For the State of Washington
Department of Natural Resources
Wildland Fire Management

Peninsula Light Company Wildland Fire Mitigation Plan

October 4, 2024

Wildfire Mitigation Plan Disclaimer

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Executive Summary

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 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.

PenLight's mission is to proactively protect our community and infrastructure from the devastating impacts of wildfires by implementing a comprehensive wildfire mitigation plan. Through collaboration, innovation, and education, we strive to minimize the risk of wildfire ignition, reduce the spread of wildfires, and safeguard the reliability and resilience of our electric grid. By prioritizing safety, environmental stewardship, and the well-being of our members, we aim to create a more resilient and sustainable future for our communities.

Submission: In accordance with RCW 76.04.780 PenLight will submit this WMP to:

Bryan Perrenod, Secretary, Utility Wildland Fire Prevention Advisory Committee
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1.0   Wildfire Mitigation Plan Overview

1.1   Purpose of the Wildfire Mitigation Plan

This Wildfire Mitigation Plan (WMP) describes in detail the range of activities that a Utility or joint Utilities are taking to mitigate the threat of utility involved wildfires, including various programs, policies, and procedures. This plan complies with the requirements of HB1032 for customer owned electric utilities (COU) to prepare a wildfire mitigation plan by October 31, 2024, and every three years thereafter.

Reducing the risk of utility-caused wildfire plays an essential role in PenLight's 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 becoming the origin or a contributing factor for wildfire.

PenLight believes the strategies and activities described in this WMP, with associated goals and metrics, are an effective approach to reduce fire-related risk for PenLight's members in the near-term and will allow for refinement and improvement over time. As PenLight gains experience implementing the WMP's mitigation programs, and as new information emerges, the co-op will assess, evaluate, enhance, and refine its practices.

The WMP describes vegetation management (VM), asset inspection and maintenance, recloser setting protocols, restoration of service processes, and community outreach efforts. Additionally, plan roles, performance metrics, deficiency identification, and the plan's audit and approval process. It also addresses the unique features of PenLight's service area such as topography, weather, infrastructure, grid configuration and potential wildfire risks.

1.2   Description of Where WMP Can be Found Online

PenLight's WMP will be made available to the public through the utility wildland fire prevention advisory committee created in RCW 76.04.780. The committee is required by law to have all WMP's made available through their website.

1.3 Best Practices Cross-Reference Table

Table 1.   Best Practices Cross-Reference

Standard or Best Practice Name and Description	Document, page number, or citation
HB 1032 – By October 31, 2024, and every three years thereafter, each Investor-owner and Consumer-owned Utility must review, if appropriate revise, and adopt its wildfire mitigation plan	All Sections
National Incident Management System and Incident Command System	Section 4.4
PenLight Construction Standards	
National Electric Safety Code	
OHSA 1910.269: Qualified electrical workers	
ANSI Z133.1 (2000): Safety requirements	
WAC 296-45-455: Line-clearance tree-trimming operations	

2.0   Utility Overview

PenLight is a member-owned, not-for-profit electric cooperative located in Gig Harbor, WA. Since 1925, PenLight has served the Gig Harbor and Key Peninsulas, along with Raft, Herron, and Fox Islands in western Pierce County. PenLight is a "full requirements utility" of the Bonneville Power Administration (BPA). The utility has grown to be the second largest cooperative in the Northwest.

