PACIFIC POWER
A DIVISION OF PACIFICORP

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December 30, 2021

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
Salem, OR 97301-3398

RE: UM 2207— PacifiCorp's 2022 Wildfire Protection Plan

PacifiCorp d/b/a Pacific Power submits for filing with the Public Utility Commission Oregon (Commission) its 2022 Wildfire Protection Plan in the above referenced proceeding.

PacifiCorp respectfully requests that all communications related to this filing be addressed to:

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Sincerely,

Shelley McCoy

Shelley McCoy
Director, Regulation


Oregon Wildfire Protection Plan

2022


PACIFIC POWER

POWERING YOUR GREATNESS

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Adherence to Requirements

Consistent with OAR 860-300-0002 effective November 30, 2021 per Order No. 21-440:

(1) Wildfire Protection Plans and Updates must, at a minimum, contain the following requirements as set forth in Section 3(2)(a)-(h), chapter 592[1], Oregon Laws 2021 and as supplemented below:

Plan Requirement	Corresponding Plan Section / Reference
(a) Identified areas that are subject to a heightened risk of wildfire, including determinations for such conclusions, and are: (A) Within the service territory of the Public Utility, and (B) Outside the service territory of the Public Utility but within the Public Utility's right-of-way for generation and transmission assets.	See Section 1- Risk Modeling and Drivers *See Figure 1: Study Area to Determine FHCA *See Figure 3: Fire High Consequence Area (FHCA) Map
(b) Identified means of mitigating wildfire risk that reflects a reasonable balancing of mitigation costs with the resulting reduction of wildfire risk.	See Section 14 - Plan Summary, Costs, & Benefit
(c) Identified preventative actions and programs that the Public Utility will carry out to minimize the risk of utility facilities causing wildfire.	Key preventative actions identified in plan include enhanced inspections and vegetation management, system hardening, situational awareness, system operations, field operations, and PSPS implementation.
(d) Discussion of outreach efforts to regional, state, and local entities, including municipalities regarding a protocol for the de-energization of power lines and adjusting power system operations to mitigate wildfires, promote the safety of the public and first responders and preserve health and communication infrastructure.	See Section 9 - Public Safety Partner Coordination Strategy, Section 10- Wildfire Protection Plan Engagement Strategy, and Section 11 - Education and Awareness Strategy

[1] SB762 2021 Regular Session - Oregon Legislative Information System (oregonlegislature.gov)

Plan Requirement	Corresponding Plan Section / Reference
(e) Identified protocol for the de-energization of power lines and adjusting of power system operations to mitigate wildfires, promote the safety of the public and first responders and preserve health and communication infrastructure.	See Section 6 - System Operations, Section 7 - Field Operations & Work Practices, and Section 8 - Public Safety Power Shutoff (PSPS)
(f) Identification of the community outreach and public awareness efforts that the Public Utility will use before, during and after a wildfire season.	See Section 9 - Public Safety Partner Coordination Strategy, Section 10- Wildfire Protection Plan Engagement Strategy, and Section 11 - Education and Awareness Strategy
(g) Description of procedures, standards, and time frames that the Public Utility will use to inspect utility infrastructure in areas the Public Utility identified as heightened risk of wildfire.	See Section 2- Inspection and Correction
(h) Description of the procedures, standards, and time frames that the Public Utility will use to carry out vegetation management in areas the Public Utility identified as heightened risk of wildfire.	See Section 3 - Vegetation Management
(i) Identification of the development, implementation, and administrative costs for the plan, which includes discussion of risk-based cost and benefit analysis, including consideration of technologies that offer co-benefits to the utility's system.	See Section 14 - Plan Summary, Costs, & Benefits
(j) Description of participation in national and international forums, including workshops identified in section 2, chapter 592, Oregon Laws 2021, as well as research and analysis the Public Utility has undertaken to maintain expertise in leading edge technologies and operational practices, as well as how such technologies and operational practices have been used develop and implement cost effective wildfire mitigation solutions.	See Section 12 - Industry Collaboration

The above table reflects the existing plan requirements as identified in OAR 860-300-0002. Pacific Power acknowledges the additional permanent rulemaking underway in Oregon, anticipates that future iterations of the plan may need to change, and plans to incorporate any changes into the company's 2023 Wildfire Protection Plan or equivalent update.

Introduction

Due to the growing threat of catastrophic wildfire in the western United States, Pacific Power has developed a comprehensive plan for wildfire mitigation efforts in all of its service territories. The 2022 Oregon Wildfire Protection Plan (WPP) included in this document specifically guides the mitigation strategies that will be deployed in Oregon. These efforts are designed to reduce the probability of utility related wildfires, as well to mitigate the damage to Pacific Power facilities because of wildfire.

Wildfire has long been an issue of notable public concern. Electric utilities have always needed to be concerned with the potential of a fire starting because of sparks that could be emitted from an electrical facility, generally during a fault condition. Decades of disturbing trends in the growth of wildfire size and intensity have magnified these concerns. Regardless of the causes, or political debates surrounding the issue, the reality is stark. Despite effective fire suppression agencies and increased suppression budgets, wildfires have grown in number, size and intensity. Increased human development in the wildland-urban interface, the area where people (and their structures) are intermixed with, or located near, substantial wildland vegetation has increased the probability and exacerbated the costs of wildfire damage in terms of both harm to people and property damage. A wildfire in an undeveloped area can have ecological consequences – some positive, some negative – but a wildfire in an undeveloped area will not, generally, directly affect large numbers of people. A wildfire engulfing a developed area, on the other hand, can have catastrophic consequences on people and property. For all of these reasons, Pacific Power is committed to making long-term investments to reduce the chances of catastrophic wildfire.

The measures in this Wildfire Protection Plan (WPP) describe those investments to construct, maintain and operate electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire. In evaluating which engineering, construction and operational strategies to deploy, Pacific Power was guided by the following core principles:

- Frequency of ignition events related to electric facilities can be reduced by engineering more resilient systems that experience fewer fault events.
- When a fault event does occur, the impact of the event can be minimized using equipment and personnel to shorten the duration to isolate the fault event.

- Systems that facilitate situational awareness and operational readiness are central to mitigating fire risk and its impacts.

A successful plan must also consider the impact on Oregon customers and Oregon communities, in the overall imperative to provide safe, reliable, and affordable electric service.

Currently, Pacific Power's Wildfire Protection Plan includes an increased investment of approximately $473 million, or $371 million capital and $102 million expense, over the next 5 years, with an expectation of continued, additional investment beyond 2026. Section 14, Plan Summary, Costs, & Benefits, includes a summary of all plan elements, forecasted costs, and anticipated benefits.

The strategies embodied in this plan are evolving and are subject to change. As new analyses, technologies, practices, network changes, environmental influence or risks are identified, changes to address them may be incorporated into future iterations of the plan as described in Section 13, Plan Monitoring & Implementation.

1. Risk Modeling and Drivers

1.1 BASELINE WILDFIRE RISK MAP

Pacific Power areas of heighted risk of wildfire, which are expected to remain fixed for multiple years, are referred to as the "FHCA" or Fire High Consequence Areas. The FHCA, determined in collaboration with REAX engineering, a consultant specializing in wildland fire computer modelling, is grounded in 30 years of historic meteorological and fire weather data and represents the most probable locations of experiencing utility related catastrophic wildfire risk in Pacific Power's service territory. The FHCA map identified through the methodology described in this section, functions as Pacific Power's baseline risk assessment and sets the geographical boundaries for current wildfire programs such as asset inspections, vegetation management, and system hardening. Pacific Power further segregates pockets of extreme risk from this FHCA map to identify Public Safety Power Shutoff Zones, commonly referred to as PSPS Zones. The determination of these zones, also discussed in the methodology below, aids Pacific Power in prioritizing and focusing system hardening projects and PSPS preparedness efforts to mitigate risk more quickly and efficiently.

Scope

Pacific Power's analysis of the wildfire risk in Oregon was a part of a larger, multi-state[2] effort in 2018 and 2019 patterned after the methodology developed through a multi-year, iterative process in California. To take advantage of the company's experience gained in California, Pacific Power engaged fire-science engineering firm REAX Engineering Inc. to identify areas of elevated wildfire risk, which were ultimately designated with the name of Fire High Consequence Areas (FHCA).

To accomplish this, Pacific Power and REAX first identified the general geographic areas subject to the risk analysis, which included Pacific Power's service territory and a 25-mile

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[2] Pacific Power is the division of PacifiCorp that has service territory in Oregon, Washington, and California. Rocky Mountain Power is the division of Pacific Power that has service territory in Utah, Idaho, and Wyoming. The risk modeling effort in 2018 and 2019 was across all PacifiCorp states.

radius study area around all Pacific Power-owned transmission lines. The general methodology, described in the next section, was then applied to this subject area depicted below.

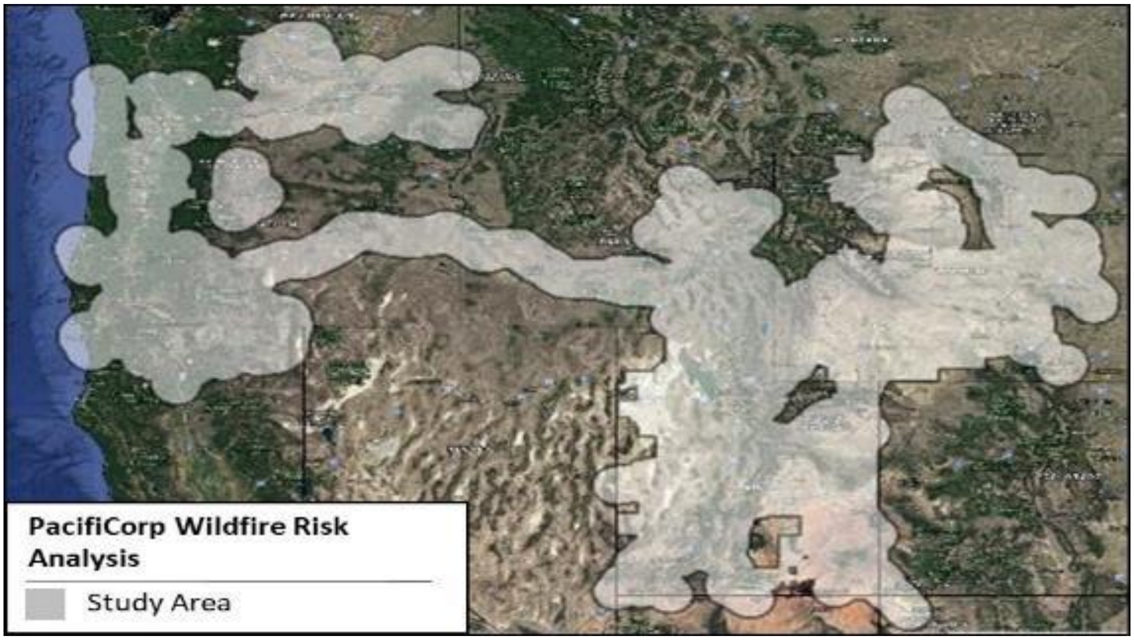

Figure 1: Study Area to Determine FHCA

General Methodology

Pacific Power's baseline risk evaluation process employs the concept that the risk is essentially the product of the likelihood of a specific risk event multiplied by the impact of the event, also often referred to as consequence. The likelihood, or probability, of an event is an estimate of a particular event occurring within a given time frame. The impact of event is an estimate of the effect when an event occurs. Impact can be evaluated using a variety of factors, including considerations centered on health and safety, the environment, customer satisfaction, system reliability, the company's image and reputation, and financial implications. As discussed below, the risk analysis in this plan focuses on the potential impact in terms of harm to people and damage to property. In doing so, Pacific Power's risk analysis does not include the financial value of damage to the property and, instead, views all structures as equal.

Pacific Power's baseline risk analysis evaluates topography, fuel data, climatology, historic fire weather days, live fuel moisture estimates, and presence of structures, to identify the geographic areas in Pacific Power's service territory at the greatest risk of catastrophic fire, should an ignition occur, as depicted in the diagram below.

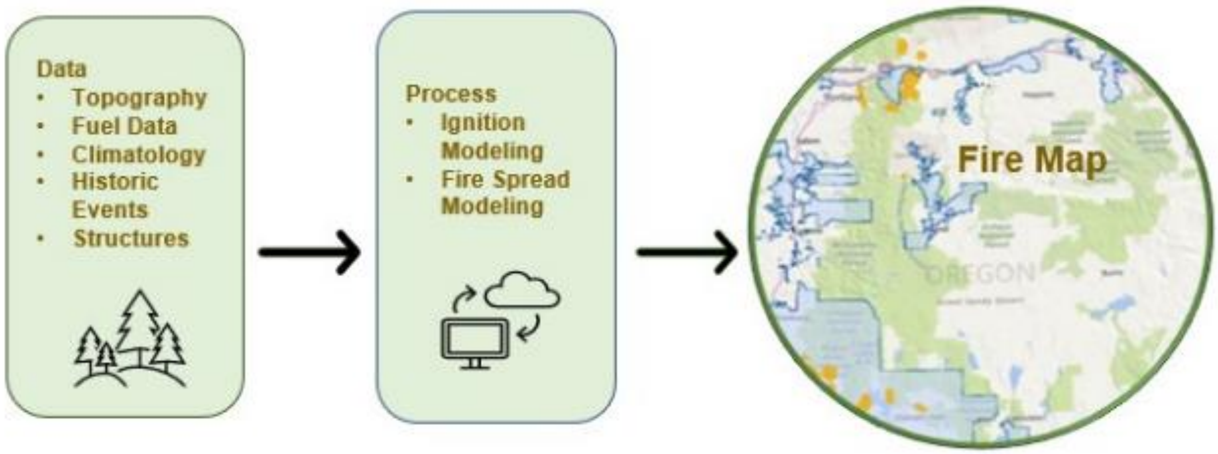

Figure 2: Methodology for Baseline Risk Modelling to Develop Fire Map

REAX conducted wildfire risk analysis on the scoped area uses the following reputable datasets, data sources, and processes:

1. Topography of the land, including elevation, slope and aspect
2. Fuel data (from a dataset known as LANDFIRE[3]) with 30 m pixel resolution were used to quantify surface fuel loading, particle size, and other quantities needed by fire models using the "Scott and Burgan 40" Fire Behavior Fuel Models.
3. Weather Research and Forecasting (WRF), resulting in climatology derivative from North American Regional Reanalysis (NARR) with resolution at 32 km, which is a hybrid of weather modeling and surface weather observations (including temperature, relative humidity, wind speed/direction, and precipitation, weather balloon observations of wind speed/direction and atmospheric, sea surface temperatures from buoys, satellite imagery for cloud cover and precipitation).[4]

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[3] https://www.landfire.gov/datatool.php

[4] Essentially, a weather model similar to WRF assimilates/ingests several thousand weather observations over a three-hour period and then uses that information to create a 3D representation of the atmosphere every three hours. This includes not only surface (meaning near ground level) quantities but also upper atmosphere quantities as well. The NARR dataset is available from 1979 (when modern satellites first became available) to current day (with a lag of a few weeks).

4. Historic fire weather days spanning the period from January 1, 1979 through December 31, 2017.
5. Estimated live fuel moisture from the United States Forest Service (USFS).
6. Ignition modeling, using Monte Carlo-simulated ignition scenarios.
7. Fire spread modeling, Eulerian Level Set Model for Fire Spread (ELMFIRE).

These key data inputs were then processed using complex Monte-Carlo simulations, a computerized mathematical technique used to predict the probability of different outcomes, and the Eulerian Level Set Model for Fire (ELMFIRE), an established wildland fire spread process and software, to evaluate the potential severity of fire spread that could exist associated with a wide range of potential ignition events across Pacific Power's service territory. In doing so, this process runs thousands of simulations using these inputs and spread algorithms, assumes a six hour burn period, and leverages fire type, flame length, and nearby structures to quantify the potential fire size (acres), volume, (acre-ft) and impact (number of structures).

Through this process, individual blocks of geographic area, each 2-kilometer square cell, received a grid score corresponding to its relative wildfire risk. To establish the FHCA, REAX used the prior Pacific Power California mapping project for calibration and assigned grid cell scores correlating with California statewide grid cell scores. This approach enabled an "apples-to-apples" comparison to the results of that prior project, so that the relative degree of wildfire risk in areas of other states could be compared to the risk in areas of California. REAX then used geographic information system (GIS) software algorithm "Jenks natural breaks" to segment areas into 33 families of risk areas[5], so that all cell areas were given a score from 0 to 32. In this model, cell values do not imply direct mathematical relationships, but rather indicate groupings of relative catastrophic wildfire risk. The score is relative to other areas within the evaluated Pacific Power territory and thus may not correlate exactly were a full state evaluation to be conducted. After REAX completed the computer modeling, a validation activity was completed by evaluating historic fire perimeters, existing Pacific Power facility equipment, and local conditions.

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[5] https://www.spatialanalysisonline.com/extractv6.pdf

FHCA Map

Based on the methodology described in the previous section, the following map was generated highlighting the FHCA, the geographic locations within Pacific Power's service territory with a heightened risk of catastrophic wildfires.

