active fires in Clark and adjacent counties
Monitoring of utility-owned weather stations
Industrial Fire Precaution Level (IFPL) monitoring
Weather Monitoring (USFS-WFAS, NWS)
RESPONSE AND RECOVERY
Outage response communications
Line patrols prior to re-energization
Crisis Communication Plan (CCP)
Emergency Response and Operations Continuity Plan (EROC)
WMP performance metrics
Workforce training

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3 Risk Analysis and Risk Drivers

To establish a baseline understanding of the risks and risk drivers involved, the utility examined its exposure to all fire-related hazards. Clark Public Utilities also examined its asset locations to identify risks unique to its service area. This chapter will provide an overview of the service area properties and associated risks, which are factored into the wildfire mitigation strategy. See section 1.5 for a description of the service area.

3.1 Fire Risk Drivers

Utility staff evaluated its own, as well as other utilities' fire causes in the region and applied field experience to determine the key potential risk drivers. Six categories were identified as contributors for heightened wildfire risk:

- Climate Change
- Fire Weather/Drought
- Vegetation Type/Fuels
- Tree Failure/Tree Mortality
- Foreign Contact
- Equipment/Facility Failure

3.1.1 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[5].

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. Average annual temperature is projected to continue to increase in the Pacific Northwest along with increasing number and severity of wildfires and insect outbreaks[6]. Rising temperatures are likely to increase bark beetle survival, 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.

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

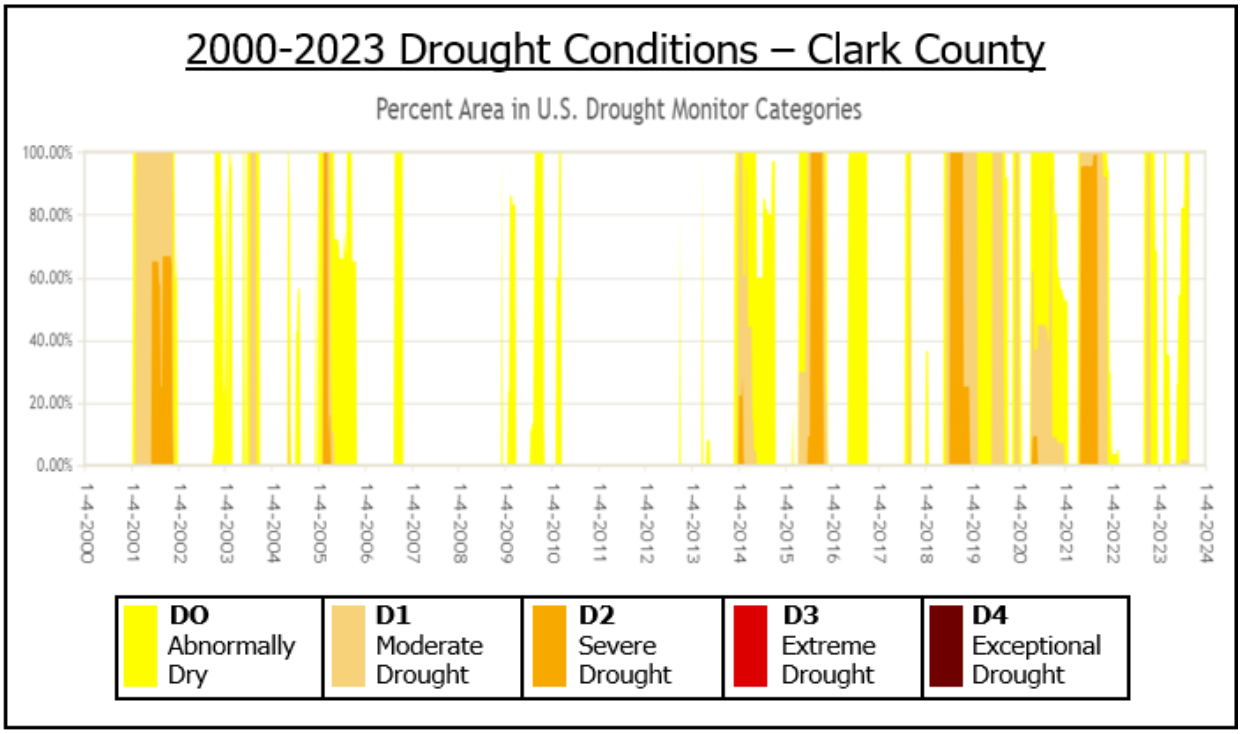
[6] (McKenzie et al. 2004, 2008, Westerling et al. 2006, Mote et al. 2014, Shafer et al. 2014)

3.1.2 Fire Weather/Drought

The service area can experience hot and dry weather during late summer and early fall. Drought, combined with warming temperatures, can result in decreased snowpack and streamflow, increased evaporative demand, dry soils, and tree deaths, which results in increased potential for wildfires. These conditions create increased potential for extreme wildfires that spread rapidly, burn with more severity, and are costly to suppress.

The U.S. Drought Monitor[7] depicts the location and intensity of drought conditions across the landscape. The system uses five categories: Abnormally Dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought (D1–D4) as listed in the legend below. Records going back to 2000 show drought conditions for the Clark County area (Figure 2). D3-Extreme or D4-Exeptional conditions did not occur in the sample date range. Figures 3 and 4 on the following page represent the historic occurrence of Red Flag Warnings (RFWs) in the service area from 2017 through 2023. Unlike droughts, RFWs are regional alerts to short term weather conditions that are conducive to wildfire outbreak and spread.

Figure 2. Historic Drought Conditions



[7] https://www.drought.gov/states/washington/county/clark

Figure 3. Red Flag Warnings 2017-2023

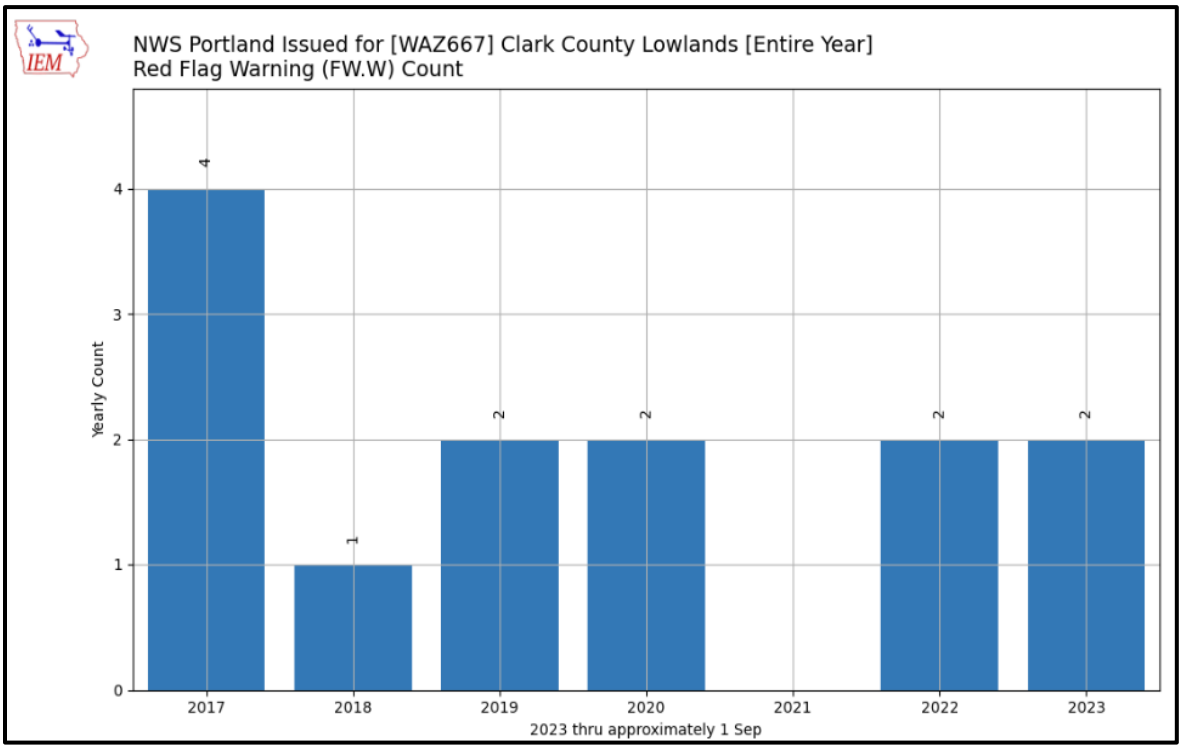
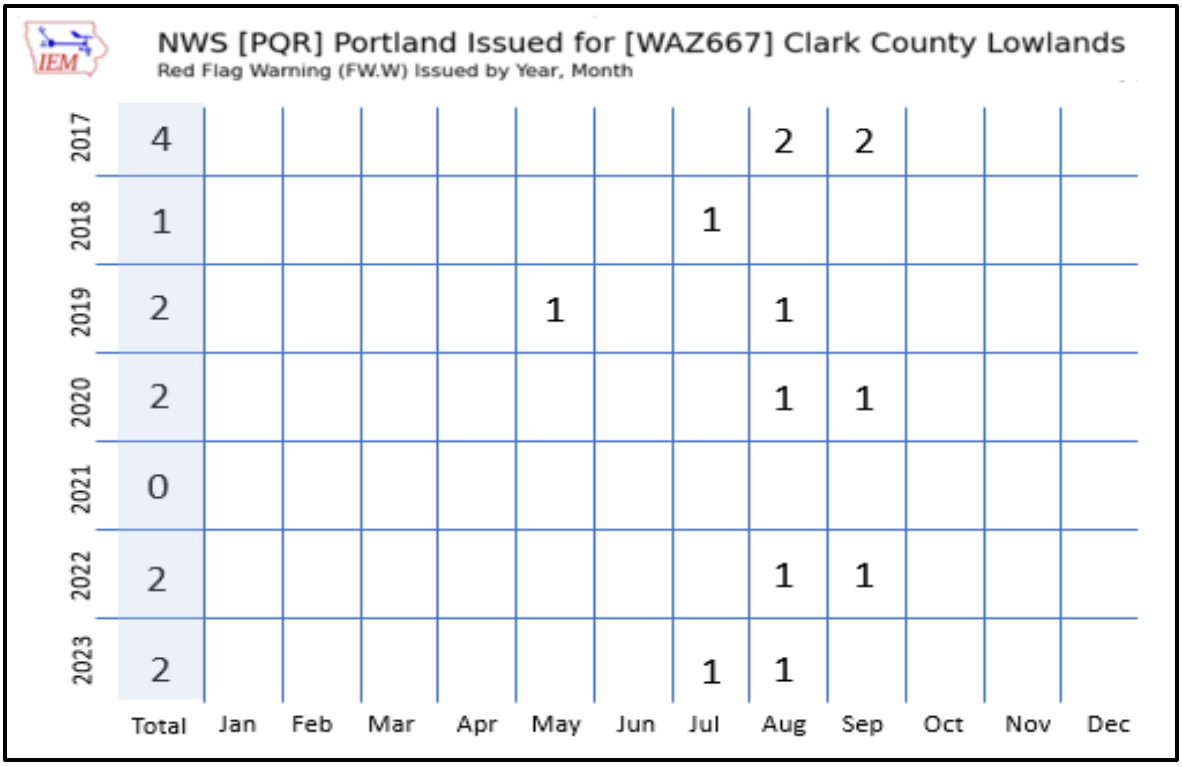


Figure 4. Red Flag Warnings by Year/Month 2017-2023



3.1.3 Vegetation Type/Fuels

The predominant forest type in the upper elevations of the service area is Western hemlock, followed by interior Douglas fir and Grand fir types. Much of the service area's lower elevation vegetation is comprised of open grasslands, dryland farming, and non-irrigated agriculture.

