2024 WILDFIRE MITIGATION PLAN

1.0 Executive Summary

Fire mitigation plays an essential role in Klickitat Public Utility District's (KPUD's) operational practices. KPUD's existing policies, programs and procedures directly or indirectly manage or reduce this risk. Over the years, KPUD has adopted additional fire mitigation programs to adjust to changes in fire-related conditions, adopted technological advances and improved operational practices to further mitigate the potential for utility caused ignitions and more effectively respond to high wildfire risk conditions.

The strategies, programs and activities included in this WMP, with associated goals and metrics, are an effective approach to reduce fire-related risk for KPUD's customers in the near-term and will allow for refinement and improvement over time. As KPUD gains experience implementing the WMP's mitigation programs, and as new information emerges, the PUD will assess, evaluate, enhance and refine its practices. The WMP also describes vegetation management, asset inspection and maintenance, recloser setting protocols, communication plans and its restoration of service processes. Additionally, it spells out plan ownership, performance metrics, deficiency identification, and the plan's audit and approval process.

When the Washington Legislature passed House Bill 1032 in July 2023 it stated that, it is in the best interest of the state, our citizens, and our natural resources to identify the sources of wildland fires; identify and implement best practices to reduce the prevalence and intensity of those wildland fires; put those practices in place; and by putting those practices in place, reduce the risk of wildland fires and damage and losses resulting from those fires.

The Legislature directed the Department of Natural Resources (DNR), in consultation with the Energy Resilience and Emergency Management Office of the Department of Commerce, to contract with an independent consultant with experience in developing electric utility wildfire mitigation plans to develop an electric utility wildfire mitigation plan format and a list of elements to be included in electric utility wildfire mitigation plans. The Wildfire Mitigation Plan (WMP) format below achieves the direction of the Legislature.

By October 31, 2024, and every three years thereafter, each consumer-owned utility and investor-owned utility must review, if appropriate revise, and adopt its wildfire mitigation plan. When reviewing or revising a wildfire mitigation plan, utilities must use the recommended format and elements contained in the WMP format. 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.

Table of Contents

List of Figures

Figure **Page**

List of Tables

Table **Page**

2.0 Wildfire Mitigation Plan Overview

2.1 Purpose of the Wildfire Mitigation Plan

This plan describes KPUD's strategies and programs to mitigate the threat of electrical equipment ignited wildfires. It addresses the unique features of KPUD's service area such as topography, weather, infrastructure, grid configuration and potential wildfire risks. While KPUD's Board of Commissioners provides supervision over the plan, its implementation primarily resides with the Operations Manager (OM), and it is the General Manager (GM) who is ultimately responsible.

2.2 Description of Where WMP Can be Found Online

KPUD is currently in the process of updating and moving our website to a new platform, once that is completed the WMP will be available on our website at www.klickitatpud.com

2.3 Best Practices Cross-Reference Table

Provide any industry standard or other best practices[1] referenced within the WMP including what section and page number in the form of hyperlinks. Standards that do not have a specific reference within the text but apply to the entirely of the plan can be listed without additional information.

If no industry-wide standards or practices are utilized, this table may be left blank.

Standard or Best Practice Name and Description	**Document, page number, or citation**
Infrastructure Inspection and Maintenance	RUS Bulletin 1730B-121, NERC Reliability Standard PRC-005, WAC 296-45-045
Vegetation Management	(ANSI) A300 Part 1, FAC-003
Fire Mitigation Construction	APLIC 2006
Workforce Training	WADNR RT130

[1] Standards may include guidance from FEMA, US Forest Service, NERC regulations, NST, OSHA guidelines, etc.

3.0 Utility Overview

3.1 Utility Description and Context Setting Table

KPUD serves 14,180 customers out of offices located in Goldendale, Washington, with a branch office in White Salmon. KPUD transmits and distributes electricity within a 2,200 square mile service area that includes Roosevelt, Bickleton, Alderdale, Maryhill, Dallesport, Klickitat, Lyle, Snowden, Trout Lake, Glenwood, Centerville, White Salmon, Bingen, High Prairie, Appleton, Husum, Wishram and Goldendale. The service area covers the entirety of Klickitat County as well as portions of Skamania, Yakima and Benton Counties.

The service area, shown in Figure 1, is located in a transition zone between western and eastern Gorge. Positioned along the Columbia River in south central Washington, it stretches 84 miles from the eastern slopes of the Cascade Range in the west to the semi-arid plateaus in the east. From south to north, the service area spans 29 miles at its widest point, bordered by the Columbia River in the south and traversing over the Simcoe Mountains into Yakama Indian Reservation in the north. Elevations range from ~175 feet above mean sea level (AMSL) at the Columbia River to ~5800 feet AMSL in the Simcoe Mountains.

There is a dramatic shift in the vegetation profile from west to east. Fir forests in the west and central north, give way to a mix of white oak and conifer stands in the canyons, white oak, grasses and shrubs on the prairies, shrub-steppe in the swales and canyon ridges along the river, and to the mostly treeless plateau areas surrounding Centerville and Goldendale. North of Goldendale are the forested Simcoe Hills which reach 5,800 feet in elevation and separate Klickitat County from the Yakima Valley to the north. Major bodies of water include the Columbia River, Klickitat River, White Salmon River, Little Klickitat River, the Swale and Rock Creek. These rivers are accompanied by deep river canyons that crisscross the landscape.

The Columbia Gorge is notorious for strong and sustained winds that can travel in either an easterly or westerly direction. The wind patterns also effect the many canyons and river drainage features along the south perimeter of the service territory. While these wind patterns are crucial for the generation of electricity from the many wind turbines located in Klickitat County, it also exacerbates wildfires and can hinder suppression efforts.

The Klickitat County area has a Northern Pacific coastal climate in the northwest half, transitioning to a typical continental climate in southeast half. The summer fire season is generally from mid-June to mid-September with the average daily high temperatures above 75°. The hottest day of the year is August 2nd with an average high temperature of 85°, but temperatures in the mid-90s, or even above 100 are not uncommon for short periods in the late summer. Annual precipitation is approximately 24 inches with only a fraction of an inch during the summer months.

KPUD owns and operates an electric system that includes generation, transmission and distribution facilities. The PUD has invested heavily in renewable energy projects over the

decades. In 1997, the PUD began generating a portion of its load for the first time with the completion of a small hydro plant at the McNary Dam fishway which produces about 12% of KPUD's annual energy load. The District has also developed a renewable natural gas project at the Roosevelt regional landfill, and has partial ownership of the Whitecreek Wind project in Bickleton, WA.

KPUD's electric system supplies a total annual retail load of approximately 512,000 MWh for the year ending December 31, 2023. KPUD's 2012-2023 annual average peak load was 71.26 MW with a system peak 101 MW in December of 2023. Power is largely supplied by the Bonneville Power Administration (BPA) and District owned generation output from the McNary hydro project. Additional power needs are provided from the wholesale power markets. Power is wheeled primarily over BPA lines with the exception of the Bingen Substation, which is wheeled over PacifiCorp transmission lines.

KPUD's sub-transmission system is 69kV and the transmission system is made up of 115kV and 230kV circuits. This power is delivered from 24 bulk power substations and is distributed via a 12.5kV overhead and underground distribution system. The utility also has ~2 miles of 3Φ under-build on PacifiCorp line in White Salmon.

Figure 1. KPUD Service Area

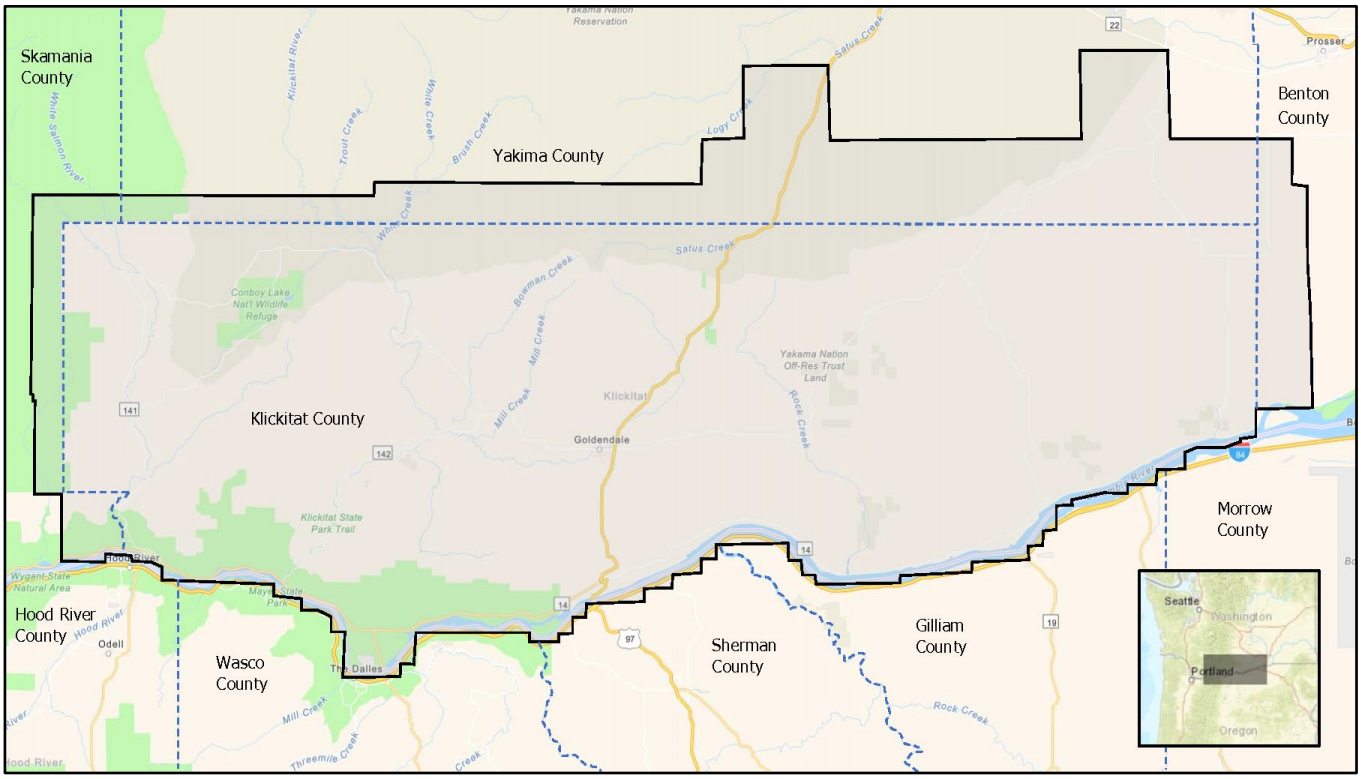


Table 1. Context-Setting Information Table

Utility Name	Public Utility District No. 1 of Klickitat County
Service Territory Size (sq miles)	2200 square miles
Service Territory Make-up **Based on the USGS National Land Cover Database 2021**	Unclassified 38.9181% Open Water 1.0253% Perennial Snow/Ice 0.0000% Developed, Open Space 1.4907% Developed, Low Intensity 0.7490% Developed, Medium Intensity 0.1639% Developed, High Intensity 0.0302% Barren Land 0.0113% Deciduous Forest 0.3163% Evergreen Forest 17.0525% Mixed Forest 0.2889% Shrub/Scrub 12.9610% Herbaceous 18.8011% Hay/Pasture 0.5216% Cultivated Crops 7.0457% Woody Wetlands 0.2234% Emergent Herbaceous Wetlands 0.4010%
Service Territory Wildland Urban Interface (based on total area) Based on analysis using WADNR WUI mapping.	[1.68]% Wildland Urban Interface [8.27]% Wildland Urban Intermix [ ] NA / Not tracked (please add any other detail below)
Customers Served	14,181
Account Demographic	[83.7]% Residential [1.7]% Agricultural [14.5]% Commercial/Industrial [ ] NA / Not tracked (please add any other detail below)
Utility Equipment Make-up (circuit miles) Measured by linear length of conductor.	Overhead Dist.:1358 Overhead Trans.:199.5 Underground Dist.:363.4 Underground Trans.:0

Has developed protocols to pre-emptively shut off electricity in response to elevated wildfire risks?[2]	Yes ☐ No ☐ A summary or description of protocols can be provided in section 7.
Has previously pre-emptively shut off electricity in response to elevated wildfire risk?	Yes ☐ No ☐ If yes, then provide the following data for the three trailing calendar years: Number of shut-off events: [ ] Customer Accounts that lost service for >10 minutes: [ ] For prior response, average duration before service restored: [ ]