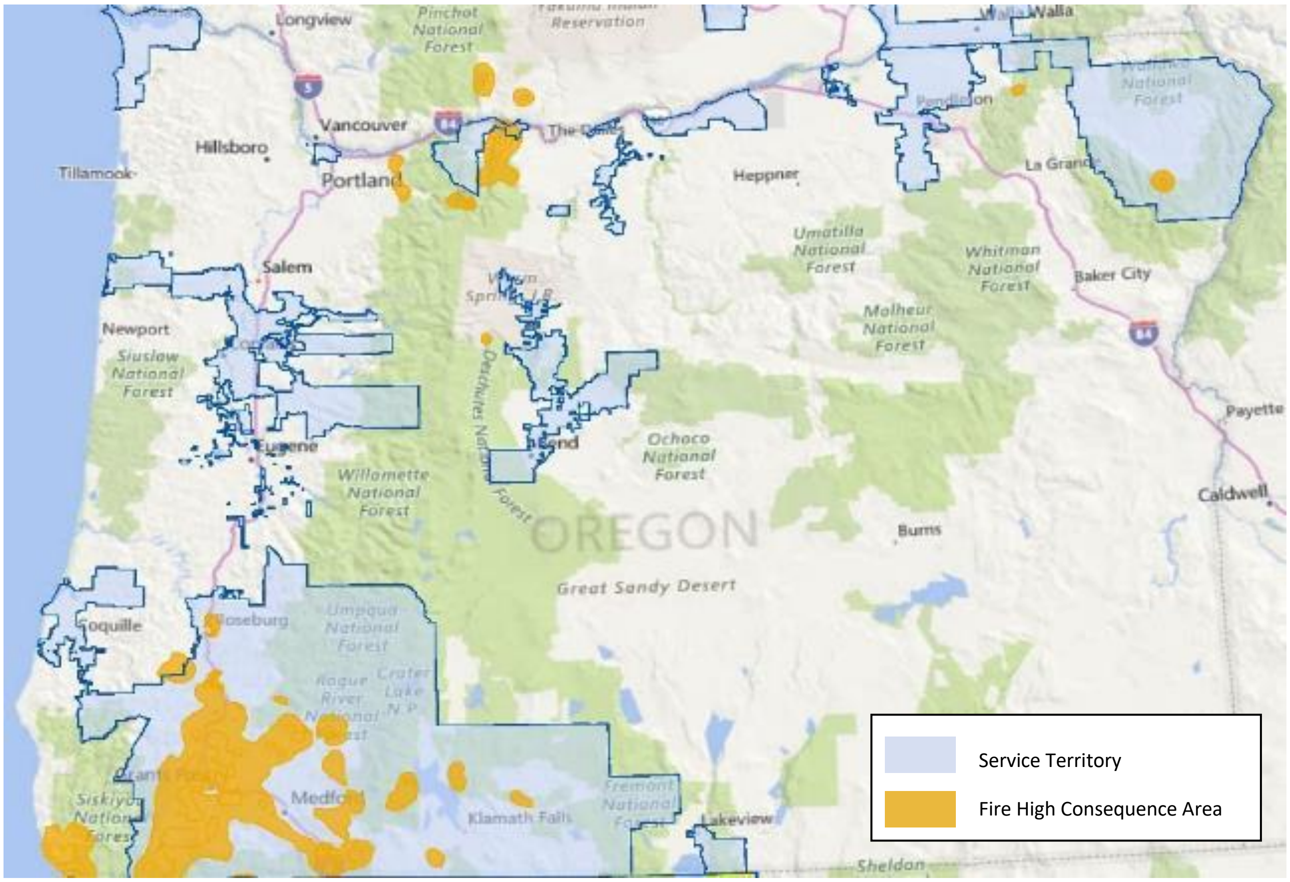


Figure 3: Fire High Consequence Area (FHCA) Map

This map and identification of the FHCA forms the backbone of the company's wildfire protection plan and strategy. This baseline risk map informs targeted investment where multi-year programmatic shifts, such as the increased frequency of asset inspections or the use of enhanced vegetation management practices, can work to mitigate the risk of catastrophic wildfire. The following table describes the breakdown of Pacific Power assets in the FHCA where many of these targeted strategies are focused.

Table 1: Overhead Asset Inventory in the FHCA

Asset	Total	FHCA	
	Line-Miles	Line-Miles	% of Total
OH Transmission	3,053	413	14%
57kV Transmission Lines	14	0	0%
69kV Transmission Lines	914	96	10%
115 kV Transmission Lines	999	177	18%
230 kV Transmission Lines	605	90	15%
500 kV Transmission Lines	522	50	10%
OH Distribution	14,040	2,267	16%

Public Safety Power Shutoff Zones

While the FHCA map identifies a subset of Pacific Power's service territory with a heightened risk of catastrophic wildfires, the overall FHCA area remains relatively broad and includes approximately 2,700 miles of overhead lines.

To pinpoint the areas of most extreme risk, Pacific Power further examined the FHCA map overlaid with typical fire weather patterns to identify locations within the FHCA where significant escalation potential exists due to wind patterns, vegetation, and population. The following map depicts the result of this analysis to further refine the baseline risk map and identifies 13 areas of extreme risk, referred to as Public Safety Power Shutoff Zones, or PSPS Zones.

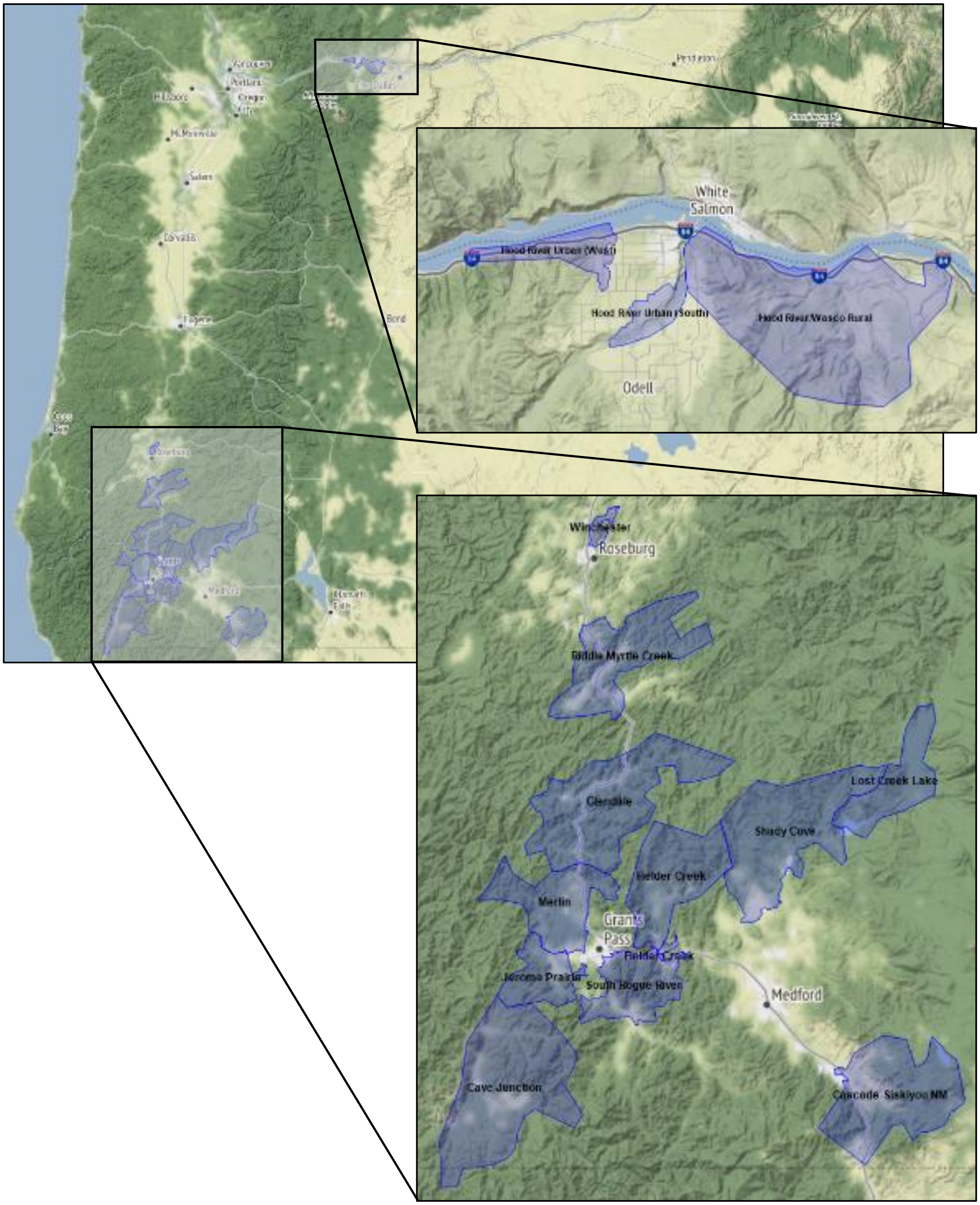


Figure 4: Map of Public Safety Power Shut Off Zones

These 13 locations are further described in the table below.

Table 2: Summary of PSPS Zones

PSPS Zone	Customers	Distribution OH Miles	Distribution UG Miles
Cave Junction	4,874	394	93
Fielder Creek	563	51	15
Glendale	1,666	117	27
Hood River - Rural	1,837	112	35
Hood River - Urban	587	21	14
Jerome Prairie	1,902	108	51
Lost Creek	230	32	26
Merlin	5,460	234	162
Riddle Myrtle Creek	36	5	4
Shady Cove	333	35	10
Siskiyou	838	101	42
South Rogue River	2,768	124	53
Winchester	11	2	0
TOTAL	21,105	1,336	532

These areas above reflect the pockets of most extreme risk within Pacific Power's service territory where a PSPS is most likely to occur as a measure of last resort. These locations also serve to pinpoint locations where prioritization of certain mitigation strategies can mitigate the extreme risk of utility related wildfire and reduce the need for a PSPS event. Similar to how the FHCA Map is used to inform certain multi-year programmatic shifts, these PSPS Zones serve to identify the location, prioritization, and scope of certain system hardening strategies used to mitigate the risk of wildfire and reduce the potential need for PSPS events.

1.2 RISK DRIVERS

While risk mapping identifies geographic locations with a heightened level of catastrophic wildfire risk, Pacific Power also analyzes the components of risk associated with utility facilities. In particular, an understanding of risk drivers informs specific mitigation tactics or strategies that can be used to reduce the total amount of risk associated with utility operations. For example, if the risk of utility related wildfire exists due to the potential for equipment failure, an increase in inspections or maintenance activities can help to mitigate the risk. Conversely, if the risk exists due to potential contact with third party objects, constructing a system more resilient to contact with objects can help to mitigate the risk.

In determining the potential risk drivers throughout the FHCA, Pacific Power leverages a data driven approach. Outage data is the best available data to correlate an identifiable event on the electrical network to the risk of a utility-related wildfire. There is a logical physical relationship, when a fault creates a spark, there is a risk of fire. An outage – which is when a line is unintentionally de-energized – is most often rooted in a fault. Accordingly, the company has closely analyzed the causes and frequency of outages. This analysis is leveraged to determine which wildfire mitigation programs and protocols are best suited to minimize fault events, thereby reducing the risk of fire.

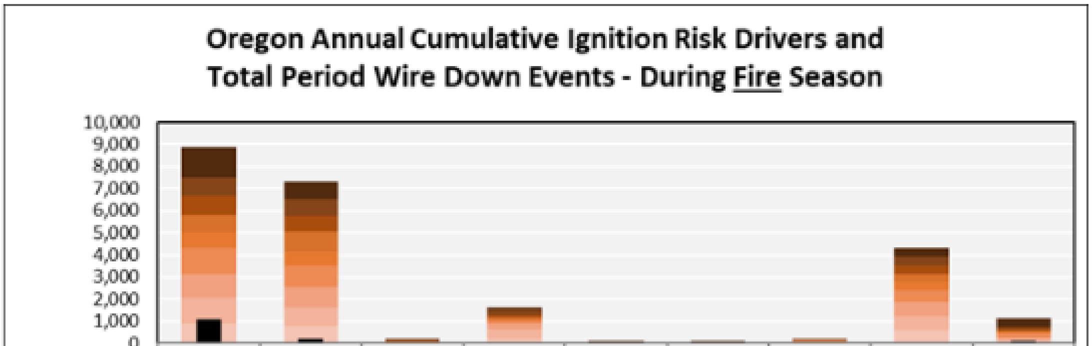
Pacific Power maintains outage records in the normal course of business, as part of Pacific Power's efforts to assess service reliability. These records document the frequency, duration and cause of outages. To understand key risk drivers, these outage records were organized into categories to understand the potential of each outage cause with the implication of a spark. These categories are included in Table 3 below. Additional outage categories, such as loss of upstream transmission supply, planned outage, or not an outage (misclassification), do not implicate the potential of a spark and, therefore, were not included in this table.

Table 3: Outage Causes with Possible Correlation to Ignition Potential

Outage Category[6]	Description
ANIMALS	Animals making unwanted direct contact with energized assets.
ENVIRONMENT	Exposure to environmental factors, such as contamination
EQUIPMENT DAMAGED	Broken equipment from car hit-poles, vandalism or other non-lightening weather-related factors.
EQUIPMENT FAILURE	Failure of energized equipment due to normal deterioration and wear, such as a cross arm that has become cracked or the incorrect operation of a recloser, circuit breaker, relay, or switch
LIGHTNING	Outage event directly caused by lightning striking either (i) energized utility assets or (ii) nearby vegetation or equipment that, as a result, makes contact with energized utility assets
OTHER EXTERNAL INTERFERENCE	External factors not relating to damaged equipment such as mylar balloons, hay or other interference resulting in a potential ignition source
NOT CLASSIFIABLE	Outage event with unknown cause or multiple potential possible causes identified
OPERATIONAL	Outage event resulting from improper operating practice or other human error
TREE-PREVENTABLE	Outage attributed to vegetation condition which should have been remedied during regular cycle maintenance under the company's vegetation management program
TREE-OUTSIDE PROGRAM	Outage attributed to vegetation condition not managed under the company's vegetation management program

Using these ten outage categories, Pacific Power performed a seven year look back in the outage records and focused specifically on outages occurring during fire season (June 1 through October 1). Because "wire down" events are the situation most likely to ignite ground fuels, tracking and diagnosing components which are involved in wire down events is important. For this reason, wire down event data is overlaid in Figure 5 and Figure 6 below.

[6] Outage categories align with potential correlation to an ignition and may not necessarily match the outage classification used by field employees.



	Object contact	Equipment failure	Contamina tion	Lightning	Utility work	Vandalism/ theft	Wire-to-wire Contact	Unknown	Other
2020	1,330	815	20	113	3	9	17	427	370
2019	876	768	16	204	2	3	22	367	93
2018	844	674	11	134	0	3	12	413	104
2017	823	900	17	135	4	4	11	330	69
2016	668	635	19	16	8	2	17	379	55
2015	1,173	961	31	137	5	4	25	528	153
2014	1,072	939	22	235	3	7	26	642	68
2013	1,175	867	12	424	7	8	42	669	154
2012	895	772	9	222	8	9	20	576	52
Total Wire Down Events	1,107	226	11	60	1	4	32	61	99

Figure 5: Ignition Risk Drivers During Fire Season

	Object contact	Equipment failure	Contamina tion	Lightning	Utility work	Vandalism /theft	Wire-to-wire Contact	Unknown	Other
2020	1,716	1,636	63	51	14	18	31	625	820
2019	1,680	1,684	24	29	7	9	40	565	936
2018	1,365	1,625	32	91	13	8	28	598	434
2017	1,790	1,758	44	46	7	9	34	650	1,067
2016	1,640	1,644	41	42	5	6	45	556	463
2015	2,142	2,171	51	43	8	10	63	738	815
2014	2,598	2,146	46	26	7	10	53	930	703
2013	1,056	1,897	18	60	17	15	43	865	152
2012	2,929	2,180	50	42	7	13	64	948	1,254
Total Wire Down Events	3,850	531	19	18	6	5	48	74	1,029

Figure 6: Ignition Risk Drivers During Non-Fire Season

Seasonal risk modeling, described in Situational Awareness, informs the priority and selection of reliability related programs and protocols. Information from these ignition risk drivers, directs Pacific Power to focus programs on technologies that reduce outages due to contact on the line, such as relay setting protocols, and is used to prioritize system hardening programs within the FHCA.

1.3 SUMMARY & APPLICATION

Pacific Power's baseline risk mapping efforts identified that approximately 16% of the company's overhead assets are located within the FHCA. Furthermore, approximately 1,300 miles of overhead distribution lines are located within PSPS Zones.

Table 4: FHCA and PSPS Zone Asset Summary

Asset	Total	FHCA		PSPS Zone	
	Line-Miles	Line-Miles	% of Total	Line-Miles	% of Total
OH Transmission	3,053	413	14%	0	0%
OH Distribution	14,040	2,267	16%	1,336	9%

The locations were then layered with the data driven analysis of risk drivers discussed in the previous section to inform the prioritization and selection of strategic mitigation tactics as shown in the image below. These mitigation efforts are described in the corresponding sections of the plan.

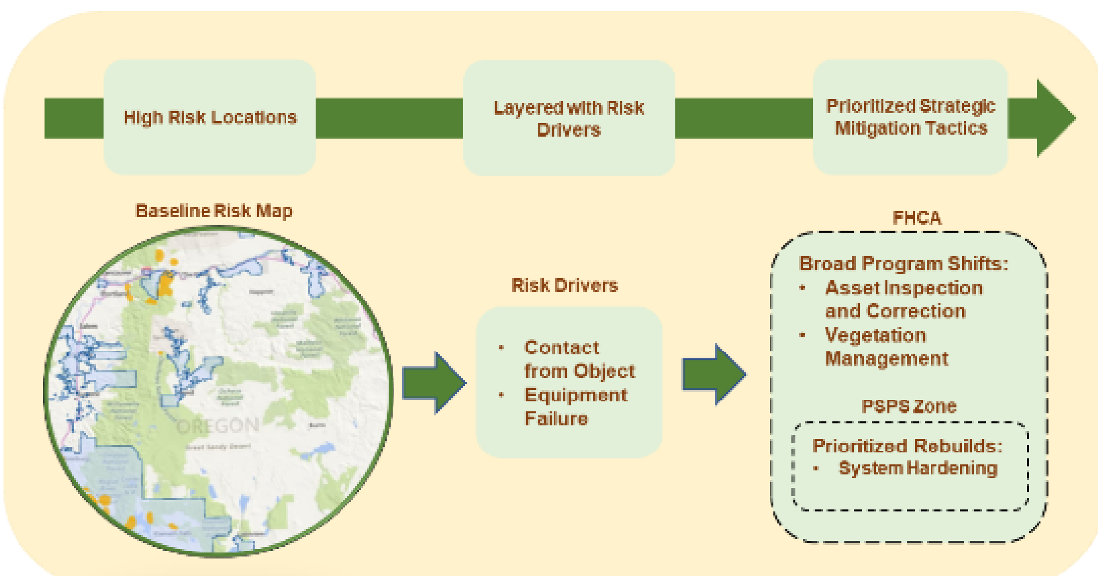


Figure 7: Baseline Risk Summary and Applications

1.4 FUTURE EVOLUTION OF RISK ASSESSMENT AND MAPPING

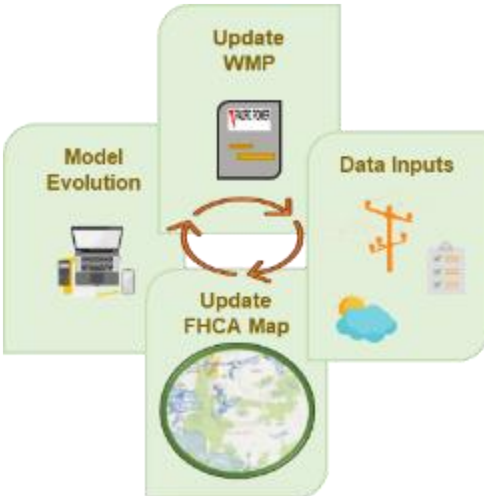


Figure 8: Overview of Risk Mapping Continuous Improvement

Pacific Power's methodologies for fire risk evaluation have generated an initial FHCA map and the identification of PSPS zones, allowing the company to begin wildfire mitigation programs in areas with the highest fire risk within Pacific Power's territory. The fire risk models have been developed and validated with reputable inputs and processes available. Pacific Power remains committed, however, to continue improving its risk assessment strategies.

For example, Pacific Power recognizes that technologies are rapidly developing to increase the quality of inputs and advance fire risk modelling. Along these lines, Pacific Power plans to evolve the wildfire risk model as new models are verified and new reputable data is made available. Pacific Power will also assess the potential for incorporating developments spurred by ongoing efforts by state agencies to model fire risk and create a statewide Oregon fire risk map, as well as the efforts by other utilities and research groups. Pacific Power also participates in fire risk modelling workshops with California utilities. As part of this experience, Pacific Power continues to develop strategies for making increasingly localized risk assessments referencing isolation points on a distribution circuit. If changes are made to the risk mapping described above, Pacific Power will explain such changes in future iterations of its Oregon WPP.

