WILDFIRE MITIGATION AND RESPONSE PLAN

2023

PUGET SOUND ENERGY

CONTENTS

PSE PUGET SOUND ENERGY

1. INTRODUCTION

Safety is Puget Sound Energy's (PSE) top priority. PSE is an "all-hazards" company – our natural gas and electric systems must serve our customers through a range of weather and environmental conditions, such as wildfires, high winds, flooding or earthquakes, and human-caused hazards such as vehicle accidents or cyber threats. Emergency preparedness and response is at the core of our services, and meeting the growing challenge of wildfires is an extension of that responsibility.

Over the past decade, wildfires have emerged as a significant public health and safety concern for much of the Western United States. As a result of climate change and chronic drought conditions, the risk of wildfire now extends beyond historically active areas into communities experiencing significant growth and development. While the severity of these conditions varies greatly across the West, and even within individual states, the growing risk warrants appropriate assessment and mitigation by utilities and their regulators, as well as broader engagement with impacted communities and interested persons. A comprehensive, geographically specific, and data-driven approach that mitigates wildfire hazards while maintaining the reliable delivery of energy is critical.

This Wildfire Mitigation and Response Plan (Plan) documents our strategies, programs, procedures, and specific actions to respond to and mitigate wild-land fires. It incorporates best practice models from risk management, operations, emergency management, communications, training, and continuous improvement, with the ultimate priority being the safety of the communities and customers we serve, and the personnel that serve them. This Plan will continue to evolve with our collective understanding of wildfire risk and as new risk reduction strategies and technologies emerge.

Included as Appendix A to this Plan is a summary of the Plan by strategic element, which states performance metrics, recent actions, accomplishments, and upcoming milestones. Significant changes and improvements from the previous Plan include:

- An updated risk model with additional granularity to facilitate the scoping of grid-hardening work.
- A new Plan objective that embeds equity into planning and execution processes.
- Matured wildfire response plans, including progressing the development of a Public Safety Power Shutoff (PSPS) Plan.
- New standards for use in higher wildfire risk areas to influence the scoping and materials of distribution projects in defined wildfire zones.
- A Charter for PSE's Wildfire Mitigation Task Force that clearly identifies roles and responsibilities associated with ongoing work to maintain and mature the Wildfire Mitigation Program.
- Key performance metrics that will be used to track the progress and performance of the Wildfire Mitigation Program.
- A new outage model that will be applied to prioritize future grid-hardening portfolios.
- A process for capturing ignition data to enhance PSE's ability to report on wildfire season experiences, identify trends for correction, and improve situational awareness for planning and maintenance engineers.

The following table represents a summary of the capital investments made in 2021-2022 and the planned investments through 2026. These investments are designed to provide reliability benefits, reduce wildfire risks, and improve response activities described in this Plan.

Table 1: PSE's capital investments 2021-2026 with reliability and wildfire risk reduction benefits

	2021		2022		2023		2024		2025		2026	
MITIGATION TYPE	COUNT	$	COUNT	$	COUNT	$	COUNT	$	COUNT	$	COUNT	$
Fault Reduction	**16**	**$14,900,000**	**12**	**$9,400,000**	**18**	**$15,400,000**	**25**	**$29,400,000**	**14**	**$24,709,497**	**12**	**$ 2,200,000**
Covered Conductor	1	$1,000,000	2	$5,900,000	2	$2,200,000	8	$10,000,000	-	$-	-	$-
UG Upgrade	-	$-	1	$1,400,000	1	$2,800,000	-	$-	-	$-	-	$-
UG Conversion	2	$8,800,000	-	$-	1	$1,500,000	3	$9,100,000	-	$20,500,000		
OH Upgrade	1	$200,000	-	$-	2	$5,500,000	2	$6,600,000	-	$-	-	$-
UG Capacity	-	$-	-	$-	1	$500,000	-	$-	-	$-	-	$-
OH Capacity	1	$2,200,000	-	$-	2	$800,000	1	$1,300,000	1	$100,000	-	$-
Pole Replacement	11	$2,700,000	9	$2,100,000	9	$2,100,000	11	$2,400,000	11	$2,400,000	12	$ 2,200,000
Copper Replacement	-	$-	-	$-	-	$-	-	$-	2	$1,709,497	-	$-
Fault Protection	**11**	**$2,400,000**	**9**	**$1,400,000**	**28**	**$5,300,000**	**33**	**$10,300,000**	**25**	**$12,000,000**	**1**	**$ 3,500,000**
Wildfire Resilience	-	$-	-	$-	1	$1,200,000	1	$5,000,000	1	$3,000,000	1	$ 3,500,000
Substation SCADA	4	$600,000	3	$500,000	10	$1,300,000	20	$3,000,000	19	$4,800,000	-	$-
Recloser	5	$400,000	4	$300,000	14	$1,100,000	9	$700,000	-	$-	-	$-
Distribution Automation	-	$-	-	$-	2	$900,000	3	$1,600,000	4	$3,700,000	-	$-
Transmission Automation	2	$1,400,000	2	$600,000	1	$800,000	-	$-	1	$500,000	-	$-

Appendix B provides a view of the investments summarized in Table 1 by business plan over various time-frames. Appendix B also estimates the number of projects on wildfire circuits for the outer years and the proportion of the planned investments for those programs that will provide wildfire risk reduction benefits.

2. FRAMEWORK

2.1. PURPOSE

The Plan documents PSE's strategies, operational procedures, and system investment approaches that enable our utility to identify, mitigate, and respond to evolving wild-land fire risks that pose a risk to our services and communities. The Plan establishes safety as the first priority and describes methods in which PSE addresses situational awareness, notification, preventative measures, and response and recovery actions specific to wildfire risks.

2.2. SCOPE

PSE operates approximately 2,600 miles of transmission and 10,000 miles of overhead distribution circuits, including 340,000 poles, and 440 substations in Washington State. PSE invests in reliability and resiliency improvements, which helps improve wildfire resilience throughout our service area. This Plan applies to PSE's entire service area, however, we use risk modeling and defined wildfire zones to determine where communities and assets are at the greatest risk of wildfire and focus investments in those areas.

This Plan details the actions that PSE is currently performing to address wildfire risks in our service area and describes the steps we are taking to improve the electric system and our operational response to changing conditions and emerging risks. This Plan also includes PSE's plans for communicating and working with customers and communities to ensure safety and reliability. Consistent with PSE's continuous improvement model, we will make adjustments to this Plan periodically as new information and experience is learned from our internal teams, industry partners, regulatory bodies, customers, and communities.

2.3. OBJECTIVES

The objectives of this Plan are as follows:

- Uphold safety for the communities and customers we serve, and for our employees.
- Embed equity into the planning and execution of wildfire mitigation strategies throughout the communities we serve.
- Understand the long-term and real-time wildfire risk in PSE's service area through development and maturity of the appropriate assessment tools.
- Implement mitigation solutions that balance the risk of wildfire with safe and reliable energy delivery by prioritizing higher risk assets and geographic areas.
- Leverage existing grid modernization programs to deliver benefits for wildfire resiliency.
- Incorporate communication with fire agencies into operational processes to ensure the safety of PSE employees during an active fire event.
- Inform customers of PSE's wildfire preparedness measures and our communication protocols in the event of a specific wildfire risk.
- Engage with customers and communities in the ongoing development of the Plan, particularly as it relates to ensuring customer safety and electric reliability.
- Continuously improve this Plan through learning from others and deploy best practices as they become helpful to PSE's service area and risks.

2.4. ELEMENTS

The following elements focus PSE's approach in delivering the Plan objectives:

- Situational Awareness: PSE's wildfire risk modeling and weather forecast monitoring enables grid operators to proactively identify emerging risks associated with fire weather. Enhanced inspection technology pilots are under way to evaluate how new tools might provide a more detailed assessment of equipment condition and vegetation encroachment.
- Fault Reduction: Decrease the number of outage incidences along PSE's system by prioritizing reliability programs that strengthen PSE's infrastructure within higher wildfire risk areas to reduce the duration and extent of electrical fault incidences.
- Fault Protection: Reduce the duration and extent of outage incidences along PSE's system. Adopt common fault protection tactics including altering automatic reclosing and protective device setting.
- Operational Procedures and Emergency Response: Operation within wildfire zones and during wild-land fire weather events may be different than traditional operating procedures, increasing the need to predict conditions, respond proactively, and coordinate emergency response differently and with many other entities.
- Communication and Outreach: Effective external and internal communication is essential for coordinated prevention and response to wildfire risks. PSE is committed to keeping our customers and impacted communities informed and engaged in our wildfire program. Communications and outreach for the wildfire program includes education and awareness, equitable public involvement and timely communications during an emergency.