The western lowland areas of the service area are classified as "Portland/Vancouver Basin" ecoregion, and the more heavily vegetated eastern half is "Western Cascades Lowlands and Valleys"[8]. This area is made up primarily of Douglas fir tree farms. The native species/vegetation profile for large trees (>20' at mature height):

- Black hawthorn
- Black cottonwood
- Douglas Fir
- Grand fir
- Oregon ash
- Oregon oak
- Pacific crabapple
- Pacific flowering dogwood
- Pacific madrone
- Pacific yew
- Ponderosa pine
- Red alder
- Vine maple
- Western cedar
- Western hemlock

3.1.4 Tree Mortality

Emerald Ash Borer (EAB) is a destructive invasive species native to eastern Asia that has spread to about three dozen states since 2002. It will likely begin killing ash trees within Clark County in the next five years. The most common sign of infestation is crown dieback, small D-shaped exit holes, and suspicious trunk sprouting on true ash trees (*Fraxinus*). The metallic green adults are typically about one half-inch in size. First identified in Michigan in 2002, they have since spread throughout the Midwest and have now been discovered in the Pacific Northwest. Although harmless to people, pets, and animals, it has proven deadly to all ash species in North America.

Fir trees in Oregon and Washington are dying in record numbers as well. The fir tree mortality appears to be due to a combination of drought coupled with insects and fungal diseases. Extreme heat is also being investigated as a possible cause. Die-offs were recorded for "true fir" species such as grand fir, white fir, red fir, noble fir, and the hybrid Shasta red fir. Timber crop Douglas fir is not considered to be true fir, although they are experiencing a smaller scale die-

[8] https://www.plantmaps.com/interactive-washington-ecoregions-l4-map.php

off of their own. The pests implicated are the fir engraver beetle (Scolytus ventralis), a type of bark beetle; and multiple fungal root diseases.

Starting in 2015, state foresters began warning that Western hemlocks, a particularly drought-sensitive species common to the Coast Range and Cascades, were succumbing to pests and fungi that infested the already-stressed trees. Foresters are also seeing widespread die-offs of Western red cedar. Stems and the structures that move water and nutrients are destroyed by excessive heat and drought. When these structures overheat, the tissues inside them fall apart, and they turn red or brown as their chlorophyll breaks down[9].

3.1.5 Tree Failure

The majority of all line down events are attributed to trees or branches falling into power lines. In fact, trees and limbs account for 50% of the outages in Clark County. Since many portions of Clark Public Utilities' distribution system are located in wooded or heavily treed areas, any tree, either live or dead, is considered a potential threat to the electric system if it is within striking distance of the power lines. Electric utilities that investigate the actual causes of outages often find that the failure of hazardous branches and trees is a significant component of the tree-related outage category[10].

3.1.6 Foreign Contact

As is the case for most electrical utilities, most overhead power lines on the Clark Public Utilities system are installed with bare wire conductor on insulated structures. Protection equipment is utilized to isolate faults, but there are time delays associated with circuit breakers, reclosers and fuses. These time delays are not fast enough in some cases to prevent all sparks prior to interruption.

3.1.7 Equipment Failure

There are many reasons equipment failure can occur during its service life. Most equipment requires regular maintenance for optimal performance. Even though the utility's qualified personnel regularly perform scheduled inspection and maintenance on system equipment, internal defects that are not visible or predictable can be the cause of destructive equipment failure resulting in ejection of sparks and/or molten metal. The failure of components such as hot line clamps, splices, connectors, jumpers, arrestors, and insulators can result in failure and wire to ground contact. Transformers and capacitor banks can have internal shorts potentially resulting in the ejection of materials which could cause an ignition.

[9] Crosscut; Pacific Northwest forests are heating up and drying out- Sarah Trent, March 14, 2023
[10] NRECA Vegetation Management Manual

3.2 Key Risk Consequences

The aforementioned risks have many possible consequences should one or more become a contributing factor for an ignition. The list below outlines some of the worst-case scenarios, the prevention of which is the impetus for the development of this plan:

- Personal injuries or fatalities to the public, employees, and contractors
- Damage to public and/or private property
- Damage and loss of utility infrastructures and assets
- Impacts to reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to the utility's reputation and loss of public confidence
- Negative public opinion of the power industry in general
- Environmental impacts

3.3 Fire Threat Assessment in Utility Service Territory

As part of the risk analysis process, Clark Public Utilities examined its asset locations in relation to topographic features, wildfire history and land ownership data to identify risks unique to its service area. This chapter will provide an overview of the service area properties and associated risks, which are factored into the wildfire mitigation strategy. See section 1.5 for a description of the service area.

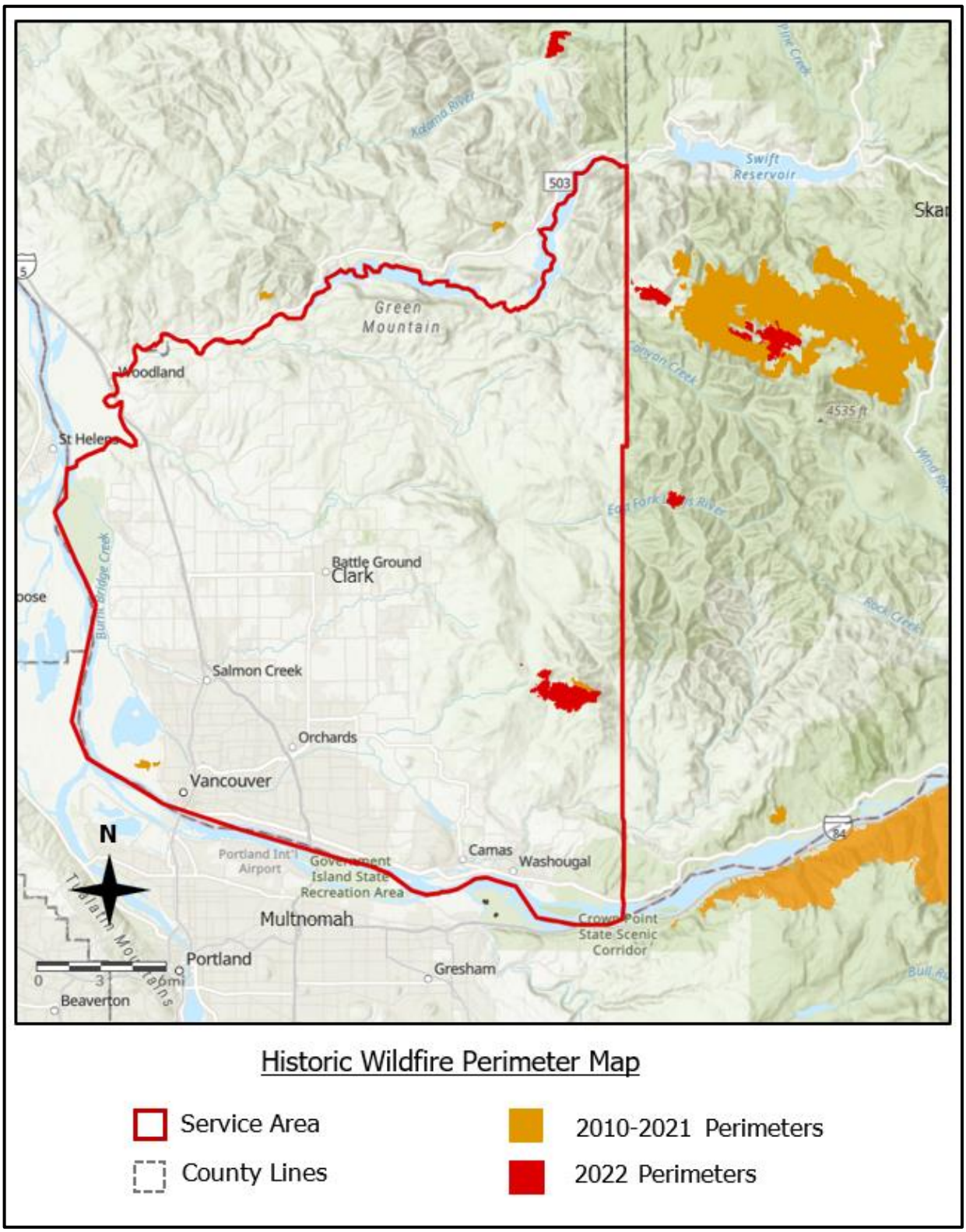
3.3.1 Wildfire History and Outlook

Washington has a long history of both small and very large wildfires, some reaching over 100,000 acres. Historically, these have occurred primarily on the drier, east side of the Cascade Range. While this is still generally the case, more wildfires have been occurring on the "wet" west side in recent years. As of the writing of this plan, 2022 was the largest fire year in recent western Washington history. In fact, in stark contrast to typical fire seasons, fire affected more forested areas in western Washington in 2022 (53,600 acres) than in eastern Washington (48,000 acres)[11]. Figure 5 shows the regional wildfire occurrence since 2010[12].

Generally speaking, fire season in Washington lasts from April through the end of October, but research indicates that this is changing. Fire seasons from 2003 through 2012 averaged more than 84 days longer than in 1973 to 1982[13]. The largest fire years coincide with warm spring and summer temperatures, and early spring snowmelt. Annual large wildfire frequency in United States Forest Service (USFS), National Park Service and Bureau of Indian Affairs (BIA) forests is significantly correlated with spring and summer temperature.