2. Inspection and Correction

Inspection and correction programs are the cornerstone of a resilient system. These programs are tailored to identify conditions that could result in premature failure or potential fault scenarios, including situations in which the infrastructure may no longer be able to operate per code or engineered design, or may become susceptible to external factors, such as weather conditions.

Pacific Power performs inspections on a routine basis as dictated by both state-specific regulatory requirements and Pacific Power-specific policies. When an inspection is performed on a Pacific Power asset, inspectors use a predetermined list of condition codes (defined below) and priority levels (defined below) to describe any noteworthy observations or potential noncompliance discovered during the inspection. Once recorded, Pacific Power uses condition codes to establish the scope of and timeline for corrective action to make sure that the asset is in conformance with National Electric Safety Code (NESC) requirements, state-specific code requirements and/or Pacific Power specific policies. This process is designed to correct conditions while reducing impact to normal operations.

Key terms associated with Pacific Power's Inspections & Corrections Program are defined as follows:

Detailed Inspection. A careful visual inspection accomplished by visiting each structure, as well as inspecting spans between structures, which is intended to identify potential nonconformance with the NESC or other applicable state requirements, infringement by other utilities or individuals, defects, potential safety hazards, and deterioration of the facilities that need to be corrected to maintain reliable and safe service.

Pole Test & Treat. An inspection of wood poles to identify decay, wear or damage, which may include pole-sounding, inspection hole drilling, and excavation tests to assess the pole condition and identify the need for any repair, or replacement and apply remedial treatment according to policy.

Visual Assurance Inspection. A brief visual inspection performed by viewing each facility from a vantage point allowing reasonable viewing access, which is intended to identify damage or defects to the transmission and distribution system, or other potential hazards or right-of-wayencroachments that may endanger the public or adversely affect the integrity of the electric system, including items that could potentially cause a spark.

Enhanced Inspection. A supplemental inspection performed that exceeds requirements of traditional detailed or visual inspections, typically a capture of Infrared data.

Condition. The state of something with regard to appearance, quality, or working order that can sometimes be used to identify potential impact to normal system operation or clearance, which is typically identified by an inspection.

Condition Codes. Predetermined list of codes for use by inspectors to efficiently capture and communicate observations and inform the scope of and timeline for potential corrective action.

Correction. Scope of work required to remove a condition within a specified timeframe.

Priority Level. The level of risk assigned to the condition observed, as follows:

Imminent – imminent risk to safety or reliability

Priority A – risk of high potential impact to safety or reliability

Priority B – low to moderate risk to safety, reliability, or worker safety

2.1 CURRENT INSPECTION AND CORRECTION PROGRAMS

Pacific Power's asset inspection program involves three primary types of inspections: (1) visual assurance inspection; (2) detailed inspection, and (3) pole test & treat. Inspection cycles, which dictate the frequency of inspections, are set by Pacific Power asset management. In general, visual assurance inspections are conducted more frequently, to quickly identify any obvious damage or defects that could affect safety or reliability. Detailed inspections have a more detailed scope of work, so they are performed less frequently than visual assurance inspections. The frequency of pole test & treat is based on the age of wood poles, and such inspections are typically scheduled in conjunction with certain detailed inspections. The inspector conducting the inspection will assign a condition code to any conditions found and the associated priority level in Pacific Power's facility point inspection (FPI) system. Corrections are then scheduled and completed within the correction timeframes established by Pacific Power asset management, as discussed below. While the same condition codes are used throughout Pacific Power's service territory, the timeframe for corrective action is different in different state jurisdictions. In all cases, the timeline for corrections considers the priority level of any identified condition. An A priority level condition is addressed on a much shorter timeframe than a B priority condition.

2.2 FHCA INSPECTION AND CORRECTION PROGRAMS

The existing inspection and correction programs are effective at maintaining regulatory compliance and managing routine operational risk. They also mitigate some wildfire risk by identifying and correcting Conditions which, if uncorrected, could potentially ignite a fire. Recognizing the growing risk of wildfire, Pacific Power is supplementing its existing programs to further mitigate the growing wildfire specific operational risks and create greater resiliency against wildfires. There are three primary elements to this proposal: (1) creating a fire threat classification for specific Condition Codes; (2) increasing inspection frequencies in the FHCA; and (3) reducing Correction timeframes for fire threat Conditions.

Fire Threat Conditions. Pacific Power designates certain conditions as "fire threat conditions." Each condition is still assigned a condition code, but certain condition codes are categorically designated as a fire threat condition. Accordingly, if a condition is designated under a particular condition code associated as a fire threat, the condition will also be designated as a fire threat condition. To this end, a review was performed on all existing condition codes to determine whether the condition code could have any correlation with fire ignition. Condition codes reflecting an appreciable risk of fire ignition were designated as fire threat conditions. For example, if a damaged or frayed primary conductor was observed during an inspection, the inspector would record condition code CONDFRAY, which is designated as a fire threat condition because the condition could eventually result in an ignition under certain circumstances. In contrast, the observation of a missing or broken guy marker would result in the condition code GUYMARK, which is not designated as a fire threat condition.

Inspection Frequency. Pacific Power's plans include an increase to the frequency of certain inspection types for assets located in the FHCA. Consistent with industry best practices, inspections are Pacific Power's preferred mechanism to identify conditions. An increase in the frequency of inspections will result in more timely identification of potential fire risk conditions. Inspection frequencies for Oregon asset types are summarized in the following table:

Table 5: Planned Inspection Frequency in the FHCA

Inspection Type	Non-FHCA Frequency (years)	FHCA Inspection Frequency (years)
OH Distribution and Local Transmission (Less than 200 kV)		
Visual	2	1
Detailed	10	5
Pole Test & Treat	10	10
OH Main Grid (More than 200kV) – No Change		
Visual	1	1
Detailed	2	2
Pole Test & Treat	10	10

Correction Timeframe. Pacific Power will further mitigate wildfire risk by reducing the time for correction of fire risk conditions in the FHCA. As expressed above, certain types of conditions have been identified as having characteristics associated with a higher risk of wildfire potential. Accordingly, Pacific Power is prioritizing those conditions for correction and will complete correction much sooner than allowed under the typical twenty-four-month timeframe. Pacific Power performs an aggressive correction schedule for fire threat conditions in the FHCA, requiring that Priority A conditions be corrected within 90-days and that Priority B fire risk conditions be corrected within 12 months. Correction timeframes for fire threat conditions in the FHCA are summarized in the following table:

Table 6: Planned Correction Timeframes for Fire Threat Conditions in the FHCA

Condition	FHCA Correction Timeframes[7]
A – imminent	Immediate
A – fire risk and in the FHCA	90 days
B – fire risk and in the FHCA	12 months

[7] Oregon Administrative Rule 860-024-0012 requires that "(1) A violation of the Commission Safety Rules that poses an imminent danger to life or property must be repaired, disconnected, or isolated by the operator immediately after discovery. (2) Except as otherwise provided by this rule, the operator must correct violations of Commission Safety Rules no later than two years after discovery." Pacific Power's correction timeframes for fire threat conditions in the FHCA exceed these requirements. See https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=221274

2.3 ENHANCED INSPECTIONS

Pacific Power's enhanced inspection utilizes alternate technologies to identify hot spots, equipment degradation, and potentially substandard connections that aren't detectable through a visual inspection. Infrared data is gathered using a helicopter flying over the designated lines within the FHCA near peak loading intervals and is performed incrementally to existing inspection programs. Hot spots on power lines identified through Infrared data gathering can be indicative of loose connections, deterioration and/or potential future fault locations. Therefore, identification and removal of hot spots on high risk overhead transmission lines can prevent further deterioration, reduce the potential for equipment failure and faults, and reduce ignition probability related to equipment failure.

Identified Lines. These enhanced inspections are performed on overhead transmission lines operating at 69kV, 115kV, 230kV, or 500kV with at least a single structure residing in the FHCA, ensuring to capture electrically connected overhead lines and promote operational efficiency. The regions in Oregon that are covered mimic the FHCA Map and include Southern Oregon, Hood River, and Enterprise totaling 35 line-segments and approximately 1,000 line-miles.

Inspection Intervals. Enhanced inspections are performed annually, where lines are "bundled" depending on peak loading events. Peak loading events are seasonal with three main intervals; winter months DEC-FEB (7am and 11am), the spring months APR-JUN (anytime) as the hydro sites have the winter runoff, and the summer months JUL-AUG (3pm-8pm). Inspecting during peak loading ensures the highest probability of detecting abnormal thermal rises on the equipment induced by the loading.

Corrective Action. Similar to other inspection and correction programs, Pacific Power takes a tiered approach to correcting any anomalies identified during an enhanced inspection. Findings are separated into three severity ranges depending on the measured temperature rise over anticipated conditions. These recommended time periods for correction align with the accelerated correction time periods of other conditions identified in the FHCA and are scheduled per policy.

3. Vegetation Management

Vegetation management is generally recognized as a significant strategy in any Wildfire Protection Plan. Vegetation contacting a power line is a potential source of fire ignition. Thus, reducing vegetation contacts reduces the potential of an ignition originating from electrical facilities. While it is impossible to eliminate vegetation contacts completely, at least without radically altering the landscape near power lines, a primary objective of Pacific Power's existing vegetation management program is to minimize contact between vegetation and power lines by addressing grow-in and fall-in risks. This objective is in alignment with core Wildfire Protection Plan efforts, and continuing dedication to administering existing programs is a solid foundation for Pacific Power's Wildfire Protection Plan efforts. To supplement the existing program, Pacific Power vegetation management is implementing additional Wildfire Protection Plan strategies in FHCA.

3.1 REGULAR VEGETATION MANAGEMENT PROGRAM

The focus of Pacific Power's vegetation management efforts is different for distribution lines and transmission lines. In both cases, typical work functions include pruning and tree removals. Pacific Power prunes trees to maintain a safe distance between tree limbs and power lines. Pacific Power also removes trees that pose an elevated risk of falling into a power line. Pacific Power uses significantly more restrictive clearance protocols under transmission lines and typically has wider rights-of-way that allow it to remove vegetation. Similar to other utilities, Pacific Power contracts with vegetation management service providers to perform the pruning and tree removal work for both transmission and distribution lines.[8]

Distribution

Vegetation management on distribution circuits in Oregon has historically been completed on a four-year cycle (with interim work sometimes performed, as needed, halfway through the cycle. Starting in 2022, Pacific Power plans to transition to a three-year cycle for all vegetation

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[8] Pacific Power's vegetation management program is described in detail in Pacific Power's Transmission & Distribution Vegetation Management Program Standard Operating Procedures, which guides the work done by vegetation contractors.

management work in Oregon.[9] All vegetation on a given circuit requiring work is pruned to comply with defined minimum post-work clearance specifications. Because some trees grow faster than others, minimum post-work clearance specifications vary depending on the type of tree being pruned. For example, faster growing trees need a greater minimum post-work clearance to maintain required clearance throughout the cycle.

Pacific Power also integrates spatial concepts to distinguish between side clearances, under clearances, and overhang clearances. Recognizing that certain trees grow vertically faster than other trees, it is appropriate to use an increased clearance when moderate or fast-growing trees are under a conductor. Increasing overhang clearances also reduces the potential for any contacts due to falling overhang.

The minimum post-work clearance specifications are designed so that regulatory mandated clearance with primary lines will be maintained throughout the cycle. As Pacific Power transitions to a three-year cycle, contractors will continue to prune to the clearance distances previously used with the four-year cycle. This approach should further enhance maintenance of clearances at all times. The specific distances for the minimum post-work clearance specifications are as follows:

Table 7: Distribution Minimum Vegetation Clearance Specifications in Oregon

	SLOW GROWING (<1 FT/YR.)	MODERATE GROWING (1-3 FT/YR.)	FAST GROWING (> 3 FT./YR.)
SIDE CLEARANCE	8 ft.	10 ft.	14 ft.
UNDER CLEARANCE	10 ft.	14 ft.	16 ft.
OVERHANG CLEARANCE	12 ft.	14 ft.	14 ft.

When a tree is pruned, natural target pruning techniques are used to protect the health of a tree. Natural targets are the final pruning cut location at a strong point in a tree's disease defense system, which are branch collars and proper laterals. Pruning at natural targets

[9] As an exception to the typical practice described above, Pacific power has historically applied a two-year cycle for distribution vegetation management work in Portland and will continue to do so.

protects the joining trunk or limb.[10] Consequently, an actual cut is typically beyond the minimum post-work clearance distance listed in the table above. In all cases, however, the cut is at least to the minimum post-work clearance distance. Pacific Power will continue to evaluate post-work clearance distances as the three-year cycle is implemented, and distances might be reduced if results observed over the course of time warrant a reduction.

Pacific Power also removes high-risk trees as part of distribution cycle work, to minimize vegetation contact through fall-in risk. High-risk trees are defined in the SOP as "dead, dying, diseased, deformed, or unstable trees that have a high probability of falling and contacting a substation, distribution conductor, transmission conductor, structure, guys or other [Pacific Power] electric facility."[11] Inspections are performed on distribution lines in advance of distribution cycle maintenance work, to identify which trees will be worked in the cycle, including high-risk trees subject to removal. To identify hazard trees, Pacific Power uses best management practices,[12] including an initial Level 1 assessment, with particular attention to the prevailing winds and trees on any uphill slope. Suspect trees that require further inspection may be subjected to a Level 2 assessment, to further assess their condition. After the work is completed, Pacific Power sometimes conducts post-work inspections as part of an audit and quality review process.

Distribution cycle work also includes work designed to reduce future work volumes. In particular, volunteer saplings, small trees that were not intentionally planted, are typically removed if they could eventually grow into a power line. From a long-term perspective, this type of inventory reduction helps mitigate wildfire risk by eliminating a potential vegetation contact long before it could ever occur.

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[10]This technique is drawn from ISA Best Management Practices: Tree Pruning (Gilman and Lilly 2002) and A300 (ANSI 2008). (See also Miller, Randall H., 1998. Why Utilities "V-Out" Trees. Arborist News. 7(2):9-16.)

[11]See Table 2 of FAC-003-04, at https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-003-4.pdf

[12] ANSI A300 (Part 9); Smiley, Matheny and Lilly (2011), Best Management Practices: Tree Risk Assessment, International Society of Arboriculture

Transmission

Vegetation management on transmission lines is also focused on maintaining clearances, but the clearance distances are greater. Because of the nature of transmission lines, wider rights-of-way generally allow Pacific Power to maintain clearances well in excess of the required minimum clearances set forth in the "Minimum Vegetation Clearance Distance" (MVCD[13]). Accordingly, rather than scheduling vegetation management work for transmission lines on a fixed cycle timeframe, such work is scheduled on an as-needed basis, depending on the results of regular inspections and specific local conditions. To determine whether work is needed, an "Action Threshold" is applied, meaning that work is done if vegetation has grown within the action threshold distance. When work is completed, vegetation is cleared to the minimum post-work clearance as specified in the table below:

Table 8: Transmission Minimum Vegetation Clearance (in Feet) by Line Voltage

	500 KV	345 KV	230 KV	161 KV	138 KV	115 KV	69 KV	45 KV
MINIMUM VEGETATION CLEARANCE DISTANCE (MVCD)	8.5	5.3	5.0	3.4	2.9	2.4	1.4	N/A
ACTION THRESHOLDS	18.5	15.5	15.0	13.5	13.0	12.5	10.5	5
MINIMUM CLEARANCES FOLLOWING WORK	50	40	30	30	30	30	25	20

Taking advantage of greater legal rights to manage the vegetation in the right-of-way for transmission lines, Pacific Power employs "Integrated Vegetation Management" (IVM) practices to prevent vegetation growth from violating clearances. Rather than depending on pruning in regular work cycles, IVM seeks to prevent clearance issues from emerging, by managing the species of trees and other vegetation growing in the right-of-way. Under such an approach, Pacific Power removes tree species that could potentially threaten clearance requirements, while encouraging low growing cover vegetation, which would never implicate clearance issues.

[13]See Table 2 of FAC-003-04, available at https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-003-4.pdf

Line Patrol Workers inspect most transmission lines annually and notify the vegetation management department of any vegetation conditions. Pacific Power's utility Forestry Arborists (foresters) and/or contracted vegetation management forest technicians also conduct regular inspections of vegetation near transmission lines, including annual inspections of vegetation on all main grid transmission lines. Vegetation work is scheduled dependent on a number of local factors, which is consistent with industry standards and best management practices. Vegetation work on local transmission overbuild is completed on the distribution cycle schedule and inspected accordingly.

3.2 WILDFIRE MITIGATION IN THE FHCA

In addition to the transition to a three-year cycle discussed above, Pacific Power's vegetation management specifically targets risk reduction in the FHCA with three distinct strategies. First, Pacific Power vegetation management will conduct annual vegetation inspections on all lines in the FHCA, with correction work also completed based on inspection results. Second, Pacific Power will use increased minimum clearance distances for distribution cycle work completed in the FHCA will be increased. Third, Pacific Power plans to complete annual pole clearing on subject equipment poles located in the FHCA. To accomplish these new wildfire protection plan strategies, Pacific Power anticipates that additional resources will be required and currently plans to recruit approximately 7 additional FTEs.

Annual FHCA Vegetation Inspection

Pacific Power vegetation management is transitioning to annual vegetation inspections for all lines or portions of lines located in the FHCA. Pacific Power vegetation management believes that this tool is the most effective strategy to identify high-risk trees at the earliest stage possible. This strategy facilitates removal of high-risk trees before such trees could ever fall into a line and cause a wildfire. The annual inspection includes both on-cycle and off-cycle work to achieve an annual inspection of all line miles within FHCA.

Extended Clearances

Pacific Power is transitioning to increased minimum post-work clearance specifications for any distribution cycle work in the FHCA. The new minimum post-work clearance specifications targets pruning to at least 12 feet, in all directions and for all types of trees, when work is identified as needed. As discussed above in the previous section, minimum clearance specifications dictate the distance achieved after pruning is completed. By increasing the minimum distance required at the time pruning is done, Pacific Power further minimizes the potential of vegetation contacting a power line at any time. The planned minimum clearance specifications for the FHCA are as follows:

Table 9: Distribution Minimum Vegetation Clearance Specifications in the FHCA

	SLOW GROWING (<1 FT./YR.)	MODERATE GROWING (1-3 FT./YR.)	FAST GROWING (>3FT./YR.)
SIDE CLEARANCE	12 ft.	12 ft.	14 ft.
UNDER CLEARANCE	12 ft.	14 ft.	16 ft.
OVERHANG CLEARANCE	12 ft.	14 ft.	14 ft.

While certain fast-growing trees can sometimes exceed expected annual growth, these minimum post-work clearance specifications are designed with the expectation that such clearances achieved at the time of work will minimize potential for vegetation impinging a 3-foot clearance at any time before the next work cycle.