2.5. PERFORMANCE METRICS

In the 2022 Plan, PSE proposed an initial list of performance metrics. Upon reviewing those initial performance metrics and integrating feedback from interested persons, including Washington Utilities and Transportation Commission staff, PSE selected the performance metrics listed to the right to track per calendar year to report progress. Capturing these metrics will hold value in identifying the work delivered, evaluating how useful that work is in accomplishing Plan objectives, and providing insights on how methods can be improved.

Listed below are the specific performance metrics that will be reported in Appendix A.

Situational Awareness

- Miles of high-risk overhead power lines inspected pre-wildfire season

Fault Reduction

- Miles of bare conductor upgraded
- Miles of conductor undergrounded
- Miles of covered conductor installed

Fault Protection

- Number of SCADA-enabled reclosers installed
- SCADA upgrades to circuit breakers
- Distribution Automation schemes installed
- Fiberglass arms installed

Communication and Outreach

- Unique page views of pse.com/wildfirepreparedness

2.6. EXECUTION AND CONTINUOUS IMPROVEMENT

2.6.1. CHRONOLOGY OF THE PSE WILDFIRE PROGRAM

Appendix C is a chronology of the development of the wildfire program at PSE. It documents the development and maturation of PSE's Plan and supplements the additional actions that are discussed throughout this Plan.

2.6.2. STAFFING

Currently, PSE has a total of four staff positions dedicated specifically to the planning, administration, and continuous improvement of PSE's wildfire mitigation efforts. This includes a Wildfire Mitigation Program Manager and Asset Management-Wildfire Engineer that were on-staff at the time of the last plan update. Since the previous Plan update, PSE hired a Data Scientist in May of 2022 and a Communications Initiatives Consultant in December of 2022. These positions will ensure year-round progress in the different elements of this Plan.

PSE's Wildfire Mitigation Program Manager leads development and implementation of PSE's wildfire risk reduction strategies and ensures that mitigation aligns with corporate objectives. Additional responsibilities of this role include:

- Establish internal governance and a charter for the program.
- Manage wildfire program budgets.
- Establish and maintain documentation that demonstrates the effectiveness of our wildfire investments.
- Prioritize resources needed to deliver the program's objectives.
- Facilitate communication and outreach activities with interested persons, including customers and Washington Utilities and Transportation Commission regulatory staff, about the wildfire program and other wildfire risks, mitigation, and associated issues.
- Ensure that equity is embedded into planning and execution of wildfire mitigation strategies.
- Engage in industry working groups and workshops on wildfire-related topics.

PSE's Asset Management-Wildfire Engineer is responsible for:

- Support the development of holistic strategies and processes for reducing wildfire risk and improving reliability and resiliency.
- Provide technical expertise and guidance to the Wildfire Mitigation Program Manager.
- Assess equipment reliability and performance needs from an asset management perspective.
- Develop and implement asset management strategies for long-term system hardening in higher wildfire risk areas.
- Engage with the industry and vendors to align with best practices and evaluate the potential for integrating new technologies or approaches to reduce wildfire risk.
- Work with Field Engineering & Innovation and Standards to explore new technologies and improve equipment specifications.
- Define and review metrics by which PSE can quantify the value of decision-making based on risk, performance, and cost.

PSE's Data Scientist position will support PSE's wildfire mitigation efforts. This person is responsible for:

- Leverage data, internal and external, to develop operational models for a predictive approach to wildfire mitigation.
- Collaborate with multiple external entities to ensure PSE is on the front lines of latest wildfire mitigation efforts.
- Develop visualization for real-time monitoring and evaluation of data models.

PSE's Communications Initiatives Consultant is responsible for:

- Manage the communications and public engagement components of PSE's Wildfire Mitigation and Response Program, and support the development, exercise, and continuous improvement of communication-specific wildfire response plans.
- Identify audiences, including highly impacted communities and vulnerable populations, and develop and implement a strategic communications and community engagement plan with a focus on reaching all impacted audiences.
- Engage directly with customers, answering questions, and act as a liaison between the public and the Wildfire Mitigation and Response Program.
- Identify and implement communications tools, techniques and best practices to support PSE's Wildfire Mitigation and Response Program.

2.6.3. GOVERNANCE

In addition to the dedicated staff positions described above, many internal departments at PSE have been and will remain actively involved in wildfire risk mitigation. In 2022, PSE developed a charter for the Wildfire Task Force Team to provide greater structure and governance. The following roles and responsibilities matrix is taken from the charter and outlines specifically who is responsible for what bodies of work beyond the four dedicated wildfire mitigation and response staff noted above.

TITLE	ROLE	RESPONSIBILITIES
Energy Delivery, Vice President	Sponsor	• Approves Charter • Approves overall direction and strategy associated with Wildfire Mitigation Program • Helps remove obstacles that prevent Wildfire Task Force members from accomplishing objectives • Actively provides feedback • Provides a perspective of PSE's and Energy Delivery's organizational mission and goals
Director, Legal Communications **Marketing and Community Engagement, Director** **Electric Operations, Director** **Energy Equity, Director** **Engineering, Director** **System Planning, Director** **Project Delivery, Director** **Safety, Director**	Steering Committee	• Provides advice and direct input related to the Wildfire Mitigation Program • Aids in the decision-making related to the strategic direction of projects and initiatives associated with wildfire mitigation • Is an advocate for wildfire mitigation initiatives and projects across their organizations • Assures adequate resources are allocated to deliver work plan tasks • Provides guidance to ensure PSE complies with current and future regulations related to Wildfire Preparedness and Mitigation
Wildfire Mitigation and Response, Program Manager **Infrastructure Program Management, Manager** **Vegetation Management, Manager** **Asset Management, Engineer** **Communication Initiatives, Wildfire Mitigation, Communications Initiatives Consultant**	Core Wildfire Team	• Develops the Wildfire Task Force Charter • Manages overall completion of the Wildfire Mitigation Program deliverables set forth in the work plan • Annually updates the Wildfire Mitigation and Response Plan in compliance with WUTC requirements • Benchmarks utility best practices and makes recommendations to leadership taking in consideration which practices are appropriate to implement for PSE's system based on the specific wildfire risks in our service area • Provides regular program updates to internal and external interested parties