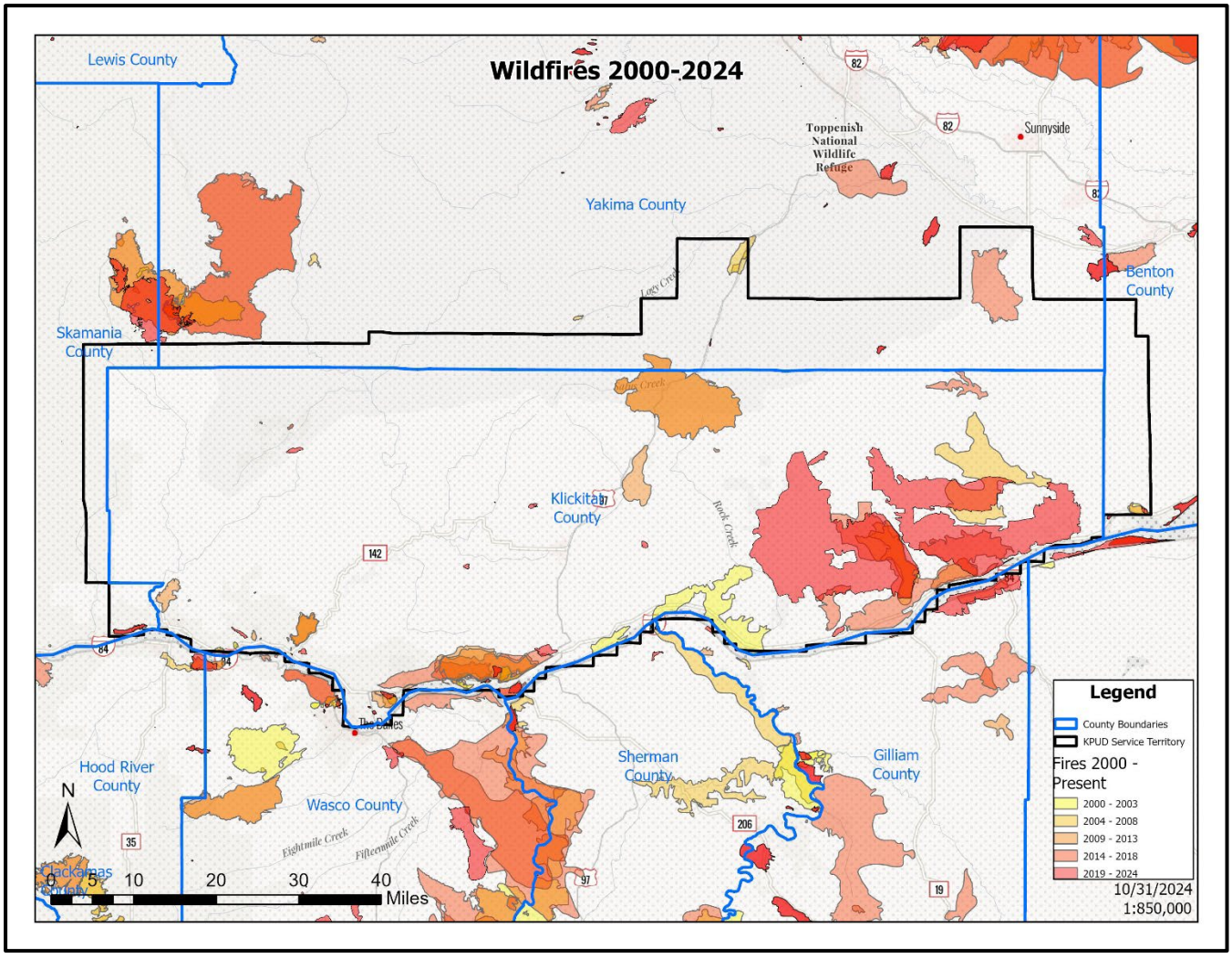
Fire Threat Assessment in KPUD Service Territory

As part of the risk analysis process, KPUD 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. The KPUD service area is located in south central Washington along the Columbia River Gorge. See section 3.1 for a complete description of the service area.

The fire history map (Figure 2) below shows that most large fires have occurred in the dry southeastern regions where dry rangeland grasses and shrubs provide a continuous fuel source. East of the Cascades, the higher winds associated the Gorge may also contribute to the scale of the fires seen in this area. East wind events can persist up to 48 hours with wind speed reaching 60 miles per hour.

[2] For many utilities this will be a reference to a Public Safety Power Shutoff (PSPS) event. These events, whether through a formally defined PSPS program or not, are recognized as a safety measure of last resort initiated by utilities to pre-emptively de-energize specific powerlines during critical fire weather to reduce the risk of the electric system being involved in an ignition. The decision to either have or not have this type of practice is at the operational discretion of the individual utility.

Figure 2. Wildfire Perimeters 2000-2024



Wildland Urban Interface

The United States Forest Service (USFS) defines the wildland urban interface (WUI) as a place where humans and their development meet or intermix with wildland fuel. Communities that are within 0.5 miles of the zone are included. According to the USDA Forest Service, the area considered WUI has expanded 30% in Washington from 1990 to 2010, with the number of

homes increasing by 50%[3]. There are now nearly a million homes in Washington located in the WUI[4]. Figure 3 illustrates the WUI areas in Klickitat County.

The Skamania and Klickitat Community Wildfire Protection Plan (CWPP) uses five classes of WUI in its assessment:

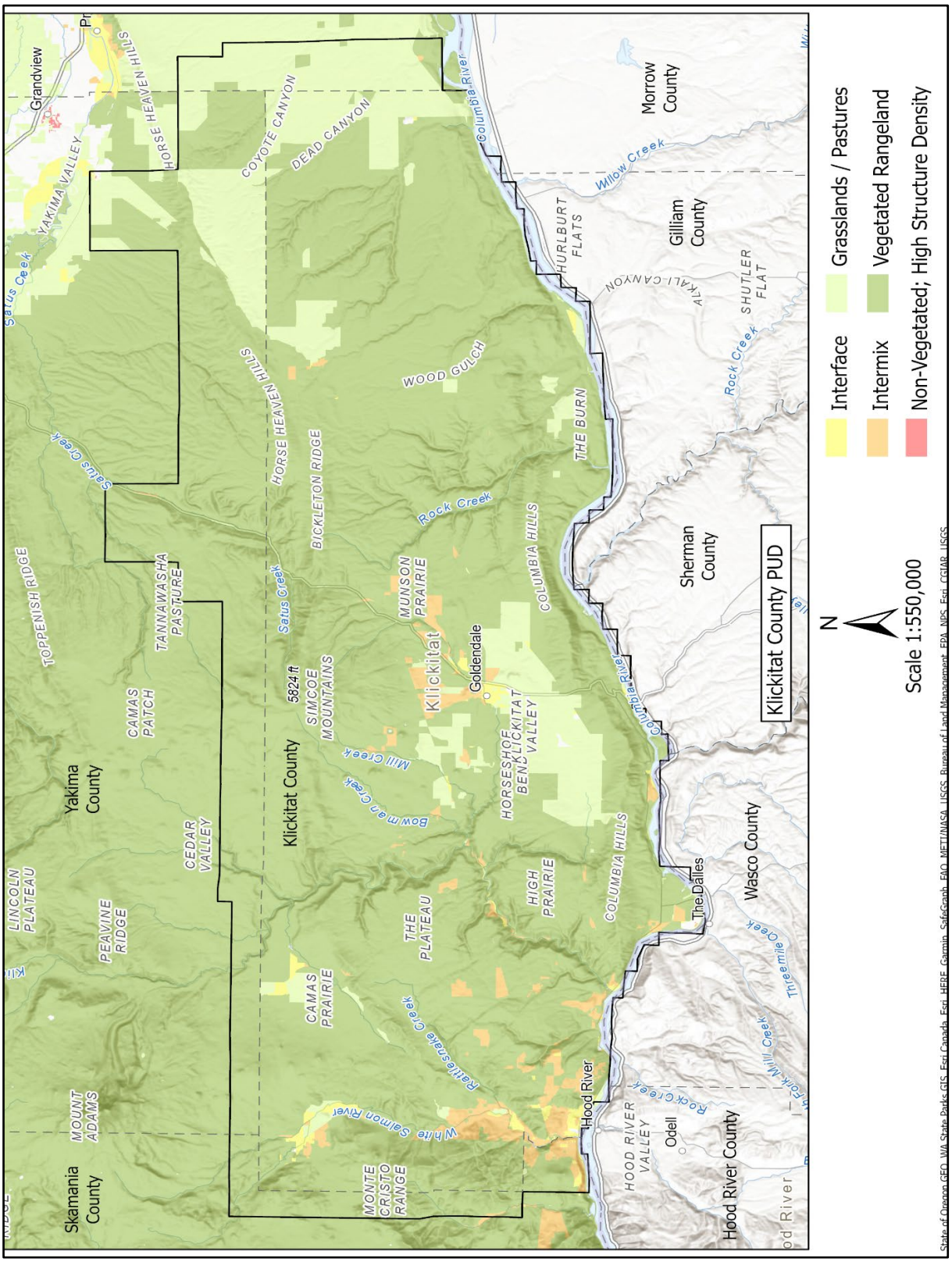
- **Interface:** High density of dwellings with at least three buildings per acre. Clear line of demarcation between wildland fuels and residential, business, and public structures. Often found inside city limits. Clear line of demarcation between wildland fuels and structures with fuels not generally continuing into the developed area.
- **Intermix:** Lower density, usually less than three dwellings per acre. Dwelling density considered "grouped dwellings" creating a difficult wildland fire fighting position. No clear line of demarcation; wildland fuels are continuous outside and within the developed area.
- **Rural:** These regions are most closely related to agriculture, farming and ranching operations, including infrastructure, crops, and equipment used or produced.
- **Wildland:** This WUI does not have significant groups of buildings or dwellings. Generally, very few, if any, buildings are present. This includes areas with high recreation or economic impact to the community.
- **Water:** This WUI is characterized by significant bodies of water. Rivers are not delineated in this WUI unless there is significant impoundment of water.

On a National Interagency Fire Center list of the top 10 states for wildfires ranked by number of fires and by number of acres burned, Washington comes in at number nine and six respectively[5]. On a Washington Department of Natural Resources (WDNR) list identifying the 25 places most likely to be exposed to wildland fire, Goldendale ranks number seven.

In 2023, Washington Emergency Management Division (EMD) along with multiple State agencies published the Washington State Enhanced Hazard Mitigation Plan. In the Wildfire hazard and vulnerabilities analysis it shows the entire Central Klickitat County region to be a Wildfire hot spot with 90 to 99 percent confidence of being significantly higher than State average for large wildfire risks[6].

[3] https://www.nrs.fs.fed.us/data/wui/state_summary/
[4] https://www.dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf?lmvb8d
[5] National Interagency Fire Center
[6] Enhanced Hazard Mitigation Plan | Washington State Military Department, Citizens Serving Citizens with Pride & Tradition

Figure 3. Wildland Urban Interface



Fire Threat Assessment Mapping

The datasets used in the Wildfire Hazard Potential (WHP) maps[7] were developed by the USDA Forest Service, Fire Modeling Institute to assist in evaluating wildfire risk and prioritizing fuels management needs on a national level. The WHP maps are intended to depict the relative potential for wildfire that would be difficult to suppress or contain.

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

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

To help determine fire threat levels within KPUD's service area, the electrical system was overlaid on the WHP maps shown in Figures 4 through 7. T&D assets as well as substation and switchyard locations can be seen in relation to the WHP zones shown in color-coded overlays. Factors such as fire history, topography and physical access are considered in the risk analysis.

Figures 4 through 7 provide a high-level diagram of KPUD's assets in relation to the Wildfire Hazard Potential areas throughout the service area. Due to wildfire history, vegetation types and topography, the High Fire Threat Areas (HFTAs) listed below are considered higher risk and are given extra attention before fire season. The majority of the VM work is carried out in the west and north regions of the service area.

- Trout Lake: (High/Very High WHP) - Located on the west side of the service area at approximately 1,900 feet above sea level (ASL), this is a heavily vegetated area with pine forests mixed with deciduous trees surrounding agricultural lands. Although Trout Lake does not have a history of wildfire, there were recent large wildfires approximately 7 miles north (2024) caused by lightning. Due to the fast-growing nature of the vegetation

7 Dillon, Gregory K. 2018. Wildfire Hazard Potential (WHP) for the conterminous United States (270-m GRID), version 2018 classified. 2nd Edition. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2015-0046-2

there, enhanced VM inspections and trimming are required to maintain clearance of the lines. Much of Trout Lake is considered Wildland Urban Intermix/Rural.

- Glenwood: (High/Very High WHP) - Approximately 10 miles east of Trout Lake with a similar topography and vegetation profile as Trout Lake. A 69Kv sub-transmission line terminates at the Glenwood Substation (Map #1).
- Appleton/Snowden: (Very High WHP) - Very dense pine forested areas at 2,400' ASL with narrow ROWs (Map #1). Limited access points and unimproved/unmarked gravel/dirt roads contribute to the risk in this area.
- Klickitat/Wahkiacus: (High WHP) – Klickitat River canyon near Klickitat contains very rugged and steep canyon walls with dense vegetation. High winds, lack of cell service in some areas and difficult access to the lines make this area higher risk. Portions of the 69Kv sub-transmission and 12.5kV lines run within the canyon (Map #1).

The WHP maps below represent wildfire hazard potential for wildfire ranked from Low to Very High. Low intensity, fast spreading grassland fires are common in the southern and eastern parts of the service area as shown on the historic fire perimeter map (Figure 2, page 6). The majority of the of KPUD's assets at risk from this type of wildfire are located in the "medium" risk tier. Many are ignited from trains that traverse the service area along the Columbia River, automobile traffic along State highways and County roads, or from dry lightning. The high winds common in the area contribute to the rapid spread of grass fires along the river bluffs.