Pole Clearing

Pacific Power vegetation management performs pole clearing on subject equipment poles located in the FHCA. Pole clearing involves removing all vegetation within a 10-foot radius cylinder (up to 8 feet vertically) of clear space around a subject pole and applying herbicides and/or soil sterilant to prevent any vegetation regrowth (unless prohibited by law or the property owner). This strategy is distinct from the clearance and removal activities discussed above because it is not designed to prevent contact between vegetation and a power line. Instead, pole clearing is designed to reduce the risk of fire ignition if sparks are emitted from electrical equipment. Pole clearing will be performed on wildland vegetation in the FHCA around poles that have fuses, air switches, clamps or other devices that could create sparks. After a pole has been cleared, a spark falling within the 10-foot radius would be much less likely to ignite a fire.

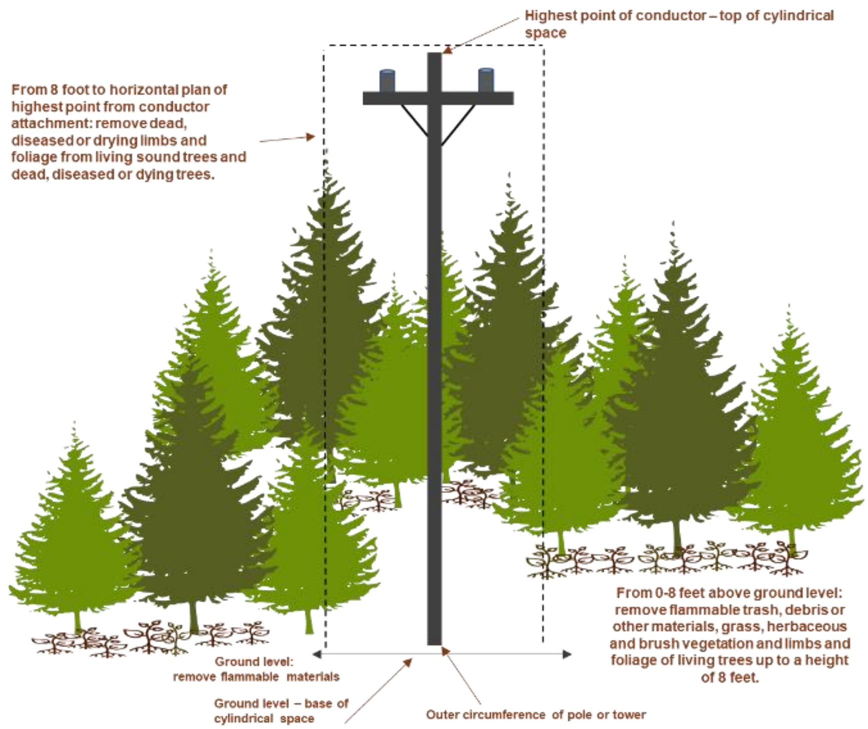

Figure 9: Pole Clearing Example Image

Continuous Improvement Plans

Pacific Power vegetation management will continue to evaluate other strategies and emerging industry standards and best practices in the arena of wildfire mitigation. Along these lines, Pacific Power may implement additional vegetation management strategies in a subsequent Wildfire Protection Plan.

4. System Hardening

Pacific Power's electrical infrastructure is engineered, designed and operated in a manner consistent with prudent utility practice, enabling the delivery of safe, reliable power to all customers. When installing new assets, Pacific Power is committed to incorporating the latest technology and engineered solutions. When conditions warrant, Pacific Power may engage in strategic system hardening, which may consist of replacing existing assets (or, in some circumstances, modifying existing assets using a new design and additional equipment) to make the assets more resilient. Recognizing the growing risk of wildfire, Pacific Power plans to supplement existing asset replacement projects with system hardening programs designed to mitigate specific operational risks associated with wildfire.

System hardening programs are designed in reference to the equipment on the electrical network that could be involved in the ignition of a wildfire or be subject to an existing wildfire event. In general, system hardening programs attempt to reduce the occurrence of events involving the emission of sparks (or other forms of heat) from electrical facilities or reduce the impact of an existing wildfire on utility infrastructure. System hardening programs represent the greatest long-term mitigation tool available for use by electric utilities. The phasing and prioritization of such programs is therefore focused on locations that present the greatest risk.

No single system hardening program mitigates all wildfire risk related to all types of equipment. Individual programs address different factors, different circumstances and different geographic areas. Each program described below, however, shares the common objective of reducing overall wildfire risk associated with the design and type of equipment used to construct electrical facilities. In prioritizing particular design or equipment elements, these programs can also consider environmental factors impacting the magnitude of a wildfire. Dry and windy conditions pose the greatest degree of risk. Consequently, system hardening programs may specifically attempt to reduce the potential of an ignition event when it is dry and windy, by looking at equipment that is more susceptible to failure or contact with foreign objects when it is dry and windy.

It must be emphasized, however, that system hardening cannot prevent all ignitions, no matter how much is invested in the electrical network. Equipment does not always work perfectly and, even when manufactured and maintained properly, can age and fail; in addition, there are external forces and factors impacting equipment, including from third parties and natural conditions. Therefore, Pacific Power cannot guarantee that a spark or heat coming from equipment owned and operated by Pacific Power will never ignite a wildfire. Instead, Pacific Power seeks to reduce the potential of an ignition associated with any electrical equipment. To this end, Pacific Power plans to make investments with targeted system hardening programs.

Pacific Power developed new design standards applicable to new construction in areas of elevated wildfire risk, described in the construction standards section. The idea of "system hardening" applies in these contexts, as Pacific Power plans for new construction to be "hardened" against wildfire risk. However, system hardening referenced in this plan is geared toward specific programs aimed at making existing facilities more resistant to wildfire, even though those existing facilities are fully functional and do not require any corrective work under current utility practices.

4.1 FHCA LINE REBUILD PROGRAM

Pacific Power has evaluated specific areas for system hardening work. The wildfire risk assessment and, more specifically, the identified PSPS Zones discussed in Section 1, is an important factor in evaluating where work is appropriate. Pacific Power has identified areas in Oregon where bare overhead wire may be replaced with covered conductor. Where appropriate, poles will either be replaced with fiberglass or made more fire resilient (by fire protective treatment methods). Additionally, where conductor diameters do not support fault current properly (due to the limited arc energy they can tolerate), they will be replaced, generally with covered conductor. After being rebuilt, such lines will be more tolerant to incidental contact, while also able to tolerate greater levels of fault event arc energy.

The company used different criteria to determine which lines are included within the line rebuild program. First, because of the heightened risk in the FHCA, all lines included in the rebuild program are located at least partially in the FHCA and typically included in a PSPS Zone. Certain segments of a rebuild might extend outside the FHCA, based on the location of substations or protective devices. In general, however, the vast majority of rebuild work is in the FHCA and associated with a specific PSPS Zone.

Covered Conductor. Historically, the vast majority of high voltage power lines in the United States – and in Pacific Power's service territory – were installed with bare overhead conductor. As the name "bare" suggests, the wire surface is uninsulated and exposed to the elements. For purposes of wildfire mitigation, a new conductor design has emerged as an industry best practice. Most of the projects in the FHCA Line Rebuild Program will involve the installation of insulated covered conductor. Sometimes, with some variations in products, covered conductor is also called spacer cable, aerial cable, or tree wire.

The dominant characteristic of covered conductor is manufactured with multiple high-impact resistant extruded layers forming an insulation around stranded hard drawn conductor. As a comparison, covered conductor is like an extension power cord that you might use in your garage. The inherent design provides insulation for the energized metal conductor. To be clear, covered conductor is not insulated enough for people to directly handle an energized high voltage power line (as discussed below). But the principle is the same. The insulating layers have proven to effectively reduce the risk of wildfire by minimizing the vegetation or ground contact over bare conductor.

Variations in covered conductor products have been used in the industry for decades. Due to many operating constraints, however, use of covered conductor tended to be limited to locations with extremely dense vegetation where traditional vegetation management was not feasible or efficient. Recent technological developments have remarkably improved covered conductor products, reducing the operating constraints historically associated with the design. These advances have improved the durability of the project and reduced the impact of conductor thermal constraints (i.e. bare conductor has higher thermal constraints over covered conductor). There are still logistical challenges with covered conductor. Above all, the wire is heavier, especially during heavy snow/ice loading, meaning that more and/or stronger poles may be required to support covered conductor. And the product itself is more expensive than bare conductor.

The wildfire mitigation benefits of covered conductor are significant. As discussed in the risk assessment section, a disruption on the electrical network, a fault, can result in emission of spark or heat that could be a potential source of ignition. Covered conductor greatly reduces the potential of many kinds of faults. For example, contact from object is major category of real-world faults which can cause a spark. Whether it is a tree branch falling into a line and pushing two phases together or a Mylar balloon carried by the wind drifting into a line, contact with energized bare conductor can cause the emission of sparks. If those same objects contact covered conductor, the wire is insulated enough that there are no sparks. Likewise, many equipment failures are a wildfire risk because the equipment failure then allows a bare conductor to contact a grounded object. Consequently, covered conductor greatly reduces the risk of ignition associated with most types of equipment failure. For example, if a cross arm breaks, the wire held up by the cross arm often falls to the ground (or low and out of position, so that the wire might be contacting vegetation on the ground or the pole itself). In those circumstances, a bare conductor can emit sparks (or heat) that can cause an ignition. The use of covered conductor, in those exact same circumstances, would almost certainly not lead to an ignition, because the insulation around the wire is sufficient enough to prevent any sparks and limit energy flow, even when there is contact with an object.

Covered conductor is especially well-suited to reduce the occurrence of faults linked with the worst wildfire events. Dry and windy conditions pose the greatest wildfire risks. Wind, in particular, is the driving force behind catastrophic wildfire spread. At the same time, wind has distinct and negative impacts on a power line. The wind blows objects into lines; a strong wind can cause equipment failure; and even parallel lines slapping in the wind can cause sparks. Covered conductor specifically reduces the potential of a catastrophic ignition event, because covered conductor is especially effective at limiting the kinds of faults that occur when it is windy. Taken together, these substantial benefits warrant the use of covered conductor in areas with a high wildfire risk. This approach is consistent with emerging best practices, as utilities in geographic areas with extreme wildfire risk have trended heavily towards use of covered conductor.

Pacific Power also evaluated the potential to convert overhead lines to underground lines for the rebuild projects. The potential wildfire mitigation benefits are undeniable. While an underground design does not completely eliminate every ignition potential (i.e. because of above-ground junctions), it is the most effective design to most dramatically reduce the risk of any utility-related ignition. Unfortunately, the cost and operational constraints of underground construction often make it difficult to apply on a widespread basis. . Nonetheless, some electric utilities are planning to employ an underground strategy more broadly. At this time, Pacific Power is evaluating the use of underground design as part of the rebuild projects on a project-by-project basis; and it will use under-grounding where practical. Through the design process, each individual rebuild project is assessed to determine whether sections of the rebuild should be completed with underground construction. (Some communities and landowners may also prefer to pursue a higher cost underground alternative for aesthetic reasons, and Pacific Power will continue to work with communities or individual landowners willing to pay incremental costs.)

Non-Wooden Poles. Traditionally, overhead poles are replaced or reinforced within Pacific Power's service territory consistent with state specific requirements and prudent utility practice. When a pole is identified for replacement, typically through routine inspections and testing, major weather events, or joint use accommodation projects, a new pole consistent with engineering specifications suitable for the intended use and design is installed in its place. Engineering specifications typically reflect the use of wooden poles which is consistent with prudent utility practice and considered safe and structurally sufficient to support overhead electrical facilities during standard operating conditions. However, the use of alternate non-wooden construction, such as steel or fiberglass, can provide additional structural resilience in high-risk locations during wildfire events and, therefore, aid in restoration efforts.

In addition to the installation of non-wooden solutions as a part of standard replacement programs or mechanisms in priority locations with increased risk, certain wooden poles may also be replaced with non-wooden solutions in conjunction with other wildfire mitigation system hardening programs. For example, as a part of covered conductor installation, the strength of existing poles is evaluated. In many cases, the strength of existing poles may not be sufficient to accommodate the additional weight of covered conductor. In these instances, the existing wooden pole is upgraded to support the increased strength requirements and, when present in high priority locations, replaced with a non-wooden solution for added resilience.

FHCA Line Rebuild Summary

As a part of the FHCA line rebuild program, Pacific Power plans to rebuild approximately 1,200 miles of overhead line within the FHCA and, more specifically, targeted toward PSPS Zones.

Through experience gained in California implementing a similar program, Pacific Power plans to implement this program over a minimum of 8 years. Unlike many distribution construction projects, the use of covered conductor requires a custom engineered design for each project, long lead unique materials, specialized resources, and a larger volume of personnel to construct. Pacific Power is in the early stages of ramping up this effort and plans to look for opportunities for acceleration where possible. The following image depicts the planed locations to rebuild approximately 1,200 miles of overhead covered conductor over 8 years, mostly centered around Southern Oregon and Hood River.

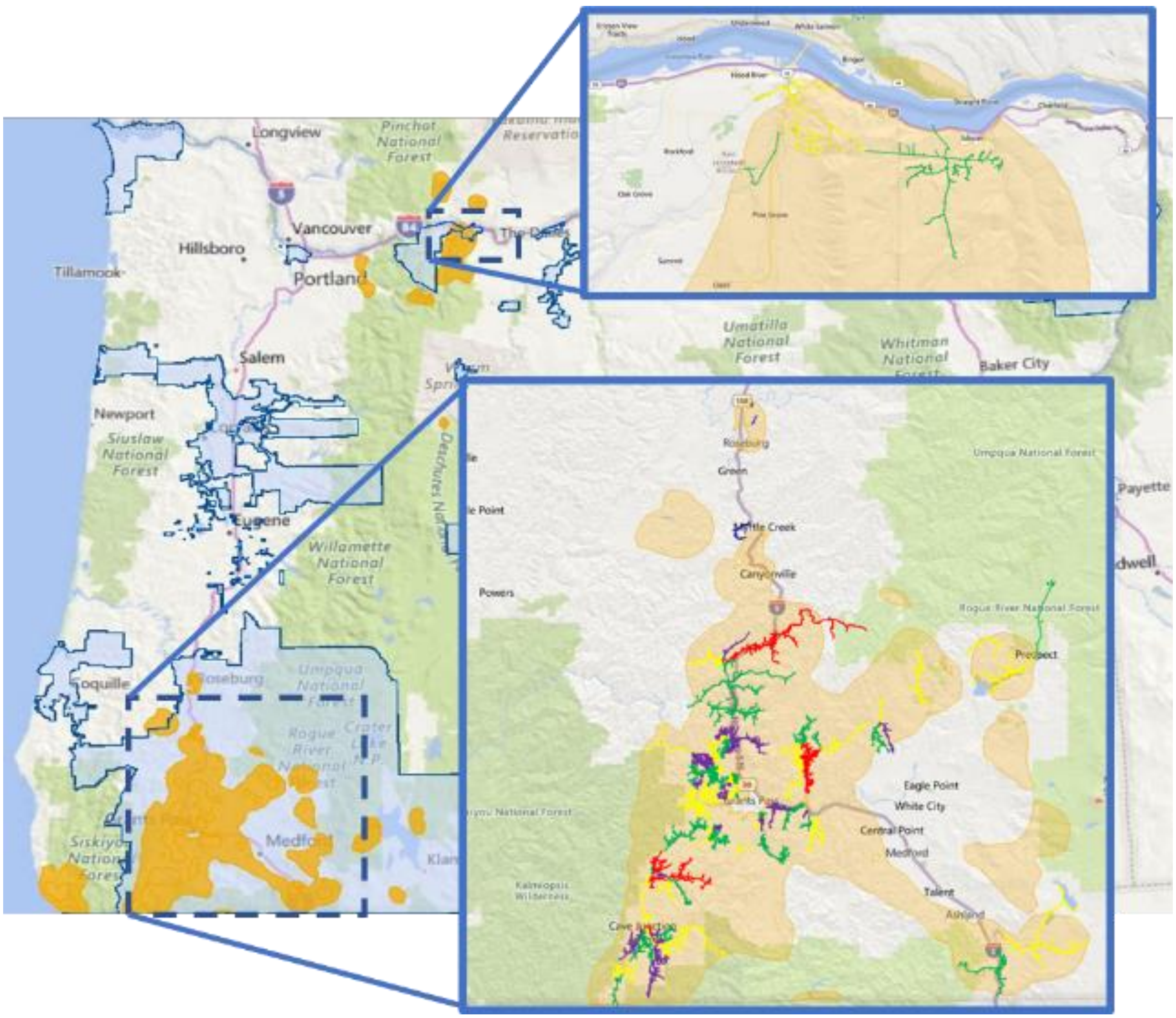

Figure 10: Multi-Year FHCA Line Rebuild Summary

As Pacific Power learns more about risk and the longer-term effects of climate change in the region, the company anticipates that this program could expand beyond the initial scope identified and is prepared to implement additionally, necessary measures to mitigate risk.

4.2 ADVANCED SYSTEM PROTECTION AND CONTROL

Pacific Power plans to replace electro-mechanical relays with microprocessor relays throughout the FHCA, initially prioritized in PSPS Zones.

Microprocessor relays provide multiple wildfire mitigation benefits. They are able to exercise programmed functions much faster than an electro-mechanical relay and above all, the faster relay limits the length and magnitude of fault events. After a fault occurs, energy is released, posing a risk of ignition, until the fault is cleared. Reducing the duration of a fault event reduces the risk that the fault might result in a fire.

Additionally, microprocessor relays also allow for greater customization to address environmental conditions through a variety of settings and are better able to incorporate complex logic to execute specific operations. These functional features allow for the company to use more refined settings for application during periods of greater wildfire risk, which will be discussed in Section 6.

Finally, in contrast to electro-mechanical relays, microprocessor relays retain event logs that provide data for fault location and later analysis. In certain circumstances, this information can help the company locate and correct a condition prior to the condition leading to a more serious event. At a minimum, such information facilitates better knowledge of the network, possibly shaping future mitigation strategies. As part of replacing an electro-mechanical relay, the associated circuit breaker or other line equipment may also be replaced, as appropriate to facilitate the functionality of a microprocessor relay.

Pacific Power plans to replace 138 relays and 151 reclosers over approximately 5 years, with completion planned in 2026.

4.3 EXPULSION FUSE REPLACEMENT

Overhead expulsion fuses serve as one of the primary system protection devices on the overhead system. The expulsion fuse has a small metal element within the fuse body that is designed to melt when excessive current passes through the fuse body, interrupting the flow of electricity to the downstream distribution system. Under certain conditions, the melting action and interruption technique will expel an arc out of the bottom of the fuse tab. To reduce the potential for ignition as a result of fuse operation, Pacific Power has identified alternate methodologies and equipment that do not expel an arc for installation within the FHCA. Pacific Power plans to proactively replace all expulsion fuses and other linked hardware within the FHCA in a systematic, prioritized manner as part of a multi-year effort. Currently, approximately 26,780 fuses have been identified for replacement beginning in 2022 with completion anticipated in 2025.