TITLE	ROLE	RESPONSIBILITIES
System Planning, Manager **Grid Modernization Strategy and Enablement, Manager** **Asset Management of System Planning, Supervisor** **Asset Management of System Planning, Data Scientist** **Asset Management of System Planning, Engineer**	Planning Support	• Develops and updates the Wildfire Business case that includes holistic strategies and processes for reducing wildfire risk and improving reliability and resiliency equitably • Provides technical expertise and guidance to the Wildfire Mitigation Program Manager • Assesses equipment reliability and performance needs from an asset management perspective • Develops and implements asset management strategies for long-term system hardening in higher wildfire risk areas • Engages with the industry and vendors to align with best practices and evaluate the potential for integrating new technologies or approaches to reduce wildfire risk • Works with Field Engineering & Innovation and Standards to explore new technologies and improve equipment specifications • Defines and reviews metrics by which PSE can quantify the value of decisions based on risk, performance, and cost • Leverages data, internal and external, to develop operational models for a predictive approach to wildfire mitigation • Develops visualization for real-time monitoring and evaluation of data models
Electric Operations, Electric First Response, Manager **Electric Operations, Substations, Manager** **Electric Operations, System Management and Ops, Manager** **Transmission Load Office, Manager** **Vegetation Management, Manager**	Operational Support	• Identifies and executes annual pre-season wildfire preparations such as pre-season vegetation inspections and maintenance of high-risk portions of the electrical system • Identifies and executes annual pre-season wildfire preparations such as pre-season inspections and repairs of high-risk portions of the electrical system and training on wildfire operational and response protocols • Leads in developing, executing, training, and providing continuous improvement of operational protocols needed during times of heightened wildfire risk, wildfire response, and Public Safety Power Shut Off (PSPS) events • Leads in identifying and executing operational requirements needed to be fully capable of implementing a PSPS
Communications Initiatives, Manager **Communication Initiatives, Major Projects and Initiatives, Supervisor** **Communication Initiatives, Wildfire Mitigation, Communications Initiatives Consultant**	Communication Support	• Develops and executes an overall communications and outreach strategy to support the Wildfire Program • Coordinates public affairs components among responsible parties • Takes lead in developing, executing, and continuously improving a PSPS Communication and Engagement Plan • Engages directly with customers to answer questions, and acts as a liaison between the public and the Wildfire Mitigation and Response Program
Government Affairs, Senior Rep **Community Engagement Representative** **Outreach Manager** **Municipal Liaison Manager**	Government Relations and Community Outreach Support	• Coordinates communication and outreach to external interested parties such as customers, governmental agencies, and community partner agencies on new PSE Wildfire Program developments such as PSPS planning • Helps develop and participates in exercising the Public Safety Power Shut Off Communication and Engagement Plan annually once the plan has been developed • Coordinates with local agencies and organizations to support impacted populations during wildfire events • Communicates directly with local elected officials about active wildfire response
Operational Training, Manager **Field Engineering & Innovation, Supervisor Engineering** **Field Engineering & Innovation, Engineer** **Standards and Quality, Engineer** **Standards and Quality, Manager**	Operational Training/ Procedures Support	• Works with Wildfire Asset Engineer to explore new technologies and improve equipment specifications to reduce wildfire risks • Works with Ops Training & Procedures to ensure all appropriate personnel have completed training on new technologies and equipment • Works with Wildfire Asset Engineer to develop construction standards for higher wildfire risk areas

TITLE	ROLE	RESPONSIBILITIES
Emergency Management, Planning Manager	Emergency Management Support	• Ensures wildfire response plans align overall with the PSE Energy Restoration Plan • Acts as a liaison to external emergency management agency partners • Takes lead in developing wildfire related exercises
Compliance, Manager **Grid Modernization Strategy and Enablement, Consulting Engineer** **Infrastructure Program Management** **Manager of Energy Equity** **Regulatory Initiative Affairs, Manager** **System Protection, Supervisor of Engineering** **Technology, GIS Technical Systems Analyst** **Safety Department, Safety Health Work Practice Consultant**	Technical Support*	• Provides guidance to ensure PSE complies with current and future regulations related to Wildfire Preparedness and Mitigation • Provides the Wildfire Program technical perspective and support services within their specific discipline

* There may be other Technical Support Members needed from time to time that are not listed.

2.6.4. APPLYING EQUITY TO PLANNING AND EXECUTION

In 2023, PSE has created a new energy equity team to embed equity in business processes across the enterprise and that team has been consulted in the development of this plan. Embedding equity in PSE's Wildfire Mitigation plan is important to engaging all interested parties and communities. This involves identifying highly impacted communities and vulnerable populations impacted by the plan developing approaches to meaningfully engage with them and considering and addressing the unique needs and vulnerabilities of all communities impacted by the plan. This includes taking into account socio-economic factors such as income, race, and language barriers, as well as physical factors such as geography and infrastructure. Equity considerations may involve outreach efforts to ensure that all community members are informed and engaged in the planning process, providing adequate resources and support for highly impacted communities and vulnerable populations. By considering equity in the development and implementation of the wildfire mitigation plan, PSE can help ensure that all members of the community are considered and have the opportunity to take action to mitigate the risk of wildfires.

PSE will leverage tools and resources available to identify high wildfire area that are part of PSE's Name Community (Highly Impacted and Vulnerable Population), and develop a prioritization approach to ensure we consider equity in mitigating risk within our service territory.

2.6.5. LESSONS LEARNED

PSE incorporates lessons learned from previous wildfire seasons and interactions with regulators, customers and communities, peer utilities, Emergency response agencies, industry groups, and others. Lessons learned during the 2022 wildfire season that will be incorporated in 2023 include:

- Clear communication is needed during de-energization events in response to active wildfires. These de-energization events are not PSPS events. In the case of the Bolt Creek Fire, there was some confusion regarding the de-energization for first responder and community safety with active wildfires, which resulted in it being referenced incorrectly as a Public Safety Power Shutoff.

  Action taken: As a result, PSE added information to community meetings to help clarify the key distinctions between these two types of events and will continue to clarify these actions in our external messaging to the public. PSE is also working with the Department of Commerce Energy Resilience and Emergency Management Director to ensure clear lines of communication during future de-energization events similar to the one that occurred in response to the Bolt Creek Fire.

- While our general wildfire response efforts proved to be effective during the 2022 season, PSE identified the further refinement of certain wildfire response roles and responsibilities would be beneficial.

  Action taken: PSE revised internal communication emergency response documents related to various emergency types to include key wildfire personnel. Additionally, PSE developed internal checklists for pre-wildfire season preparations, and small and large fire response in early 2023 all of which clarify roles and responsibilities.

3. PSE WILDFIRE RISK

3.1. WASHINGTON STATE FIRE ENVIRONMENT

Washington is not immune to the effects of climate change, which are projected to increase in nature over the next several decades. Summers are projected to be drier and warmer and extreme weather events may become more likely. Changing weather patterns can shift tree pests and disease as well, causing additional fire load in forests and in the adjacent wild-land urban interface (WUI).

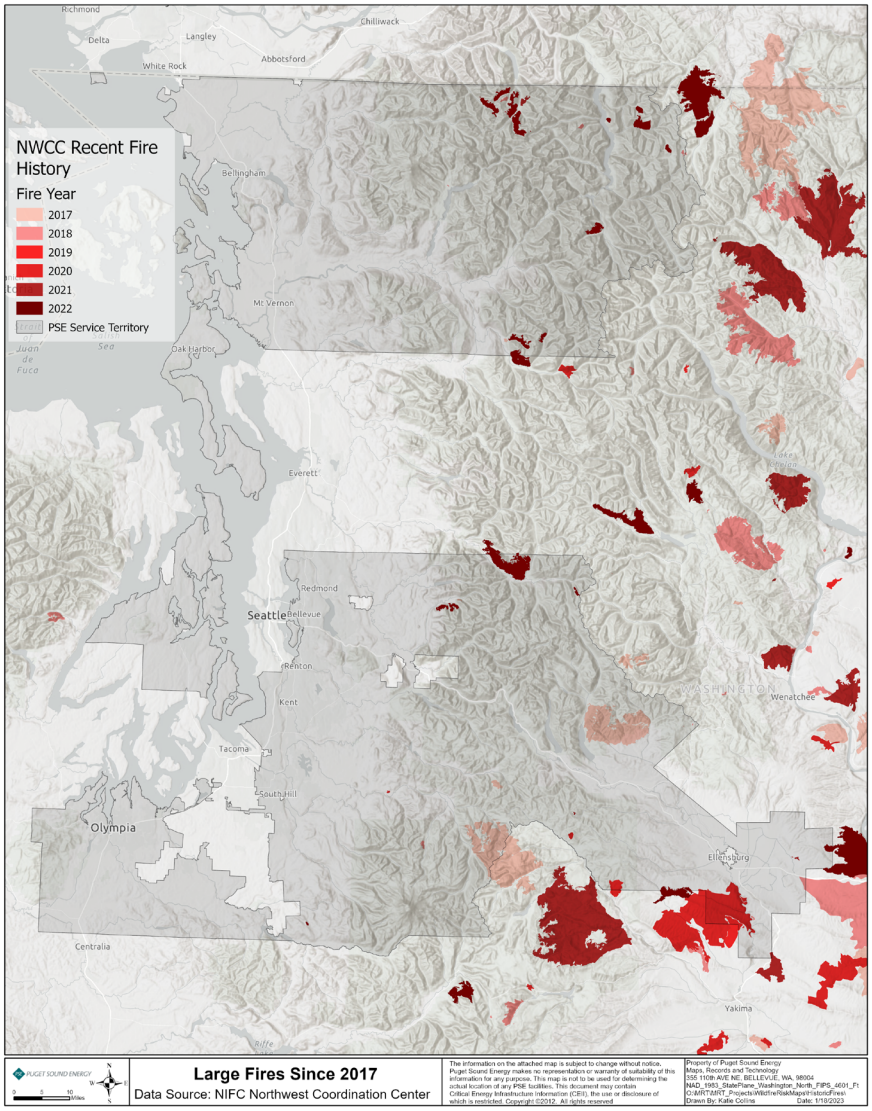
Increased development in areas exposed to wildfire risk means that the potential consequence of wildfires on human populations is increasing. Human settlement and forest management practices have led to increased fire suppression activities allowing for additional accumulation of fuel.