Table 2.Wildfire Hazard Potential Overview

Assets	Total	Low		Medium		High		Very High	
	Line-miles	Line-miles	%	Line-miles	%	Line-miles	%	Line-miles	%
230 kV Transmission	47	0	0	43	92%	4	8%	0	0%
115 kV Transmission	43	2	5	35	82%	6	13%	0	0%
69 kV Sub-Transmission	112	0	0	63	56%	33	29%	16	14%
12.5kV OH Distribution	1,351	24	2	792	59%	406	30%	129	10%
12.5kV UG Distribution	334	0	0	173	52%	114	34%	48	14%
Totals									
Total Transmission	201	2	1	142	71%	42	21%	16	8%
Total Distribution	1685	24	1%	989	59%	520	31%	177	10%
Substations	24	1	4	16	67%	6	25%	1	4%
Total Line Miles	1,886								

Figure 4. Wildfire Hazard Potential Overview

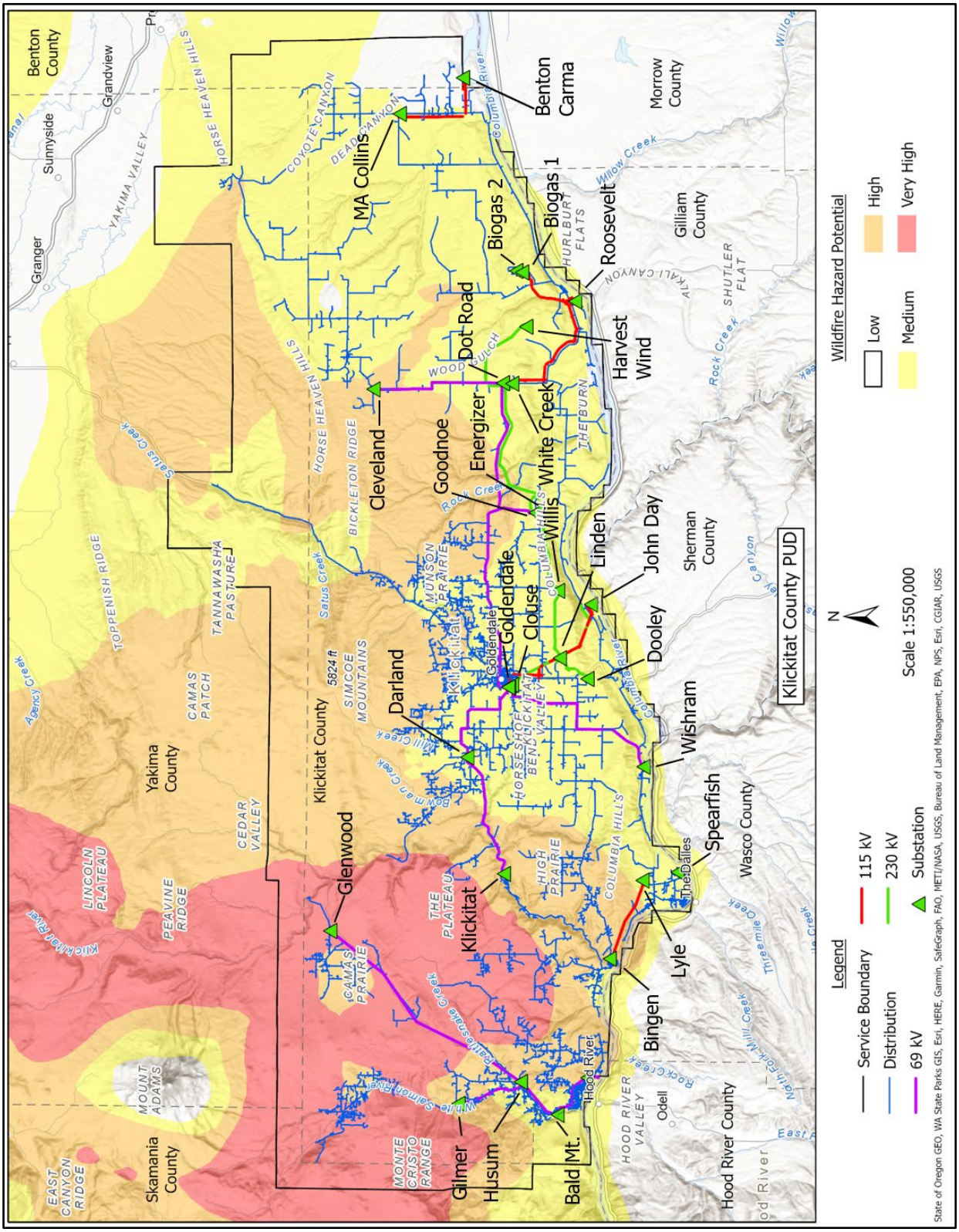


Figure 5. Wildfire Hazard Potential Detail Map #1

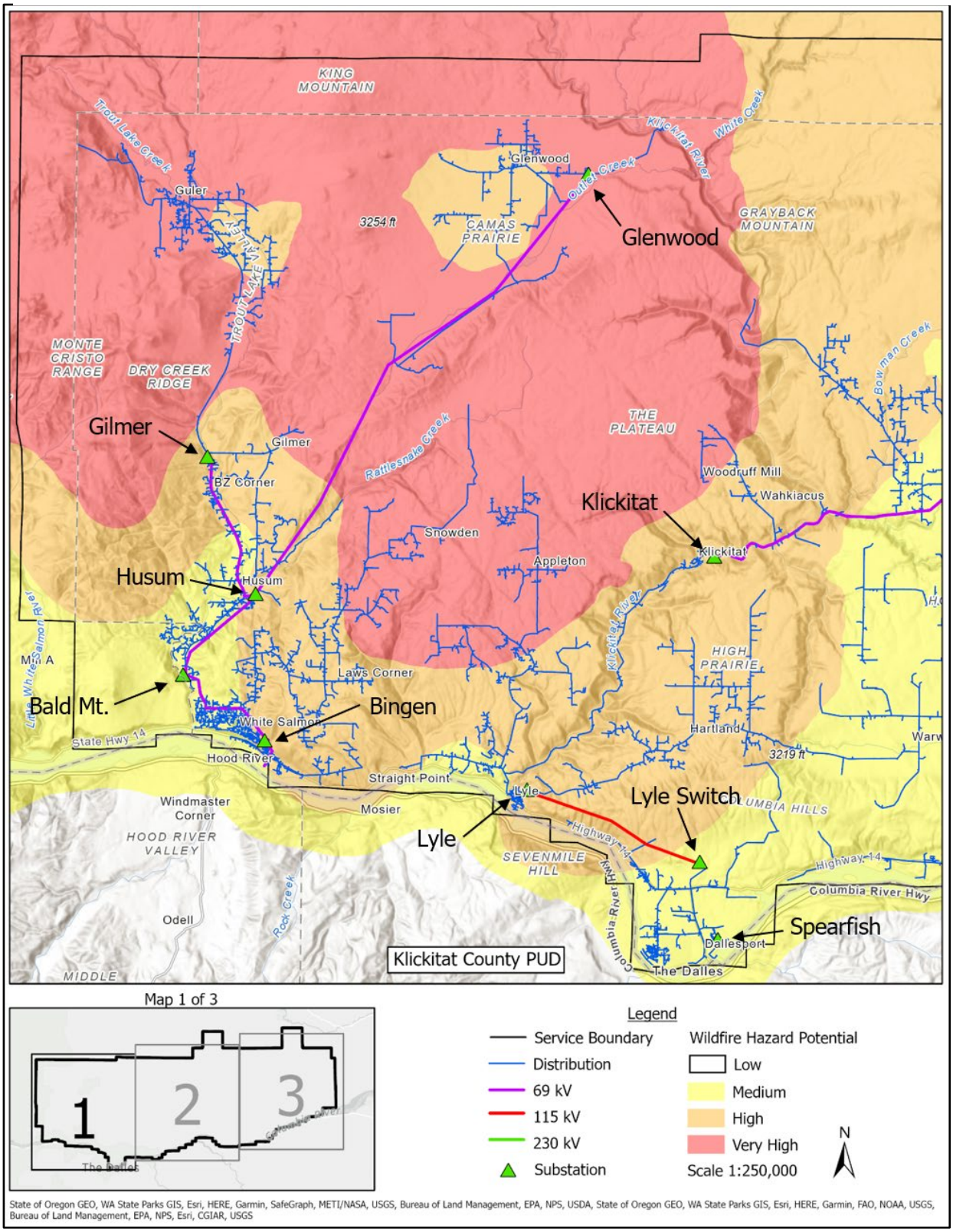


Figure 6. Wildfire Hazard Potential Detail Map #2

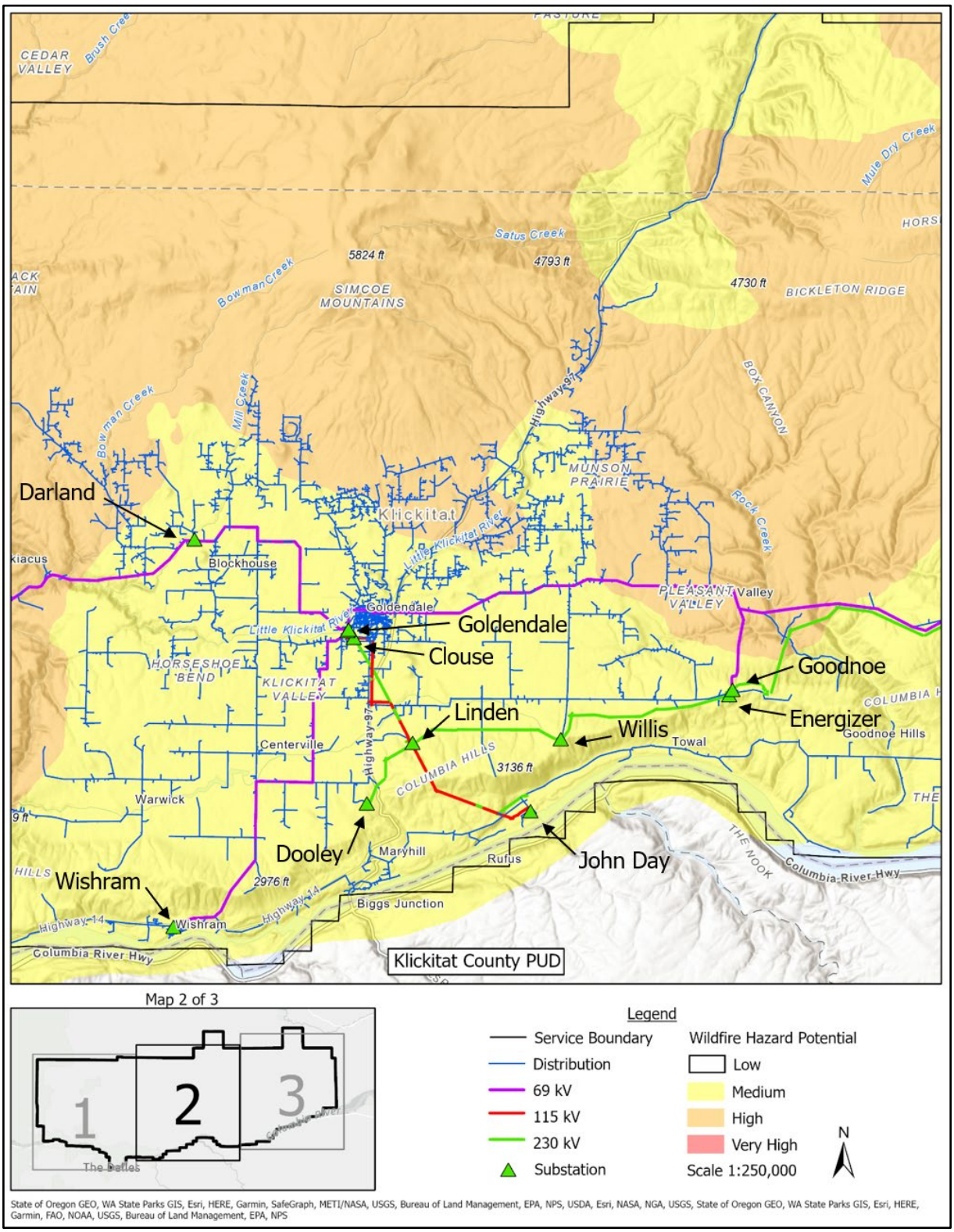
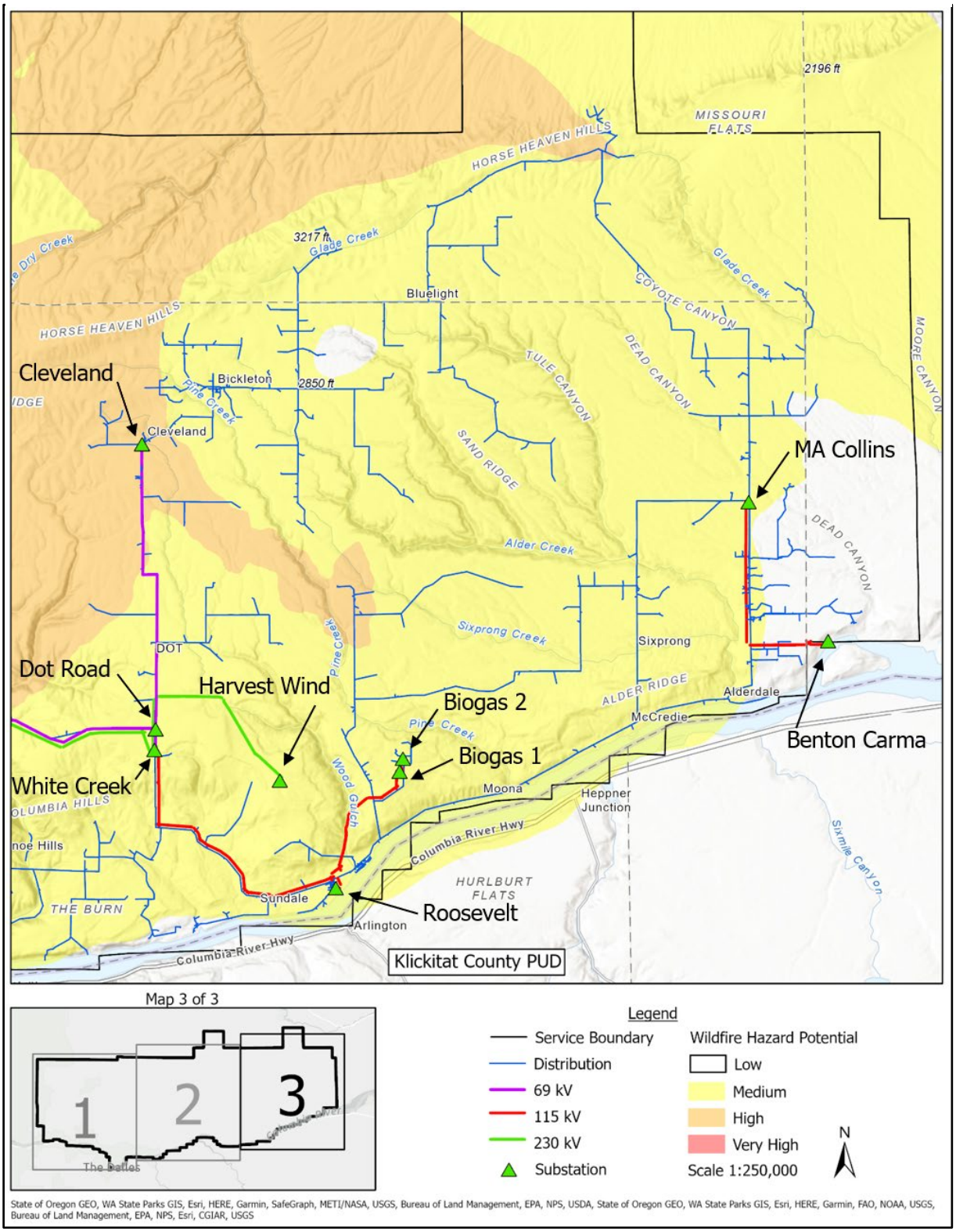


Figure 7. Wildfire Hazard Potential Detail Map #3



4.0 Objectives of the Wildfire Mitigation Plan

The main objective seeks to implement an actionable plan to create increased reliability and safety while minimizing the probability that KPUD assets may be the origin or contributing factor in the ignition of a wildfire. All programs and strategies will comply with current and anticipated Washington Utilities and Transportation Commission (WUTC), Washington State law, and National Electric Safety Code (NESC) regulations and guidelines. To help develop the Plan, KPUD assessed new industry practices and technologies that will reduce the likelihood of an interruption in service and reduce an outage's duration.