5. Situational Awareness

As described in Section 1, Pacific Power uses the FHCA, the company's baseline risk map, layered with a risk driver analysis to inform strategic asset inspections, vegetation maintenance practices, and long-term system hardening solutions. However, as climate and weather patterns change, extreme weather events are predicted to become more frequent, and the potential exists for seasonal, dynamic, and/or isolated risk events to occur that compound or deviate from this baseline risk. Therefore, having an additional sophisticated, dynamic risk model grounded in situational awareness is pertinent to ensure electric utilities know when, where, how, and why to take abnormal action to mitigate the risk of wildfire.

Pacific Power's approach to situational awareness includes the acquisition of data to forecast and assess the risk of potential or active events to inform operational strategies, response to local conditions, and decision making. These key components, as outlined below, rely on a core team of utility meteorologist to guide, execute, and continuously evolve.

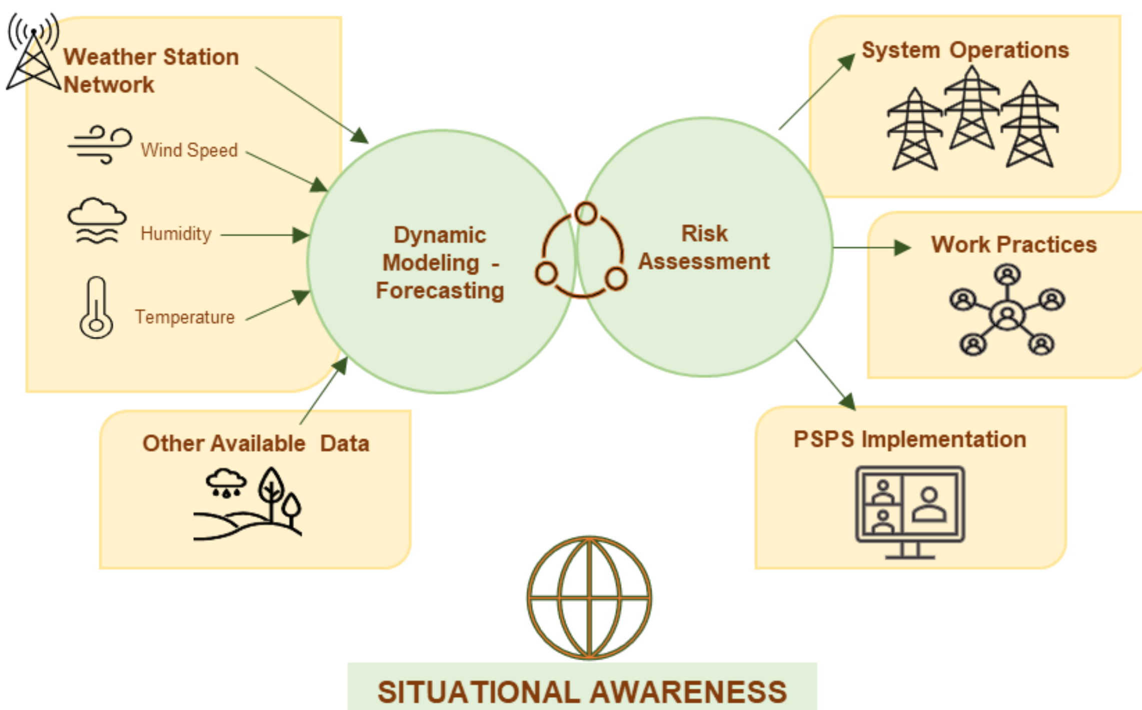

Figure 11: Overview of Situational Awareness

5.1 METEOROLOGY

As described above, the ability to gather, interpret, and translate data into an assessment of utility specific risk and inform decision making is key component of Pacific Power's situational awareness capability. To support this effort, Pacific Power has developed an experienced meteorology department within the company's broader emergency management department. This new team consists of four experienced professionals and one manager.

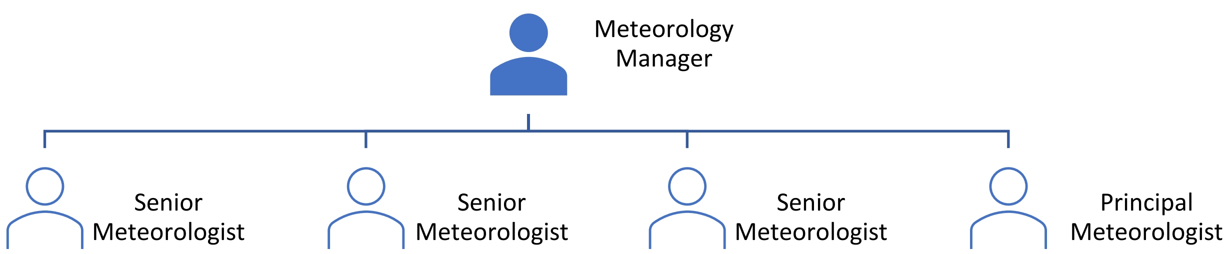

Figure 12: Meteorology Team

The objectives of this department are to supplement the company's longer term risk analysis capabilities with a real time risk assessment and forecasting tool, identify and close any forecasting data gaps, manage day to day threats and risks, and recommend changes to operational protocols during periods of elevated risk as depicted below.

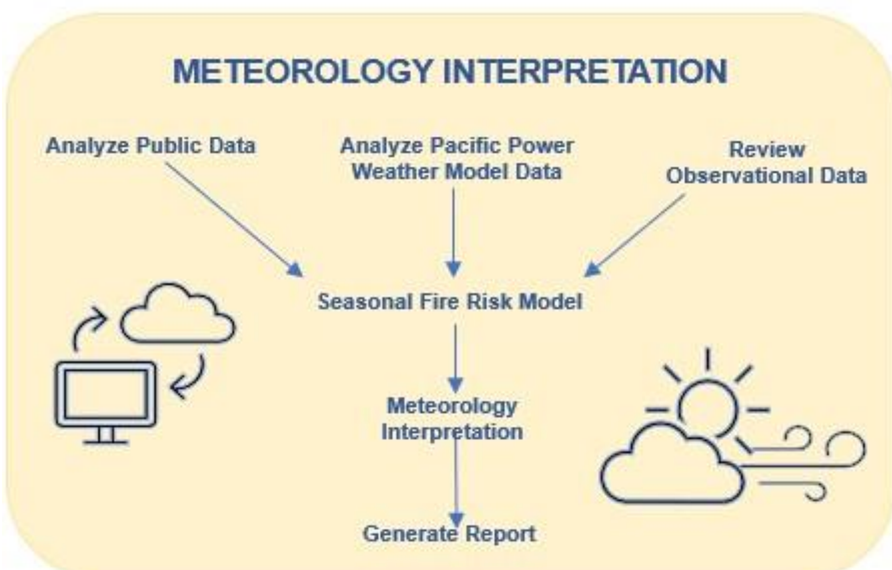

Figure 13: Meteorology Daily Process

5.2 DATA ACQUISITION

Data acquisition, from both internal and external sources, is another key component of Pacific Power's situational awareness model.

Weather Station Network

Data captured from weather stations serve at least two purposes, notably creating a view of routine weather patterns within a specific area, in addition to providing data that can be mined to determine when extreme periods of risk are being experienced. The assessment of these extreme periods of risk and modelling of impacts to utility infrastructure and surrounding landscape is a key component of situational awareness to inform decision making and operational protocols.

Generalized public weather data is and has been available for many years. However, in particularly dynamic situations, which pose an increased wildfire risk, this data may not be sufficient or granular enough to understand localized risks posed to utility infrastructure, particularly in rural locations with less development. Additionally, public weather data can be less reliable or less frequently calibrated than company owned and collected data. Therefore, in 2019, Pacific Power began building out its own weather station network to capture temperature, humidity, wind speed and direction, rainfall and fuel moisture data to fill in weather data gaps that may have existed with the publicly available data.

Because of the need to inform decision making, Pacific Power initially prioritized deployment of weather stations within PSPS Zones. Looking forward, Pacific Power will build out its weather station network beyond established PSPS Zones, ensure appropriate coverage to assess risk, and target any "blind spots" to weather phenomenon identified and increase visibility across Pacific Power territory. Pacific Power currently operates 19 weather stations across the state of Oregon, with a plan to increase weather station count to approximately 122 weather stations in 2022.

The image below depicts the company's existing and planned weather stations, where blue dots represented weather stations currently installed and weather station symbols depict he 2022 planned weather stations.

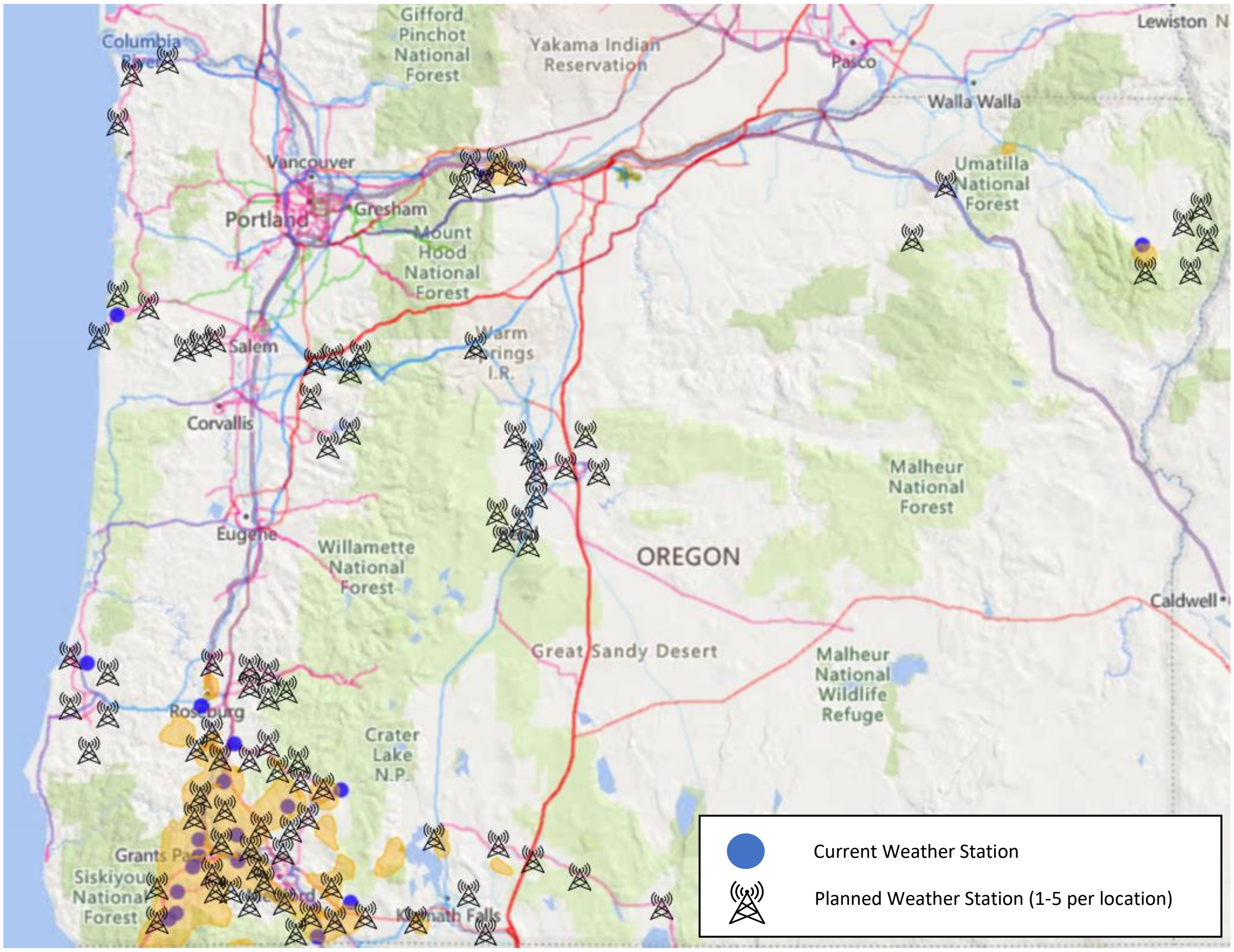

Figure 14: Map of Current and Planned Weather Stations

Pacific Power's meteorology department will continue to evaluate the benefits of additional weather stations and anticipates that this program will continue to grow.

External Data Inputs

In addition to company supplied weather data, climate data can be supplied through reputable vendors to adequately support high level climate assessments. To support a more detailed and customized assessment, Pacific Power plans to perform a separate climate study in 2022 for use in future modeling and risk assessment efforts.

5.3 DAILY FORECASTING & ASSESSMENT

During times of elevated fire risk Pacific Power needs the capability to determine the potential impact of rapidly changing environmental situations, from the ignition of a fire to the change in a strong wind. Currently, Pacific Power uses a multi-day forecasting tool developed throughout 2021 to inform its situational awareness.

To do this, Pacific Power employs a validated, real-time analysis model of wildfire behavior and simulation to generate maps and reports. Situational awareness reports are generated daily by the meteorology department and inform the PSPS decision- making process, system operations practices and field operations' work practices. These reports identify where fuels (dead and live vegetation) are critically dry, where and when critical fire weather conditions are expected (gusty winds and low humidity), and where and when the weather is forecast to negatively impact system performance and reliability. It is the intersection of these three triggers that result in the potential for a change to field operations, operational work practices, or a PSPS event.

Real Time Impact Based Fire Modelling

Pacific Power's daily forecasting tool and process are effective at informing decision making today at a macro level. However, evolution to a real time, mature fire modelling program that complements the forecasting tool will provide additional insight into factors such as fire size potential, population impacted, buildings impacted and additional fire behavior. This insight can be used to better characterize real time risk and inform decision making at the micro-level to facilitate a surgical approach.

The real time fire modelling program is planned to evolve to enhance available information and a more discrete characterization of risk quickly on the micro level.

This multi-year effort, which will pull heavily from experience in California, will incorporate fire spread analysis and modelling with existing data, align with the Integrated Reporting of Wildland Fire Information (IRWIN) federal active wildfire incident reporting tool and ALERT wildfire cameras, and leverage enhanced inputs such as updated climate data and satellite mapping of vegetation.

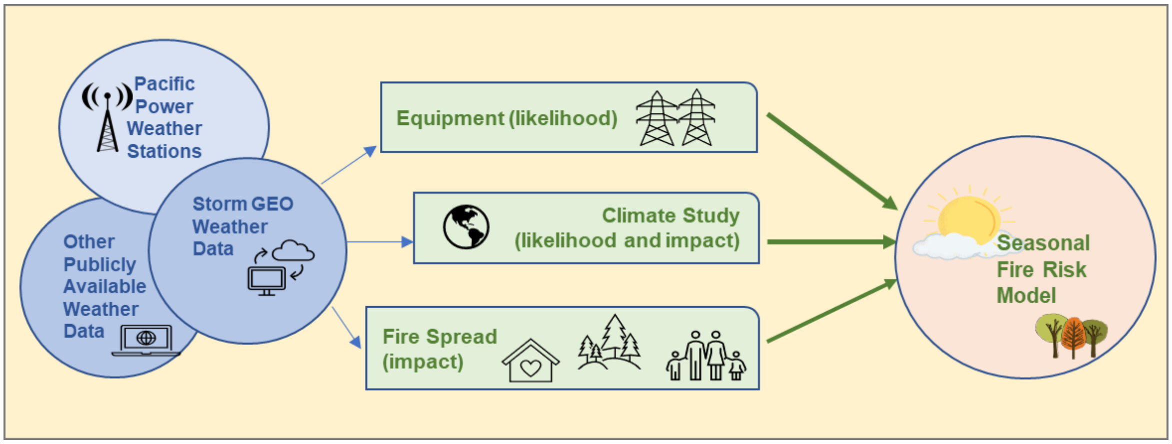

Figure 15: Future Vision for Real Time Impact Based Fire Modelling

5.4 APPLICATION & USE

Functional, thorough, and robust situational awareness allows Pacific Power to make timely, informed wildfire mitigation decisions in advance of severe weather to reduce restoration times and mitigate risk. While data acquired through situational awareness can be integrated with existing utility data to prioritize system hardening infrastructure programs, situational awareness is predominantly used to provide daily and real time insight into the conditions of the company's service territory to inform system operations, field operations, and PSPS decision making, as discussed in the next sections.

6. System Operations

Adjustments to power system operations can help mitigate wildfire risk. System operations adjustments include the disabling of recloser functions, as well as the modification of relay settings for protective devices on distribution lines or changes to line re-energization testing protocols described further in this section. These adjustments are not universally applied to power system operations because there are certain disadvantages in their use, especially because they may increase outage frequency and duration experienced by customers. In other words, a balance is required to provide customers with reliable power while still mitigating wildfire risk. To help balance these concerns, Pacific Power is developing strategies, including the use of technologies such as communicating fault circuit indicators (CFCI's), as discussed in greater below, to reduce the impact on reliability.

6.1 PROTECTION AND CONTROL SETTINGS

Line protective devices, such as line reclosers, are currently deployed on various transmission and distribution lines throughout Pacific Power's service territory. When a line trips open due to fault activity, reclosers can be programmed to momentarily open, allow the fault to dissipate, then reclose in an effort to test if the fault is temporary. The reclosing function gives the ability to restore service on a line that has tripped while maintaining the option to open again if the fault persists. If the fault is permanent, the recloser will operate and stay open (known as the "lock out" state) until the line has been deemed ready for re-energization. The image below generally depicts one potential configuration of a distribution circuit with multiple line reclosers installed.

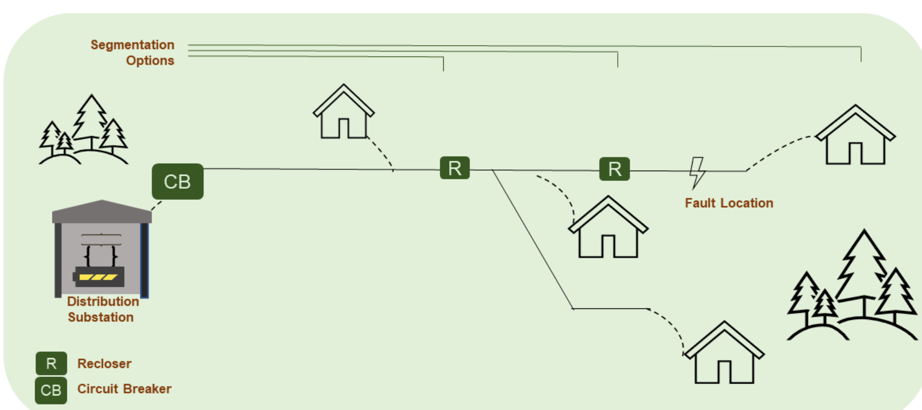

Figure 16: Example of Distribution Circuit with Multiple Reclosers

In general, recloser operation is beneficial because it reduces the number of sustained outages and improves customer reliability. The reclosing function, however, implicates some degree of ignition risk because additional energy can be released if a fault persists. When a fault is detected on the line, a recloser will trip and reclose based on predetermined settings in an attempt to re-energize the line. If the fault is temporary in nature and is no longer present upon the reclose operation, the line will re-energize resulting in limited impact to customers. If the fault persists, however, reclosing can, depending on the circumstances, potentially cause arcing or an emission of sparks. Accordingly, a strategic balance between customer reliability goals and wildfire mitigation goals is required.