As PSE continues to implement and mature this Plan, an increasingly granular understanding of evolving wildfire risk within our service area will help us to take action in an efficient and effective manner. As changing conditions shift the risk landscape across PSE's service area, frequent iterations and improvements to existing risk modeling will be vital to the timely deployment of mitigation tactics and system hardening projects.

3.1.1. HISTORICAL WILDFIRE ACTIVITY IN PSE'S SERVICE AREA

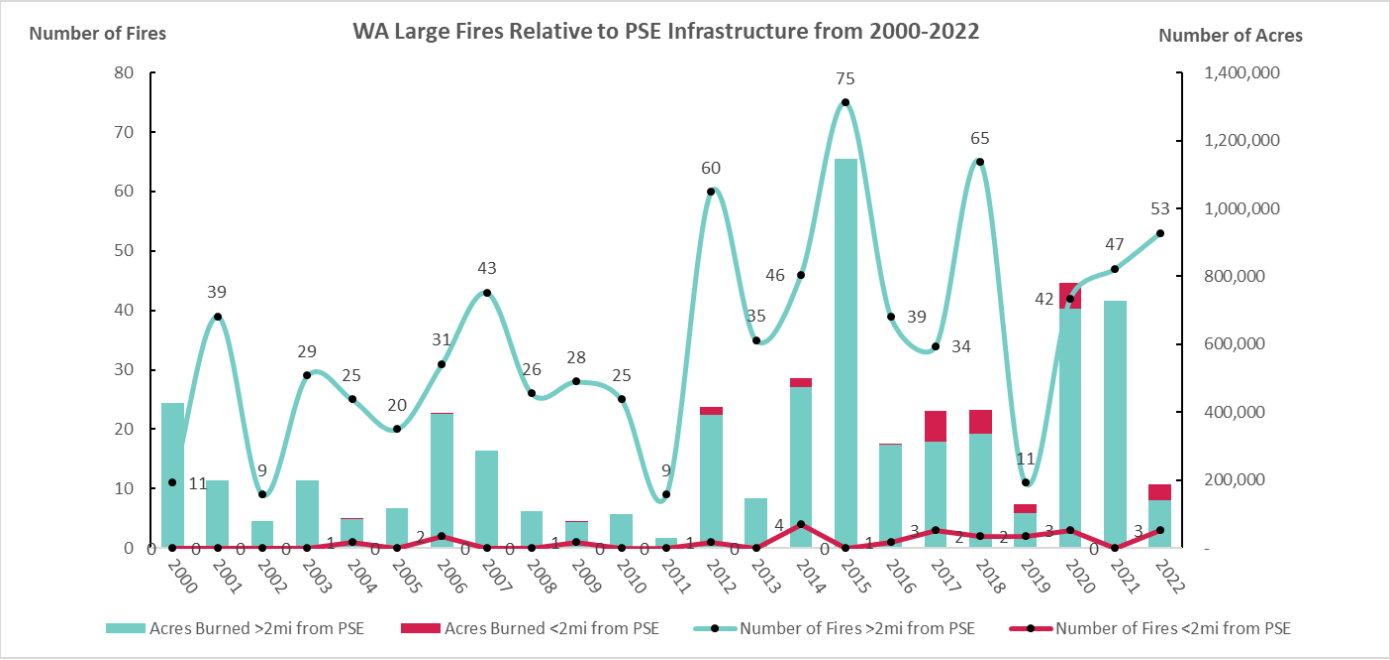
PSE operates in both Western and Central Washington, which have historically had different wildfire risks based on their different environmental conditions. The majority of PSE's electric distribution and transmission system is located in Western Washington where large wildfires are historically quite rare. Figure 1 shows the different experiences with large wildfires on each side of the Cascade Mountain range since 2017.

Figure 1: Large wildfires from 2017-2022



PSE has a historical lack of wildfire-related loss events in its service area. However, as illustrated in Figure 2, recent events impacting utilities throughout Washington State indicate that climate conditions are shifting the risk landscape. Accordingly, PSE has prioritized assessing where higher wildfire risk areas exist for several years. As we continue to refine and improve wildfire risk modeling, additional granularity will enable more geographically specific identification of areas within PSE's service area that are subject to increasing risk due to climate conditions. This improved understanding of the shift in risk throughout PSE's service area will ensure effective deployment of grid modernization projects and operational actions designed to mitigate the risk of wildfire.

Figure 2: Washington State large fires relative to PSE infrastructure from 2000-2022



Source: Washington Department of Natural Resources

3.2. PSE RISK ASSESSMENT AND MODELING

3.2.1. WILDFIRE RISK ASSESSMENT

PSE's risk assessment process results in an understanding of where the risks of fire are highest due to the burn potential in specific areas as well as the interaction of vegetation contacting PSE equipment and other potential equipment failures that may entail spark ignition potential.

The wire specification (type and size) of conductors and overhead equipment is one variable in assessing the risk of a potential fault. The various types of conductors used throughout PSE's service area have been priority rated as low, medium, and high based on material and level of insulation. Grid modernization and hardening aid in reducing spark ignition potential.

The vegetation maintenance cycle is also used to determine the risk of a vegetation contact fault. Routine inspection and maintenance activity minimizes the risk of vegetation growing or falling into a circuit.

Fire Ignition

PSE employs the United States Forest Service (USFS) Wild-land Hazard Potential (WHP) map (also known as the burn potential map) to determine the risk of heat (a spark or arc) developing into a fire. More overhead exposure in these higher burn potential areas is considered by PSE to be a higher overall risk. Combining the wire specification risk and the burn potential severity gives an overall risk for an ignition potential.

Wildfire Propagation

For a fire event to spread into a wildfire, wind and terrain/fuels are the biggest drivers. The USFS burn potential map considers the fuel types and the terrain already, so PSE then adds several weather datasets to include the wind component.

Wind speed is a major driver of Red Flag Warnings issued by the National Weather Service (NWS), along with low humidity. PSE uses these two conditions as the trigger for operational decisions regarding how to configure the electrical system during high fire risk days.