The secondary objective is to measure, through the annual evaluation of the matrix, the effectiveness of the specific wildfire mitigation strategies as they apply to KPUD. Where a particular action, program component or protocol proves unnecessary or ineffective, KPUD will assess whether modification or replacement is suitable.

4.1 Minimizing likelihood of ignition

One-Shot/Non-Reclose or alternative settings on reclosers

During fire season, certain reclosers are set to alternative configurations. This ensures that if a fault or line contact occurs, they will open to de-energize the line. These reclosers must then be manually reset after downstream line inspections are completed.

Wildlife coverup and covered conductor on transformer bank, overhead to underground dips, reclosers and regulator banks.

KPUD installs coverup on all new transformer and primary dip installations. If an existing site that does not have coverup is visited for maintenance or other work they are upgraded with coverup.

- **Vegetation management/pole clearing/Hazard tree removals**
    - KPUD has fulltime contracted trimming crews that maintain all KPUD transmission and distribution power lines. Trees are trimmed or removed for safety, reliability, board policies, and compliance with the National Electric Safety Code (NESC) as well as the latest version of NERC Reliability Standard FAC-003. VM work is conducted year-round, but during fire season, work is focused on urban areas where fire risk is lower
- **Infrastructure Inspections and Maintenance**
    - KPUD maintains a formal inspection and maintenance program for distribution, transmission and substation equipment. KPUD performs multiple time-based inspections on its transmission and distribution facilities that play an important role in wildfire prevention, reliability and safety.

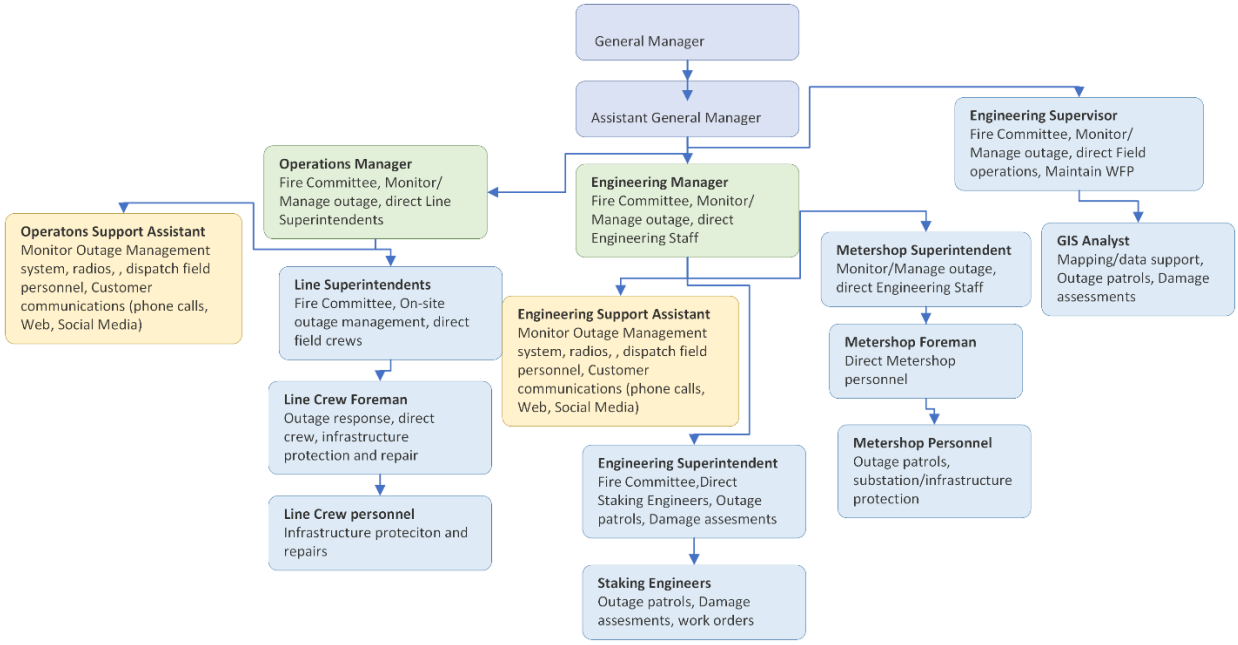
4.2 Resiliency of the electric grid

KPUD has a robust Situational Awareness program which actively monitors multiple weather sources and KCDEM radio traffic which help inform decisions on when and where to initiate proactive measures to reduce fire weather related impacts. This also allows us to put staff on alert for incidents and inform customers on the likelihood of events occurring that may affect them. If an event occurs, KPUD staff respond to every fire call from KCDEM to monitor fire activity and be onsite to assist first responders and also protect or repair our powerlines in the event that a fire affects our infrastructure.

5.0 Roles and Responsibilities

5.1 Utility Roles and Responsibilities

Figure 8. KPUD roles and Responsibilities



KPUD's Operations and Engineering Departments are responsible for monitoring and auditing the targets specified in the WMP to confirm that objectives are met, as well as the implementation of the plan in general.

This WMP is intended to mitigate the risk of its assets, becoming the source or contributing factor of a wildfire. Staff responsible for assigned mitigation areas have the role of vetting current procedures and recommending changes or enhancements to build upon the strategies in the WMP. Either due to unforeseen circumstances, regulatory changes, emerging technologies or

other rationales, deficiencies within the WMP will be sought out and reported to the Board of Commissioners in the form of an updated WMP annually or on legislated time frame.

At any point in time when deficiencies are identified in the WMP, the Supervisors or their delegates are responsible for making the appropriate plan adjustments. KPUD staff and qualified stakeholders are encouraged to bring any potential deficiencies to the attention of the OM or EM or designee. The OM or EM or designee, along with the appropriate staff, will evaluate each reported deficiency, and if determined to be valid, shall record the deficiency for further action.

KPUD does not have wildfire specific staff or positions, rather people from different departments with various roles carry out wildfire specific duties during wildfire season.

- Engineering Supervisor – responsible for developing and maintaining the WMP, part of the Fire Committee, managing and dispatching during active wildfires.
- Staking Engineers – on the ground response and patrols during fires, provide input on recommendations on existing and proposed WMP programs and efforts.
- Operations Manager - part of the Fire Committee, managing and dispatching during active wildfires, oversees Line Superintendents whom are responsible for managing line crews and tree crews.
- Line Superintendent – Manage line crews and tree crews

5.2 Coordination with local utility and infrastructure providers

KPUD collaborates with local utilities and infrastructure providers during wildfires and assists in recovery efforts if our supporting infrastructure is impacted. During fire and outage events, we maintain communication with local emergency management personnel both on-site and from the office, sharing and receiving updates on the status of our powerlines

5.3 Coordination with local Tribal entities

During outage events that occur which affects portions of the Yakama Nation land or facilities, KPUD initially collaborates with specific customers as part of our normal operations. In the event of a wildfire KPUD would coordinate with the Yakama Nation Fire Management department if they are the agency coordinating firefighting response efforts.

5.4 Emergency Management / Incident Response Organization

KPUD coordinates with its local emergency response agencies as well as other relevant local and state agencies, as a peer partner. In response to all emergency events, KPUD collaborates with the local Department of Emergency Management (DEM) and provide an agency representative to the county Emergency Operations Centers (EOC) to ensure effective communication and coordination. KPUD's primary coordination point is Klickitat County DEM.

During emergency events, KPUD Emergency Response staff contact the local DEM and establish themselves as the duty officer for coordination. The employee identified in Procedure 36 acts as the communications officer during an emergency. The PUD also has communications capabilities with 911 Dispatch and ground crews.

KPUD works with the Goldendale WA DNR office to provide yearly Wildland Fire Operator Safety Training to all field personnel as well as key office staff that may be involved in wildfire response.

6.0 Wildfire Risks and Drivers Associated with Design, Construction, Operation, and Maintenance

Risk Factors Associated with Types of Construction

- Equipment / Facility Failure (Conductor, Crossarm, Insulator, Splice, Oil Filled Equipment, Pole, Cutout/Fuse, other)
- Foreign Contact (Animals, balloons, vegetation, other)
- Vehicle/Equipment Impact
- Expulsion Fuses
- Aging Infrastructure
- Other

Equipment Failure

There are a many reasons equipment failure can occur during its service life. Even though KPUD's qualified personnel perform regularly scheduled inspection and maintenance on all 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 cutout fuse holders, hot line clamps, connectors and insulators can result in wire failure and wire to ground contact. Transformers and capacitor banks can have internal shorts potentially resulting in the ejection of materials which could be a fire source.

Foreign Contact

As is the case for most electrical utilities, most overhead powerlines are installed with bare wire conductor on insulated structures. The benefits of this type of conductor is that it is much lighter and easier to work with, as well as a much more cost-effective method of delivering energy compared to insulated/covered wire. The downside to bare wire is its susceptibility to contact from foreign objects such as wildlife, vegetation and third-party equipment. 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 many cases, to prevent all sparks prior to tripping. Ejected molten metal, sparks or burnt foreign objects can potentially ignite any fuels in the vicinity of the fault.

Standard Fuses

Typical utility industry practice is to install expulsion fuses on transformer 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 vents 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. Klickitat PUD employs the practice of "fuse saving" in their protection scheme, where it is known or assumed that a fault would be of a temporary nature. In the fuse saving scheme, an upstream recloser or breaker will operate before a fuse actually blows. However, if the fault is not temporary in nature, the fuse will blow. This scheme results in fewer blown line fuses overall, as most overhead faults are of a temporary nature.

Vehicle Impact

Vehicles leaving the roadway and contacting a pole is a common source of faults. Such an impact with poles or guy wires can break poles and/or crossarms, creating enough stress on the conductors to break them. The results can be ground contact, potentially emitting sparks.

Other Potential Risk Factors

Construction projects by non-KPUD crews are another possible cause of ignition. Third party cranes and other vehicles and equipment working near power lines can contact conductors causing a fault. Digging without first locating power lines is another hazard as KPUD has approximately 331 miles of underground distribution lines in its service area. These situations would most likely not be the source of an uncontrolled wildfire, as this type of event would be observed, and responsive actions immediately taken.

Tools and vehicles can be sources of sparks or ignition as well. For example, driving a vehicle over dry grass/brush can cause the dry grass/brush to ignite when contacting hot surfaces. For these reasons, KPUD vehicles are equipped with fire suppression equipment. Staff are trained on the proper use of fire suppression equipment and how to respond to fires. Tailgate meetings are held before work to discuss the potential for fire and to confirm the location and condition of on-board fire suppression equipment.

6.1 Risks and risk drivers associated with topographic and climatological risk factors

Within KPUD's service territory and the surrounding areas, the following are Risk Drivers for wildfire:

- Contamination / Wire to Wire Contact
- Tree Failure – Dead and Dying trees outside the Right-of-Way
- Dry Weather/Continuing Drought
- Vegetation Type / Fuel Load
- Topography
- Lightning
- Red Flag Waring Conditions

Portions of the service area have steep and rugged terrain with thick vegetation and a high tree mortality rate. These factors make some areas more vulnerable to uncontrollable wildfire than areas with less extreme topography. Fire-fighting activities in this type of terrain are challenging, as access to remote sections of some distribution lines can be very difficult and time consuming.

Contamination

High wind events and storms are common occurrences in the region and are potential causes of wire-to-wire contact referred to as contamination. Conductors can sway under these conditions, and if extreme, wire-to-wire contact can occur. When two or more energized conductors encounter each other, they will generally emit sparks or cause breakers or line fuses to trip, emitting sparks and ejecting molten material. A vehicle impacting a pole, livestock rubbing on guy wires are also potential causes for contamination. Certain processes of re-energization of conductors can cause a "galloping" condition which may result in reduced phase spacing.

Tree Failure

Tree failures account for a large portion of the line down events (LDEs) experienced by KPUD. Approximately 437 (or 46% of the total) LDEs were attributed to live trees falling onto power lines from 2010 to 2024. High wind accounts ~40.5% of the total live tree caused LDEs, with ~51% attributed to ice and snow.