Pacific Power has used recloser disabling strategies on transmission lines for many years, and it has employed more frequent disabling of reclosers on transmission lines in recent years because of the increased wildfire risk. On distribution circuits, Pacific Power requires a patrol prior to line testing during periods of elevated wildfire risk. In general, Pacific Power has been able to use these strategies without having too great of an impact on customer reliability. With wildfire risk continuing to increase, Pacific Power is implementing additional strategies on the distribution network, more frequently disabling distribution reclosers and employing modified relay settings, as discussed below. Such applications on the distribution network, however, tend to have a greater impact on customer reliability and Pacific Power is exploring different strategic combinations to find the right balance. For example, Pacific Power is experimenting with the use of fast trips settings, which will cause a device to trip faster. Fast trip settings can have a wildfire mitigation benefit, by reducing the amount of energy released into a fault; but such settings can also be harmful to customer reliability because of larger outages and longer patrol times as depicted in Figure 17.

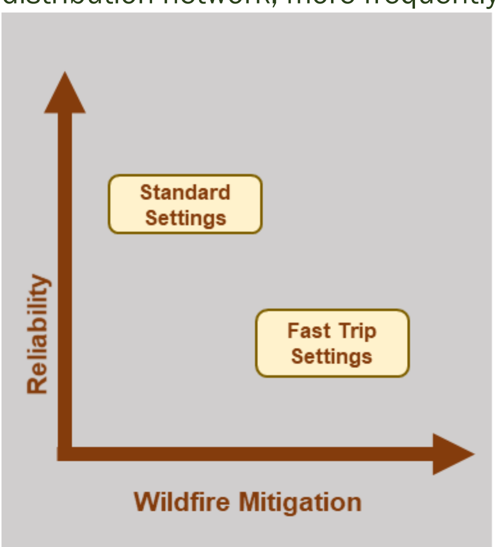

Figure 17: General Relationship between Settings, Reliability, and Wildfire Mitigation

In context of distribution applications, Pacific Power is mitigating impacts on customer reliability by transitioning recloser programming to multiple operating modes which are managed based on situational awareness of local wildfire conditions. For example, when meteorological conditions of increased wildfire risk occur, an alternative operating mode may sometimes be used to reduce the number of reclose attempts, increase the open interval time between trip and reclose operations, or set the recloser to lock out upon a single trip event. The diagram below illustrates one possible mode referenced above. Note, this mode does not directly define an operational mode that is programmed in a standard recloser control unit at Pacific Power but is shown to illustrate some of the elements used in defining an operational mode.

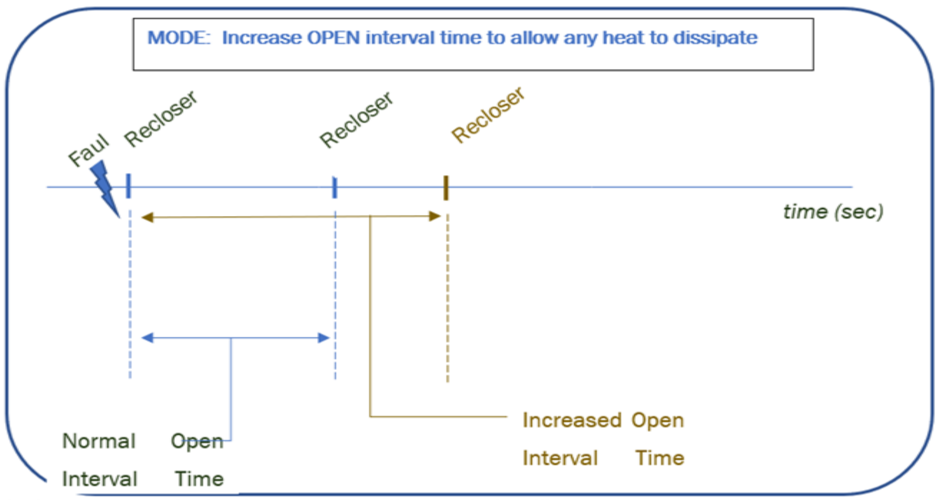

Figure 18: Visual Depiction of One Possible Relay Setting Mode

Pacific Power plans to review the risk level and set the operating mode commensurate with the risk level. There are multiple operating modes possibly used as a mitigation strategy, typically implemented by field operations, and Pacific Power is continuously evaluating situational awareness, customer outages and other information to further optimize the settings.

6.2 RE-ENERGIZATION PRACTICES

The risk associated with testing overhead lines by energization is very similar because it also requires a balance between customer reliability and wildfire mitigation. If a breaker or recloser has "locked-out" – meaning that it has opened and no longer conducts electricity – a system operator or field personnel will sometimes "test" the line. To test the line, the system operator or field personnel will close the device, thereby allowing the line to be re-energized. If the fault has cleared, then the system will run normally. If the fault has not cleared, the device will lock out again. If the device locks out again, the system operator then knows that additional investigation or work will be required before the line can be successfully re-energized. Because faults are often temporary, line-testing can be an efficient tool to maintain customer reliability. At the same time, line-testing can potentially result in arcing or an emission of sparks if a fault has not yet cleared when the line is tested. To mitigate this risk, Pacific Power requires an appropriate level of patrol prior to line testing, depending on local circumstances. In 2022, Pacific Power plans to further incorporate situational awareness reports, discussed in the previous section, to better inform specific patrol methods used prior to line testing.

6.3 COMMUNICATING FAULT CURRENT INDICATORS

Implementation of fast trip settings can result in more frequent outages to customers. Additionally, introducing alternate re-energization practices that require incremental or augmented patrols after system faults can take a substantial amount of time. While sometimes warranted to reduce the risk of wildfire, Pacific Power recognizes the disruption this can have to customers and communities.

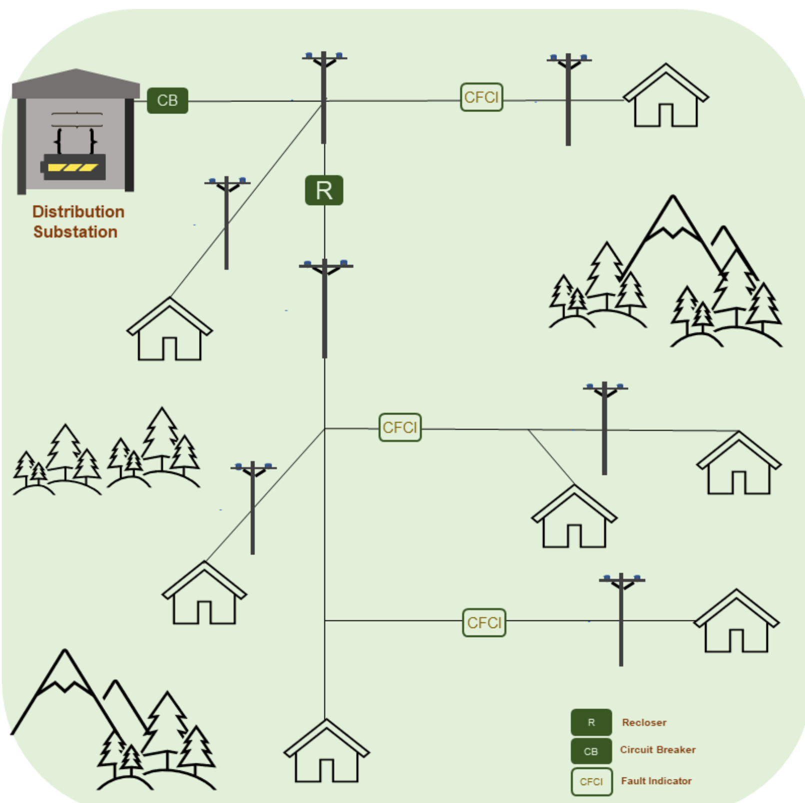

Figure 19: General CFCI Configuration

The time it takes to patrol a line and overall impact to customers can be substantially reduced when the fault location can be determined. Therefore, Pacific Power is planning to install Communicating Fault Current Indicators (CFCIs) across the Oregon service territory, beginning with circuits that feed into the FHCA areas where fast trip settings are most likely to be implemented. Different than traditional fault indicators, CFCIs communicate the fault location back to central grid operations, thus allowing for operators to remotely pin-point fault locations and target operations response and patrols more efficiently. As Pacific Power continually adjusts recloser settings and modes of operation, these CFCIs will be instrumental in quicker restoration times.

7. Field Operations & Work Practices

During fire season, Pacific Power modifies the way it operates in the field to further mitigate wildfire risk. As a part of the forecasted effort and daily briefings performed by the meteorology department, field operations considers the local weather and geographic conditions that may create an elevated risk of wildfire. These practices are targeted to reduce the potential of direct or indirect causes of ignition during planned work activities, fault response and outage restoration.

Pacific Power personnel working in the field during fire season mitigate wildfire risk through a variety of tactics. Routine work, such as condition correction and outage response, poses some degree of ignition risk, and, in certain circumstances, crews modify their work practices and equipment to decrease this risk. In the extremely unlikely event that a fire ignition occurs while field crews or other Pacific Power personnel are working in the field (collectively “field personnel”), such field personnel are equipped with basic tools to extinguish small fires.

Work Restrictions

Pacific Power field operations is able to mitigate some wildfire risk by managing the way that field work is scheduled and performed. To effectively manage work during fire season, area managers regularly review local fire conditions and weather forecasts provided to them as part of Pacific Power’s monitoring program – discussed in the situational awareness section below.

During fire season generally, field operations managers are encouraged to defer any nonessential work at locations with dense and dry wildland vegetation, especially during periods of heightened fire weather conditions. If essential work needs to be performed in the FHCA and other areas with appreciable wildland vegetation, certain restrictions may apply, including:

Hot Work Restrictions. Field operations managers are encouraged to evaluate whether work should be performed during a planned interruption, rather than while a line is energized.

Time of Day Restrictions. Field operations managers are encouraged to consider using alternate work hours to accommodate evening and night work, when there may be less risk of ignition.

Wind Restrictions. Field personnel are encouraged to defer work, if feasible, when there are windy conditions at a particular work site.

Driving Restrictions. Field personnel are encouraged to keep vehicles on designated roads whenever operationally feasible.

Worksite Preparation. If wildland vegetation posing an ignition risk is prevalent at a worksite, and the work to be performed involves the potential emission of sparks from electrical equipment, field personnel working during fire season are encouraged to remove vegetation at the work site where allowed in accordance with land management/agency permit requirements, especially when there is dry or tall wildland grass. In addition to clearing work, the water truck resources, discussed below, are strategically assigned to sometimes accompany field personnel working in a wildland area during fire season, especially in the FHCA. Depending on local conditions, dry vegetation in the immediate vicinity may be sprayed with water before work as a preventative measure.

Vehicles

Vehicles can be a source of ignition. As discussed above, field operations personnel are instructed to stay on designated roads during fire season, as feasible, and to avoid vegetation which could contact the undercarriage of parked vehicle. To further mitigate any wildfire risk associated with the use of vehicles, field operations plan to convert, over time, the vehicle exhaust configuration of work trucks. To accomplish this objective, field operations will strategically convert some vehicles in districts with the greatest amount of FHCA. Long term, when new vehicles are purchased, Pacific Power plans to purchase trucks with a vehicle exhaust configuration which minimizes ignition risk.

Additional Labor Resources

Some wildfire mitigation activities require the time of field personnel, including in two key areas: (a) supporting system operations in administering the procedures generally discussed above in Sections 5 and 6 and (b) responding to outages during fire season as discussed in 6.2.

Because faults are often temporary, line-testing can be an efficient tool to maintain customer reliability. At the same time, line-testing can result in the emission of sparks if a fault has not yet cleared when the line is tested

Under normal operating procedures, system operators and field personnel work together on a daily basis to manage the electrical network. In many situations, system operators depend on field personnel to gather information and assess local conditions. As discussed above, there are system operations procedures during wildfire season for disabling automatic recloser functions and limiting line-testing. Consequently, system operators need field personnel to gather information and assess local conditions during fire season more frequently than would otherwise be required under normal operating procedures. The requests from system operators may be varied, ranging from a simple phone call to confirm that it is raining in a particular area, to a much more time-intensive request, such as a full line patrol on a circuit.

Field personnel may also spend some additional time when responding to an outage during fire season. As discussed in Section 6.2, a heightened risk exists with traditional restoration practices. To mitigate this risk, field operations may perform some amount of line patrol on certain de-energized sections of the circuit, notably during fire season and particularly in the FHCA dependent on current conditions at the work site and the duration of the restoration work. Depending on the circumstances, this extra patrol might be done just before or just after re-energizing the line. Typically, this type of line patrol does not involve a close inspection of any particular facility; instead, it is a quick visual assessment specifically targeted to identify obvious foreign objects that may have fallen into the line during restoration work.

Currently, the costs associated with this additional effort and labor resource is not uniquely tracked. However, as Pacific Power gains experience tracking and forecasting these specific expenditures, the company anticipates augmented future plans to increase transparency.

Basic Personal Suppression Equipment

Personal safety is the first priority, and Pacific Power field personnel are encouraged to evacuate and call 911 if necessary. Field personnel working in the FHCA maintain the capability to extinguish a small fire that ignited while they are working in the field. Field personnel should attempt suppression only if the fire is small enough so that one person can effectively fight the fire while maintaining their personal safety. All field personnel working in the FHCA during fire season will have basic suppression equipment available onsite, because field utility trucks typically carry the following equipment: (1) fire extinguisher; (2) shovel; (3) Pulaski; (4) water container; and (5) dust mask. The water container should hold at least five gallons and may be a pressurized container or a backpack with a manual pump (or other).

Water Trailer Resources

Pacific Power has water trailers that field operations use to mitigate against wildfire risk. For clarity, these resources are not dispatched to reported fires (i.e., like a fire truck). Instead, Pacific Power resources are strategically assigned to accompany field personnel if conditions warrant. For example, if it is necessary to perform work in the FHCA during a period in which there is a Red Flag Warning, Pacific Power field operations may schedule a water trailer to join field personnel working in the field. As discussed above, the water trailer can be used to help prep the site for work. By watering down dry vegetation in the work area, any chance of an ignition can be minimized. In the extremely unlikely event there was an ignition, the water trailer could be used to assist in the suppression of a small fire.

8. Public Safety Power Shutoff (PSPS) Program

Pacific Power may de-energize power lines as a preventative measure during periods of the greatest wildfire risk. This practice is referred to as "proactive de-energization" or is more commonly known as a "Public Safety Power Shutoff" or "PSPS." The decision to implement a PSPS is based on extreme weather and area conditions, including high wind speeds, low humidity, and critically dry fuels. A PSPS event is implemented as a last resort and is intended to supplement – not replace – existing wildfire mitigation strategies. The general process is described below.

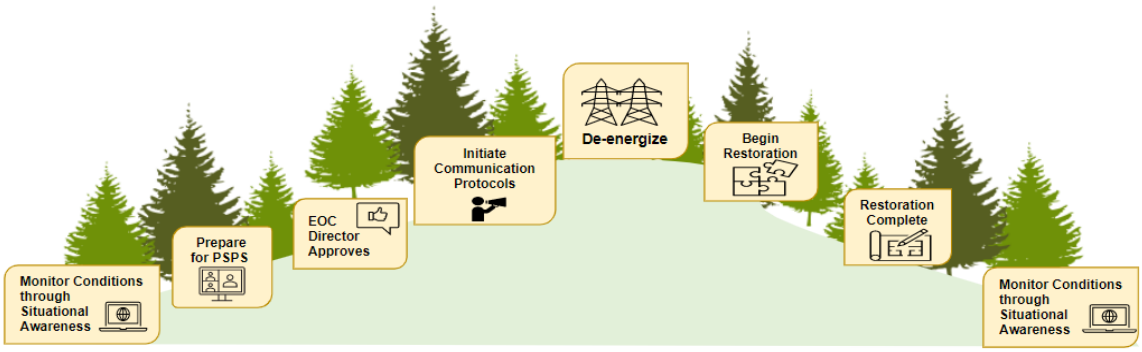

Figure 20: De-Energization Overview

The following subsections describe Pacific Power's program in greater detail. Many of the program elements revolve around the successful execution of a PSPS event, if needed as a measure of last resort, while other elements bolster decision-making, mitigate the potential impact of a PSPS event, or help to avoid use of the tool altogether.

8.1 INITIATION

As discussed in Section 5, situational awareness reports are generated daily by the meteorology department to aid in decision making during periods of elevated risk such as PSPS assessment and activation. These reports identify where fuels (dead and live vegetation) are critically dry, where and when critical fire weather conditions are expected (gusty winds and low humidity), and where and when the weather is forecast to negatively impact system performance and reliability. It is the intersection of these three triggers that result in the potential for a PSPS event.

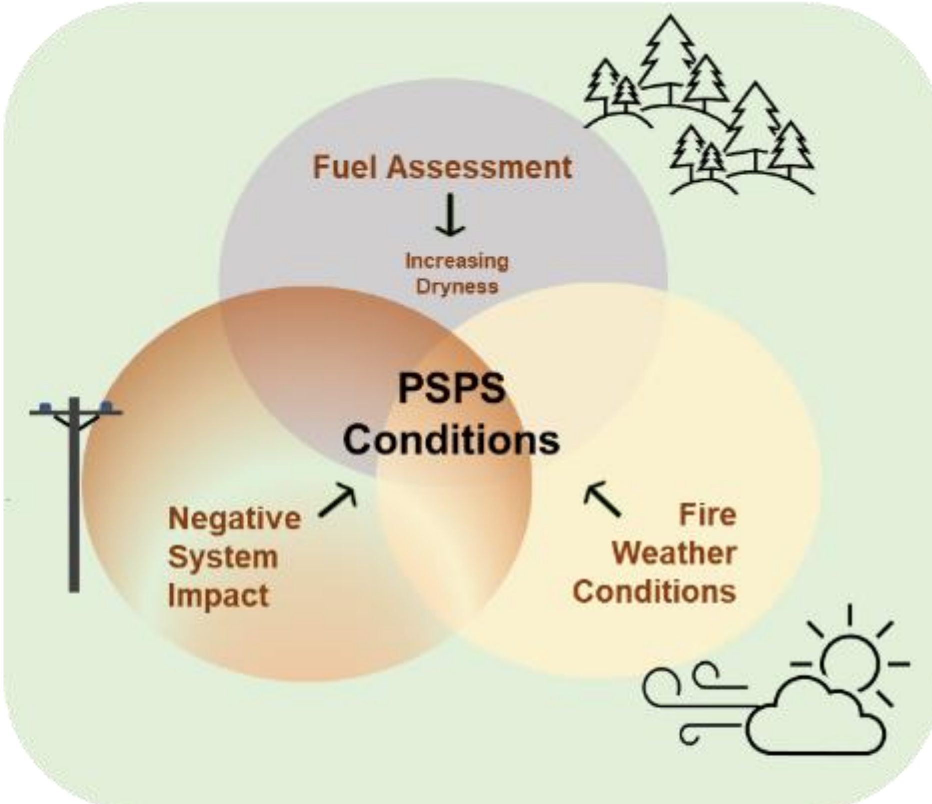

Figure 21: PSPS Assessment Methodology

Fuels Assessment: Pacific Power relies on information from the Geographic Area Coordination Center (GACC), field observations, as well as output from its own in-house Weather Research and Forecast (WRF) model to determine when fuels are critically dry. This includes an assessment of dead fuel moisture (1, 10, 100, & 1,000 hour), live fuel moisture (herbaceous and woody), and Energy Release Component (ERC). Further, Pacific Power has on staff a former GACC meteorologist with considerable fire weather experience to help with this assessment.