Consequence

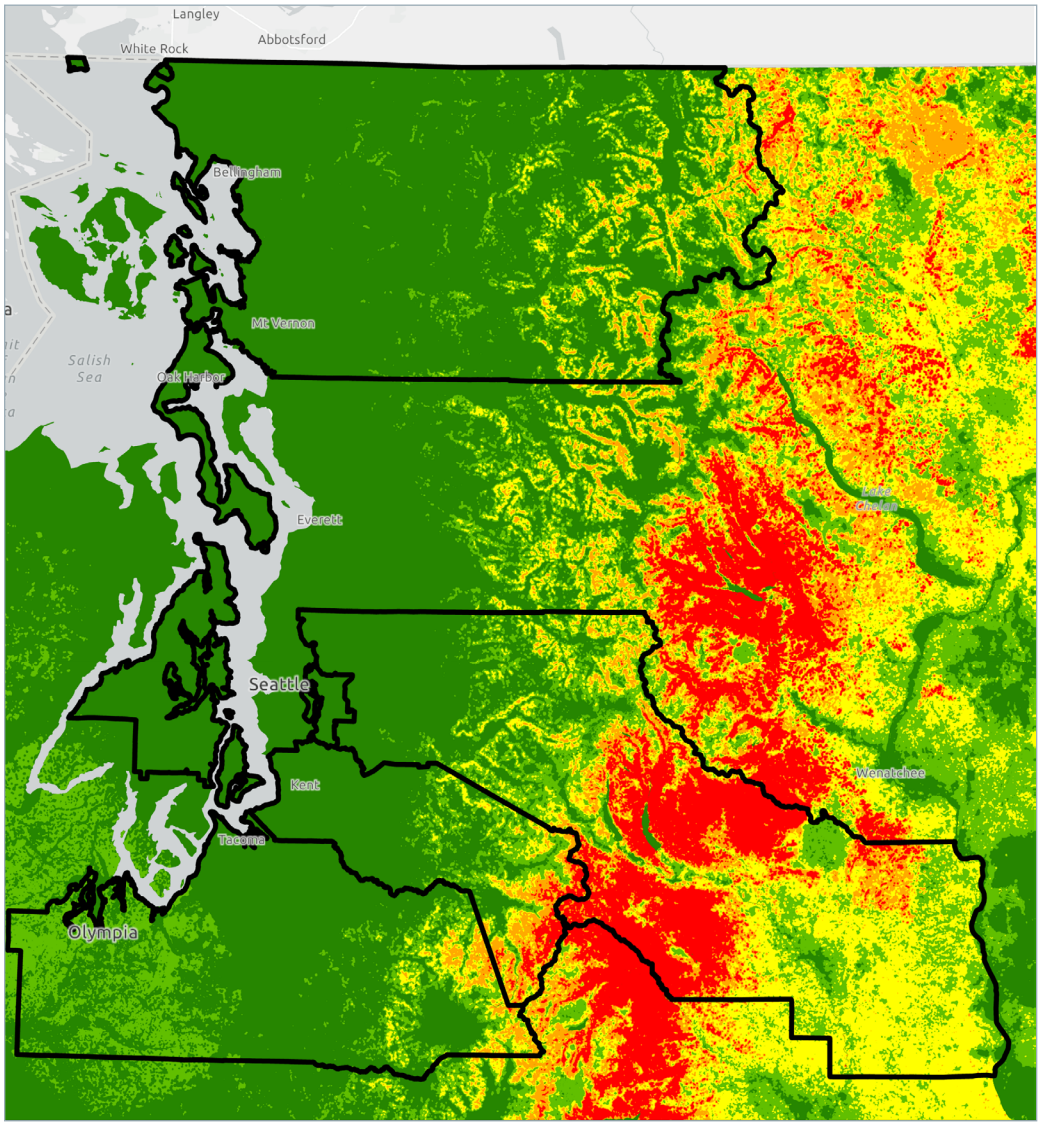
WUI is used to determine the possible consequences of a large wildfire threat to people and property. As development continues to increase and homes are built at the edge of and inside densely forested areas, people and structures are at increased risk of wildfire impacts. WUI provides a relative risk-weighting factor for these areas.

To identify the specific areas of PSE's system that have a higher risk of a wildfire event, it is necessary to overlay several different geospatial datasets with PSE's asset data. The primary datasets PSE uses to identify likelihood of ignition and consequence of a wildfire event are the WHP/burn potential and Burn Probability datasets created by the USFS, and the WUI dataset created by the Washington State Department of Natural Resources.

3.2.2. WILDFIRE HAZARD POTENTIAL

WHP mapping is a geospatial product produced by the USFS Fire Modeling Institute. This dataset depicts the relative potential for wildfire that would be difficult for suppression resources to contain, and combines information on wildfire likelihood, intensity, and fuels/vegetation as shown in Figure 3. The black outlines in figures 3-5 represent PSE's service territories.

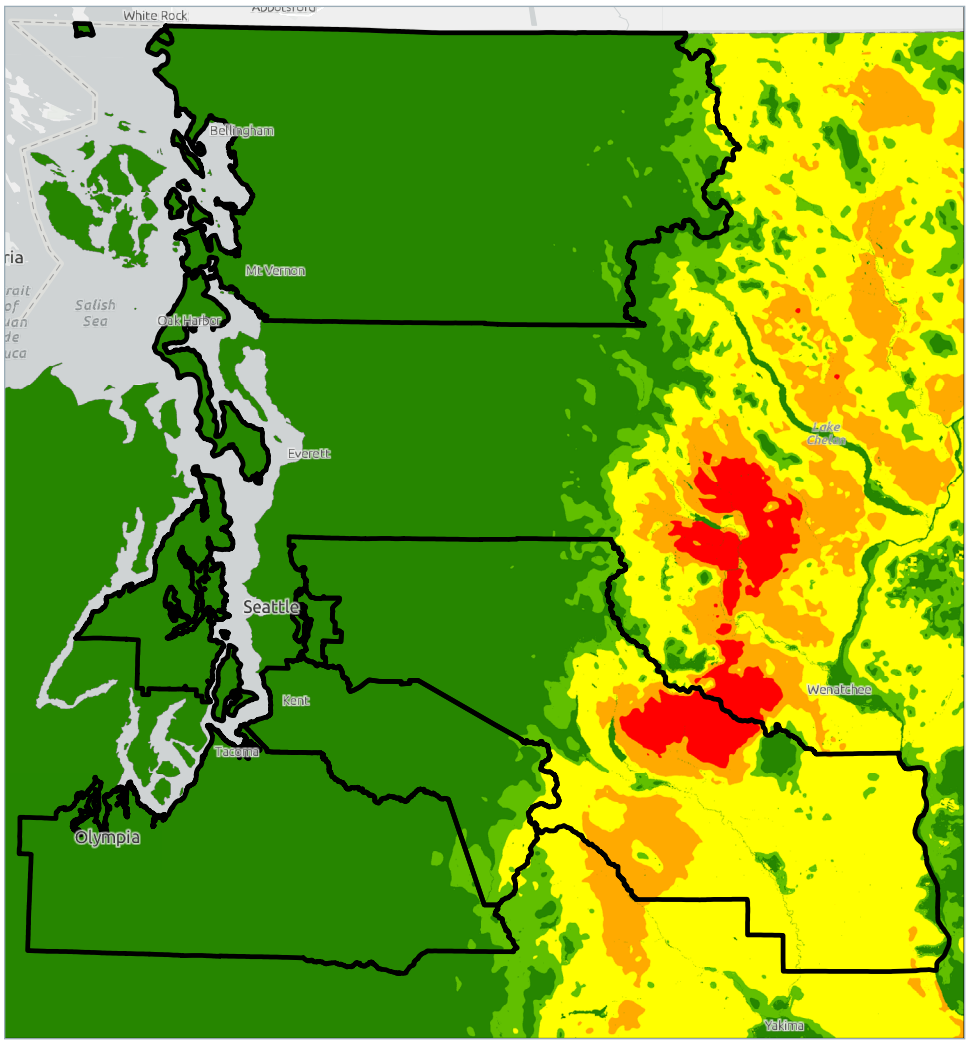
Figure 3: WHP map for PSE's territory



3.2.3. WILDFIRE BURN PROBABILITY

Wildfire Burn Probability mapping is a geospatial product produced by the USFS. This dataset depicts the annual probability that wildfire will burn in a specific location as shown in Figure 4.