Washington has seen an increase in western pine beetle, Douglas-fir beetle and California Fivespined ips outbreaks in recent years with some annual aerial surveys counting a million acres of new beetle-killed trees each year8. A once healthy tree can become a hazard tree after

[8] Forest Health Highlights in Washington - 2017

succumbing to the damage inflicted by various species of beetle in the region. Approximately 5% of all LDEs are attributed to dead trees falling into power lines. KPUD records indicated that High winds were the cause of ~57% of dead tree LDEs from 2010 to 2024.Drought/Dry Weather

The service area can experience very dry weather during late summer and early fall and sudden drought conditions can develop quickly. The U.S. Drought Monitor, which started in 2000, indicates the longest duration of drought (D1-D4[9]) over the past 10 years in Klickitat County lasted 127 weeks beginning on December 19, 2019, and ending on May 17, 2022. The most intense period of drought occurred between July 20, 2021 and November 15, 2021 D4 (exceptional drought) affected 34.85% of Klickitat County, during this same period 62 to 100% of the County was in D2-D3.

The western region does not experience the extreme changes in drought conditions that occur in eastern part of the state due to the separation of the Cascade Range. Currently the entire service territory is experiencing D0 (abnormally dry) conditions[10].

Vegetation Type / Fuel Load

Assessing the contributing factors of wildfires that can threaten homes and communities is an important step in developing a WMP. Those factors include, among others, vegetation (often referred to as fuels in a fire context), general climate, and specific fire weather patterns. Broadly, these physical characteristics combine to comprise the fire environment. A significant portion of the power lines in the western third of KPUD's service area run through densely forested lands containing a wide range of vegetation patterns and types. Most of land in the area is comprised of conifer forests followed by western red cedar or white oak woodlands.

Various hazards such as western pine beetle, Douglas-fir beetles, and California Fivespined ips increase tree mortality and the overall health of the surrounding forests increasing the fuel load and ignition potential. The large pines and oaks present a hazard for tree failure when damaged or killed by insects and disease.

While the large trees in the west and northern areas present a risk of downed lines, most large fires occur in the vast grasslands in the drier eastern region due to continuous fuel loading and rapid spread potential. Cheat grass and other invasive species have negatively altered the fire regime of native plant communities by reducing the fire return intervals and altering fire behavior. Cheat grass infested areas tend to burn more often and burn more area before being suppressed.

[9] D0-abnormally dry, D1-moderate drought, D2-severe drought, D3-extreme drought,D4-exceptional drought
[10] National Integrated Drought Information System

Lightning

Twenty million lightning strikes hit the ground in the U.S. every year[11]. When lightning hits a power line, the surge of electricity can cause a flashover and the appropriate corrective action depends on how flashover occurred.

A back flashover occurs when a lightning strike hits a shield wire or a tower structure. When this happens, current flows in both directions and down the tower into the ground, developing a voltage on the crossarm is enough to flash over the insulator string. A backflash is typically caused by large strike currents, high tower surge impedances (tall towers) and/or high footing resistance. One of the most common causes of a transformer explosion is a lightning strike forcing an overload. Damage to wires or equipment elsewhere in the electrical grid can also cause too much electricity to flow into the transformer, causing it to explode.

Red Flag Warning Conditions

The National Weather Service (NWS) issues Red Flag Warnings (RFW) & Fire Weather Watches to alert fire departments of the onset, or possible onset of critical weather and dry conditions that could lead to rapid or dramatic increases in wildfire activity[12]. An RFW is issued for weather events which may result in extreme fire behavior that will occur within 24 hours. A Fire Weather Watch is issued when weather conditions could exist in the next 12-72 hours. An RFW is the highest alert.

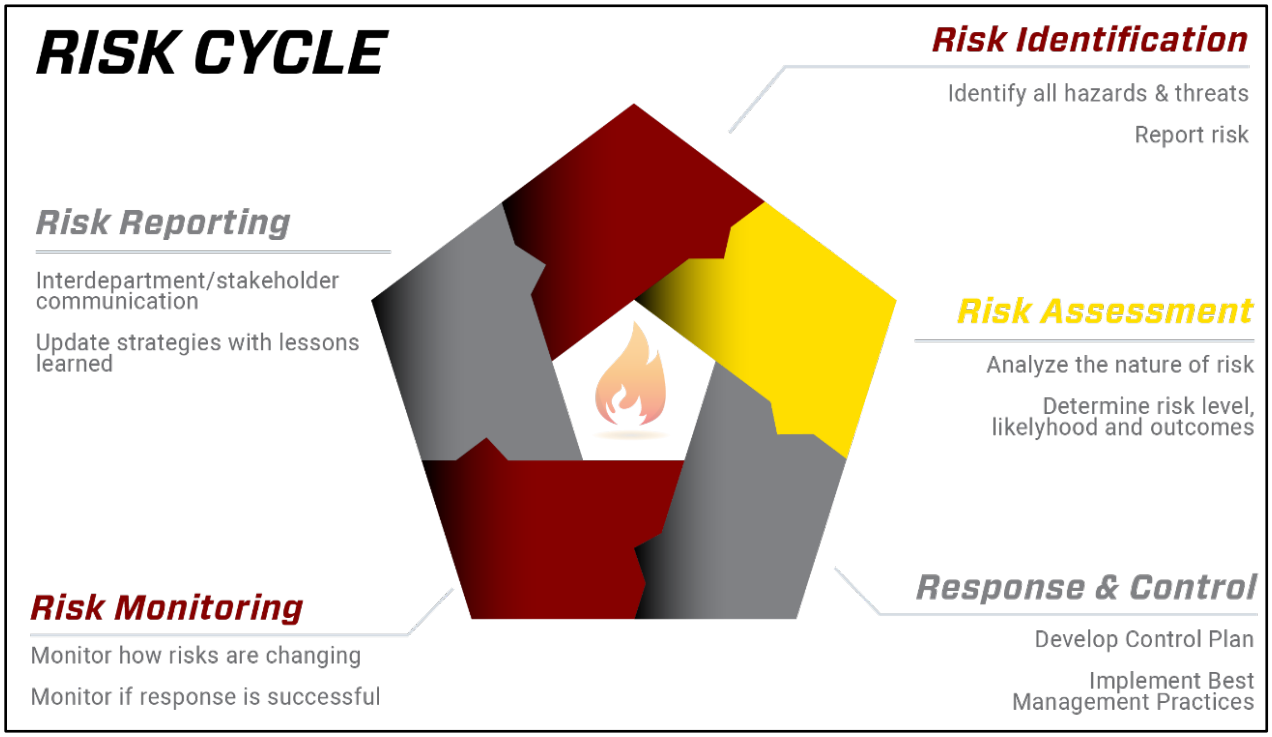
While an RFW is in effect, KPUD crews do not work in remote sites unless it is for outage restoration or critical maintenance work. Vegetation Management (VM) and line crews have fire suppression equipment on-site, including self-contained fire suppression skids mounted in trucks and or side by sides, water backpacks, shovels and fire rakes. Work crews conduct tail-gate meetings to confirm the location and readiness of the fire suppression equipment. Designated staff assigned as a fire watch remain on site for up to one hour to ensure a fire doesn't start after work crews leave a remote or high-risk area.

6.2 Enterprise-wide Safety Risks

The Enterprise Risk Management is not a periodic "Risk Assessment" but an ongoing and forward-looking management discipline that allows KPUD to analyze risks on a continual basis and adapt to changing conditions. Figure 9 displays the 5 steps of Enterprise Risk Management Process. The key or critical risks affect the entire community and are interrelated, and thus, are managed holistically and with a structured approach.

[11] National Lightning Detection Network (NLDN)
[12] https://inciweb.nwcg.gov/

Figure 9. KPUD Enterprise Risk Management Process



The Risk Assessment process begins with the GM, key staff and stakeholders working together to collect information on all potential and perceived risks. Relevant local plans, such as the *Klickitat County Community Wildfire Protection Plan* (CWPP), *Ponderosa Park CWPP* were reviewed for additional data, as well as the *USFS PNW Region Wildfire Risk Assessment (PNRA)* and *Klickitat Multi-Hazard Mitigation Plan.*

Climate Change

Washington's location on the northwest corner of the contiguous United States exposes the state to a mix of diverse weather systems that originate from the Pacific Ocean, the Arctic, and sometimes subtropical regions. The Cascade Range, which has a predominantly north-south alignment in Washington, effectively splits the state into climatically distinct western wet and eastern dry regions with respect to moisture from eastward-flowing Pacific Maritime air.

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-century or late century. The lack of snowpack in 2020 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 1.93 million acres burned across Oregon and Washington[13].

There is a growing body of evidence suggesting that climate change will likely increase the frequency and/or intensity of extreme events such as flooding, landslides, drought, wildfire and heat waves. Several investigations have highlighted the vulnerability of water supply, hydropower, and transportation to such changes[14].

An increase in fire risk (i.e., probability of occurrence), including an increase in size and possible frequency and/or severity (i.e., tree mortality), is expected in the coming century as a result of prolonged fire seasons due to increased temperatures and fuel loads resulting from past fire suppression policy.

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.

For decades, KPUD has designed its electrical system with the primary goal of providing safe, reliable, and affordable power. These designs stem from many decades of engineering experience and the adoption of emerging technologies. KPUD's design practices continue to advance with the addition of newer safety and reliability-related technologies. As part of this advancement, it is important to understand and adapt to the new normal and the challenges climate change brings.

7.0 Wildfire Preventative Strategies

7.1 Weather Monitoring/Situational Awareness

7.1.1 Current Strategy Overview

Fire Season System Conditions Procedure

During fire season, KPUD will heighten its Situational Awareness of the conditions that exist within the district and evaluate measures to reduce risk during elevated fire risk periods.

A committee consisting of the Engineering Manager (or designee), Operations Manager (or designee), Engineering Supervisor's, Line Superintendents and the General Manager (or

[13] National Interagency Fire Center "National Large Incident Year-to-Date Report" As of November 19, 2020
[14] Fourth National Climate Assessment

designee) will regularly meet to perform a Situational Assessment to determine if conditions are such that proactive measures are needed to reduce power line conflict.

No single factor drives decisions; KPUD staff will carefully review a combination of many criteria when determining if actions will be taken. The factors generally include but are not limited to:

- Low humidity levels, generally 20 percent or below
- Forecasted sustained winds generally above 25mph and wind gust in excess of approximately 45mph, depending on location and site – specific conditions such as temperature, terrain and local climate.
- A Red Flag Warning declared by the National Weather Service.
- Condition of dry fuel on the ground and low live vegetation moisture content.
- Information gained from KPUD's identified Situational Awareness resources.
- Real time observations from KPUD field crews and Staff.

Field Recloser/Breakers

During elevated fire risk conditions, the committee will evaluate circuits based on the multiple criteria and if deemed necessary develop a priority-based list of circuits and/or devices to be placed in a Fire Condition setting. Devices will be tagged with a Fire Condition Tag (Yellow) and recorded in the Switching log.

Settings on reclosers will be One-Shot on vacuum reclosers, electronic reclosers will be set to One-Shot or alternative settings.

The committee will provide the list to field personnel on electronic devises or paper maps, and direct them to implement the plan. When the Field personnel activate the Fire Condition, that information will be transmitted by Radio to the Operations Assistant and recorded and smart tags applied on the OMS. This information will be given to GIS and updates applied to the field mapping application.

Outage Response

When outages occur during these Fire Conditions, the responding Lineman will notify the Operations Manager or Line Superintendents and additional resources may be called in to patrol and identify the cause of outage. **No attempt to re-energize will be allowed until all lines of the affected area have been patrolled during these Fire Conditions.**

During Fire season conditions the on-call person will take a response vehicle home.

KPUD contracts with Earth Networks an AEM company for its custom weather threat forecasting service, which provides a detailed 2 day and extended 3-day weather forecast for our service territory, broken into 3 districts. This service also provides forecast and alerts from the following:

- United States National Weather Service Alerts (Fire Weather, Red Flag)
- NOAA/NWS Storm Prediction Center- Fire Weather Outlook and Convective Outlook
- National Interagency Fire Center – Significant Fire Potential (3-day outlook, and Monthly Fire Potential Outlook for current and 3 future months)

- Hot-Dry-Windy 7-Day outlook
- U.S. Drought Monitor

KPUD also monitors the following

- United States Forest Service Wildland Fire Assessment System
- National Fire Danger Rating System
- WADNR Industrial Fire Precaution Levels (IFPL) Which indicates restrictions for work type and work hours on DNR protected lands during fire season.

7.1.2 Planned Updates

Over the next three years, KPUD as part of a DOE GRIP Grant intends on installing up to eight high grade weather stations throughout our service territory to increase hyper local weather forecasting. KPUD is also partnering with AlertWest, the University of Oregon Hazards Lab, and the Klickitat County Department of Emergency Management to install up to eight hilltop located PTZ camera systems with AI driven wildfire smoke detection software. We are evaluating upgrading our forecasting services to AEM Elements 360, that is a dashboard driven situational awareness multi-hazard management SAAS that would integrate feeds from the weather stations and cameras and combine with a long list of other data sources within the system.

As part of the same grant, we are evaluating AiDash's Climate Risk Intelligence System (CHRIS) which assists with forecasting storm and wildfire outages and damages, it estimates the number of outages and locations so that KPUD can prepare for outages and pre-position resources prior to the event occurring.

7.2 Design and Construction Standards

7.2.1 Current Strategy Overview

Increased Phase Spacing on new construction in high fire risk areas and timbered areas.

- KPUD uses what we call our Avian Specs for new construction in Timbered portions of our service territory, the specs provide phase spacing that exceeds the APLIC 2006 spacing recommendations. This ensures that animal electrocutions (possible fire start) are dramatically reduced, as well as reduces the likelihood that branches or other foreign objects can spam phase to phase or phase to neutral causing arching. It also reduces the possibility of phase slapping.