[11] Wildfire Season 2022-Work of Wildfire Assessment
[12] Washington Large Fires 1973-2022, DNR, June 29, 2023
[13] Westerling, A.L. 2016 Increasing Western US Forest Wildfire Activity; https://royalsocietypublishing.org/doi/10.1098/rstb.2015.0178

Figure 5. Wildfire Perimeters 2000-2022



3.3.2 Wildland Urban Interface

The USFS defines the wildland urban interface (WUI) as a place where humans and their development meet or intermix with wildland fuel and is composed of both interface and intermix communities. The distinction between the two is based on the characteristics and distribution of houses and wildland vegetation across the landscape.

Interface WUI

Interface is defined as those areas where human development meets areas that are covered with more than 50% wildlands. To be considered an "Interface" land area, development or structures must be bordered by wildlands on at least one side.

Intermix WUI

Intermix refers to areas where housing and wildland vegetation intermingle. To be considered intermix, a development or structure must be surrounded on two (2) or more sides by wildlands. Intermix is often found between the Interface and the wildlands. However, as can be seen in Clark County, Intermix can also be found in undeveloped/low-density pockets of urban areas.

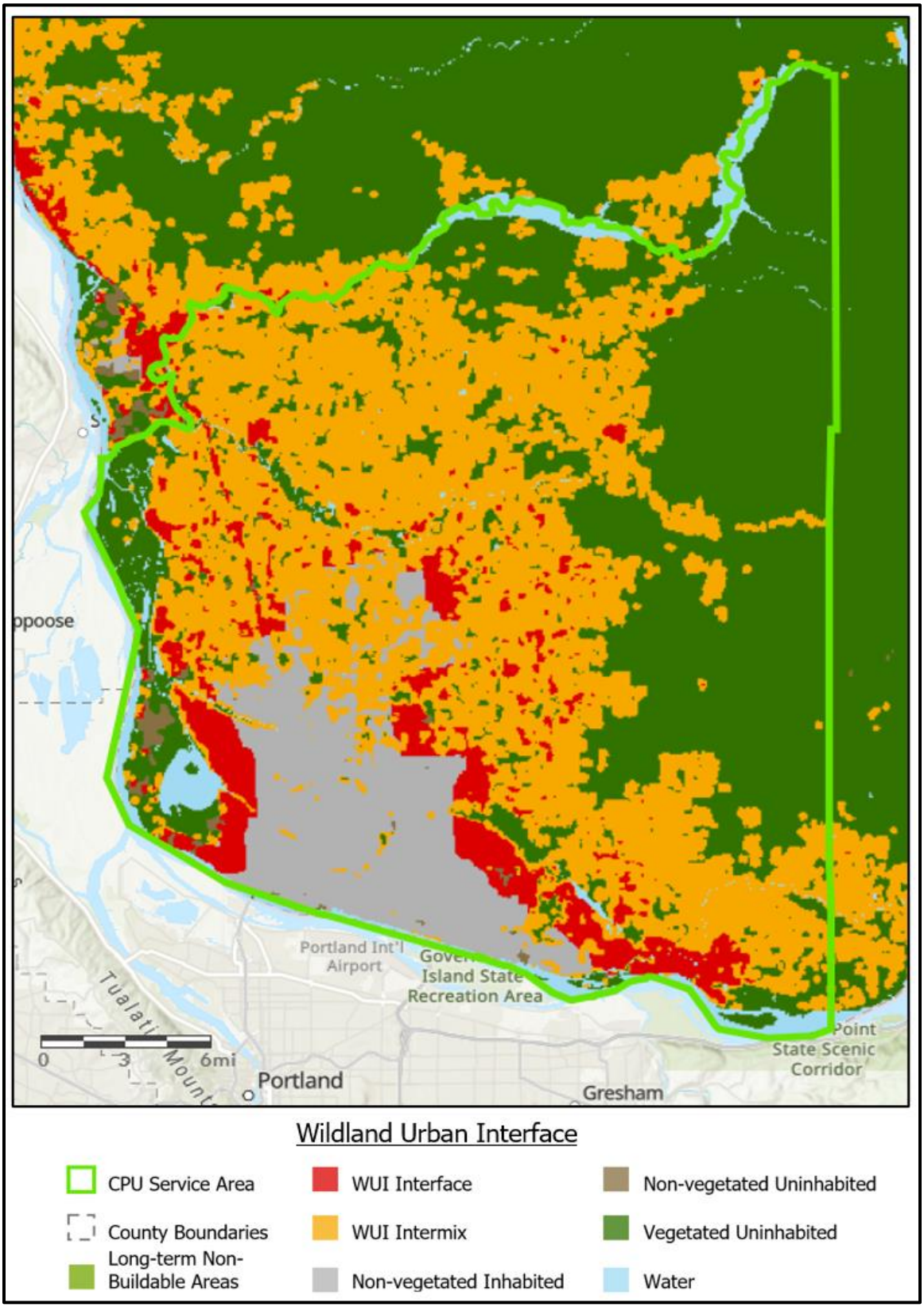
Wildlands

For the purposes of this map, "wildlands" are defined as any area without any structures or human development that also have more than 50% burnable vegetated cover including grasslands and sagebrush-steppe. However, most wildlands could eventually become Intermix, Interface, or even Urban Areas. For example, a new single-family home in the woods could make WILDLANDS into INTERMIX, while a new housing development, strip mall, or other series of structures could turn a section of WILDLANDS into INTERFACE.

According to the USDA Forest Service, the area considered WUI has expanded 30% in Washington from 1990 to 2010, with the number of homes increasing by 50%[14]. There are now nearly a million homes in Washington located in the WUI[15]. Figure 6 illustrates the distribution of WUI areas in the service area as mapped by the Washington Department of Natural Resources (DNR) in 2019. This map indicates up to 45% of the service territory could be categorized as INTERMIX and 7% as INTERFACE.

[14] https://www.nrs.fs.fed.us/data/wui/state_summary/
[15] https://www.dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf?lmvb8d

Figure 6. Wildland Urban Interface Map



3.3.3 Geographic Wildfire Threat Assessment

Geographic wildfire risk analysis uses data derived from various governmental, academic, and industrial datasets that describe the conditions that are either conducive or resistant to wildfire. This historical information includes terrain, vegetation, topography, asset locations, and climate data, including degree days, winds, rainfall, and temperature, as well as agency data on wildfires (flame length, intensity, wildland proximity), damage reports on structures, and specific attributes contributing to damage. Every aspect of the land, the fuel, the behavior of fire, and ignition events is used in the analysis. Various public and private entities combine the data in different ways to study the conditional risk of an area and the probability of large fire.

Wildfire Hazard Potential, for example is one which concentrates on vegetation and fuels that increase the potential for high-intensity wildfire that may be difficult to manage. This can be especially useful to land management decisions that affect fuel levels. Others relate this potential to proximity of homes and communities. Companies such as Athena Intelligence[16] leverage artificial intelligence, or machine learning, to analyze a large number of these data subsets and produce a wildfire conditional risk ranking across the landscape.

Clark County, when compared to the state as a whole, does not currently contain areas on the upper end of the scale classified as high or very high risk such as are found in the higher elevations of the Cascades and on the drier east side. Areas in Clark County with risk assessments in the next lower classification range correspond mainly with undeveloped land in the foothills on the east edge of the county. Clark Public Utilities has very few power lines installed in this area.

The utility will continue to refer to various risk maps to maintain situational awareness in the service territory as these analyses are continually evolving to incorporate the latest data on climatologic and vegetation/fuel conditions.

[16] https://www.athenaintel.io/

4 Operational Practices

This chapter outlines the utility's existing fire mitigation efforts and identifies new processes and programs the utility 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. The utility continues to explore new technologies and approaches to determine their ability to reduce the risk of ignition and improve system reliability.

Clark Public Utilities has initiated several new programs, such as drone inspections, infrared inspections, alternate recloser settings, and reconductoring projects. The utility makes ongoing efforts to update its practices as new information emerges and adopt improved strategies.

4.1 Situational Awareness and Assessment Tools

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.

Clark Public Utilities uses all situational awareness resources at its disposal to monitor evolving fire weather, fuel, and other climatological conditions that may lead to fire events. It evaluates information such as real-time field observations, GIS data, asset maintenance reports, ongoing

wildfire reporting and other resources. Based on available information, the utility schedules work crews, adjusts equipment settings, and prepares for fire conditions as needed.

The utility's System Operators use available resources to monitor evolving fire weather and climatological conditions that may lead to fire events, including:

- **The National Weather Service (NWS):** The NWS provides 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 online 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)
- **Industrial Fire Level Precaution Levels (IFPL):** Fire season requirements become effective when fire season is declared in each Washington Department of Natural Resources Protection District. (https://www.dnr.wa.gov/ifpl)
- **Clark Public Utilities' Weather Stations:** The utility has installed its own weather stations at nine substations throughout the service area. These stations are monitored remotely through the SCADA system and provide temperature, wind speed and/or relative humidity data.

4.2 Fire Precautionary Period

Historically, the fire season in the utility's service area occurs between June and late October, with mid-August most vulnerable to extreme fire conditions. For this plan and the utility's wildfire related operations, the Fire Precautionary Period is June 1st to October 25th of any year. During the Fire Precautionary Period, the utility takes the following measures:

- Reference this Wildfire Mitigation Plan as a guide for reducing wildfire risk
- Patrol and prevent fires caused by vegetation management activities,
- Take steps necessary to help prevent employees and contractors from starting fires and require reporting of any fires set directly or indirectly as a result of their operations,
- Take corrective action when observing or having been notified that fire protection measures have not been properly installed or maintained,
- Ensure that wildfire data is appropriately collected.

4.3 Industrial Fire Precaution Levels

Each summer, when qualifying conditions of fire hazard exist, the State Forester will declare fire season to be in effect. The Industrial Fire Precaution Level (IFPL) system is intended to help prevent wildfires by regulating industrial and recreational activities on Washington Department of Natural Resources, Forest Service or Bureau of Land Management forestlands.

IFPL restrictions[17] are issued at one of four levels that begin with Level One at the start of the "closed fire season" and progress through Level Four as conditions warrant. Because conditions vary across the state, each protection district will declare fire season separately. The declaration of fire season affects forestry and other commercial operations as well as the activities of the general public. Fire season remains in effect until terminated by an additional declaration or the State Forester declares that conditions of fire hazard no longer exist.

Clark Public Utilities' crews and contractors will follow state IFPL restrictions and have the required hand tools and fire suppression equipment at the worksite. During fire season, the utility monitors the status of these precaution levels daily and issues instructions to its crews and contractors accordingly.