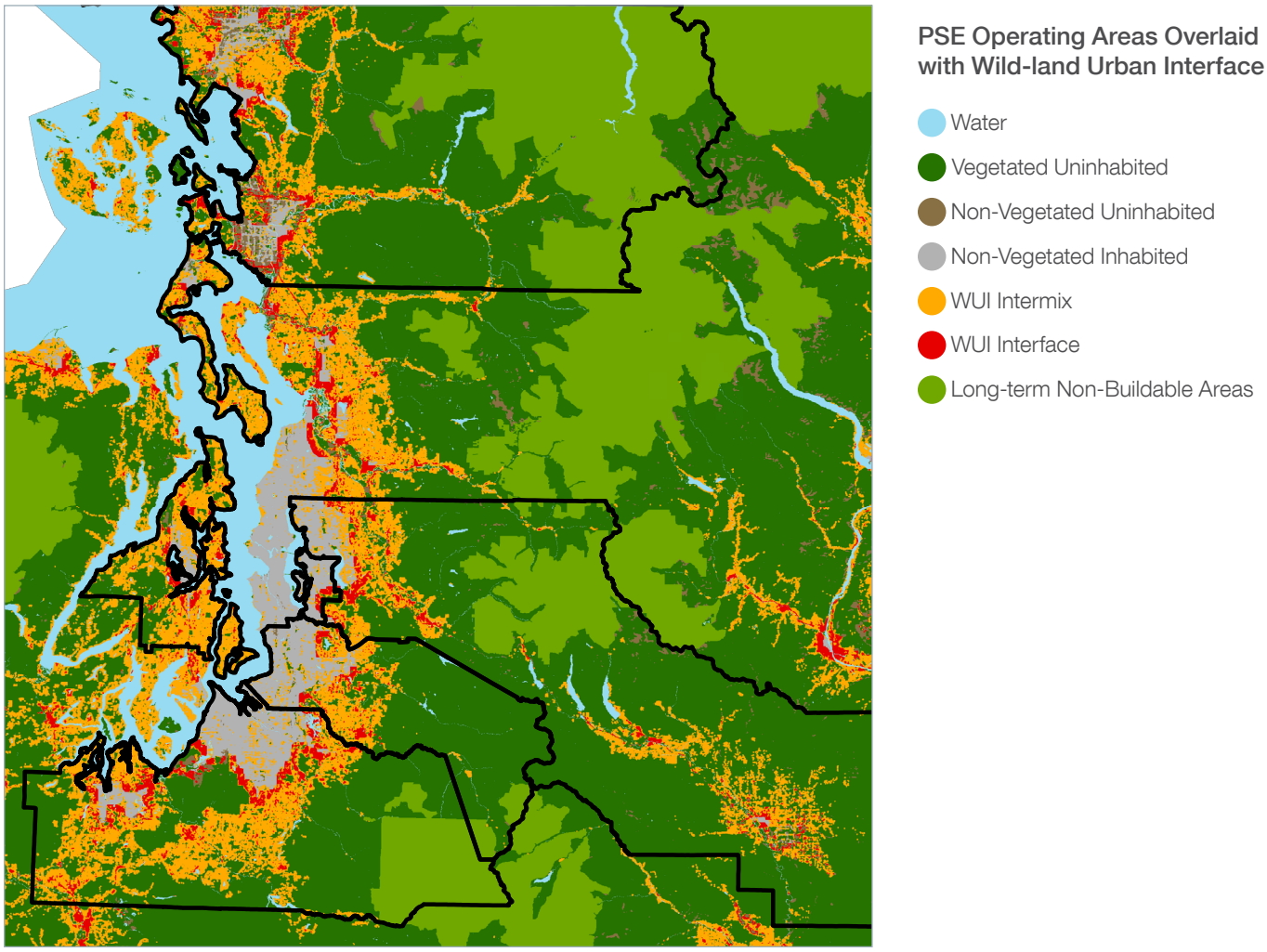
Figure 4: Burn probability map for PSE's area



3.2.4. WILD-LAND URBAN INTERFACE

The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wild-land or vegetative fuels. Communities adjacent to and surrounded by wild-land are at varying degrees of risk from wildfire. The Washington State Department of Natural Resources has identified the WUI areas. Figure 5 is the map of the WUI.

Figure 5: WUI map of PSE's area



3.2.5. WILDFIRE RISK MODELING

PSE's wildfire risk model is similar to other wildfire risk models employed by peer utilities in that risk is quantified by considering the likelihood of a wildfire event multiplied by the impact of a wildfire event in a particular area of our service area. PSE uses WHP to quantify the likelihood of an ignition propagating into a wildfire, Burn Probability to quantify the likelihood of a wildfire occurring during the year, and WUI as a proxy for the possible impact of that wildfire to personal safety and damage to property.

The geospatial datasets quantifying WHP, Burn Probability, and WUI are then overlaid with PSE's geospatial datasets of overhead electrical assets to determine the areas in which each type of risk exists. Generally, higher lineal footages of overhead conductors in the different risk classes will result in a higher risk score being assigned to that distribution circuit or transmission line.

In addition to WHP, Burn Probability, and WUI, PSE also utilizes additional asset data to further refine and differentiate the risk at the distribution circuit or transmission line level such as the types of electrical conductor used for construction.

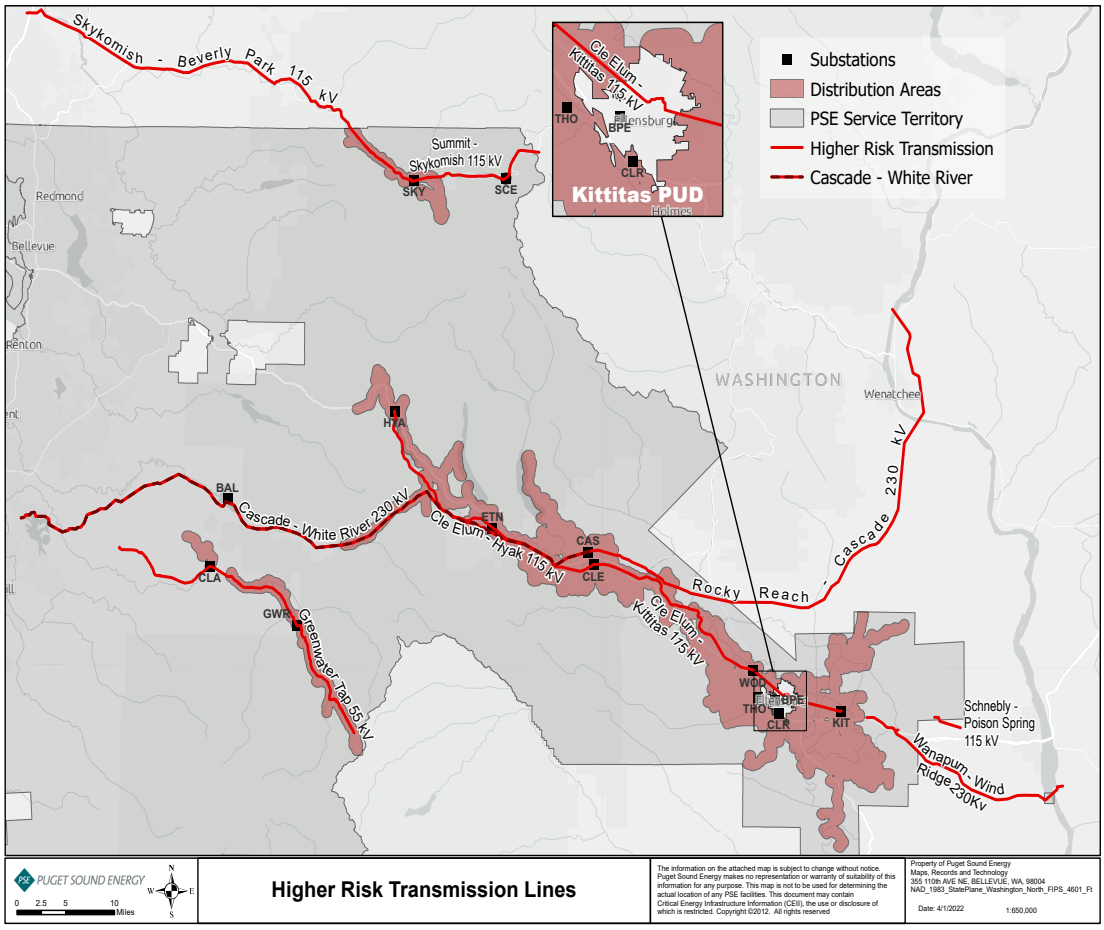
3.2.6. ANNUAL RISK RATING

The final output of PSE's wildfire risk model results in risk ratings at the distribution circuit and transmission line levels that can be used to adjust Plan activities and efficiently prioritize inspections, maintenance, upgrades, and operational protocols. Unsurprisingly, the majority of higher risk circuits are located on the east side of the Cascade Mountains in Kittitas County – but the risk assessment also identifies a discrete amount of higher risk circuits located in Western Washington as well.

The circuit risk ratings incorporate all the aforementioned characteristics with weighting factors applied. PSE concentrates most risk mitigation activities in areas with a moderate or higher burn potential, as indicated by USFS data sets, and uses Burn Probability and WUI to further prioritize work within these areas. These risk characteristics are applied in a geospatial map dashboard discussed in Section 4.1.2 of this Plan.

Figure 6 shows specific areas of our service area that have been identified as having a higher risk of wildfire. The majority of these transmission lines are located on the eastern side of the Cascade Mountains. However, some higher risk lines are located partially or entirely on the western slopes of the Cascades. While the transmission lines are inspected on a routine basis, as part of the wildfire mitigation strategy, in 2023 PSE will conduct a full-scale needs assessment of the top two high-risk lines, Cascade – White River and Rocky Reach – Cascade. By examining these 126.5 miles of line, we can identify infrastructure and environmental concerns and take appropriate steps to ensure the infrastructure risk is appropriately mitigated.