Undergrounding some powerlines in high fire risk areas

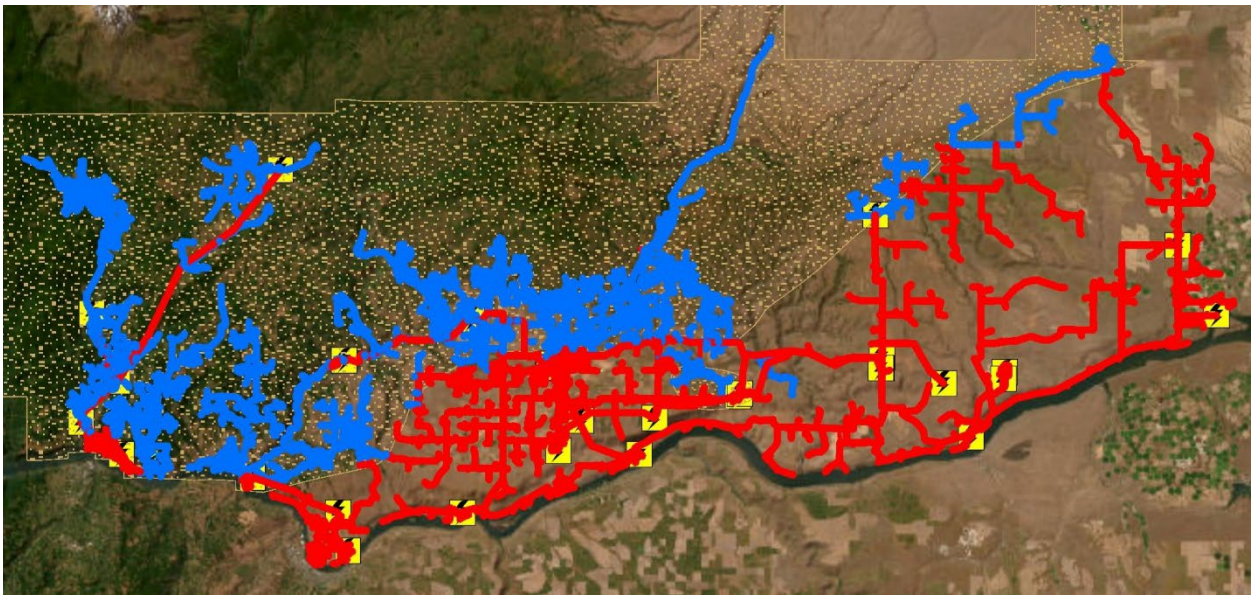
- KPUD evaluates areas where undergrounding of overhead lines would reduce wildfire risk and increase reliability and completes these as part of our capital improvement projects each year.
- In 2022 KPUD completed a project that undergrounded a 2.1-mile section of overhead powerlines, that feed critical KCDEM and Forest Service radio sites, as well as two cellular phone providers and an internet provider. The powerline is on the outskirts of the

Trout Lake community and traverses rugged and heavily forest lands owned by the Washington Dept. of Natural Resources, USFS, and private timber company lands.

Designated Underground Only areas

- In 2023 KPUD enacted a requirement that all new customer line extensions in designated areas be underground, the restriction covers nearly all timbered areas within our service territory, It is also used as a guide for internal decisions on undergrounding of existing KPUD powerlines or newly constructed infrastructure.

Figure 10, KPUD Mandatory Underground Area (Blue line segments, Yellow polygon)



Tree wire construction

- In 2024 KPUD began using Overhead Covered Conductor (Tree Wire) in our construction standards in heavily timbered areas. This allows narrower profile construction, reduces faults due to contacts, and resists abrasion on the wire if there is contact.
    - In 2024 we are converting a 2600-foot section of single phase to 3 phase tree wire, and in 2025 plan to convert 2.5 miles of single phase to 3 phase tree wire.
- **Covered Jumpers and Wildlife coverup on all transformers, reclosers, regulators, and overhead to underground dips.** KPUD has been doing this for many years on new construction, and retrofits any sites that are not covered when they are revisited for maintenance or other reasons.

7.2.2 Planned Updates

KPUD carried out a pilot project in 2024 as part of an Eagle In-Lieu Fee grant program, where we retrofitted existing power poles to make them Eagle friendly. As part of the project, we installed pin and conductor covers, deadend and cutout covers, bushing covers and covered jumpers. KPUD will evaluate the coverup over time to see if these mitigations are effective and lasting and whether it is a program we will continue to expand.

7.3 Fuel & Vegetation Management

7.3.1 Current Strategy Overview

KPUD has fulltime contracted trimming crews that maintain all KPUD transmission and distribution power lines. We also have two full time journeyman tree trimmers that are primarily tasked with hot-spotting, hazard tree mitigation, mulching and spraying. Trees are trimmed or removed for safety, reliability, board policies, and compliance with the National Electric Safety Code (NESC) as well as the latest version of NERC Reliability Standard FAC-003. VM work is conducted year-round, but during fire season, work may be focused on urban areas where fire risk is lower.

KPUD also has a vegetation spraying program that concentrates primarily on treating right-of-way's that were trimmed or mulched the prior year. This program is intended to extend the trimming cycle by retarding the growth of brush and small trees in the ROW.

KPUD is currently using AiDash Inc.'s Intelligent Vegetation Management System (IVMS) using annual satellite data acquisition (of the entire KPUD system) and ground based inspections. AiDash then uses proprietary Artificial Intelligence based algorithms to analyze the data to identify vegetation encroachment on utility powerlines, Hazard tree identification, as well as develop growth rate models for prediction of trim cycles.

On distribution and transmission circuits KPUD uses AiDash, performs UAV and ground-based inspections of tree and conductor clearances and hazard tree identification. UAV and ground patrols are used to help tune the AiDash model. The IVMS identifies which year each circuit and/or segments of the system should be treated based on current conditions and growth rates. Cycle trims vary by location and are developed through the AiDash IVMS. Segments not identified for trimming with IVMS will be physically inspected at no more than a 10 year interval.

AiDash's web-based application is used analyzing, planning, assigning and tracking progress of cycle trim, hot spotting, and hazard tree mitigation. Field personnel utilize an app that runs in iOS and Android devices, that allows them to receive and track work assignments, take photos of progress and completion of tasks, log and report unassigned tree work.

During tree work, trimming is done to achieve 10' of clearance at time of trimming unless otherwise directed by KPUD VM staff. Tree trimmers also clear vegetation from KPUD's secondary voltage, service drops and pole climbing space on an as needed basis. Overhanging

branches are removed to a height of 15’ above distribution conductors at time of trimming, and all overhangs are removed from above transmission conductors.

KPUD’s tree trimming crews and contractors are governed by principles of modern arboriculture using the following standards:

- American National Standards Institute (ANSI) A300 Part 1 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the pruning cycle
- International Society of Arboriculture Tree Pruning Standards (1995)
- Pruning Trees near Electric Utility Lines (Shigo-1990)
- ANSI C2
- National Electrical Safety Code (NESC)15
- Latest version NERC FAC-003

Tree clearance is determined by the growth rate of the species. Correct tree trimming should promote tree growth away from electrical conductors, provide longer periods of clearance, and reduce future work. Correct tree trimming techniques include collar cuts, directional pruning, and drop-crotch trimming.

Secondary and Neutral Clearances – Trees on open wire and all other secondary wire will be trimmed or removed to provide a minimum of 3' of clearance. Secondary will only be trimmed with approval of the District Representative. Secondary beyond the last District pole will only be trimmed upon specific direction by a District representative.

Large branches, vines or trees laying on or applying pressure to guywires, poles or other District facilities are trimmed or removed. No trimming is done specifically for television cable, telephone cable or private electrical facilities. Transmission ROWs are mowed where feasible. Where mowing is impractical, an environmentally friendly herbicide is used around poles to protect from rangeland fires.

All species located directly under the line will be removed at ground level, unless located under canyon crossings where their height will never encroach within the Minimum Vegetation Clearance Distance (MVCD). Trees directly in front of a residence may be cut with a clearance of 10’ to the nearest conductor and left for a buffer, as determined by the District representative

[15] Rules 012,013 and 218

Table 3. Vegetation Management Schedules

ASSET CLASSIFICATION	OPERATION TYPE	FREQUENCY
230kV Overhead Transmission	Inspection	Annually per latest version NERC Standard FAC-003 Semiannual IVMS
	Trimming	Annually per latest version NERC Standard FAC-003
69kV-115kV Overhead Transmission	Inspection	Safety Patrolled Annually IVMS Annually
	Trimming	Cycle Trim developed by IVMS, 5-6 year average
12.5kV Overhead Distribution	Inspection	Annually using AiDash IVMS
	Trimming	Cycle Trim developed by IVMS, 5-6 year average