2.1   Utility Description and Context Setting Table

Table 2.   Context-Setting Information

Utility Name	Peninsula Light Company (PenLight)
Service Territory Size (sq miles)	112 sq miles
Service Territory Make-up	Urban Conifer Forest Conifer Woodland Herbaceous Shrub Water
Service Territory Wildland Urban Interface (WUI) (based on estimated %s)	Mostly WUI Intermix with small areas of WUI Interface and Vegetated Uninhabited wildlands ~10% Non-Vegetated Uninhabited ~15% Vegetated Uninhabited ~10% Wildland Urban Intermix ~65% Wildland Urban Intermix
Meter's Served	35,000 meters
Account Demographic (as a % of total customers served)	90% Residential 10% Commercial
Utility Equipment Make-up (circuit miles) Line miles are calculated linearly for primary line infrastructure within PenLight's Esri based system models on an end of year basis.	Overhead Dist.: 266 miles Overhead Trans.: 13 miles Underground Dist.: 739 miles

Has developed protocols to pre-emptively shut off electricity in response to elevated wildfire risks?[1]	Yes, PenLight has existing protocols.
Has previously pre-emptively shut off electricity in response to elevated wildfire risk?	No, PenLight has not performed this type of operation prior to September 16, 2024.

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[1] 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.

3.0 Objectives of the Wildfire Mitigation Plan

The WMP's main objective is to implement an actionable plan to:

- Create increased reliability and safety, to every extent possible.
- Prevent (using industry standard equipment and technologies that are reasonably applicable) mitigate, respond/assist, and recover from wildfires.
- Comply with current Washington State law and regulations, National Electric Safety Code (NESC) regulations, the guideline requirements, and polices as outlined by PenLight's insurer (Federated Insurance Company), and other standards applicable to a distribution utility.
- Reduce liability.
- Continually improve the WMP.

PenLight's strategy to achieve the objectives is described in more detail under Section 6 Fire Prevention Strategies.

3.1 Minimizing likelihood of ignition

Through the preventative strategies discussed in Section 6 of the WMP, PenLight prioritizes our operational practices to reduce the likelihood of ignitions. While modernization and system improvements reduce the likelihood of ignitions, full elimination of any ignition is not a realistic goal.

3.2 Resiliency of the electric grid

PenLight's distribution system is a reliable and resilient electric system today. The system has been developed over the years to provide redundant feeding and sectionalizing capabilities, modernized protective devices with Supervisory Control and Data Acquisition (SCADA), undergrounded lines, tree wire on critical overhead lines, and AMI meters. These strategic system characteristics, alongside robust Vegetation Management (VM) and maintenance procedures, provide PenLight's members with a highly reliable distribution system under normal conditions. Depending on the severity of any major event, including a localized wildfire, observed system reliability is fully event dependent.

4.0 Roles and Responsibilities

The Board of Directors of PenLight make policy decisions for PenLight, and as such, they will be responsible for approving the WMP. PenLight staff support the development, implementation, and continual maintaining of the Wildfire Mitigation Plan:
- PenLight's WMP Team

4.1 Utility Roles and Responsibilities

PenLight operates as a collective team and collaboration amongst each team member is necessary to create a unified approach to wildfire management. By sharing information, resources, and

expertise, PenLight maximizes its effectiveness in preventing and responding to wildfires, ensuring the safety and reliability of its services. Team roles and responsibilities are managed by the following teams:

- Wildfire Prevention Team
    - Develops and implements the WMP to minimize wildfire risks.
- Emergency Operations Team
    - Ensures PenLight's emergency operations plan and procedures are followed before, during, and after an emergency.
- Community Outreach/Public Information Team
    - Develops and implements utility notifications to PenLight's members in coordination with the PenLight Emergency Operations Team.
- Infrastructure Resilience Team
    - Develops and enhances existing preventative strategies to improve overall system resiliency.

4.2   Coordination with local utility and infrastructure providers

PenLight understands the importance of proactively planning and coordinating closely with local governments, agencies, and key accounts including critical infrastructure, emergency management and first responders, utility districts, members, and business groups.

Specifically, PenLight has coordinated the development of this plan with local fire districts for their review and input. As the WMP is formally adopted by PenLight, PenLight will continue to identify opportunities to coordinate and communicate with other agencies, emergency management services, neighboring utilities, and first responders.