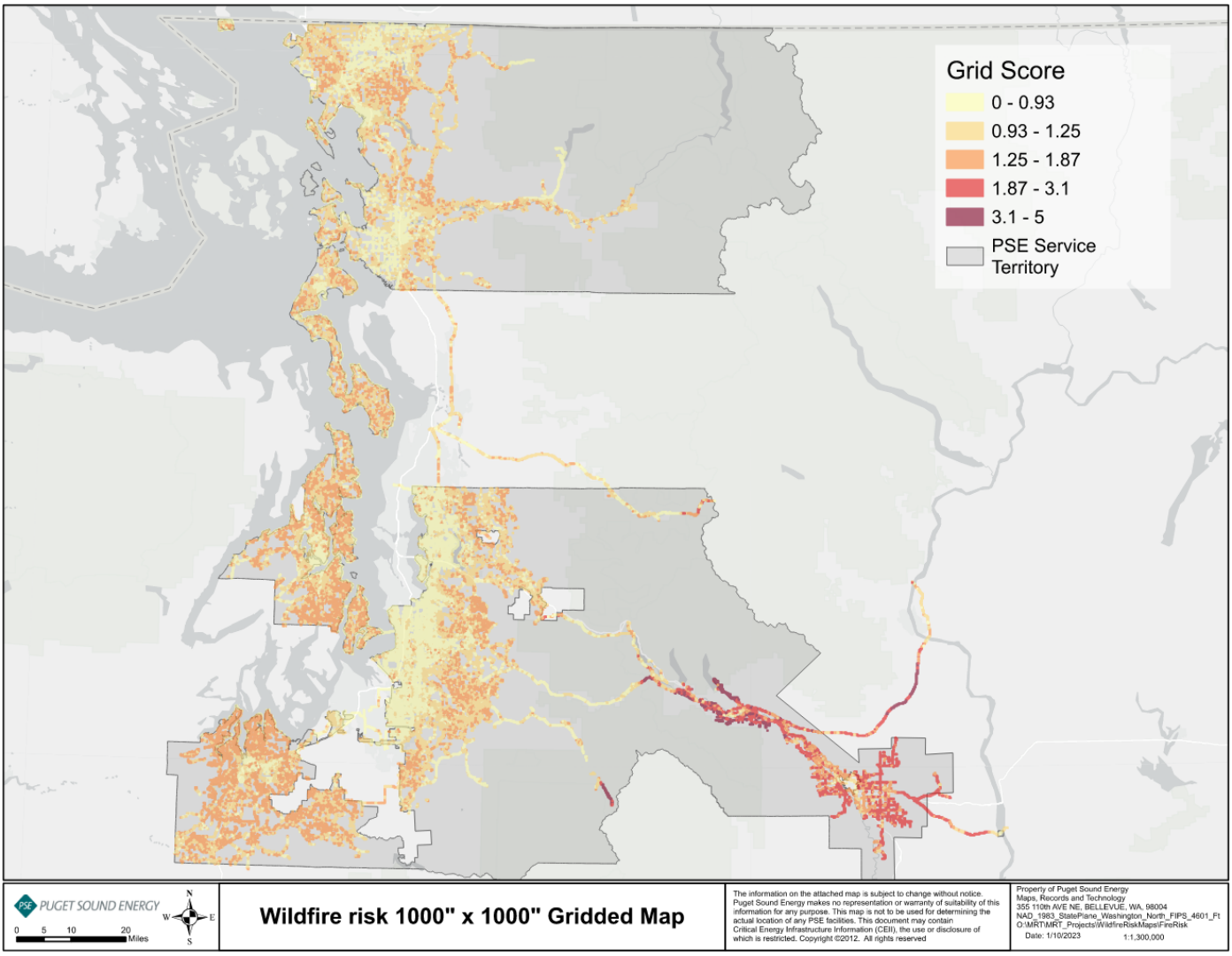
Figure 6: Example of higher risk lines in PSE's territory



PUGET SOUND ENERGY

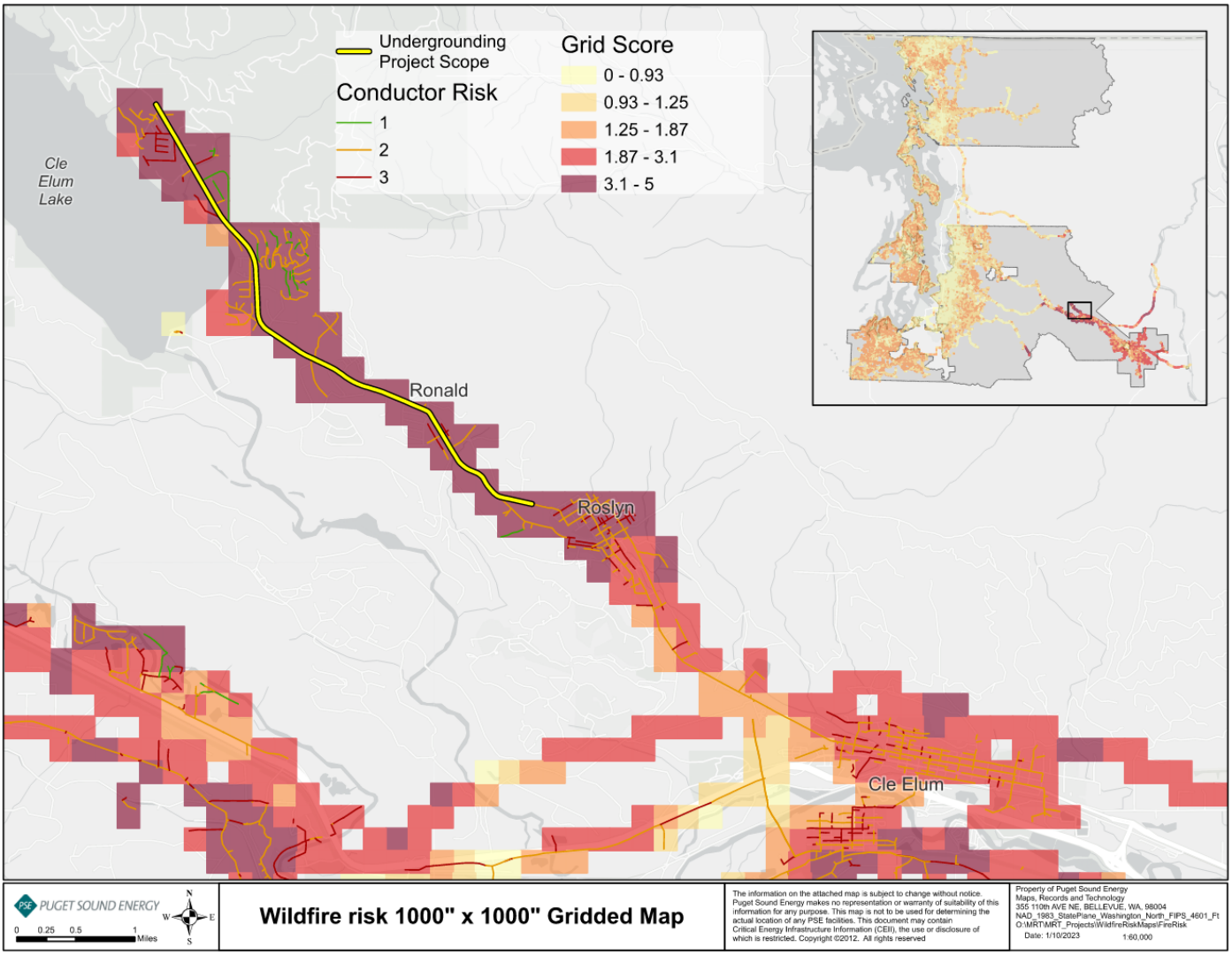
In 2022, PSE created a new version of the risk model to evaluate risk not only at a circuit-wide level, but on a more granular scale. This gridded wildfire risk model breaks risk ranking out into 1,000' by 1,000' grids and is shown below in Figure 7. This new 'grid-map' was used to plan grid hardening efforts in the highest risk sections of high-risk circuits. The map is being deployed in conjunction with new Wildfire Mitigation Standards so that future PSE assets in high-risk areas are built to minimize wildfire risk.