Figure 11. Distribution ROW Line Clearing

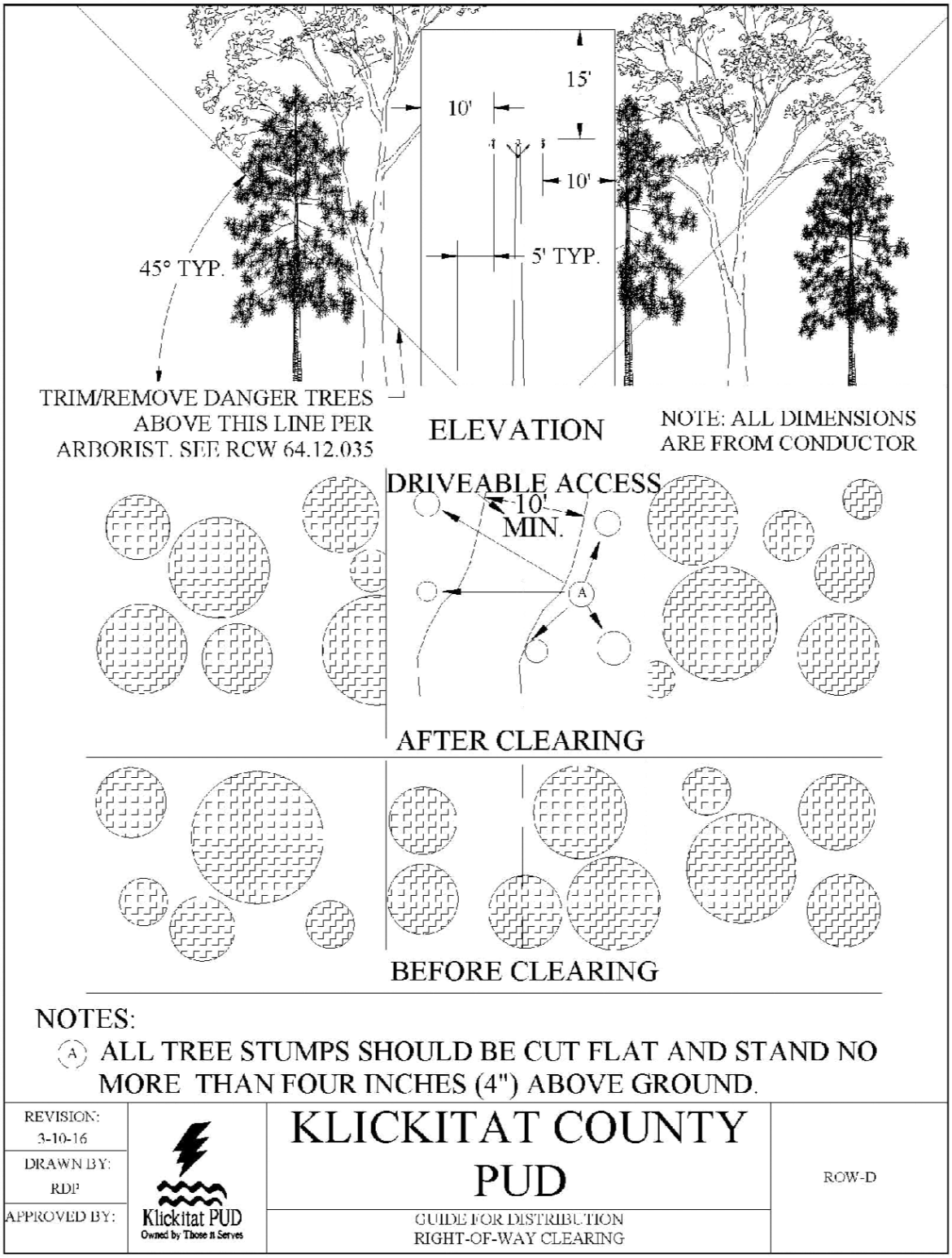


Figure 12. Single Pole ROW Line Clearing

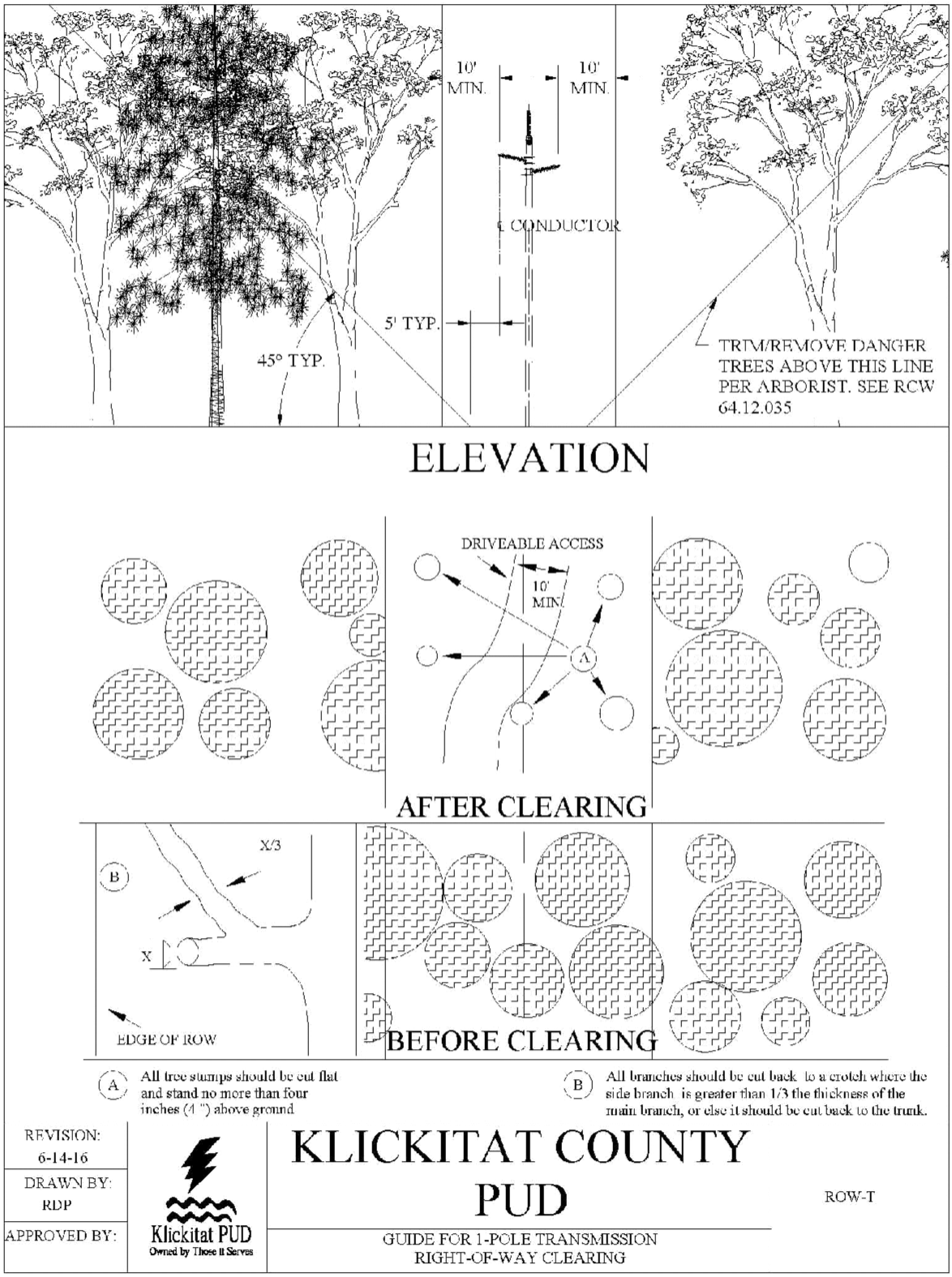
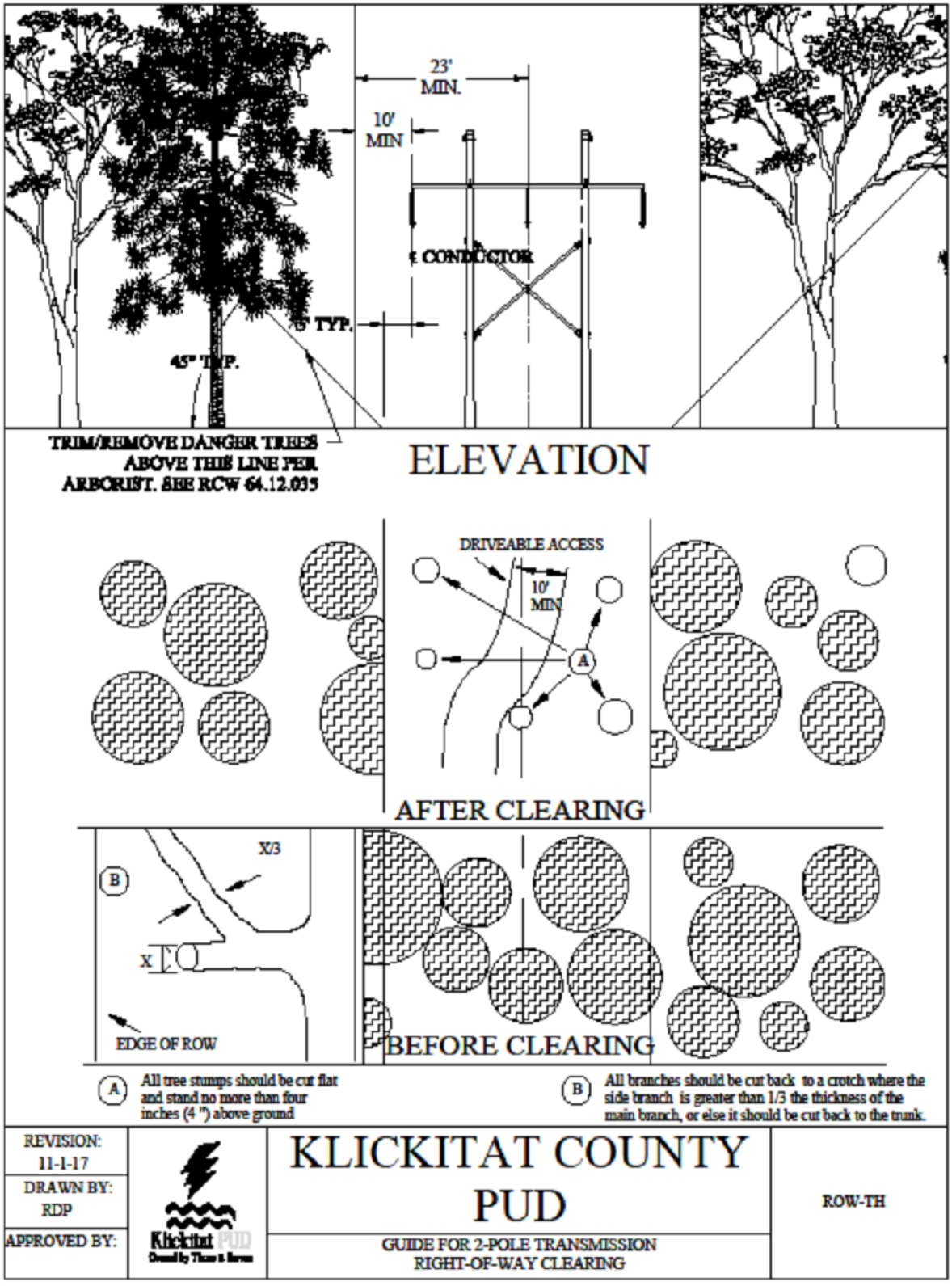


Figure 13. H Structure Line Clearing



7.3.2 Planned Updates

KPUD is increasing the miles of right-of-way that are treated by mulching and chemical spray application. We are working with AiDash to incorporate workflows into our IVMS system for identification, tracking and monitoring of these programs. As AiDash's AI model improves over time, the vegetation analysis and trim year predictions become more accurate, this will help us better define cycle trim years, hot-spotting locations as well as hazard tree identification.

7.4 Asset Inspections and Response

7.4.1 Current Strategy Overview

Recognizing the hazards of equipment that operate high voltage lines, KPUD maintains a formal inspection and maintenance program for distribution, transmission and substation equipment. KPUD performs multiple time-based inspections on its transmission and distribution facilities that play an important role in wildfire prevention, reliability and safety. The following sections outline policies for inspections of KPUD assets. Table 5 outlines the inspection schedule for all assets.

Table 4. Inspection Program Summary

ASSET CLASSIFICATION	INSPECTION TYPE	FREQUENCY
230kV Overhead Transmission	Safety Patrol Inspection	Annually
	Detailed UAV Inspection	Every 5 years
	UV Inspections	As needed
69kV-115kV Overhead Transmission	Safety Patrol Inspection	Annually
	Detailed Inspection	Every 10 years
	Wood Pole Test and Treatment	Every 12 years
	IR Inspections	As needed
	Safety Patrol Inspection	Under Evaluation

Overhead Distribution	Detailed Inspection	Every 12 years (combination of PT&T, UAV, and foot patrols)
	Wood Pole Test and Treatment	Every 12 years
	IR Inspections	As needed
Substation	Visual Inspection	Monthly
	Detailed Inspection	Quarterly
	IR Inspection	Annually

Definition of Inspection Levels

1. **Safety Patrol/Visual Inspection:** A simple visual inspection of applicable utility equipment and structures designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business.
2. **Detailed Inspection:** Individual pieces of equipment and structures are carefully examined, visually and through use of routine diagnostic testing, as appropriate, and (if practical and if useful information can be so gathered) opened and the condition of each rated and recorded. UAV technology has been incorporated into the inspection program allowing for more thorough inspections of T&D assets.
3. **Intrusive Pole Inspection:** Involving the movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument readings. Pictures of each structure are collected, reviewed and archived. Wood pole inspections are considered Detailed Inspections.

230kV Transmission Line Safety Patrol Inspection

KPUD has a system patrol process complying with NESC and NERC[16] requirements, including safety patrol inspections for >200kV transmission lines annually.

Inspections are carried out by vehicle and foot patrols using binoculars to closely inspect all sides of structures to identify any deficiencies. Inspectors look for visible signs of defects, structural damage, broken hardware, displaced conductors, and vegetation clearance issues. Any anomalies found are addressed and prioritized based on the severity of the defect.

[16] Latest version of FAC-003 Transmission Vegetation Management Inspection Requirements

Beginning in the summer of 2024, this work will be tracked using GIS mapping software to ensure all circuits are being inspected on planned schedules.

In addition to transmission asset inspection, the KPUD monitors vegetation during its system patrols and directs a VM contractor to conduct additional vegetation management as needed. Efforts are also made to identify and document all hazard trees during safety patrol inspections.

230kV Transmission Line Detailed UAV Inspections

KPUD has incorporated unmanned aerial vehicle (UAV) inspection technology to enhance the 230kV transmission asset inspection program. The Detailed UAV inspections are planned to occur every 5-years and will be performed by FAA part 107 certified and licensed in-house UAV pilots. The KPUD-owned UAVs are equipped with a high-resolution camera allowing for detailed inspections of insulators, conductor, hardware and other equipment not easily visible from the ground. Infrared (IR) imaging photography can also be used as needed to assist in identifying problem areas with spans and equipment. We use PoleHawk by Wiggins Tech, as the software platform to evaluate the imagery, annotate discrepancies and produce reports that are used to schedule crews for line maintenance that needs completed.

69kV – 115kV Safety Patrol Inspection

All transmission and sub-transmission lines operating below 200kV are given a routine patrol inspection on an annual basis. Patrols are conducted by vehicle or on foot. Linemen use binoculars on all sides of each structure to identify deficiencies.

Detailed inspections will occur on a 10-year cycle. These may be either ground or UAV based. Photos will be taken of each structure from ground patrols. During UAV flights multiple high-resolution photos are taken at each structure for in office follow-up review. If deficiencies are found during either the ground or UAV inspection, they will be recorded in a GIS based inspection application and scheduled for repair based on severity. UAV inspections may occur after storms, outage event or equipment malfunction. Infrared (IR) technology may be used as needed to help identify deficiencies not visible to the human eye.

Safety Patrol Inspection for Distribution Lines

KPUD is evaluating the cycle in which to perform routine patrol inspections of all 12.5kV distribution lines. Distribution lines are patrolled during regular line work and service calls. These inspections can be conducted by vehicle, foot patrol, or UAV, and during normal every-day operations. KPUD is also evaluating the process for assigning, recording and tracking these types of inspections.

KPUD will likely have a shorter cycle for areas that fall into the High and Very High fire threat zones.

Detailed Inspection for Distribution Line

KPUD carries out detailed UAV inspections on segments of our distribution system regularly for various reasons. We also believe the data our Pole Test and Treat contractor has been collecting since 2018, qualifies as a Detailed Inspection. Our contractor identifies deficiencies with the pole, crossarms, grounding, conductors and installed equipment on poles and recorded their findings on spreadsheets that are turned in weekly or monthly. Records specify the pole number, facility or equipment inspected, the inspector, the date of the inspection, and any problems (or items requiring corrective action) identified during each inspection. KPUD will continue to use this as well as internal resources to ensure all distribution facilities are inspected on the designated inspection cycle.

Instruction to Inspectors

The Preventive Maintenance Plan is designed to provide safe reliable service. The plan is based on sound industry principles and practices. Maintenance work shall be prioritized considering the most urgent need due to compromised safety and reliability.

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.

Inspection tags (overhead & underground) 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. All 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 that can be scheduled to maintain the integrity of the system. Priority #2 tags will be prioritized by urgency and will be scheduled to have appropriate repairs made to correct the condition within a year where practicable.

- **Priority # 3** – Non-emergency repair condition:

Conditions that do not present a situation that could jeopardize the safety of the system, line workers and the general public. Priority #3 tags will be submitted by the inspector with the time interval recommended. In the judgment of the inspector, work will be scheduled to be completed within two years.

230kV Transmission Protection System Maintenance Program

The Transmission Protection System Maintenance and Testing Program (PSMP) provides guidelines to District personnel and contractors for testing and maintaining transmission voltage

relays and equipment that protect the KPUD electric system. The 230kV maintenance and testing program complies with Latest NERC Reliability Standard PRC-005. The Engineering Manager or designee ensures that KPUD adequately implements the PSMP and maintains the documentation outlined in the plan. WECC evaluates the PSMP and testing documentation to determine compliance with applicable NERC Standards within PRC-005.

Wood Pole Testing and Treatment

A formal Wood Pole Maintenance Program has been in place for decades to determine whether they have degraded below National Electric Safety Code (NESC) design strength requirements with safety factors. The goal is to inspect and test all poles on a 12-year cycle. This results in 10%, or approximately 2,200 poles tested per year, meeting interval recommendations in RUS Bulletin 1730B-121. Circuits are identified by the Manager of Operations (MO) for testing by a third party in accordance with the above-mentioned RUS standard. Each inspection is recorded using GIS based asset management software.