Critical Fire Weather Assessment: Pacific Power relies on information from the National Weather Service (NWS) as well as output from its own in-house Weather Research and Forecast (WRF) model to determine when fire weather conditions will become critical and contribute to rapid fire spread. In general, fire weather conditions are considered critical when strong and gusty winds are accompanied by low relative humidity. It is not necessarily a requirement that the weather be hot as there are many examples of wind-driven wildfires that occurred during mild or even relatively cool temperatures. Critical fire weather criteria vary across Oregon and is established by the National Weather Service. In 2021, Pacific Power hired a meteorologist with prior fire weather experience at both the National Weather Service and San Diego Gas & Electric to help with this assessment.

Assessing the Potential for Weather-Related System Impacts: Pacific Power has identified correlations between wind conditions and system performance through an analysis of historical observations and model data. Based on the early results of this analysis, Pacific Power can use weather forecast data from the High Resolution Rapid Refresh (HRRR) model and its own in-house WRF model to anticipate wind conditions that could lead to wind-related system impacts.

Pacific Power is on-track to produce a high resolution, 30-year WRF reanalysis dataset in 2022 to include hourly weather and fuels conditions across its entire service territory. This dataset will enable Pacific Power's to further refine its PSPS decision thresholds and combine them into a single index or Wildfire Risk Score, such as in the example below.

Wildfire Risk Index
100+ Extreme wildfire conditions , de-energization recommended
90-100 Wildfire risk is moderately high, de-energization watch recommended
<90 Wildfire risk does not support de-energizing customers

Figure 22: General Wildfire Risk Index

It is Pacific Power's intent to further refine and begin using this Wildfire Risk Index in 2022 to assess risk and PSPS decision making. Pacific Power expects that this will be a somewhat iterative process each year as new information, methods, and industry best practices are incorporated. Additionally, Pacific Power expects to potentially refine this methodology as the company seeks to find a balance between adequately warning the public of a potential PSPS event versus raising a false alarm too frequently or over-use of PSPS as a tool.

8.2 DE-ENERGIZATION WATCH PROTOCOL

Pacific Power actively monitors real-time weather conditions and endeavors to provide customers with additional notifications if de-energization is likely. When real-time observations and weather forecasts indicate that the three triggers for “de-energization watch” have been evaluated and the Wildfire Risk Index (WRI) is elevated, the de-energization watch protocol is initiated which includes activation of an “Emergency Coordination Center” (ECC), communication with local Public Safety Partners, and implementation of additional monitoring activities.

The ECC is staffed by a specialty group of company representatives who assemble during de-energization warning and implementation to provide critical support to operational resources through the collection and analysis of data. The ECC makes decisions to maintain the safety and reliability of the transmission and distribution system and helps facilitate cross-organization incident coordination. The ECC is led by an ECC Director and has the support of a safety officer, a joint information team, emergency management, meteorology and operational stakeholders representing field operations, system operations, vegetation management, engineering, and other specialties.

Upon activation of the ECC, Pacific Power emergency management gathers input from public safety partners to properly characterize and consider impacts to local communities and send notifications to the operators of pre-identified critical facilities, partner utilities, and adjacent local Public Safety Partners. The Pacific Power customer service team then coordinates through the ECC to confirm customer lists for the subject area to develop a communication plan for those customers potentially impacted.

Local patrol and inspection of lines during a PSPS watch can include a variety of methods depending on the accessibility of locations, the reliability of the line, area conditions and other factors. The ECC reviews these factors to determine necessary tasks such as the deployment of crews or remote monitoring by system operations.

Because of the public desire for reliable electric service, together with public safety concerns associated with de-energization, a PSPS is a measure of last resort and is disfavored. Nonetheless, consistent with existing regulations and the general mandate to operate the electrical system safely, the ECC has discretion to determine when a PSPS is appropriate. The ECC Director will consider all available information, including real-time feedback and other considerations from other ECC participants and field operations to determine whether PSPS should be executed. Additionally, the ECC Director may decide to further refine the PSPS areas described above. As a matter of practical reality, the ECC Director cannot know whether a PSPS will prevent a utility-related ignition. If a PSPS is not implemented and an ignition occurs, the ignition itself is not proof that a PSPS should have been implemented. Likewise, if a PSPS is implemented, the event itself does not prove that an ignition that would have otherwise occurred was prevented.

8.3 DE-ENERGIZATION PROTOCOL

When a PSPS event is initiated, an action plan is prepared to include affected location details, event timing and projected event duration. Once approved by the ECC Director, an internal notification is sent to initiate appropriate notifications to customers, Public Safety Partners, regulatory organizations, large industrial customers and required field and system operations team members. Preparations also begin for the opening Community Resource Centers (CRC) as needed and additional field resources may be deployed or staged accordingly. Conditions are continually monitored; when PSPS conditions are no longer exceeded, the lines are patrolled and assessed for damage to begin the process of re-energization.

8.4 COMMUNICATION PROTOCOLS

Pacific Power recognizes that adequate and clear communication is a key component to the successful implementation of a PSPS event and will always strive to provide as much notice as practical to impacted parties as described in the following section. However, it is critical to note that PSPS decisions are often made based on weather forecasts. Weather can often change quickly or dramatically with little forewarning, requiring some degree of balancing in communication protocols. When this occurs, advanced notice may not be possible to all parties as outlined in this plan.

Public Safety Partners and Critical Facilities

Public safety partners play a crucial role in the successful implementation of a PSPS event. Pacific Power's initial communication with local public safety agencies starts as early as possible when weather forecasts indicate a PSPS event is possible. Proactive communications to entities such as non-emergency dispatch centers, emergency management, fire agencies and law enforcement agencies allow those disciplines to prepare for anticipated operational impacts internally and mitigate any community-wide impacts that may occur as a result of de-energization. Collaboration with these agencies supports impact reduction of de-energization and communicates information regarding the impacted areas and expected event duration.

Upon activation of the ECC, emergency management resources coordinate, as appropriate, with local, county, tribal and state emergency management to provide information through the assigned representative of the agency. ECC assigned staff provide event details including estimated timing and event duration, potential customer impacts, and GIS shapefiles which include PSPS boundaries for areas subject to de-energization. Throughout a PSPS event, Pacific Power's emergency management group maintains regular communication with local, regional and state emergency responders, mutual assistance groups, tribal emergency managers, and the State of Oregon Emergency Coordination Center through Emergency Support Function (ESF) 12 - Utilities. The company will support efforts to send out emergency alerts and status updates as appropriate until restoration efforts begin. Critical facilities are particularly vulnerable to the impact of PSPS events. Pacific Power emergency management maintains a list of critical facilities within its service territory and, upon activation of the ECC, will work to establish and maintain direct contact with these facilities' emergency points of contact to provide projected PSPS timing and regular status updates until restoration efforts begin.

During a PSPS event, Pacific Power recognizes the importance of providing additional geographical details of the affected area and plans to provide these details to Public Safety Partners through a secure web-based application that will host information regarding critical facilities or infrastructure. Key information will include GIS files for location, primary/secondary contact information, and known backup generation capabilities. The portal will be accessible to public safety partners during PSPS events to assist in notification and collaboration of potentially affected facilities. Public safety partners will include emergency responders from federal, state, local and tribal governments, telecommunication providers, water agencies, public-owned utilities, emergency hospitals, and transportation agencies. The portal will assist Pacific Power with the prioritization of restoration activity, backup power evaluation, and additional communications to critical facilities before and during PSPS events to critical facility customers.

Customers

The Pacific Power PSPS webpage provides timely and detailed information for potential and actual PSPS events relevant to a specific location. Pacific Power's website has the bandwidth to manage site traffic under extreme demand; and has implemented bandwidth capacity to a level that will allow for increased customer access while maintaining site integrity. The webpage (available at www.pacificpower.net/psps) allows customers to determine the likelihood of a PSPS event based on address information. An additional online tool allows the customer to see the "Public safety power shutoff forecasting" for that area over the following seven days. The status indicates whether the area is operating as "Normal," whether there is a PSPS "Watch," or whether there is an actual PSPS "Event." The website is easily accessible by mobile device - additionally - the Pacific Power 'app' is available for mobile devices which allows customer access to real-time outage updates and information.

To ensure that outreach is provided in identified prevalent languages, Pacific Power delivers wildfire safety-specific communications including brochures, handouts, and bill messages translated into Spanish; a message in nine languages – which includes Chinese traditional, Chinese simplified, Tagalog, Vietnamese, Mixteco, Zapoteco, Hmong, German and Spanish – is included on bill messages, press releases, and on the company's wildfire safety website pages that states "A customer care agent can speak with you about wildfire safety and preparedness. Please call 888-221-7070."; and customers with specific language needs can contact the company's customer care number and request to speak with an agent that speaks their language. Pacific Power employs Spanish-speaking customer care professionals and contracts with a 24/7 translation service that translates communications in real-time over the phone in Chinese, Cantonese, Mandarin, Tagalog or Vietnamese and a variety of other languages and dialects; and the company's customer care agents have access to and training with wildfire safety and preparedness and PSPS-related communications and can facilitate a conversation between the customer and translation service to ensure the customer receives the wildfire safety and preparedness and PSPS-related information they need.

Public Safety Partners are an essential component to any communication plan during an event. They provide essential insight into the geographic and cultural demographics of the affected areas to advise on protocols to address limited broadband access, languages, medical needs and vision or hearing impairment. Pacific Power's communications plan includes procedures which ensure appropriate notifications (additional if time allows) to customers with serious medical conditions. Upon activation of the ECC, Pacific Power will attempt, time and circumstances allowing, to make personal outbound calls with known vulnerable customers who utilize life support equipment.

Pacific Power's communication plan allows for informational updates to customers using multiple methods of communication. Direct customer notifications are made by way of outbound calls, text messaging and email notifications. Customers will receive an outbound call - when possible - within 48 hours of a potential PSPS event, at the commencement of the event, at the beginning of the re-energization process and upon the event conclusion. Additional methods of notification include use of social media sites including Facebook and Twitter. Upon activation of the ECC, and following appropriate customer notifications, the public information officer will distribute a press release to news outlets that serve the affected areas. Regular updates across all available channels are distributed as they are available, and the public information officer will manage press inquiries as appropriate.

Notification Timing

When there is a potential PSPS event forecast, customers and local government representatives will be provided with advanced notice; if feasible, notifications will begin 48 hours in advance of a potential de-energization event. If this is not possible due to rapidly changing weather conditions, or other emerging circumstances, the notification process will begin as soon as possible. Additional notice will be provided at appropriate times, as conditions are monitored and depending on the circumstances. There is some degree of balancing required. Customers generally want ample advance notice of any actual de-energization. At the same time, recognizing that weather forecasts are inherently speculative, it is possible to overburden customers with notices of "potential" PSPS events that never materialize, especially remembering that Pacific Power's fundamental business objective is to keep the grid energized except under the most extreme conditions.

The table below illustrates Pacific Power's planned PSPS notification timeline for notifications sent to customers, public safety partners and critical facilities. Timelines may be reduced if rapidly changing conditions do not allow for advance notification. In these cases, the company will notify customers as promptly as possible and will include a summary of the circumstances contrary to regulatory requirements in the final report.

Table 10: PSPS Notification Timeline

72-48 Hours Prior	De-energization Warning
48-24 Hours Prior	De-energization Warning
1-4 Hours Prior	De-energization Imminent / Begins
Re-energization Begins	Re-energization Begins
Re-energization Completed	Re-energization Completed
Cancellation of Event	De-energization Event Canceled *(if needed)*
Status Updates	Every 24 hours during event *(if needed)*

8.5 COMMUNITY RESOURCE CENTERS

Pacific Power is aware of the potential impacts of PSPS events to customers, business, and communities and plans to provide community support through Community Resource Centers (CRCs). By leveraging established relationships with community and public safety partners, Pacific Power plans to activate a CRC in an impacted area, which allows community members and businesses to have access to items that may be affected by the interruption of electrical service. The services, which vary across CRCs, may include:

- Potable water
- Shelter from hazardous environment
- Air Conditioning
- Seating and tables
- Restroom facilities
- Refrigeration for medicine and/or baby needs
- Interior and area lighting
- On-site security
- Communications including internet, Wi-Fi, cellular access, and satellite phone
- Television and radio
- On-site medical support (where available)
- Charging stations for cellular devices, radios and computers

CRCs also adhere to all existing local, county, state or federal public health orders and will have personal protective equipment available on site for customers.

9. Public Safety Partner Coordination Strategy

Pacific Power participates in multiple Public Safety Partner meetings and workshops throughout the calendar year across all our service territory. Meetings include monthly, quarterly, and annual County Emergency Management partner meetings in addition to pre and post fire season collaboration meetings with local, state, and Federal fire officials. Pacific Power's 2022 emergency training and exercise plan includes two (2) tabletop exercises, centrally located within the FHCA such that adjacent counties within the FHCA may attend, and one (1) functional exercise. Additionally, the company plans to complete several (4-6) workshops to further compare and refine plans, streamline processes, and confirm capabilities (such as customer outreach, critical facilities and CRC locations and operations) with our local public safety partners located in the designated FHCA. Additionally, Pacific Power provides an annually updated webinar, prominently displayed on the Wildfire Safety website, as further described in the Education and Awareness Strategy section, to provide additional information on the PSPS practices.

Tabletop Exercises

To further coordinate with public safety partners, Pacific Power also facilitates annual tabletop exercises to support awareness, PSPS planning, and overall collaborative wildfire safety and PSPS preparedness within two of the PSPS Zones. These exercises aim to facilitate public and private sector coordination, validate communications protocols, and verify capability to support communities during extreme risk events through mitigation actions such as the deployment of community resource centers. Additionally, these exercises include the collective identification of critical infrastructure at the county level to better inform restoration planning and notifications.

Pacific Power will collect after action reports from exercise and real-world events involving wildfire safety & Public Safety Power Shutoffs. Areas found for improvement, will be put into our comprehensive improvement plan which will be shared with the appropriate public safety partners. Additionally, Pacific Power will complete an annual survey in alignment with our wildfire safety and messaging awareness surveys to public safety partners across our service territory.

10. Wildfire Protection Plan Engagement Strategy

Pacific Power employs a multi-pronged approach for community engagement and outreach with the goal of providing clear, actionable and timely information to customers, community stakeholders and regulators. Over the past several years, the company has engaged customers and the general public throughout its three-state service area on the topic of wildfire safety and preparedness through a variety of tactics including webinars, in-person forums, targeted paid media campaigns, press engagement, distributed print materials, social media updates, and communication through owned channels such as bill messages and website content, among others. The wildfire safety and preparedness community engagement plans to continue maturing year-over-year as additional feedback and regulatory guidance is incorporated to broaden engagement and outreach outside of traditional engagement methods.

Information on the 2022 Wildfire Protection Plan Engagement Strategy is included below.

Wildfire Protection Plan Forums

Pacific Power is a public utility, and as such, aims to develop a Wildfire Protection Plan that aligns with public interests. Therefore, in 2022, Pacific Power plans to initiate a series of in-person Wildfire Protection Plan listening forums to seek feedback and commentary from Public Safety Partners and communities located in the FHCA while adhering to all applicable health and safety precautions. As detailed in the wildfire mitigation plan, specific actions and work are being undertaken in FHCAs. To target outreach to communities directly impacted by the plan, meetings will be hosted in FHCAs. The exact location and timing of these events will be set in collaboration with local Public Safety Partners and Community-Based Organizations, to optimize accessibility, language preferences and other accommodations. For those who may not be able to travel to the meetings, Pacific Power intends to provide a live stream of the event, with Spanish translation at a minimum, and make available the recorded event on company wildfire safety webpages and social media channels.

During these forums, communities will be informed on key elements of the Pacific Power Wildfire Protection Plan and have the opportunity to ask questions or comment in person or through email. These forums will allow for a two-way dialogue and create a space where feedback can be collected and applied in context to key elements of the plan.

Pacific Power is committed to inclusive engagement with its communities providing wildfire safety information that is clear, accessible, and actionable. Therefore, while the objectives and general program outline have been planned, the specifics of multiple languages and additional media platforms will be informed by Public Safety Partners. Additionally, the company will hire a contracted community engagement agency, which can provide Spanish translation support and American Sign Language services at forums.

11. Education and Awareness Strategy

Pacific Power provides wildfire safety and preparedness and Public Safety Power Shutoff (PSPS) public outreach and education through a variety of channels. Some communication efforts on these topics target the company's entire customer base, while specific communications target communities in FHCAs with some overlap into non-FHCA locations depending on media market and distribution channel. The following descriptions of engagement and outreach methods are not meant to be an exhaustive list but represent the baseline efforts that are planned for 2022. Pacific Power maintains an education and awareness strategy that is flexible and allows for a dynamic communications plan, informed by customer survey data, community stakeholder input and community needs. Overall, Pacific Power's plan includes information that can be heard, watched and read in a variety of ways with the goal of accessibility and understandability.

11.1 MEDIA CAMPAIGN

For the past several years, the company has deployed some form of paid media campaign to raise awareness and action on wildfire safety. The company plans to expand this effort in 2022 as part of the broader community engagement strategy. The company will deploy radio, newspaper, digital, and social media ads, as a minimum, to promote wildfire safety and preparedness.

Prior to the 2022 paid media campaign launch, Pacific Power will engage Public Safety Partners, and Community-Based Organizations for messaging input and to ascertain if there are additional campaign element opportunities outside of traditional paid advertising channels. Based on customer survey data, Pacific Power anticipates that it will run social media and radio ads in Spanish. The paid media campaign will run during the wildfire season months. Following the campaign, the company will conduct a community survey and engagement review with Public Safety Partners to determine additional messaging and engagement opportunities ahead of the 2023 campaign.

11.2 SUPPORTING COLLATERAL AND MEDIA OUTREACH

Pacific Power has developed a number of print and digital collateral pieces that includes factsheets, flyers, brochures, infographics and safety checklists. These items are accessible through the company wildfire safety webpages and are utilized at public meetings and community events to describe PSPS (including its necessity, PSPS considerations and expectations before, during and after a PSPS) and to provide general information on emergency kits/plans and preparation checklists, among other topics. Brochures, flyers and factsheets are also printed and mailed to Community-Based Organizations and Public Safety Partners for additional distribution. The company is working to expand those efforts ahead of the 2022 wildfire season. Annually, the Pacific Power communications team updates these materials to ensure the information is relevant, accessible and actionable. Spanish versions of each piece of collateral are also available. Bill messages are an additional low cost means to reach customers. In 2022, Pacific Power plans to include messaging on bills similar to 2021.