It is common practice for PenLight staff to conduct quarterly or annual strategic coordination efforts with multiple groups to enhance emergency response efforts within our local area. These coordination efforts include the following groups:

- Gig Harbor Fire District
- Key Peninsula Fire District
- Pierce County Emergency Management
- The City of Gig Harbor
- Additional local emergency services and first responders

4.3   Coordination with local Tribal entities

This section is not applicable to PenLight's service territory and is intended to be left blank.

4.4   Emergency Management / Incident Response Organization

During an emergency, PenLight uses the systems and processes described in its *Emergency Operations Plan Overview* (Overview) to guide its response and recovery efforts. This Overview outlines an organizational structure for coordinating emergency operations so that PenLight staff can make and implement informed decisions. The Overview describes the PenLight Emergency Operations Center (EOC), where PenLight personnel and at times partners come together to

coordinate response to and recovery from an emergency, such as a wildfire. The Emergency Operations Center (EOC) organizational structure includes the following roles:

- EOC Management
- EOC Public Information
- EOC Planning
- EOC Operations, Logistics, and Operational Technology
- EOC Finance, Admin, and IT

This organizational structure aligns with the principles of the National Incident Management System (NIMS) and the Incident Command System (ICS).

PenLight maintains mutual aid agreements with partnering power utilities throughout the State of Washington that can be used to provide additional labor and equipment support when PenLight deems it necessary.

PenLight meets regularly to discuss and practice emergency coordination, both internally and with external partners. PenLight practices implementing its emergency operations systems and structures annually at a minimum, by exercising or real-world emergencies.

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

To establish a baseline understanding of the risks and risk drivers involved, PenLight examined its exposure to all fire-related hazards. PenLight also examined its asset locations to identify risks unique to its service area. This section will provide an overview of the service area properties and associated risks, which are factored into the wildfire preventative strategy.

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

The prioritization of managing or mitigating risk drivers requires several factors to be considered and discussed internally prior to determining the most appropriate approach. PenLight utilizes its capital budget and continuous maintenance processes to develop opportunities internally to discuss potential new projects that will enhance PenLight's ability to manage or minimize these risk drivers. This is a process that is well established within the current organizational practices and as a result, has rendered PenLight to be a resilient electric system.

PenLight staff evaluates its own, as well as other utilities' climate conditions and geographical characteristics within the region and applies field experience to determine the key potential risk drivers. PenLight then enhances its existing mitigation approaches and incorporates the best available utility practices. This combination of current and future-implemented strategies is intended to manage or mitigate the risk drivers identified below.

- Drought Conditions
- Real-Time Fire Weather
    - High Winds

- o   High Temperatures
- o   Low Humidity
- o   Poor Moisture Recoveries
- Vegetation Type & Fuels

5.1.1   Drought Conditions and Real-Time Fire Weather

Utility monitoring of real-time and forecasted weather patterns is becoming a common operation year-round. Notating when a higher-than-normal drought season has occurred or is being forecasted is critical when planning for upcoming wildfire seasons. In addition, PenLight continues to key into certain weather characteristics to support operational decisions during the wildfire season. These types of collective characteristics include forecasts that are anticipated to bring high winds, high temperatures, low humidity, and an extended period of consistent poor moisture recovery days. When these characteristics are being forecasted during a certain period of time, PenLight will utilize the operational practices and preventative strategies discussed further in Section 6.

5.2   Enterprise-wide Safety Risks

Continuous monitoring and review of outage causes, and current inspection and maintenance practices allow opportunities for PenLight to strategize potential new approaches to improving existing methodologies for identifying and assessing existing wildfire preventative strategies that directly impact operational wildfire risks. Some key operational wildfire risks include:

- Equipment Failures
- Tree Failure and Foreign Contacts

5.2.1   Equipment Failure

There are many reasons equipment failure can occur during its service life. Most equipment requires regular maintenance for optimal performance. Even though PenLight's qualified personnel perform regularly 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, 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.