4.4 Red Flag Warning Operational Protocols (RFW)

An RFW is issued by the National Weather Service (NWS) when critical fire weather conditions are forecast or met. The RFW is to call attention to limited weather conditions of importance that may result in extreme wildfire risk. The type of weather patterns that can cause an RFW include low relative humidity, strong winds, dry fuels, the possibility of dry lightning strikes, or any combination of the above. An RFW can be issued during an on-going event, or if the fire-weather forecaster has a high degree of confidence that Red Flag criteria will occur within 24 or more hours. When the System Operators receive notice that an RFW has been issued, the following protocols are implemented. Work in areas of elevated wildfire risk is performed only when the following conditions are met:

- Activities are under the direct observation of the crew foreman or site lead,
- When the crew can maintain adequate communications,
- Crew has fire suppression equipment accessible in the immediate area of work that would facilitate an immediate response to an ignition, and
- Crews will be on alert for fires while working or passing through remote areas and immediately report fires or signs of fire to the operations center as soon as feasible.

4.5 Fire Weather Protection Schemes/Recloser Operational Practice

In response to the increasing risks associated with wildfires, the utility has developed fire weather standard operating procedures (SOP) for feeder breakers and field reclosers during red flag warnings and other high fire risk conditions. The utility intends to implement Fire Weather protocols and procedures outlined in System Operating Procedures 9.0, or recent revision, to determine protection settings for select breakers and reclosers on the T&D system. These procedures include field patrol protocols and settings configurations for various stages of fire weather conditions.

The purpose of this practice is to align circuit protection schemes with existing fire threat conditions. When weather forecasts or real-time weather station information indicates high fire

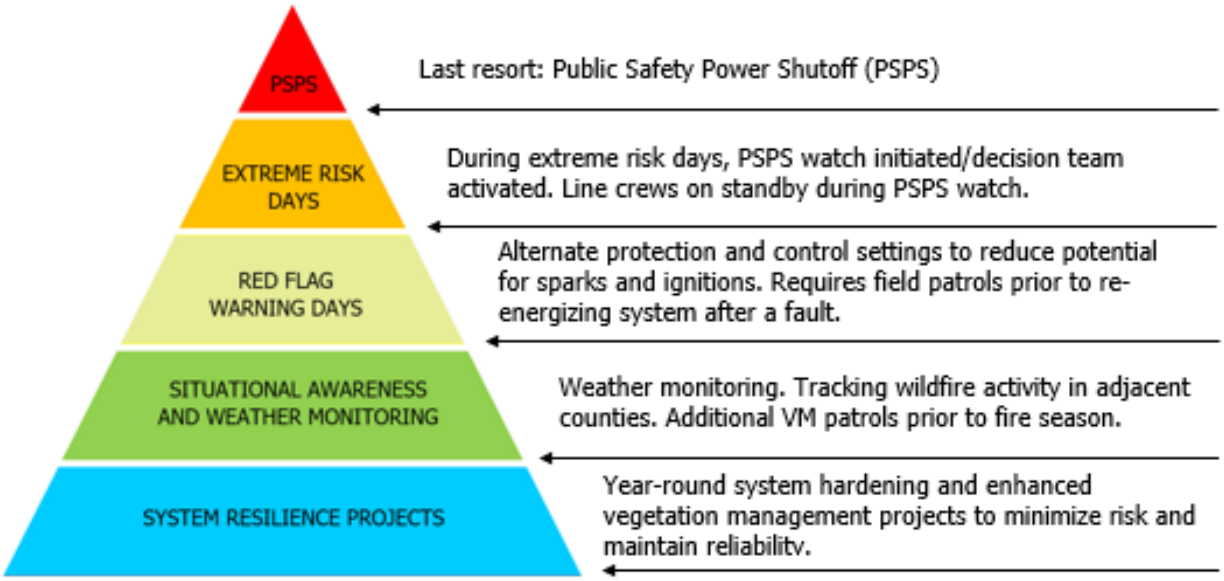
[17] https://app.leg.wa.gov/wac/default.aspx?cite=332-24-301

threat conditions, the utility intends to operate select distribution lines with a more sensitive protection regime. For areas experiencing or predicted to experience Red Flag conditions, feeder breakers may be set to non-auto reclose and field reclosers to non-auto with a single fast trip. These settings are designed to de-energize lines more quickly during incidental contact and the lines will stay de-energized until they are patrolled and conditions are determined to be safe for re-energizing. While these measures are intended to reduce the risk of ignition, re-energization patrolling times will increase significantly and may lead to prolonged customer outages.

4.6 Wildfire Readiness Framework

The utility's enterprise-wide approach to wildfire readiness is comprised of the conditional levels depicted in Figure 9 below. These readiness protocols are intended to harden the system overall, create situational awareness within and outside the service area, implement conservative protection and control settings during critical fire weather conditions, deploy additional resources when needed, and in a worst-case scenario, implement a preemptive de-energization of portions of the system.

Figure 7. Wildfire Readiness Framework



4.7 De-energization of Powerlines (PSPS)

A Public Safety Power Shutoff (PSPS) preemptively de-energizes power lines during high wind events combined with hot and dry weather conditions. When considering de-energization, the utility examines the impacts on fire response, water supply, public safety, and emergency communications.

Clark Public Utilities considers the external risks and potential consequences of de-energization while striving to meet its main priority of protecting the communities and customers we serve.

They include:

- 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, fire, police, and schools.
- 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 de-energization event.
- Loss of power for fuel station pumping.

The risks and potential consequences of initiating a PSPS are significant and extremely complex. Clark Public Utilities is in the exploratory phase of developing a PSPS plan based on the above considerations and recognizing that Clark County doesn't have any identified high risk wildfire areas, which are where a PSPS is typically implemented. While the utility recognizes the possible serious effects of implementing a PSPS to the public and emergency service providers, the PSPS does provide a last resort tool and another mitigation option.

On a case-by-case basis, the utility will consider de-energizing a portion of its system in response to a known public safety issue or response to a request from an emergency management agency. Any de-energizing of the lines is performed in coordination with key local partner agencies, but the final determination is made by the utility.

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5 Fire Mitigation Construction

5.1 Avian Protection Construction Standards

Birds and animals cause approximately 8% of distribution system outages. In response, Clark Public Utilities has employed design and construction standards to protect raptors, migratory birds, and other wildlife since 2016. The measures contained in the utility's Avian Protection Plan have been shown to reduce the collision and electrocution risks and the number of birds injured. Consequently, avian protection strategies also reduce the potential for fire ignitions while helping to prevent power outages. Avian interactions are considered in the design and installation of new facilities, as well as the operation and maintenance of existing structures. Construction standards include but are not limited to:

- 10' cross arms to achieve 60" of phase separation
- Reconductor with "tree wire" or covered conductor
- Covered wire for jumpers and stingers
- Caps on surge arresters, energized bushings, and terminators
- Bushing covers on transformers, capacitors, reclosers, and regulators
- Bird flight diverters
- Replaced double crossarms with single fiberglass crossarms to limit osprey nesting where needed
- Elevated nesting platforms
- Perch deterrents

The construction specifications listed above are used where a need has been identified, and not necessarily at every structure. These safety measures have reduced the potential for fire ignitions while also assuring compliance with the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and the Endangered Species Act (ESA).

Figure 87. Elevated Osprey Nesting Platform

5.2 Underground vs. Overhead Conductor

A benefit of overhead conductor is that it is easier to troubleshoot and restore service following a typical outage event. Overhead construction is less expensive for many types of installations, making it a more cost-effective method of delivering energy compared to underground.

The downside to overhead conductor is its susceptibility to contact from foreign objects such as wildlife, vegetation, and third-party equipment. The undergrounding of distribution lines reduces the risk of wildfire ignition, improves reliability in high wind events, and functions as an effective mitigation of most wildlife related outages. Clark Public Utilities' distribution system is 70% underground. All new residential and commercial developments are constructed underground. Some remote, rural stretches of line have been selectively converted from OH to UG where issues with vegetation are exceptional.

While there are benefits to UG infrastructure, UG lines don't prevent all outages and can have their own unique maintenance problems. In some areas underground lines may not be a reasonable or cost-effective solution due to distances, accessibility, terrain or geological conditions.

5.3 Tree Wire

Tree wire, or covered overhead wire, consists of the conductor and an insulated covering. Tree wire allows closer spacing of the conductors, resists abrasion from foreign contact, and withstands temporary contact from tree branches and other ground points. Clark Public Utilities has increased the use of tree wire in heavily treed areas to improve service reliability and to reduce the risk of ignitions due to vegetation contact. Approximately 80% of new overhead distribution construction in 2023 was covered conductor. While there are many safety benefits to tree wire, this material takes more time to construct, maintain, and repair compared to bare wire. The covering that provides many benefits can also reduce the effective operation of protective devices in situations such as a tree laying on the lines or a downed wire situation. As such, careful consideration is given when deciding whether to construct a line with tree wire.

5.4 Asset Management

Pole Management Program: Clark Public Utilities spends on average $1.8M each year on wood poles identified for replacement through the inspection program described in Section 6.1. Higher priority poles are replaced on an individual basis, while lower priority poles may be grouped together geographically and replaced as a project to take advantage of economies of scale for labor and travel. Replacement poles are outfitted with new insulators and hardware. Equipment such as transformers are evaluated for re-use or replacement. Poles identified as deficient that are located within the boundaries of other utility work are included for replacement during those projects.

Copper Replacement: The utility has made proactive efforts to identify and replace aging overhead bare copper conductor remaining on its distribution system. Smaller copper conductor may lose some of its mechanical strength as it ages and has an increased risk of failure. When planning copper replacement projects, the priority is to upgrade circuits with higher customer density, with additional consideration given to areas with elevated wildfire risk.

5.5 Circuit Recloser Upgrade

A recloser is an automatic, high-voltage electric overcurrent protective device. Like a circuit breaker in a household electric panel, these devices shut off electric power when trouble occurs, such as a short circuit. Reclosers will attempt to re-energize lines multiple times to detect if the problem still exists. If the problem was temporary, the recloser automatically resets and restores power[18]. Electronic Vacuum reclosers provide fast, low energy interruption with long contact life, are oftentimes programmable, and do not require the high maintenance demands associated with traditional recloser devices which contain oil and utilize electromechanical mechanisms.

[18] https://www.eaton.com/content/dam/eaton/products/medium-voltage-power-distribution-control-systems/reclosers/recloser-definition-information-td280027en.pdf

It is Clark Public Utilities' goal to progressively replace oil-filled hydraulic reclosers with electronic units that provide better line protection and minimize fault energy, reducing the ignition potential to start a wildfire. The utility currently has several field reclosers that can be remotely operated with the long term goal of connecting all reclosers to the operations center via SCADA. This would allow the utility to initiate Wildfire Protection Schemes remotely in response to fast-changing weather conditions.

5.6 System Monitoring - SCADA

Clark Public Utilities has retrofitted substation breakers and some downline reclosers with supervisory control and data acquisition (SCADA) functionality to monitor circuit conditions providing early notification and faster response to system abnormalities. Connecting electronic reclosers to the operations center via SCADA also allow the operators to make recloser settings adjustments without rolling trucks thus improving response time and safety. The utility's nine weather stations are also connected to the operations center via SCADA.