Wood poles are tested based on KPUD Pole Test & Treat protocols and are performed by qualified inspection contractors. Poles are first subjected to “sound” test to reveal evidence of decay. Poles suspected of deficiencies are subjected to intrusive inspection to determine and identify problems such as rot, decay and insect damage. All poles that are non-thru bore, as well as thru bore poles older than 20 years are subjected to intrusive inspection. Based on the results of the intrusive test, wood treatments are then administered.

Circuits are identified, mapped, and scheduled by the OM for inspection and testing using latest industry standard practices. In addition to assessing the condition of the wood, contractors look for and note any evident deficiencies of installed equipment such as missing ground wires, guy wire damage, damaged cross-arms, fire damage, outdated insulators, or cutouts, as well as vegetation clearance violations and raptor nests. Each pole is also photographed at the time of inspection.

Poles which fail inspection are prioritized based on level of structural defect and scheduled for replacement within a year. Wood poles that pass the intrusive inspections are re-tested within a maximum interval of 12 years.

7.4.2 Planned Updates

KPUD is evaluating software systems and process with which to identify, assign and track deficiencies on our transmission and distribution systems, with the goal of keeping better track of where issues occur, when maintenance and repairs were assigned, and tracking and logging completion of the work.

7.5 Workforce training

7.5.1 Current Strategy Overview

Field staff and select office staff receive WA DNR RT 130 Wildland Fire training annually prior to fire season, this qualifies our field staff to work with the DNR and local first responders during active wildfires, patrolling and protecting our infrastructure.

KPUD internal training

KPUD is developing rules and complementary training programs for its workforce to reduce the likelihood of an ignition. Training is held annually at scheduled Safety Meetings which all staff attend:

Trained on the content of the WMP

Trained in proper use and storage of fire extinguishers

Required, during pre-job briefings, to discuss the potential(s) for ignition, environmental conditions (current and forecasted weather that coincides with the duration of work for the day)

Required to identify the closest fire extinguisher and other fire abatement tools

Required to report all ignition events to management for follow-up

Encouraged to identify deficiencies in the WMP and bring such information to management

The Operations Manager or designee will conduct annual training of all District personnel involved in or having responsibilities associated with the VM program including the latest version of FAC-003, program objectives, applicable KPUD line limits, inspections and forms, trimming, reporting, record keeping and follow-up.

Annually at a scheduled safety meeting prior to fire season, staff are trained on KPUD's Fire Season System Conditions procedure as well as KPUD's Fire Condition Non-Reclose Procedure**.**

KPUD firefighting resources

Field staff are trained and practice the use of the following firefighting apparatus and tools.

Skid mounted firefighting tanks, in three foreman's trucks and in line two crew UTV's

500-gallon trailer mounted firefighting tanks, with chemical suppressant additive, one utilized by the Goldendale Crew and utilized by the White Salmon Crew.

Fire water can/bladders, and firefighting tools located on all line equipment and field staff vehicles.

7.5.2 Planned Updates

As new programs and processes are developed training programs will be developed along side to get our staff

7.6 Relay and Recloser Practices

7.6.1 Current Strategy Overview

KPUD has developed protocols for the resetting of its line reclosers to "Alternate settings" mode in many areas during high-risk weather conditions. During periods of elevated fire risk, KPUD Fire Committee will evaluate circuits and individual devices based on the Situational Awareness resources identified in this plan. If deemed necessary KPUD will develop a list of devices that will be set to Alternative Settings.

In 2023 KPUD started placing reclosers on alternative settings on June 13th, eight were turned on in June, fifty-five in July, and 15 in August, we began resetting to normal operation on September 27th and finished on October 31st. A total of 78 reclosers were set to alternative settings.

In 2024 KPUD started placing reclosers on alternative settings on June 21st, fifty-three were set in June, and forty-eight in July with a total of one hundred and one set to alternative settings. We began resetting back to normal operation on October 28th.

Electronic reclosers replacing Hydraulic reclosers in the field.

Electronic reclosers provide faster fault detection and isolation, have advanced features such as arc suppression and current limiting, broken conductor detection, ability to remotely monitor and control, and require less maintenance than their hydraulic counterparts. They also collect and store various data parameters such as type and magnitude used to derive a distance to fault allowing crews to more quickly locate the fault and restore power.

Over the past several years we have been actively upgrading Hydraulic field reclosers to electronic reclosers with controls.

S&C TripSaver2 upgrades single phase hydraulic reclosers, and standard fuses.

As a pilot project KPUD purchased fifty S&C Tripsaver2 cutout mounted reclosers in 2023 for use in our higher fire risk areas. These were used to replace standard cutouts and hydraulic reclosers on single phase tap lines, and allows faster fault detection and de-energization, as well as abilities to set taps to one-shot and avoid reclosing onto faults which can create sparks.

7.6.2 Planned Updates

KPUD is evaluating the use of new technology that may provide the ability to remotely monitor and control recloser settings.

3 phase NOJA Power OSM reclosers with RC-20 controls, KPUD purchased twenty in 2024 and will use them to replace hydraulic reclosers in our higher fire risk areas.

NOJA OSM reclosers have many advanced fire mitigation capabilities including Sensitive Earth Fault Protection, and Broken Conductor Detection (ANSI 46 BC method). KPUD will be evaluating the use of these technologies to further our fire mitigation efforts.

Schweitzer Engineering Laboratories (SEL) 651R recloser controls.

KPUD has been purchasing 651R controls for several years, retrofitting older controls and installing on new VWE and G&W Viper reclosers. We are currently testing the ArcSense technology for use on these devices.

G&W single phase electronic reclosers with SEL 351RS Kestrel controls

KPUD purchased twelve of these reclosers due to be received in December of 2024. We will use these on longer more heavily loaded single phase tap lines for wildfire and winter storm mitigation.

7.7 De-energization / Public Safety Power Shutoff

7.7.1 Current Strategy Overview

At this time KPUD does not have procedures and protocols to carry out PSPS. If a fire response agency requests a temporary de-energization of a line section during firefighting operations for safety or other needs, KPUD works with them to weigh the benefits and drawbacks of such an action and will de-energize if it is determined to be the best option.

KPUD has developed protocols for the resetting of its line reclosers to “Alternate settings” mode in many areas during high-risk weather conditions. During periods of elevated fire risk, KPUD Fire Committee will evaluate circuits and individual devices based on the Situational Awareness resources identified in this plan. If deemed necessary KPUD will develop a list of devices that will be set to Alternative Settings. Field crews will implement the plan and communicate back to Operations when completed, this information will be placed in the switching log, updated on the OMS and the GIS base field mapping application.

From: KPUD Fire Condition Non-Reclose Procedure

Setting FC Non-Reclose Circuit:

- If directed to set a recloser to Non-Reclose for Fire Conditions:
  - If there are any downstream reclosers go to them first and set them to Non-Reclose
    - Call in to “100 Operations” and take a FC special condition on the reclosers you have set to Non-Reclose, add FC special condition tag to each recloser.
  - Go to upstream recloser and set to Non-Reclose
    - Call in to “100 Operations” and take a FC special condition on the reclosers you have set to Non-Reclose, add FC special condition tag to each recloser.

7.7.2 Planned Updates

KPUD is actively monitoring and assessing the benefits and impacts of implementing PSPS in our service territory. We are also observing how other utilities handle this controversial method of fire liability mitigation. Given that much of our territory is rural and depends on personal wells or community water systems that require KPUD lines to be energized for firefighting water, the decision to preemptively shut of power is one that KPUD's leadership approaches with the utmost seriousness.

8.0 Community Outreach and Public Awareness

8.1 Current Community Outreach and Public Awareness Program

KPUD engages in yearly community meeting throughout our service territory, these meeting include community council members and members of the public that attend. These meetings are a venue designed to inform customer of KPUD programs and topics of interest, and are a forum for the public to interact with leaders from the PUD and bring their questions and concerns to our attention. If questions are not addressed at the meeting, members of KPUD's staff follow up with those customers at a later date.

Prior to fire season usually in late May and early June, KPUD begins posting fire season informational content on its website, as well as all social media outlets that we use for customer communications. Links to resources are included from Firewise, WADNR, Fire Adapted Communities and other resources.

During fire season when a circuit is set to Fire Conditions (FC) all customers downstream of that device are notified of the situation and informed that outages if they occur will be longer than normal due to the patrol and restoration steps KPUD is taking to ensure we do not cause a fire ignition.

When outages occur, KPUD uses the website and social media to keep customers updated on general locations of outages, estimated time of restoral (ETR), safety tips, etc.

KPUD holds yearly open houses at our offices in Goldendale and White Salmon.

8.2 Planned Updates

As part of the DOE GRIP grant funding referenced prior, KPUD will be working with Fire Adapted Communities over the next 5 years to develop a Community Engagement program that will extend throughout our entire service territory and encompass many programs.

9.0 Restoration of Service

From: KPUD Fire Condition Non-Reclose Procedure

When outages occur on a device set to FC Special Condition:

- **No attempt to re-energize will be allowed until all lines of the affected area have been patrolled during these special conditions. Includes all taps**

- Responding Lineman will notify the Operations Manager and Line Superintendent of the outage
- Ops Mgr./Line Super/Lineman will discuss if additional resources will be needed for line Patrol.
    - Ops Mgr./Line Super/Lineman will designate a Responsible person who will call in the additional patrol resources.
    - Responsible person will notify responding lineman what additional resources are responding to support patrolling efforts.
    - Responsible person will direct responding resources who to contact on site and where to begin patrols.
    - Upon arrival to outage area, responding resources will contact the Lineman in charge and take directive from them on patrol priorities.

Patrolling – FC Non-Reclose Circuit?

- Arrive at opened recloser
    - Collect recloser counts and report them on the Outage Job Order.
        - If it is an electronic control, include any fault or target data available.
- Patrol mainlines from opened recloser to any downstream recloser device
- Check for any Faulted Circuit Indicators (FCI) that are activated.
    - Patrol any FCI taps to determine if the fault occurred on it.
    - If cause is found
        - isolate the faulted circuit.
        - Re-Energize the mainline if confident this was the issue.
        - If not, continue with patrolling.
- Open all tap lines off of the main line as you patrol to the next downstream device
    - If a tap line is clearly visible to its end and is deemed clear it can stay connected
    - If you have sufficient patrol resources have them start patrolling opened tap lines as the mainline is patrolled.
- Open Downstream reclosers
- Once mainline is clear – Re-energize to the downstream device
- Patrol open tap lines off of main line, re-energize each if clear.
    - Continue patrolling taps until all are cleared and re-energized.

Continue with step restoral as necessary

10.0 Evaluating the Plan

10.1 Metrics and Assumptions for Measuring Plan Performance

Table 5. Programmatic Metrics

PROGRAM	TARGET	METRIC DESCRIPTION
Transmission Line Inspections	95-100%	Perform all scheduled line inspections by the end of the year.
Distribution Line Detailed Inspections	95-100%	Perform all scheduled detailed line inspections by the end of the year. The inspections must be completed within the specified time intervals set for each inspection type. (Chapter 7)
Distribution Line Patrol	95-100%	Perform all scheduled annual distribution line patrols by year end. See Chapter 7 for a detailed description of the program.
Distribution Wood Pole Intrusive Tests	95-100%	Perform all wood pole intrusive tests scheduled for the year. KPUD's goal is to perform wood pole tests within 12 years of installation and every 10-12 years thereafter. (Chapter 7)
Distribution Vegetation Pruning/Clearing	95-100%	Complete scheduled respective tree work to prevent ignition and propagation of fire caused by KPUD electric overhead assets.
Transmission Vegetation Pruning/Clearing	95-100%	Complete scheduled respective tree work to prevent ignition and propagation of fire caused by KPUD electric overhead assets.

10.2 Identifying and Addressing Areas of Continued Improvement in the Plan

KPUD's Operations and Engineering Departments will be responsible for monitoring and auditing the targets specified in the WMP to confirm that objectives are met, as well as the implementation of the plan in general.

This WMP is intended to mitigate the risk of its assets, becoming the source or contributing factor of a wildfire. Staff responsible for assigned mitigation areas have the role of vetting current procedures and recommending changes or enhancements to build upon the strategies in the WMP. Either due to unforeseen circumstances, regulatory changes, emerging technologies or other rationales, deficiencies within the WMP will be sought out and reported to the Board of Commissioners in the form of an updated WMP annually or on legislated time frame.

At any point in time when deficiencies are identified in the WMP, the Supervisors or their delegates are responsible for making the appropriate plan adjustments. KPUD staff and qualified stakeholders are encouraged to bring any potential deficiencies to the attention of the OM or EM or designee. The OM or EM or designee, along with the appropriate staff, will evaluate each reported deficiency, and if determined to be valid, shall record the deficiency for further action.

10.3 Monitoring the Performance of Inspections

KPUD's compliance with RCW, WAC[17], NERC 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 as outlined in those regulations. In addition to the maintenance program, KPUD is constantly evaluating its facilities while performing other activities such as outage patrols, new business planning, replacements and related field work.

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 in the deliberation of future strategies. Related strategies that mitigate wildfire risk will then be identified and proposed within the next iteration of the WMP. Aggregating this 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.

[17] WAC 296-45-045

Appendix A.

KPUD will develop processes and sources to collect and calculate these and additional matrix for the next revision of our plan.

External Risk Metrics:

- Red Flag Warning days totaled 7
- High Wind Warning days 1
- Increases to customers in high-risk areas (as identified by utility)

Performance Metrics: **These metrics have not been calculated for 2024**

- Distribution Inspections (Inspection Type if Applicable)
    - Circuit Miles Inspected
    - Count of Inspection Findings
- Transmission Inspections (Inspection Type if Applicable)
    - Circuit Miles Inspected
    - Count Inspection Findings
- Vegetation Inspections (Inspection Type if Applicable)
    - Circuit Miles Inspected
    - Count Inspection Findings

Outage Metrics:

- Distribution:
    - Utility Identified Outage Case
- Transmission:
    - Utility Identified Outage Case