5.2.2   Tree Failures and Foreign Contacts

The majority of PenLight's overhead outage events are attributed to trees, branches, or other foreign objects making contact with the power lines. Many portions of PenLight's electric system are located in wooded or heavily treed areas and, 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 outside of the VM right-of-way (ROW). PenLight implements a full-scale VM program and has constructed strategic material within the infrastructure to aid in minimizing the impacts from overhead line contacts.

6.0   Wildfire Preventative Strategies

This section outlines PenLight's existing fire mitigation strategies, lessons learned from the preventative activities, and considerations for future enhancements. Some of these strategies are multi-year and programmatic, while others are situational and based on environmental conditions such as Red Flag Warnings. PenLight continues to explore new technologies and approaches to determine their ability to reduce the risk of ignition and improve system reliability.

PenLight has initiated several new programs, such as high impedance fault detection, infrared inspections, alternate recloser settings, and overhead-to-underground construction projects. PenLight makes ongoing efforts to update its practices as new information emerges and adopt improved strategies.

6.1   Weather Monitoring

6.1.1   Current Strategy Overview

Situational Awareness (SA) 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.

The PenLight emergency operations organizational structure is designed to facilitate information sharing and coordination across all departments, as well as with external response and recovery partners. Information sharing and coordination supports SA and informed decision making during emergencies.

PenLight uses a number of SA resources to monitor evolving fire weather, fuel, and other climatological conditions that may lead to fire events. These resources are used to evaluate information, such as real-time field and weather observations, GIS data, communications with local emergency management agencies, and ongoing wildfire reporting. Based on available information, PenLight appropriately schedules work crews, adjusts equipment settings, and prepares for fire conditions as needed. SA resources include, but are not limited to the following:

- The National Weather Service (NWS): The NWS provides on-line predictive fire weather forecasting tools in the form of a current fire-weather outlook, 2-day, and a 3 to 8-day outlook. (https://www.spc.noaa.gov/products/fire_wx/)
  - Fire Weather Watch: Within NWS's web services, PenLight reviews the real-time Fire Weather Watch and Red Flag Warning interactive maps to increase awareness of potential hazards for the day. (https://www.weather.gov/wrh/fire?wfo=sew)
- NOAA Weather and Hazards Data Viewer: This on-line map provides historic or real-time surface observations including wind speed and direction, wind gust, dew point, relative humidity, and sea level pressure collected from remote automated weather stations (RAWS). Extreme-weather alerts such as fire weather watch, high wind watch, and red flag warning are provided from this resource. (https://www.wrh.noaa.gov/map/?wfo=psr)
- National Interagency Fire Center: The NIFC provides an online Incident Information System (InciWeb) with an interactive map that provides an interagency all-risk incident information management system. This is a tool that is used to get updated information on surrounding incidents that may impact the service area. (https://inciweb.wildfire.gov/)

- Pierce County Alert (PCWARN): Pierce County Emergency Management sends PCWARN messages to key county partners, including multiple PenLight emergency operations staff, on a regular basis. These messages often include information about impending weather, search and rescue operations, and a variety of incident updates, including activation of the County EOC.

- Pierce County ALERT: is an emergency mass notification tool similar to a "reverse 9-1-1" system. It gives Pierce County Emergency Management a quick and efficient way of contacting residents and businesses throughout the County. PenLight staff are encouraged to opt-in to receiving alerts directly from the County on their cell phones, home phones, or by other methods.

PenLight Weather Stations: PenLight has installed Tempest weather stations at all substations throughout the service area. The weather stations are monitored remotely through the SCADA system and provide temperature, wind speed, wind direction, barometric pressure, and relative humidity.

6.1.2 Planned Updates

With the resources discussed in Section 6.1.1, PenLight continues to evaluate resources to automatically notify staff of emergencies. PenLight performs these functions manually.