5.7 Non-expulsion Fuses

Typical utility industry practice has been to install expulsion fuses on transformers and tap-lines as a means of protecting and isolating parts of the system that have experienced a faulted condition. Expulsion fuses utilize a tin or silver-link element in an arc-tube that expel gas and potentially molten metal to the atmosphere as a means of extinguishing an arc created by a faulted condition. The molten metal, however, can be a source of ignition for fire. In contrast, non-expulsion current-limiting fuses are a non-venting fuse encapsulated within a tube to contain the arc and gases, which minimizes the potential for molten metals to be expelled. The utility is exploring the use of various types of non-expulsion or limited expulsion fuses for different applications on portions of its overhead distribution system where benefits from this design can be achieved.

6 Infrastructure Inspections and Maintenance

Clark Public Utilities' primary mission is to provide reliable and safe power to our customers. This requires continual maintenance and improvement of our electrical system, which includes vegetation maintenance and control within utility corridors and ROW. Managing these areas necessitates balancing stewardship with sustainability while working in accordance with all applicable local, state, and federal laws.

Recognizing the hazards of equipment that operate high voltage lines, the utility maintains formal time-based maintenance program for distribution, transmission, and substation equipment which plays an essential role in wildfire reduction. The following sections outline the inspection practices for the utility. Table 3 details the inspection schedule for major asset classes.

Table 3. Inspection Program Summary

ASSET CLASSIFICATION	INSPECTION TYPE	TARGETED FREQUENCY
115kV Overhead Transmission Lines	Detailed Inspection	Every 5 years
	Wood Pole Test And Treat	Every 10 years
Overhead Distribution Lines	Detailed Inspection	Every 5 years
Underground Distribution	Patrol Inspection	Every 10 years
Substations	Routine Inspection	Quarterly
	Annual Inspection & Testing	Annual

6.1 Pole and Equipment Inspection Program

Clark Public Utilities has developed a formal Pole Management Program to maintain the 57,000 poles in its service area. This program facilitates a one-stop assessment of a pole's condition on a targeted five-year cycle. The inspections are performed by Journeymen linemen inspectors on a planned basis to identify conditions or damage that may reduce the strength or functionality of the pole. All poles are visually evaluated for the condition of cross arms, hardware, and equipment, as well as the condition and clearances of the wire spans. This process serves as a systematic scheduled inspection for Clark Public Utilities' T&D assets. Transmission poles receive an intrusive pole inspection on a 10-year cycle.

Wood poles receive a visual and sound inspection while non-wood poles receive only a visual inspection. Any poles suspected of internal decay are recorded and scheduled for replacement or follow-up intrusive bore inspection utilizing resistograph technology. The intrusive tests are performed by contracted inspectors as needed. Based on the results of the intrusive test, wood treatments are then administered, if needed. Poles which fail inspection are prioritized based on level of structural defect and scheduled for replacement or corrective repair accordingly. Approximately 150-200 poles are replaced annually through this process.

6.2 Definition of Inspection Levels

1. **Routine Patrol Inspection:** A simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may occur in the course of other company business.
2. **Detailed Inspection:** Individual pieces of equipment and structures receive a careful visual examination using routine diagnostic testing as appropriate. May be carried out using UAV and/or infrared thermography.
3. **Intrusive Pole Inspection:** This involves the movement of soil, boring holes in the wood pole above and below the ground line, checking for decay, and installing a fumigant as needed.

6.3 Deficiency Correction Policy

Clark Public Utilities' Maintenance Plan is based on sound industry principles and practices and is designed to provide safe reliable service. The purpose of the Maintenance Plan is to 1) provide procedures, instructions and guidance to the field inspectors and line workers who perform inspections and patrols of utility assets, and 2) outline criteria to prioritize inspection findings and schedules to complete repairs and replacements based on the deficiency and its potential impact on safety and reliability, considering various factors.

The inspector will document the condition of the overhead and underground systems, recording defects, deterioration, violations, safety concerns or any other conditions that require attention on the inspection tags. Focus of the inspection shall be on any hazards that could affect the integrity of the system or the safety of line workers and the general public.

Maintenance work shall be based on a three-tier rating system to prioritize and resolve safety and reliability issues. Inspection tags will be prioritized and issued as follows:

- **Priority # 1** – Immediate hazard:

Conditions that may affect the integrity of the system or present a hazard to workers or the general public. Priority #1 tags will be responded to **immediately** and appropriate action taken until the hazardous condition is remedied.

- **Priority # 2** – Non-emergency repair condition:

Conditions that require maintenance or corrective action to conditions that are not an immediate threat to the integrity of the system or a hazard to workers or the general public. Priority #2 tags will be prioritized by urgency and will be scheduled to have appropriate repairs made to correct the condition within the next 12-month period.

- **Priority # 3** – Minor repair condition:

Conditions that do not require near-term remediation as they do not pose a material safety, reliability, or fire risk. Priority #3 tags will be submitted by the inspector with the time interval recommended. In the judgment of the Operations Department, work will be scheduled to be completed within five years.

Figure 9. Deficiency Risk Assessment Matrix

Reliability Risk				
	Component Failure Could lead to system failure	**Priority 2** Action required 0-12 months	**Priority 2** Action required 0-12 months	**Priority 1** Immediate Action Required
	Component Failure Low risk to system	**Priority 3** Action required 0-60 months	**Priority 2** Action required 0-12 months	**Priority 1** Immediate Action required
	Potential Component Failure	**Priority 3** Action required 0-60 months	**Priority 2** Action required 0-12 months	**Priority 2** Action required 0-12 months
		Low Impact	**Moderate Impact**	**High Impact**
	Safety Rating			

6.4 Substation Inspections

The maintenance plan provides for quarterly inspections of substations. Qualified personnel will use prudent care while performing inspections, following all required safety rules to

protect themselves, other workers, the general public and the reliability of the system. The routine inspections occur quarterly to ensure safety and reliability goals are met.

Additionally, each substation is inspected annually and key equipment tested by substation personnel. This review involves vegetation management inspection, transformer oil testing, thermal infrared photography, DC system impedance testing and periodic protection device testing.

6.5 Geographic Information Systems (GIS) Mapping

An electric distribution utility uses a network of physical facilities to provide electric power and energy to customers connected to those facilities throughout a geographical area. Each component of the distribution system, as well as each meter, has a physical location and associated data. To plan, construct, maintain, operate, and manage the electric distribution network, Clark Public Utilities develops, maintains, manages, and utilizes this GIS data.

The utility geolocates and manages its assets utilizing GIS mapping technology which has been integrated into its asset inspection and maintenance programs. This provides the ability to record and map this work to ensure all assets are maintained on a prescribed schedule.

6.6 Unmanned Aerial Vehicle Inspections

The utility has acquired a drone, or Unmanned Aerial Vehicle (UAV) equipped with high-resolution camera allowing for detailed vegetation inspections of ROWs, and to audit vegetation management work. It is also valuable for hazard tree identification, especially in the areas with limited access, steep terrain, or cross-country alignment. A visual record of ROW conditions is created during the inspection process enabling the utility to audit tree work and monitor changes in vegetation profiles. Clark Public Utilities has two FAA 14 CFR Part 107 Remote Pilot Certified UAV crew members. All pilots are required to complete a recertification exam annually to retain their license.

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. Since UAV inspection does not require de-energization, bucket trucks, foot patrols, or climbing structures, inspectors can assess crossarms, pole tops, hardware, or any equipment not easily visible from the ground. The UAV may be used for post storm inspection, trouble-shooting momentary outages

and a general enhancement of the situational information gathering ability of the operations department.

6.7 Infrared Thermography

Hundreds of different pieces of equipment may be found in an electrical distribution system. They start with generation, high voltage distribution, switchyards and substations, and end with service transformers, switchgear, breakers, meters, local distribution. Abnormal heating associated with high resistance or excessive current flow is the main cause of many problems in these electrical systems.

Forward Looking Infrared (FLIR) cameras create images from heat, rather than visible light. But thermal imagers don't just make pictures from heat; they make pictures from the minute differences in heat between objects. Because excess heat is a sign of increased resistance, FLIR technology is well suited to locating defects in connections and components. This allows inspectors to see the heat signatures associated with high electrical resistance long before the circuit becomes hot enough to cause an outage or damage.

Using FLIR cameras, also referred to as IR thermography, the utility inspects approximately 5% of the system per year as well as post-construction inspection of new feeders.

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7 Vegetation Management

Clark Public Utilities has been providing safe, affordable, and reliable power to the residents of Clark County for over 85 years. A key component of that reliability has been our Vegetation Management (VM) Program. We believe that trees are an important part of what makes Clark County a beautiful place to live. To this end, the utility has developed a comprehensive VM program intended to maintain safe and reliable electric facilities, provide safety for the public and for utility workers, and fire mitigation throughout the service area. When work is well planned and completed, the overall impact on the desirable vegetation on the ROW is reduced, and the neighboring landowners, the motoring public, and the wildlife that uses the ROW for nesting and foraging will benefit.

Clark Public Utilities maintains over 1,500 miles of OH ROW to minimize interruptions of services to our customers. This includes not only the maintenance of the hardware, conductors, and poles, but also trees and other vegetation that threaten to fall or grow into the power lines. Trees that grow within or adjacent to the overhead distribution ROW are a leading cause of outages and damage to facilities, as well as a potential cause for wildfire. While the utility is responsible for maintaining the ROW above and below our power lines, we strive to balance maintaining our natural surroundings with ensuring a reliable power supply by keeping power lines clear of vegetation. While we recognize and appreciate the beauty of trees, the three main benefits to tree trimming in ROW areas are; Safety, Reliability, and Affordability.

7.1 ROW Maintenance Program/Integrated Vegetation Management

The ROW Maintenance Plan (RWMP) follows the Integrated Vegetation Management (IVM) philosophy and utility best practices for the continual maintenance and improvement of our electrical system, which includes VM and control within utility corridors and ROWs. This program outlines Clark Public Utilities' strategies for maintaining and managing ROWs to reduce the risk of power-line ignited wildfires through annual inspections and ROW maintenance.

IVM is generally defined as the practice of promoting desirable, stable, low-growing plant communities that will resist invasion by tall growing tree species through the use of appropriate, environmentally sound, and cost-effective control methods. IVM is not a single vegetation management tool but rather a combination of approaches, including site assessment, control, evaluation, and maintenance. Maintenance methods can include a combination of chemical, biological, cultural, mechanical, and manual treatments.