Figure 23: Overview of Ad Campaign Methodology

Each year prior to fire season, Pacific Power distributes updated wildfire safety information and information on the company's wildfire mitigation plan to press outlets across its service area as an additional low-cost outreach method. Before and during previous wildfire seasons, Pacific Power Public Information Officers proactively engage with media on company wildfire mitigation efforts and wildfire safety information. For 2022, the company is working to provide additional informational forums for news reporters on these topics, such as system hardening demonstrations or interview opportunities with company subject matter experts.

11.3 CUSTOMER SERVICE TRAINING

Customers with specific language needs can contact the company's customer care number and request to speak with an agent that speaks their preferred language. Pacific Power employs Spanish-speaking customer care professionals and contracts with a 24/7 translation service that translates communications in real-time over the phone in Chinese, Cantonese, Mandarin, Tagalog, Vietnamese and a variety of other languages and dialects.

Customer care agents have received training on wildfire safety and preparedness and PSPS-related communications to facilitate a conversation between the customer and translation service to ensure the customer receives the wildfire safety and preparedness or PSPS-related information they seek.

11.4 WEBPAGE

The Pacific Power website provides robust and comprehensive information on company wildfire mitigation programs, general wildfire safety, PSPS information and more.

Various resources and tools for community preparedness can be found on the Pacific Power wildfire mitigation webpage (www.pacificpower.net/wildfiresafety). Prompts for customers to update contact information are displayed prominently on the page. Guides for the public to create an emergency plan for their family along with a Wildfire Safety Checklist are easily accessible. The Wildfire Safety webpages include a link to the Pacific Power Wildfire Protection Plan for reading, and links to webinars and videos describing key components of the plan for watching, providing site visitors a variety of ways to consume and engage with wildfire safety and preparedness information.

The Pacific Power Public Safety Power Shutoff webpage (www.pacificpower.net/psps) provides educational material on PSPS. The webpage describes why a PSPS would happen, includes details of the wildfire risks monitored prior to executing a PSPS, and how customers can prepare for PSPS. Information on how customers will be notified, what to expect during and the service restoration process if a PSPS is deemed necessary is detailed on the webpage. Pacific Power seeks to serve the community by providing them with general situational awareness information, such as an interactive map of the PSPS areas and a seven-day forecasting table that provides insight into if the company is considering a PSPS for public safety and what areas might be affected.

To ensure that the website information is provided in identified prevalent languages, the PSPS webpage has a message in nine languages – which includes Chinese traditional, Chinese simplified, Tagalog, Vietnamese, Mixteco, Zapoteco, Hmong, German and Spanish that states

"A customer care agent can speak with you about wildfire safety and preparedness. Please call 888-221-7070." The company will continue to work with Public Safety Partners and Community-Based Organizations to determine if additional languages should be included.

11.5 WEBINARS

Once a year, Pacific Power develops a webinar to provide an overview of the company's wildfire mitigation program and strategies. Amongst other items, key mitigation strategies addressed in the webinar include situational awareness capabilities, system hardening investments, and PSPS process review. The webinar also brings to focus how Pacific Power engages with local communities and Public Safety Partners on wildfire safety. The webinars continue to provide transparency and insight into the operational practices of Pacific Power's Wildfire Protection Planning and typically leave room for questions and answers during the webinar's initial live stream. The company intends to replicate this information format in a live setting during 2022 for its wildfire safety and preparedness forums.

12. Industry Collaboration

Industry collaboration is another component of Pacific Power's Wildfire Protection Plan. Through active participation in workshops, international and national forums, consortiums, and advisory boards, Pacific Power maintains an understanding of existing best practices and collaborates with industry experts regarding new technologies and research.

For example, Pacific Power is an active member of the International Wildfire Risk Mitigation Consortium (IWRMC),[14] an industry-sponsored collaborative designed to facilitate the sharing of wildfire risk mitigation insights and discovery of innovative and unique utility wildfire practices from across the globe. This consortium, with working groups focused in the areas of asset management, operations and protocols, risk management, and vegetation management, facilitates a system of working and networking channels between members of the global utility community to support the ongoing sharing of data, information, technology, and practices.

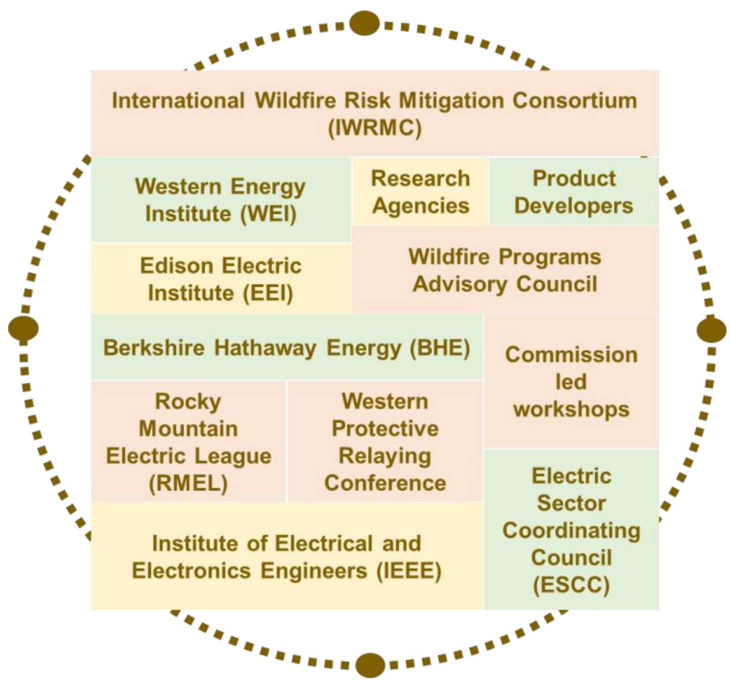

Figure 24: Key Industry Collaboration Channels

Additionally, Pacific Power plays leadership and support roles through other organizations such as the Edison Electric Institute (EEI), the Electric Sector Coordinating Council (ESCC), and the Institute of Electrical and Electronics Engineers (IEEE). Within the western United States, Pacific Power also engages with the Western Energy Institute (WEI) and the Rocky Mountain Electric League (RMEL) as well as the Western Protective Relaying Conference. Collaboration also occurs regarding

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[14] See https://www.umsgroup.com/what-we-do/learning-consortia/iwrmc/

research and applications of technologies through Pacific Power's parent company (Berkshire Hathaway Energy, BHE) and its affiliated companies.

Furthermore, Pacific Power partners with certain research and response agencies to develop and test new technologies, such as existing efforts with the with the Oregon Department of Forestry to install wildfire cameras on utility infrastructure in key, high risk locations. Additionally, Pacific Power is currently working with Texas A&M university to pilot the use of Distributed Fault Anticipation (DFA) technology on its system in Oregon. As part of a multi-year, collaborative effort, Pacific Power plans to install these unique, protection and control devices on its system and test the capability for advanced fault detection and as a potential wildfire mitigation tactic.

Through these various engagement channels, Pacific Power aims to maintain industry networks, understand the evolution of technologies, discover broader applications for such advancements, freely share data to enable scientists and academics, collaborate with developers to push the boundaries of existing capabilities, and expand its research network through support of advisory boards or grant funding.

13. Plan Monitoring & Implementation

Pacific Power's 2022 Wildfire Protection Plan describes the current wildfire mitigation programs and additional investments planned to supplement those programs. In recognition of this significant effort, Pacific Power developed a new department, commonly referred to as Wildfire Safety. This new department consists of thirteen full-time employees, is led by a Managing Director, and includes both a project management office, focused on delivery of line rebuilds and system hardening, and a program delivery team, responsible for overall plan development, monitoring, and implementation. The overall organization is depicted below.

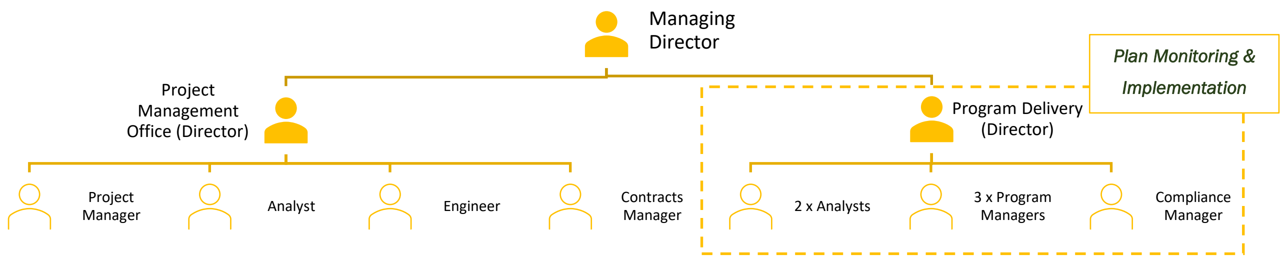

Figure 25: Pacific Power's Newly Formed Wildfire Safety Department

While the broader Wildfire Safety team is tasked with supporting all types of wildfire mitigation initiatives and strategies across the company's entire service territory, a key function of Wildfire Safety Program Delivery team is to develop, implement, monitor, and improve the company's Wildfire Protection Plan in Oregon. It is the responsibility of Wildfire Safety Program Delivery to coordinate with other internal departments such as Asset Management, Vegetation Management, Field Operations, and Emergency Management to ensure all aspects of the plan are delivered.

As new analyses, technologies, practices, network changes, environmental influence or risks are identified, Wildfire Safety will work with industry leaders and internal subject matter experts to incorporate future improvements to the existing programs. Additionally, as new requirements are identified through formal rulemaking, plan elements or scope may change.

At this time, Wildfire Safety plans to regularly evaluate its plan and provide updates as needed and consistent with statutory and regulatory requirements, with an initial updated anticipated in December of 2022.

14. Plan Summary, Costs, & Benefits

Plan Summary

Pacific Power's Wildfire Protection Plan is designed to provide timely and cost-effective wildfire mitigation benefits through a range of programs. While described in more detail through the plan itself, these programs, objectives, and key targets are summarized below.

Table 11: 2022 Wildfire Protection Plan Summary and Objectives

Program Category	Program Objectives & Key Deliverables		
Risk Modeling & Drivers	Maintain baseline risk maps to identify areas that are subject to a heightened risk of wildfire and inform longer term, multi-year investment and program shifts.		
Inspection & Correction	Continue targeted changes in the FHCA including more frequent inspections (5-yr Detail, Annual Visual Assurance), accelerated correction timeframes for fire threat conditions (12 months or less), and implementation of annual IR inspections on transmission.		
Vegetation Management	Transition to a 3-yr trim cycle system wide, increase post trim clearances in the FHCA, implement annual pole clearing of subject poles in the FHCA, and perform annual inspections in the FHCA.		
System Hardening	Complete targeted line rebuilds in PSPS Zones, implement advanced protection and control schemes through equipment upgrades, and replace OH expulsion fuses/adjacent hardware in the FHCA.	**TOTAL SCOPE** 1,200 miles of covered conductor; 138 relays, 151 reclosers; 26,780 fuses	**5 YEAR TARGET** 650 miles of covered conductor; 138 relays, 151 reclosers; 26,780 fuses
Situational Awareness	Install and operate a company owned weather station network, implement a risk forecasting and impact-based fire weather model, and inform key decision making and protocols.		120 weather stations operational by EOY 2022
System Operations	Implement the use of fast trip settings and risk-based re-energization practices and install CFCIs in the FHCA to balance risk mitigation with potential impacts to customers.		CFCIs installed on all FHCA Circuits by EOY 2022
Field Operations & Work Practices	Acquire and maintain key equipment (water trucks and personal suppression equipment) and implement risk-based work practices and resource adjustments.		
PSPS Program	Maintain the ability to actively monitor conditions, assess risk, and implement a PSPS as a measure of last resort in a manner that limits the impacts to customers and communities consistent with regulatory requirements.		

Program Category	Program Objectives & Key Deliverables		
Public Safety Partner Coordination	Develop and maintain a web based secure portal and host 5 Tabletop exercises annually to ensure consistent proactive coordination and collaboration with Public Safety Partners.	Implement a Secure Public Safety Partner Portal in 2022	Host 5 Tabletop Exercises in 2022
Wildfire Protection Plan Engagement	Inform, engage, and solicit feedback from customers and communities through 5 annual public engagement and feedback sessions, focused on plan elements and future improvements.		Host 5 Public Engagement and Information Sessions in 2022
Education and Awareness	Manage a multiprong approach including targeted social media and radio advertisements, website updates and improvements, educational webinars, digital and print brochures, and an annual customer survey to assess impacts.		
Industry Collaboration	Actively participate in consortiums, forums, and advisory boards to collaborate with industry experts, maintain expertise in leading edge technologies and operational practices, and continue to improve and advance the Wildfire Protection Plan and its programs.		
Plan Monitoring & Implementation	Leverage a centralized, dedicated team to develop, monitor, implement, and continuously improve the Wildfire Protection Plan.		

Plan Costs

Delivering Pacific Power's 2022 Wildfire Protection Plan, as summarized above, requires an increase in investment across multiple years, currently forecasted to be approximately $473 million across five years, or $371 million capital and $102 million expense. Some programs, as understood today, require finite investment with a planned end date, such as the replacement of expulsion fuses in the FHCA by the end of 2025 for $18.3 million or the installation of CFCIs in 2022 for $1.3 million. Other programs, such as enhanced inspections or vegetation management, are expected to be on-going and annual in nature. Additionally, the FHCA line rebuild program, which is particularly large and complex in scope, is forecasted to continue until 2029 to ensure completion of all 1,200 miles. Furthermore, not all programs require spend of each type in each year.

The following tables describe Pacific Power's current five-year estimate of these incremental costs broken down by program and expenditure type. While the tables only include a five-year forecast, these programs and increased expenditure are expected to continue beyond 2026.

Table 12: Planned Incremental Capital Investment by Program Category ($millions)

Program Category	2022	2023	2024	2025	2026	5 Year Total
System Hardening	$ 16.8	$ 49.1	$ 88.6	$ 116.6	$ 88.9	$ 360.0
FHCA Line Rebuild	*$ 5.7*	*$ 37.7*	*$ 73.8*	*$ 105.1*	*$ 86.1*	*$ 308.4*
System Automation	*$ 8.6*	*$ 5.2*	*$ 8.7*	*$ 7.9*	*$ 2.8*	*$ 33.2*
Fuse Replacement	*$ 2.5*	*$ 6.1*	*$ 6.1*	*$ 3.7*	*$ -*	*$ 18.3*
Situational Awareness[15]	$ 5.3	$ 1.9	$ 1.3	$ 0.4	$ 0.4	$ 9.5
Weather Station Installs	*$ 3.6*	*$ 1.3*	*$ 0.8*	*$ -*	*$ -*	*$ 5.6*
Fire Impact Modelling	*$ 1.7*	*$ 0.7*	*$ 0.5*	*$ 0.4*	*$ 0.4*	*$ 3.9*
System Operations	$ 1.3	$ -	$ -	$ -	$ -	$ 1.3
Public Safety Partner Coordination	$ 0.3	$ -	$ -	$ -	$ -	$ 0.3
Grand Total	**$ 23.7**	**$ 51.0**	**$ 89.9**	**$ 117.1**	**$ 89.3**	**$ 371.0**

Table 13: Planned Incremental Expense by Program Category ($millions)

Program Category	2022	2023	2024	2025	2026	5 Year Total
Risk Modeling and Drivers	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.7
Inspection & Correction	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 3.3
Vegetation Management	$ 15.6	$ 15.6	$ 15.6	$ 15.6	$ 15.6	$ 77.8
Situational Awareness	$ 0.9	$ 2.2	$ 2.2	$ 2.2	$ 2.2	$ 9.6
System Operations	$ 0.2	$ -	$ -	$ -	$ -	$ 0.2
PSPS Program	$ 0.9	$ 1.0	$ 0.7	$ 0.5	$ 0.3	$ 3.4
Public Safety Partner Coordination	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.7
Wildfire Plan Engagement Strategy	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.3
Education and Awareness	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 2.3
Industry Collaboration	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.1	$ 0.3
Plan Monitoring & Implementation[16]	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 0.7	$ 3.5
Grand Total	**$ 19.7**	**$ 20.9**	**$ 20.7**	**$ 20.4**	**$ 20.3**	**$ 102.1**

As this is the first Wildfire Protection Plan submitted in Oregon, there is much to be learned this first cycle to determine how best to improve wildfire safety in such a way that aligns with

[15] Situational awareness incremental spend represented in this table only includes Oregon's allocation of additional spend.

[16] Similar to Situational Awareness, Plan Monitoring & Implementation incremental spend reflects Oregon's allocation of the total incremental cost.

community and commission expectations. Key takeaways from collaborations with other utilities, Public Safety Partners, the Commission, communities and customers will be evaluated for incorporation into future Wildfire Protection Plans and may require corresponding changes or updates to these forecasts.

Co-Benefits of Plan

Pacific Power's 2022 Wildfire Protection Plan encompasses various strategies, programs, and investments designed to reduce the risk of catastrophic wildfire, in a manner consistent with emerging industry best practices. The elements of this plan provide clear benefits in the areas of wildfire mitigation, whether through enhanced inspections and corrections, additional vegetation management activities, or system hardening and the implementation of covered conductor. Additionally, maturation in the areas of risk mapping and situational awareness facilitate the prioritization and balancing of efforts to ensure the plan is delivered as efficiently as practical.

In identifying plan elements, Pacific Power considered both the costs and the benefits of any particular approach. Above all, Pacific Power's strategies were guided by the principle that the frequency of ignition events related to electric facilities can be reduced by engineering more resilient systems that experience fewer fault events.

While the mitigation strategies in this plan are designed to reduce the risk of wildfire, many also offer significant co-benefits to the utility operation and its customers. For example, more frequent inspections can result in the identification and accelerated correction of additional conditions, which reduces wildfire risk. This same program can also improve public safety, worker safety, and reliability.

Similarly, system hardening provides one of the most beneficial ways to reduce wildfire risk, by increasing the level of localized weather conditions that can be tolerated without impact on the utility operations. For example, installing covered conductor will increase the grid's resiliency against wind-driven contacts. The mechanical properties of a covered conductor design physically prevent the initiation of a flash-over due to contact, mitigating wildfire risk. For this same reason, covered conductor also reduces the potential for outages, thereby providing significant reliability benefits.

Furthermore, Pacific Power's situational awareness capabilities provide multiple wildfire mitigation benefits by informing operational and field protocols and playing a key role in the facilitation of PSPS protocols and decision-making. Along the same lines, situational awareness, paired with operational readiness, provides co-benefits throughout the year by supporting Pacific Power's response to many types of emergency related events, such as winter storms. While the program is designed to mitigate wildfire risk, Pacific Power anticipates leveraging this new capability to support other types of emergency response and overall system resilience.

Finally, Pacific Power's Wildfire Protection Plan includes the use of new technologies, such as the implementation of advanced protection and control schemes. While key to reducing the potential for utility related spark events following a fault event, this equipment provides additional co-benefits in the areas of distribution system planning readiness. These projects lay the initial foundation for greater incorporation of other tactics, such as distribution automation or distributed generation.