6.2 Design and Construction Standards

6.2.1 Current Strategy Overview

Current wildfire mitigation design and construction approaches that PenLight is actively implementing today include:
- Overhead to Underground Power Line Conversions
- System Monitoring and Control
- Circuit Recloser Upgrades
- Tree Wire Installations

6.2.1.1 Overhead to Underground Power Line Conversions

PenLight proactively plans for Overhead to Underground Conversion projects due to the benefits that it provides both the membership and our maintenance requirements. As an added benefit, it functions as an effective tool in PenLight's wildfire mitigation strategy as well. By continuing to complete overhead to underground conversion projects in strategic locations, PenLight will be able to alleviate several negative aspects of bare wire overhead conductor.

UG distribution lines typically minimizes:

- The need for VM work in the ROW,

- Risk of vegetation contact which can result in outages and possible increases risk for ignitions,

- Galloping conditions due to high wind,

- Risk of tree caused outages.

PenLight's long-term strategy is to continue to proactively convert overhead power lines to underground lines for reliability purposes. For priorities, we take into consideration outage history, cost of conversion, reliability of existing infrastructure, member impacts, and other various factors on an annual basis while developing our annual capital improvement plans for the following year. This process will continue over the next (3) three years.

6.2.1.2   System Monitoring and Control

PenLight has retrofit substation breakers and all downline reclosers with supervisory control and data acquisition (SCADA) functionality to monitor and operate circuit conditions providing early notification and faster response to system abnormalities.

The majority of all field reclosers can be remotely operated via the SCADA system, which allows PenLight to initiate non-reclose mode remotely in response to fast-changing weather conditions without rolling trucks thus improving response time and safety. The co-op's 12 weather stations are also connected to the operations center via SCADA in an effort to integrate SA monitoring in the same user interface as the electric system monitoring.

6.2.1.3   Circuit Recloser Upgrades

A recloser is an automatic, high-voltage electric overcurrent protective device. Reclosers will close back in multiple times (typically three) to detect if a momentary problem on the power line still exists. If the problem was momentary, the recloser automatically resets and restores power. As mentioned above in 6.2.1.2, PenLight has the ability to adjust the recloser protective settings to enable them to operate in a non-reclose setup to automatically open the protected system without closing back in. While this does have a reliability impact, PenLight believes that during certain wildfire weather conditions, it is in the best interest of the membership and PenLight to operate the system in this manner.

PenLight has progressively replaced oil-filled hydraulic reclosers with electronic units that provide better line protection that minimize fault energy, reducing the ignition potential to start a wildfire. Electronic reclosers also provide fast, low energy interruption with long contact life, are oftentimes programable, and do not require the high maintenance demands associated with traditional recloser devices which contain oil and utilize electromechanical mechanisms.

6.2.1.4   Tree Wire Installation

Tree wire, or covered overhead wire, consists of the conductor and the extruded covering (conductor shield, low-density inner layer, and protective outer layer). This conductor type has been heavily deployed across the system to improve service reliability and to reduce the risk of ignitions due to vegetation contact. Tree wire allows closer phase spacing, resists abrasion from foreign contact, withstands temporary contact from tree branches and other ground points, is UV stable, and is tracking and abrasion resistant. While there are safety benefits to tree wire, this material does take more time to construct, maintain, and repair compared to bare wire.

6.2.2 Planned Updates

PenLight intends to continue to seek new equipment and technologies that enhance its wildfire mitigation capabilities. PenLight has initiated various pilot projects to explore new technologies and best management practices. These pilot projects will serve to evaluate the effectiveness of new technologies while controlling unwarranted expenditures on unproven methods. PenLight may elect to integrate these technologies or practices into its ongoing maintenance programs based on the outcomes. This process has proven its validity over the years, and we will continue to follow this type of process over the next three years to derive new potential construction methods to improve wildfire mitigation.