Table 4. Vegetation Management Maintenance Schedules

ASSET CLASSIFICATION	OPERATION TYPE	TARGETED FREQUENCY
Transmission ROW	Inspection	Annual
	Maintenance	Every 5 years
Overhead Distribution ROW	Inspection	After each trim cycle
	Maintenance	Every 5 years
Substations	Inspection	Annual
	Maintenance	Every 5 years
High Growth Rate Areas	Mid-cycle Trimming	As needed

7.2 Cross Country ROW Inspections

VM inspection of cross country ROW generally takes place on an annual basis and is accomplished utilizing ground based methods and drones. The inspection interval may be reduced as conditions warrant. During the inspection process, problematic species are identified, and action thresholds considered. Various control options are evaluated and selected option(s) are implemented.

7.3 Mechanical and Chemical Control Options

This may include chemical, manual, or mechanical techniques. The choice of control option(s) is based on effectiveness, environmental impact, site characteristics, worker and public safety concerns, and economics. Clark Public Utilities chooses the mechanical technique supported by chemical application as the preferred methods of maintenance.

Clark Public Utilities' approved, environmentally safe herbicides shall be applied for cut stump treatment to prevent re-sprouting of the stump in accordance with "Cut Stump Treatment in Western States", page 7 of the DOW AgroSciences "Specimen Label". Great care shall be taken to use herbicides and related products to provide the most cost efficient and effective maintenance of the ROW as possible. No herbicide applications shall be made within 3 feet of the fence line of active pastures in keeping with the Dow AgroSciences "Specimen Label" page 3.

7.4 Site Preservation

Care shall be taken to preserve the natural ground covers where possible. Rivers, lakes, streams, natural drainage area, ponds, etc. shall not be disturbed unnecessarily. All local, state, and federal laws and regulations will be followed when performing work around fish spawning streams.

7.5 Trimming Standards

Trees are trimmed or removed for safety, reliability, and compliance with National Electric Safety Code (NESC)[19] and RCW64.12.035 requirements. Clark Public Utilities' tree trimming crews and contractors are also governed by "Best Management Practices-Utility Pruning of Trees[20]" which is a companion publication to the (ANSI) A300 Part 1: Tree, Shrub, and Other Woody Plant Maintenance. This standard is intended as a guide for federal, state, municipal, and private authorities including property owners, property managers, and utilities.

Tree workers under contract with the utility are expected to adhere to this standard when pruning trees near electric facilities. Correct tree trimming should promote tree growth away from electrical conductors, provide longer periods of clearance, and reduce future work. The pruning, and/or branch removal will be specific to the species of tree.

[19] The National Electric Safety Code, Vegetation Management Section 2IS.A.I
[20] The International Society of Arboriculture

7.6 Mid-Cycle Trimming

The VM inspection process is driven by an ongoing assessment of vegetation growth throughout the system with special attention given to areas with increased potential for tree-caused damage to power lines and utility equipment. By continuous evaluation of our entire system, we focus tree trimming resources in certain high growth areas more frequently than our normal 5-year cycle.

7.7 Clearance Specifications

Licensed and bonded contractors shall work to clear and trim all trees that are within 10 feet of overhead power lines to help ensure the reliability of our electrical system. Some tree clearance is also determined by the growth rate of the species. Trimming techniques include, but are not limited to, directional pruning such as side, slope, and V-pruning. Crown reduction is carried out when less extreme options are not considered adequate for system safety. Depending on the species, trees that cannot be removed and which are within a certain distance from power lines, shall have limbs evaluated for pruning or removal if within 180° of the conductor from the ground up to a point of 15 feet above the uppermost distribution conductor. When permitted, trees may be removed when proper pruning to the required clearance results in a reduction of 50% or greater in live crown area.

Factors considered in determining the extent of pruning required include, but are not limited to:

- Tree species, growth rates and failure characteristics
- Branch size
- Line voltage class
- Right-of-way limitations
- Framing and spacing between phases
- Vegetation's location in relation to the conductors
- Location of tree in relationship to protective devices and critical customers
- Location of tree in regard to general public safety
- Potential combined movement of vegetation and conductors during routine winds
- Sagging of conductors due to elevated temperatures or icing
- Ice and snow loading on branches
- Branches overhanging at a sharp angle

During tree work, trimmers aim to achieve the following clearance specifications:

- **OH Distribution:** Minimum of 10 feet from the outside conductor.
- **Trees Under Conductors:** All trees directly below utility facilities should have the crown reduced to 4 feet below the system neutral wire. For high neutral construction, crowns are generally reduced to achieve 8 feet of clearance below the neutral wire.

- **Overhanging Branches:** Removed to a height of 15 feet above all distribution conductors. All weak, diseased and dead limbs above primary lines are removed. No overhanging limbs are permitted on transmission circuits.
- **Secondary/Service Wire:** Branches that deflect or weigh heavily upon service or other secondary are removed, but not pruned in their entirety without specific direction by utility operations.
- **Pole Clearing:** Vines growing on poles and wires are cut at ground level to a 6-foot radius.

7.8 Danger Trees

Clark Public Utilities removes select danger trees that could potentially grow, fall, or bend into the lines. The selection of danger tree removals is based upon the condition of the tree, the stability of the ground around the tree, tree species, and any other defects that would cause the tree to be unstable and more likely to fall into the lines. If a tree is healthy and stable, it is usually not designated for removal, even if it is tall enough to strike the electric facilities if it should fall.

7.9 Hazard Trees

Electric utilities that investigate the actual causes of outages often find that the failure of branches and trees is a significant component of the tree-related outage category[21]. A subset of Danger Trees[22], a Hazard Tree is defined as any tree or portion of a dead, rotten, or decayed tree that may fall into or onto the overhead lines, or trees leaning toward transmission and distribution facilities.

When permitted, trees that are determined by the utility to be a potential threat to the continued operation of the OH electrical facilities are removed, leaving the stump as close to the ground as possible. If there are disputes from property owners regarding the health of potential hazards presented by the tree, a Tree Risk Assessment form shall be completed by a certified arborist to score the tree and the level of threat.

The utility makes it a priority to remove hazard trees once they are identified. If removal is not feasible, the crown is reduced below the neutral wire.

7.10 Service Orders/Hot Spots

This program involves the quick response to emergency situations. An example of this would be reports of arcing and sparking where trees are contacting the high voltage lines. Once reported, a service order would be generated and a tree trimming crew would be assigned to address the issue.

[21] NRECA Vegetation Management Manual
[22] As defined by ANSI 300 Part 7 standards

7.11 Utility Vegetation Management Industry

An arborist by definition is an individual who is trained in the art and science of planting, caring for, and maintaining individual trees. Clark Public Utilities' Forestry Department has at least one ISA certified arborist on staff. The current Forestry Maintenance Manager is a Certified Utility Vegetation Management Professional with the following certifications and memberships:

- UAA Certified Utility Vegetation Management Professional
- Member: International Society of Arboriculture (ISA)
- Member: Utility Arborist Association (UAA)
- Member: Tree Care Industry Association (TCIA)
- Member: Tree Line USA/Utility Vegetation Management Association
- Member: Utility Vegetation Management Board of Governors

7.12 Controlling Incompatible Vegetation

In addition to the regular patrols by utility field staff observing and reporting on incompatible uses and encroachments, Clark Public Utilities makes efforts to educate public and private landowners about incompatible vegetation that can pose risks if planted under or near conductors. The utility believes that the customer plays an important part in our ability to address problems that may pose a threat to our power supply system. Customer input, combined with regularly scheduled ROW maintenance, helps to ensure that our power system is as reliable as possible.

To this end, the utility website provides tree planting guidance as well as a link to a Tree Trim Request Form. Clark Public Utilities also offers free tree assessments and secondary line drops upon request. Additionally, the utility provides free safety trim services in preparation for customer tree pruning to ensure there is at least 10 feet of clearance away from the energized primary electric lines.

8 Emergency Response

Clark Public Utilities strives to minimize the impacts of any disruptive event regardless of the size or scope while consistently focusing attention on the community's most critical systems and infrastructure. This chapter will summarize the utility's emergency response and communication plans, land ownership in the service area, community outreach, and the restoration of service process.

8.1 Emergency Response and Operations Continuity Plan

The utility recognizes the importance of authorizing the preparation, implementation and maintenance of a comprehensive Emergency Response and Operations Continuity Plan (EROC). The purpose of the EROC Plan is to prepare utility Operations personnel and provide guidelines for response to an emergency event(s) that involve extended service outages due to extraordinary circumstances caused by factors beyond its control. The EROC provides a written and tested plan directing the restoration process in the event of an interruption in continuous service to the widest extent possible in a minimum time frame. Roles of the Emergency Restoration Team are defined in the EROC plan document, which will be reviewed and updated regularly.

Mission and objective of the EROC:

- Facilitate effective decision-making to ensure that critical district operations are continuous or restored in a timely manner,
- Define emergency levels and identify appropriate responses,
- Establish a command structure,
- Create a notification process and identify communication tools,
- Ensure adequate resources are made available and allocated appropriately in response, to events with or without warning,
- Reduce and mitigate disruptions to critical business functions,
- Protect critical facilities, equipment, vital records, and other assets,
- Identify in advance arrangements and procedures that will enable the utility's Operations personnel to respond quickly to an event, and
- Provide considerations for basic support to employees and employee families during an event.

8.2 Crisis Communication Plan

A critical component of the utility's emergency preparedness and response planning is the Crisis Communications Plan (CCP) outlining the actions the utility's Communication Department takes during a crisis. This document prescribes the response actions utility managers and leadership take in identified emergency situations that could have a potentially significant impact on the customers and organization. The CCP establishes guidelines to streamline communication and coordination for extensive emergency response activities.

The plan identifies core crisis communication team members, provides key messages, response timelines and checklists, along with templates for press releases and website/social media postings in order to:

- Guide utility management in coping more effectively with unusual situations that could cause confusion and misunderstanding.
- Control rumors and disseminate key facts in a timely manner to all who need to know.
- Provide a framework for prompt, accurate and effective communications with key audiences, including employees, customers and the news media during crisis situations.
- Ensure coordination with regulatory agencies, and federal, state, and local governments in order to exchange accurate and timely information.

8.3 Public Agency and Member Communications for Outages

For scheduled maintenance outages, the utility provides as much notice as possible, typically 48 hours in advance. Information regarding PSPS or other unplanned outages will be shared with stakeholders as soon as feasible to allow for the maximum amount of time to prepare and respond. During these times the utility will utilize the following channels of communication:

- Emergency Management agencies in affected counties
- Communications companies attached to or collocated with utility infrastructure.
- News media outlets serving the affected areas
- Utility generated emails, texts or outbound calls
- Clark Public Utilities' social media accounts
- Prominent postings and alert banners on the utility's website
- Talking points provided to personnel in customer-facing utility departments
- Direct calls to key accounts – critical commercial or industrial customers
- The utility's online "Outage Center"

8.4 Emergency Management Communication and Coordination

During active emergencies, the utility coordinates and collaborates with our local emergency response agencies as well as other relevant local and state agencies, as a peer partner. A small-scale emergency requires less resources and coordination than a large-scale event. Therefore a two-tiered approach to emergency management interaction is sensible.