6.3 Fuel & Vegetation Management

6.3.1 Current Strategy Overview

PenLight maintains approximately 1,000 miles of ROW to minimize interruptions of services to our members. 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 conductors. Trees that grow within or adjacent to powerline ROWs are a common cause of outages and damage to facilities, as well as a potential cause for wildfire. While PenLight is responsible for maintaining the ROW above and below our power lines, the co-op strives to balance maintaining natural surroundings with ensuring a reliable power supply by keeping power lines clear of vegetation. The three main benefits to tree trimming in ROW areas are safety, reliability, and affordability.

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. With a prescriptive and balanced approach to VM, PenLight can focus more of its energy and resources on preparing for future weather events, improving the reliability of the grid, and controlling maintenance costs.

6.3.1.1 ROW Maintenance

Cycle trimming is the cornerstone of VM practice. Under this concept all system electrical distribution lines are assigned a schedule for tree inspection and trimming and/or removal. Currently, the full tree trimming cycle is three years, which means every feeder line in PenLight's service territory receives attention within every three-year period. Certain fast-growth areas may receive more frequent trimming.

PenLight has evaluated the vegetation characteristics and growth rates of the predominant species along the overhead (OH) lines to determine the years of growth until they contact the conductor. Contracted VM crews are responsible for trimming trees and vegetation around the energized power lines utility poles, pad-mount transformers, and regulators to obtain the minimum required clearance with regards to current and future tree health and symmetry.

6.3.1.2 Trimming Standards

Trees are trimmed or removed for safety, reliability, board policies, and compliance with the National Electric Safety Code (NESC) and RCW 64.12.035 requirements. PenLight's tree

trimming 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)

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, but are not limited to, collar cuts, directional pruning, and drop-crotch trimming.

6.3.1.3 Safety Standards

All personnel performing vegetation management work on or near PenLight facilities or ROWs shall follow approved safety guidelines and procedures and comply with all applicable governmental safety and health regulations, and the safety and health provisions of their contracts.

PenLight follow three important standards for tree worker safety:

- OHSA 1910.269: Qualified electrical workers

- ANSI Z133.1 (2000): Safety requirements

- WAC 296-45-455: Line-clearance tree-trimming operations

Contract line clearance tree workers must meet the requirements of these standards as well as any other applicable federal, state, or local laws, codes, or regulations.

6.3.2 Planned Updates

PenLight has had a long-standing approach with VM that has enabled us to complete trimming cycles within our goals and continue to see the benefits in our reliability from our VM efforts. Moving forward, we will continue to work through our set goals and continue the VM practice that is being done today. Formal documentation of a VM program is being considered for development and implementation. This could include finding alternative ways to enhance the historical modeling of trimming cycles within our GIS systems.

6.4 Asset Inspections and Response

PenLight's primary mission is to provide reliable and safe power to our members. This requires continual maintenance and improvement of our electrical system. 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, PenLight maintains formal time-based maintenance programs for distribution, transmission, and substation equipment which plays an essential role in wildfire reduction. The results of these inspections enable PenLight to make informed decisions when prioritizing future maintenance work and potentially new capital projects. Below is a list of equipment that is included, but are not limited to, for inspection:

- Wood poles, crossarms, and cross braces
- Non-wood poles
- Switches
- Conductor sand accessories
- Insulators
- Grounding
- Protective Equipment

6.4.1   Current Strategy Overview

6.4.1.1   Pole and Equipment Inspections

Wood pole decay will progress at generally predictable rates and can be readily diagnosed in the field except for in the very early stages. Early detection and treatment are by far the most important and successful step in extending pole service life. PenLight's pole inspection practice enables staff to have visual inspections completed on portions of the electric system annually and documented in a full report. This approach includes field assessments of wood pole conditions, both above and below ground. These inspections are conducted on an annual basis in a cycle-based method. Inspections are performed by qualified and bonded contractors on a planned basis to determine whether the wood structures have degraded below National Electric Safety Code (NESC) design strength requirements with safety factors.

In addition to assessing the condition of the wood pole, inspectors look for and note evident deficiencies of installed equipment such as missing ground wires, guy wire damage, damaged cross-arms and insulators, fire damage, as well as vegetation clearance violations and missing or damaged wildlife protection.

Newer wood poles and thru-bored poles receive a visual and sound inspection while non-wood poles receive only a visual inspection. Intrusive bore inspections are conducted on poles that are indicating that potential decay may be present inside the wood pole. Once field inspections have been completed, PenLight gathers the results of the completed inspections and moves forward with proper maintenance or replacement of the specific items that were found. Approximately 15-20 poles are replaced annually through this process.

6.4.1.2   Infrared Thermography

Hundreds of different pieces of equipment may be found in an electrical 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. Thermal imagers make pictures from heat, as well as making 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, PenLight inspects substation equipment annually near peak winter load to find and measure hidden electrical and mechanical issues before they become a reliability issue. PenLight is also exploring the use of infrared thermography at the distribution level as a tool for specific types of maintenance callouts and inspections of the electrical system.

6.4.2 Planned Updates

It is common practice for PenLight to research and pilot new tools and software that will enhance our existing inspection approaches, especially when it enables us to gain process efficiencies or improve our overall results of the inspections. While PenLight has an existing long-standing inspection and maintenance practice, we will be continuing to document these practices for future use. As technologies improve and new tools become available to utilities for purchasing, we will continue to evaluate potential new uses and ways to enhance our approach to field inspections.

6.5 *Workforce training*

6.5.1 Current Strategy Overview

PenLight 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. In 2024, and annually thereafter, field staff will be:

- Trained on the content of the WMP.
- Encouraged to identify deficiencies in the WMP and bring such information to management.
- Receive training on emergency operations and practice implementing the *Emergency Operations Plan Overview*.

6.5.2 Planned Updates

While implementing this plan, PenLight will be reviewing the effectiveness of the WMP and if training adjustments are deemed needed, PenLight will determine so and adjust accordingly.

6.6 *Relay and Recloser Practices*

6.6.1 Current Strategy Overview

Please review Section 6.2.1.3 for information on Relay and Recloser Practices implemented by PenLight.

6.6.2 Planned Updates

Please review Section 6.2.2 for information on potential three-year updates with equipment.

6.7 *De-energization / Public Safety Power Shutoff*

6.7.1 Current Strategy Overview

A Public Safety Power Shutoff (PSPS) preemptively de-energizes power lines during high wind events combined with hot and dry weather conditions. PenLight's electric system has a direct

interconnection with Tacoma Public Utilities (TPWR) transmission system, and as a result, will be directly impacted by any TPWR PSPS events initiated for those specific transmission lines. For this type of scenario, PenLight will operate under the emergency management processes that exist and support restoration efforts when TPWR has given a notice that power can begin being restored.

In the event that a PSPS has not been issued by TPWR, PenLight reserves the right to de-energize any or all parts of the system due to life safety or other events that involve local emergency services. In those events, PenLight will coordinate with local emergency services to determine what de-energization will support emergency efforts.

6.7.2 Planned Updates

As experience is gained, PenLight will continue to evaluate the need for a full PSPS program, and the procedures required to enhance the program. Additional software and SA resources will continue to be explored as well to improve decision making sequences within a de-energization event to improve overall program success.

7.0   Community Outreach and Public Awareness

7.1 Current Community Outreach and Public Awareness Program

7.1.1 Residential Wildland Fire Protection Information

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. PenLight encourages its members to take these 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, PenLight provides information on prevention and mitigation on its website.

Members will also find links to the following emergency-related information on the PenLight website:
- Outage reporting phone number for members
- Safety during a power outage
- Downed power line safety
- Defensible Space Guidelines for Homeowners
- Pierce County Alert
- Peninsula Emergency Preparedness Coalition

7.1.2 WMP and PSPS Communication with Membership

PenLight continues to utilize social media outlets and PenLight's website (www.penlight.org) as the main communication media between the co-op and its membership. For WMP and de-energization notifications, PenLight will continue to conduct communication methods through these platforms when deemed necessary for the foreseeable future.