During small-scale events the utility's dispatch personnel will coordinate recovery efforts with first responders. This coordination will be maintained until first responders declare the emergency over.

When large scale emergencies require county emergency managers to stand up their emergency operations center (EOC), it means that many diverse resources are needed. During such events, the utility's Emergency Coordinator (EC) will contact the local EOC and establish themselves as the duty officer for coordination. The EC will work with emergency management staff to ensure Clark Public Utilities is contributing the necessary resources to the areas needed. Depending on

the circumstances this coordination may be via phone, email, or in person. Clark Public Utilities' primary coordination point is Clark Regional Emergency Services Agency (CRESA).

8.5 Work Crew Communications

The utility or its contractor shall have and maintain reliable communications (e.g., cell phone, phone or radio) present and available on the job site. In rare situations where cellular coverage is not available, crews have local knowledge of the closest area with coverage. All communications equipment shall be operable during the Fire Precautionary Period and/or Red Flag Warnings.

8.6 Jurisdictional Structure

Clark Public Utilities has considered the jurisdictional structure of the service area when developing or implementing its strategic plan, including those related to wildfires. Figure 14 illustrates the general land ownership within the service area. The following describes the various stakeholders, and agencies with management responsibilities.

Counties:

- Clark County
- Skamania County
- Cowlitz County

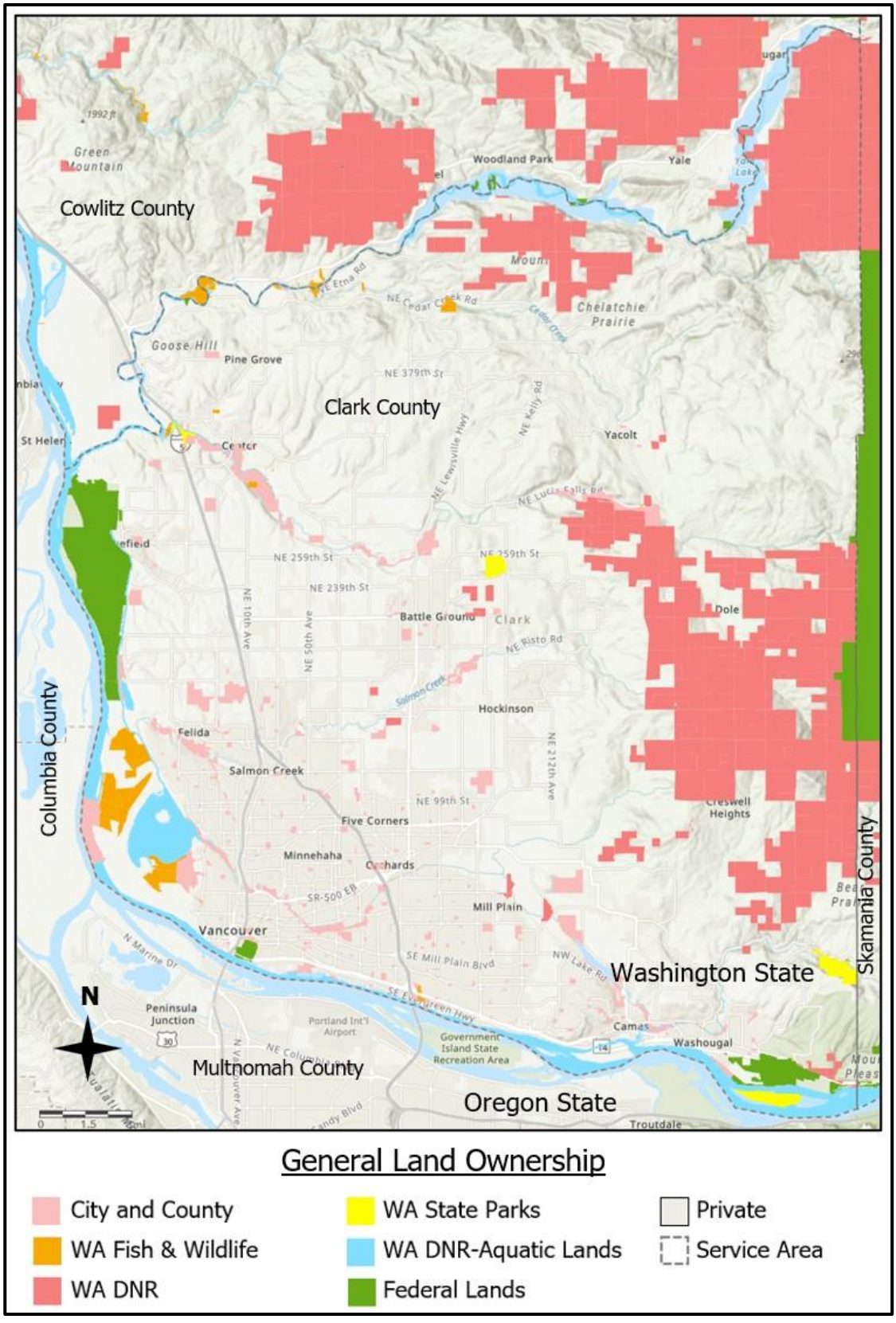
Washington State Agencies:

- Department of Natural Resources, Pacific Cascade Region
- Washington State Parks, South Cascades Region
- Department of Fish and Wildlife Service

Federal Agencies:

- US Fish and Wildlife Service
- US Forest Service

Figure 80. General Land Ownership



8.7 Community Outreach

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

Clark Public Utilities encourages its customers 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, the utility provides information on prevention and mitigation on its website.

Customers will also find links to the following information on the utility website:

- Home Emergency Planning
- Planting Trees Near Power Lines
- Safety during a power outage
- Outage preparation
- Downed power line safety
- Portable generator safety
- Defensible Space Guidelines for Homeowners

8.8 Industry Collaboration

In addition to its commitment to supporting the local community, the utility is heavily involved with the northwest and national public utility community as a peer partner. Clark Public Utilities is a member and/or contributor to the following organizations:

- Regional Wildfire Mitigation Taskforce
- Electric Utility Safety Advisory Committee (EUSAC)
- Northwest Public Power Association (NWPPA)
- Western Energy Institute (WEI) Product Development Team
- American Public Power Association (APPA)

8.9 Restoration Priorities

If an outside emergency management or emergency response agency requests a power shutdown, or if the utility elects to de-energize segments of its system due to extreme weather, utility staff will patrol the affected portions of the system before the system can be re-energized. Suspect equipment or distribution lines that cannot immediately be patrolled will remain de-energized. 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.

After a large outage, transmission circuits are given priority over distribution lines during the restoration process. The utility prioritizes outages at the higher-voltage level, which power substations serving large numbers of customer, schools, businesses, and hospitals first, then work is done to restore the largest feeders. Smaller outages are then addressed, followed by outages affecting non-essential streetlights.

8.10 Service Restoration Process

Clark Public Utilities work crews will take the following steps prior to restoring electrical service after a de-energization event. These measures are intended to protect the worker, general public, and the reliability of the system.

- **Patrol:** De-energized lines are patrolled to ensure no hazards have affected the system during the outage. If an outage is due to wildfire or other natural disaster, as soon as it is deemed safe by fire officials**,** lines and equipment are inspected for obvious damage or foreign objects and to estimate equipment needed for repair and restoration. Lines located in remote and rugged terrain with limited access may require additional time for inspection. VM crews are called on to 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, utility supervisors, managers, and engineers meet to plan the needed work. Re-building will commence as soon as affected areas become safe. Repair plans prioritize substations and transmission facilities, then distribution circuits that serve the most critical infrastructure needs. While the goal is to reenergize all areas as soon as possible, emergency services, medical facilities, and utilities are given first consideration when resources are limited. Additional crews and equipment will be dispatched as necessary.

- **Test:** After repairs are completed and the equipment is safe to operate, line segments are energized and tested.

- **Restore:** After successful line testing, power is restored to homes and businesses as quickly as possible. Customers, local news, and other agencies are then notified of the restoration of electric service. Periodic customer and media updates of restoration status prior to full restoration will be made. After initial power restoration, further demolition and rebuilding may take place.

8.11 Workforce Training

Clark Public Utilities is dedicated to developing a culture of safety throughout the organization. We believe that a critical component of the overall wildfire mitigation strategy is a well-trained and alert workforce. We are currently developing rules and complementary training programs for our workforce to prepare for all emergencies including wildfire. In 2025, and annually thereafter, field staff will be:

- Trained on the content of the WMP
- Trained in proper use and storage of fire extinguishers
- Required, during pre-job briefings, to discuss the potential(s) for ignition, environmental conditions, and the closest fire extinguisher and other fire abatement tools
- Trained on the environmental conditions conducive to wildfire
- Required to report all ignition events to management for follow-up
- Encouraged to identify deficiencies in the WMP and bring such information to management
- Trained on Avian Protection and reporting requirements for applicable personnel, including managers, line supervisors, engineers/designers/stakers, and field staff.
- Receive EROC Plan employee training-annual overview

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9 Plan Implementation and Monitoring

This chapter identifies Clark Public Utilities' management responsibilities for plan implementation and oversight. In addition to a robust mitigation strategy, the utility's management and staff have developed performance metrics to help analyze and monitor wildfire mitigation efforts over time. These metrics aim to provide a data-driven evaluation to determine the effectiveness of various programs and identify areas for possible improvement. This chapter also identifies the methods for identifying plan deficiencies and the quality control and audit process for the inspection, maintenance, and VM programs.

9.1 Plan Accountability

The Board of Commissioners makes policy decisions for Clark Public Utilities and will be responsible for approving the Wildfire Mitigation Plan. Its implementation primarily resides with the CEO/General Manager and Operations Director.

9.2 Monitoring and Auditing of the WMP

Reports of the WMP's progress and risk reduction impacts will be developed annually and circulated to appropriate utility staff to generate collaborative discussions.

At the end of each fire season, Clark Public Utilities assesses company-wide wildfire mitigation efforts. All known fire starts within the utility's service territory are tracked. Lessons learned or new best practices are defined and incorporated into the next iteration of the WMP. The plan is updated to reflect changes in the environment, technology, regulations, or any other factors that may render portions of the WMP obsolete.

9.3 Identifying Deficiencies in the WMP

Clark Public Utilities' staff is responsible for ensuring that this WMP meets public agency requirements 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 the WMP will be periodically updated to reflect needed changes.