7.2 Planned Updates

As experience is gained through exercises and/or real events, PenLight will continue to evaluate the WMP communication methods and determine if enhancement of the program is necessary. Additional tools will continue to be explored as well to enhance communication to improve overall program success.

8.0 Restoration of Service

8.1 Restoration Priorities

If an external emergency management agency requests a power shutdown, or if PenLight elects to de-energize segments of its system due to extreme weather, PenLight staff may deem it necessary to patrol the affected portions of the system before the system can be re-energized. Suspect equipment or distribution lines that cannot immediately be patrolled could remain de-energized. Poles and structures damaged in a wildfire must be assessed and rebuilt as needed prior to re-energization. Periodic member and media updates of restoration status prior to full restoration could be made if it is determined to be impactful to the membership within the event area.

After a large outage, transmission circuits are given priority over distribution lines during the restoration process. PenLight prioritizes outages at the higher-voltage level, which power substations serving large numbers of members, schools, businesses, and hospitals first, then work is done to restore the largest feeders.

8.2 Service Restoration Process

After an outage as outlined within this WMP is ready to return to an energized state, PenLight work crews will take the following steps prior to restoring electrical service. These measures are intended to protect PenLight staff, the membership, and the reliability of the system. PenLight crews will patrol the de-energized lines and inspect for obvious damage and vegetation within the ROW that may prevent safe re-energization. When damage is found, they will isolate the impacted portion of the system and perform repairs. In some cases, temporary repairs could be considered depending on the extent of the damage. Once the system has been determined to be in a safe and ready to operate state, re-energization can take place.

9.0 Evaluating the Plan

9.1 Metrics and Assumptions for Measuring Plan Performance

PenLight has selected several metrics (see Table 3 below) intended to gauge the effectiveness of the various programs and strategies outlined in the WMP. The annual 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. PenLight will reassess its operations and identify areas for improvement as more data becomes available and refine the WMP as needed.

As this plan is in the initial stage of implementation, relatively limited data is on hand. However, as results of the programs become evident and additional data is collected, PenLight will identify areas of its operations that will require a different approach, as well as methods that are working towards the goal of eliminating PenLight asset related ignitions.

As the metrics are analyzed in the following years, refinements will be made to the WMP. The selected metrics, as with other aspects of the plan, will likely evolve in future iterations of PenLight's WMP.

Table 3.   Performance Metrics

Metric	Rational	Measure of Effectiveness
Red Flag Warnings in service area	Used to adjust annual variation in criteria	Indication of overall threat level for each fire season
Number of days system is in "Fire-safe Mode"	Assess practical length of fire season regarding system protective measures	Synchrony between length of declared fire season and system effects
Number of system related ignitions	Effectiveness of the mitigation plan	Reduction or no material increase
System Average Interruption Frequency Index (SAIFI)	Assess system hardening & overall reliability	Reduction in annual average score
System Average Interruption Duration Index (SAIDI)	Assess system hardening & overall reliability	Reduction in annual average score

9.2   Identifying and Addressing Areas of Continued Improvement in the Plan

There have been no improvements to the WMP at this time. This section is intended to be left blank.

9.3   Monitoring the Performance of Inspections

PenLight's compliance with regulations and guidelines and other applicable industry practices is intended to ensure that PenLight 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, PenLight continuously evaluates its facilities while performing other activities such as outage patrols, new business planning, replacements, and VM and related fieldwork. The effectiveness of inspections is maintained by the operations department. Inspections are considered an important part to our maintenance goals and ensuring that the process in which we determine deficiencies within the electric system will continue to go through adjustments to improve the results, as deemed needed by the operations department.

[End of Wildfire Mitigation Plan]