9.4 Performance Metrics

Clark Public Utilities has developed performance metrics intended to gauge the effectiveness of its various programs and strategies for mitigating power-related ignitions. The tracking of these metrics will help identify circuits most susceptible to unexpected outages, time-of-year risks, and the adequacy of the VM and asset inspection schedules. The metrics are also intended to assess the performance of different aspects of the plan. These metrics quantify the risk environment of the utility's service territory and the mitigation policies of Clark Public Utilities.

A sample of items to review annually:

- Number and duration of Red Flag Warning days
- Number of days that reclosers are in Fire Weather Stage 2 or 3
- SAIDI and SAIFI data
- Utility equipment caused ignitions
- Traditional fuse trip with fire reference

Because this WMP is in the initial stage of implementation, relatively limited data is on hand. However, as results of the mitigation programs become evident and additional data is collected, the utility will identify areas of its operations that will require a different approach, as well as develop additional methods to eliminate utility asset-sourced ignitions.

As the metrics are analyzed in the coming years, refinements will be made, and the selected metrics, as with other aspects of the plan, will likely evolve in future iterations of the WMP.

9.5 Programmatic Goals

Clark Public Utilities outlines and schedules required work on an annual basis. Any incomplete work behind schedule is flagged for review or field verification. The district strives to complete 95-100% of the work within the initially scheduled time frame, however, emergencies or other unforeseen contingencies can occur, requiring material and labor resources to be otherwise assigned. When this happens, the delayed work receives prioritization for future time frames and completion allowing for safe and reliable operation following industry safety standards.

9.5.1 Monitor and Audit the Effectiveness of Inspections

Clark Public Utilities' compliance with state law and NESC regulations and guidelines ensures that facilities are inspected and repaired in accordance with industry standards. Any issues found impacting safety and reliability are addressed. In addition to the maintenance program, the utility continuously evaluates its facilities while performing other activities such as outage patrols, new business planning, replacements, and related fieldwork.

Monitoring the effectiveness of inspection practices will occur through ongoing tracking and annual review of findings resulting from internal processes. Concerns found during routine field work, equipment and line inspections will be used as a method to assess the effectiveness of inspection procedures.

The review process will take place annually, where inspection records will be reviewed, deficiencies identified, and corrective actions determined. An internal report will be provided to the utility's leadership for consideration in future strategies. Related strategies that mitigate wildfire risk will then be identified and proposed within the next iteration of the WMP. The analyzation of aggregated data will guide future decision-making on the direction of wildfire mitigation strategy with the intention that incidents will become less frequent or hazardous system wide.

9.6 Programmatic QC processes

9.6.1 T&D System Inspection QC Process

The T&D Manager manages the T&D line assets and develops the utility's comprehensive inspection and maintenance programs, while the Technical Services Manager oversees the utility's substation assets.

Key imperatives are to:

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

Designated managers regularly monitor inspection maintenance records and diagnostic test results to adjust maintenance plans and develop new programs as needed. Clark Public Utilities makes all efforts to follow industry best practices in developing its maintenance programs.

Clark Public Utilities' Operations Department is responsible for performing inspections and corrective maintenance. The priority is to remove safety hazards immediately and repair deficiencies according to the type of defect and severity of the risk level associated with the asset location. Work orders are monitored throughout the year to ensure timely completion via regular internal reports.

9.6.2 Vegetation Management Quality Control Process

Contracted VM crews perform the pruning and clearing work for the utility. The distribution and transmission system related VM work is field audited by a Forestry Supervisor or Manager in addition to observations by line crews during daily line and inspection work.

Quality control efforts monitor program effectiveness, overall tree work performance, and determine the adequacy of the VM work schedule. The quality control results are reviewed, and any deficient work is reissued to the contractor for corrective action.

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Appendix A: Definitions

Circuit Breaker: An electrical switch designed to protect an electrical circuit from damage caused by overcurrent/overload or short circuit. The basic function is it to interrupt current flow after protective relays detect a fault.

Commission: Popularly elected board of commissioners.

Danger 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 Clark Public Utilities distribution system includes 12.47Kv 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.

Electric Utilities Wildland Fire Prevention Task Force: The tasks assigned to the Task Force by the legislature are to advise the department on the following issues:

a) Developing, for consideration by the department and individual electric utilities, a model agreement for managing danger trees and other vegetation that pose a risk of wildland fire and associated utility liability due to the proximity to electrical transmission wires and other utility equipment;

b) Assist the department with the distribution of the model danger tree management agreement developed in (a) to utilities for their consideration for execution with the department;

c) Developing communication protocols and educational exchanges between the department and electric utilities for identifying and addressing issues relating to utility infrastructure to reduce the risks of wildland fires;

d) Developing protocols, including thresholds, for implementing the relevant provisions of RCW 76.04.015 when the department's investigation involves electric utility infrastructure or potential electric utility liability;

e) Creating rosters of certified wildland fire investigation firms or persons and third-party qualified utility operations personnel who may be called upon by the parties as appropriate; and

f) Other issues brought forward by Task Force members.

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 more likely to occur, spread, and affect resource values sufficiently to warrant organized fire management activities. 2) A legally enacted time during which burning activities are 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 DNR, BLM or USFS. 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.

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)[23]: 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,
- 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.

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

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

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

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.

Summer Fire Rules (DNR): Washington's "summer fire rules" are in effect April 15 through October 15. These rules apply to the 13 million acres of private and state forestlands protected from wildfire by the Washington Department of Natural Resources.

These regulations affect loggers, firewood cutters, land clearers, road builders, heavy equipment operators, off-road motorcyclists, and others. During fire season, people using motorized equipment in the woods must have approved spark arresters and follow fire safety precautions. In addition, those working in the woods must have fire prevention and extinguishing equipment in good working order at the job site and workers trained in proper use.

The rules are intended to prevent forest fires and to extinguish small fires before they spread to the forested lands. These rules restrict cigarette smoking in forested areas to roads, gravels pits, or other clearings and prohibit lighting fireworks on forestland.

Transmission System: The bulk delivery of electrical energy from a generating site to an electrical substation. At Clark Public Utilities, for line maintenance purposes, the transmission system is comprised of 115kV 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, shrublands, 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 with vegetative fuels in wildlands.

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Appendix B: Acronym Glossary

ANSI	American National Standards Institute
BIA	Bureau of Indian affairs
BLM	U.S. Bureau of Land Management
BMP	Best Management Practices
BPA	Bonneville Power Administration
CEO	Chief Executive Officer
CPU	Clark Public Utilities
DNR	Department of Natural Resources
EOC	Emergency Operation Center
EROC	Emergency Response and Operations Continuity Plan
FLIR	Forward Looking Infrared
GIS	Geographic Information System
HFTA	High Fire Threat Area
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
NWS	National Weather Service
OH	Overhead
OEM	Office of Emergency Management
PSPS	Public Safety Power Shutoff
QA	Quality Assurance
QC	Quality Control
RAWS	Remote Automated Weather Station

RFW	Red Flag Warning
ROW	Right of Way
SCADA	Supervisory Control and Data Acquisition
T&D	Transmission and Distribution
UAV	Unmanned Aerial Vehicle
UG	Underground
USFS	United States Forest Service
VM	Vegetation Management
WA	Washington State
WDFW	Washington Department of Fish and Wildlife
WFAS	Wildland Fire Assessment System
WMP	Wildfire Mitigation Plan
WUI	Wildland Urban Interface

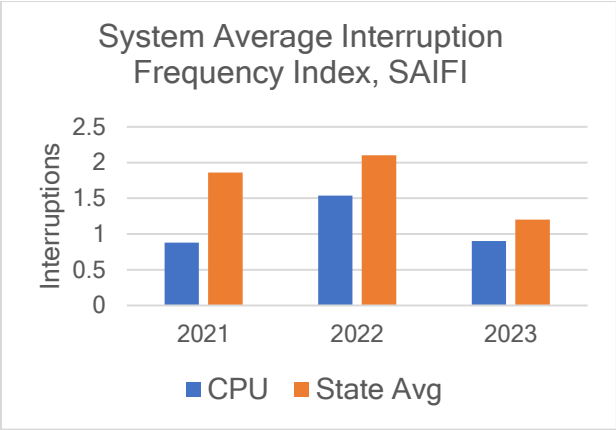
Appendix C: Metrics

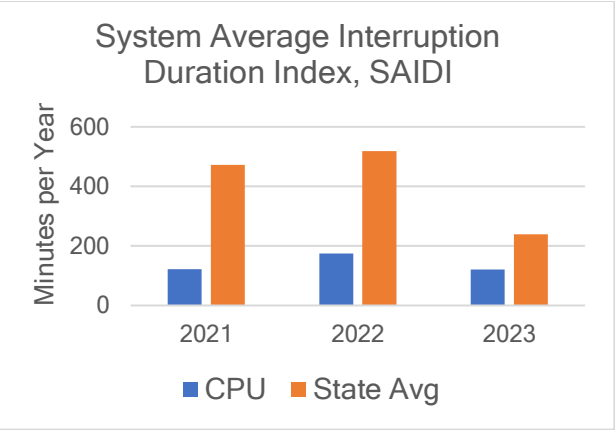
Outage Metrics				
Outage Index *		2021	2022	2023
SAIFI (System Average Interruption Frequency Index)	CPU	0.88	1.54	0.90
	State Avg	1.86	2.10	1.20
SAIDI (System Average Interruption Duration Index)	CPU	122.30	174.10	56.19
	State Avg	472.32	518.67	216.95
CAIDI (Customer Average Interruption Duration Index)	CPU	138.82	113.05	62.37
	State Avg	223.05	218.91	150.94

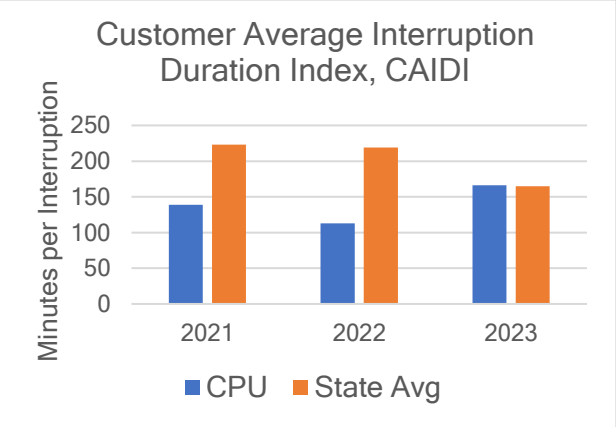
* Major Event Days included

Situational Metrics				
Fire Precautionary Status	2021	2022	2023	2024
Red Flag Warning Events	0	2	2	4**

** Year to date as of 10/5/2024







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