Figure 7: Example of higher risk lines in PSE's area



The model uses the same calculation as the annual risk but applied to 1000' x 1000' grids and normalized to a simplified risk on a scale of 0-5. This risk map allows planning and engineering to pinpoint where new construction and maintenance work overlaps with wildfire concern areas. As shown in Figure 8, this model also highlights sections of line by conductor risk based on wire type (bare copper wire, ACSR, (Aluminum Conductor Steel-Reinforced) and covered conductor) which can be used to inform mitigation options. Using this new map, five miles of high-risk overhead wire in Kittitas has been selected for undergrounding, as highlighted in Figure 8.

Figure 8: Example of gridded risk map at sub-circuit level



3.2.7. OUTAGE MODEL

To further understand risk, PSE has begun developing an outage model that utilizes public and proprietary data sources as well as machine learning to determine the relationship between potential outage causes and outages. The benefits for developing this model include:

- Better understanding of asset hardening efforts
- Improved understanding of weather's impact on outages, as outages are a proxy for potential ignitions
- Increased ability to mobilize during storm events
- Better understanding of weather events that might warrant PSPS

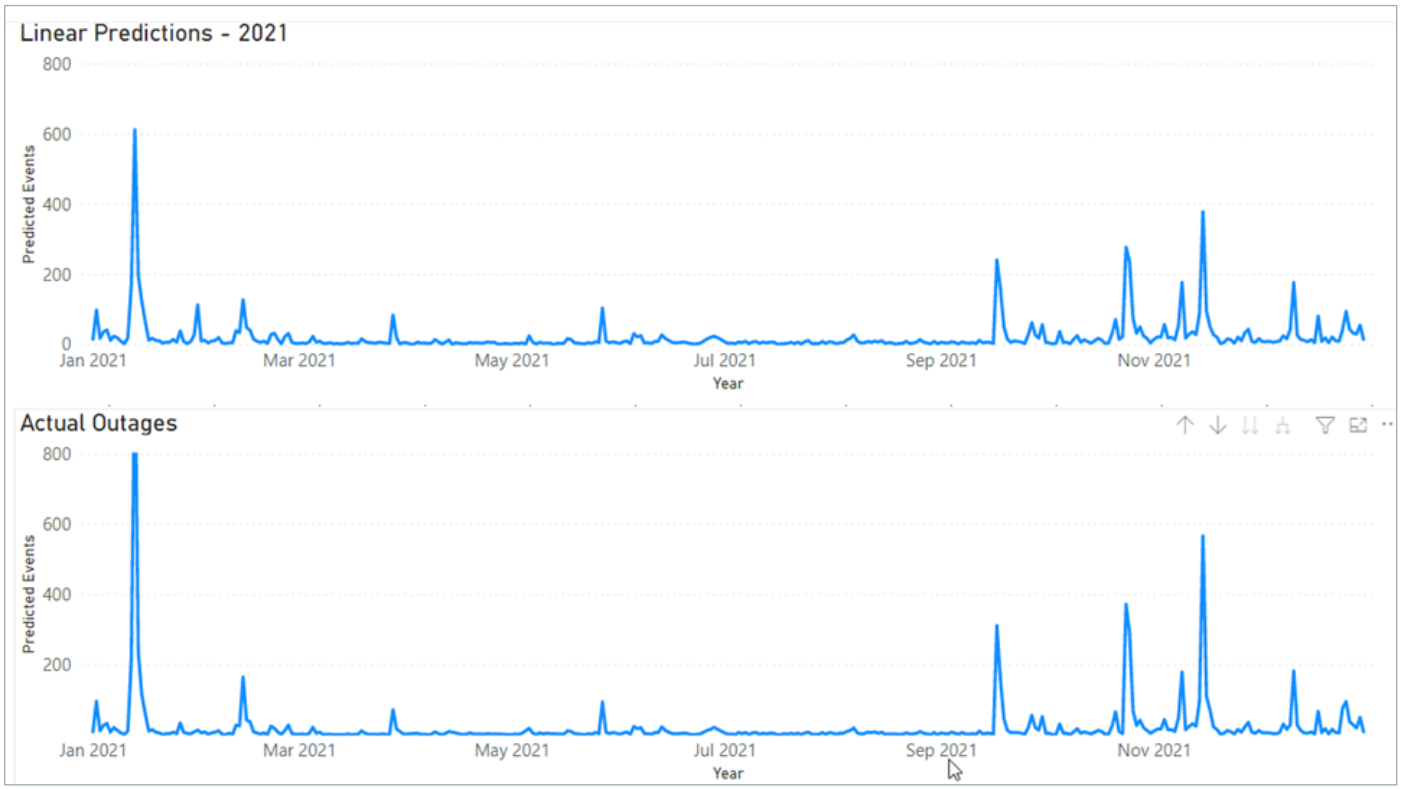
PSE's outage model is additive, and is created using vegetation outage, transformer failure, underground cable failure, other equipment failure, and bird-animal outage models, as well as a model that takes into account all other outage causes. Each of these models uses different factors to predict the estimated outages that will occur on each PSE circuit per day. These factors include, but are not limited to:

- Summer peak load
- Winter peak load
- Total Miles of Circuit
- Total Miles Overhead Line
- Total Miles of Feeder Tree Wire
- Total Miles of Bare Copper Wire
- Other Feeder Overhead Miles
- Feeder Underground Miles
- Lateral Tree Wire Miles
- Lateral Bare Copper Miles
- Lateral Other Overhead Miles
- Lateral Underground Miles
- Total Daily Precipitation
- Departure of daily precipitation from normal precipitation
- Total daily snowfall
- Highest sustained wind speed

- Average daily wind speed
- Highest wind gust
- Average daily temperature
- Highest barometric pressure
- Lowest barometric pressure
- Average barometric pressure
- Soil moisture
- Highest relative humidity
- Sleet weather conditions
- Season
- The highest sustained wind speed squared
- Average daily wind speed squared
- Highest wind gust squared
- Highest barometric pressure squared
- Lowest barometric pressure squared
- Average barometric pressure squared

All outage models are linear and have a determination of model accuracy, or R-square, value above 0.649. R-square is a measurement of model fit and the level of confidence in the prediction of the model. Model prediction and actual outages for 2021 are compared in Figure 9. The models show significantly improved abilities to predict cumulative outages for 2021 and 2020 versus a 5-year rolling average. They are also able to predict days on which PSE is expected to experience high outages, as well as to predict the geographic areas and circuits for these outages. Ongoing research is expected to further improve and refine these models so that in the future PSE can leverage the model to understand what outages drive ignition events.

Figure 9. Outage Model Prediction Example



3.2.8. RISK MODEL ENHANCEMENTS

For 2023, PSE has contracted with an external vendor to enhance our risk model. This model will incorporate PSE's outage data, fire propagation modeling, fuels data, and additional historical and real-time weather data to more accurately forecast wildfire risk. We will use this new risk model to enhance system hardening planning and prioritization, and aid in operational decision-making to reduce wildfire risk and to identify Public Safety Power Shutoff (PSPS) zones and execution thresholds for future PSPS implementation.

4. WILDFIRE MITIGATION AND RESPONSE PLAN ELEMENTS

4.1. SITUATIONAL AWARENESS

4.1.1. STRATEGIC APPROACH TO SITUATIONAL AWARENESS

Situational awareness encompasses tools and technology that convey a comprehensive understanding of real-time wildfire risk throughout PSE's service area. Conducting a thorough risk assessment creates a baseline of relative wildfire risk in different geographical areas, which then serves as a backdrop for fire weather events that escalate the chances of wildfire spread.

Emerging technologies such as Artificial Intelligence (AI)/machine learning and advanced image processing can then further refine real-time risk conditions to a granular level, which provides System Operators with the information needed to execute mitigation actions in advance of a fire weather event.

Table 2: PSE's strategic approach to situational awareness

APPROACH	APPLICATIONS AND BENEFITS	IMPLEMENTATION CONSIDERATIONS
Wildfire Risk Model	Mapping wildfire risk in the vicinity of utility assets is essential to informing operational decisions for mitigating wildfire risk.	Risk modeling improvements are a foundational component of wildfire prevention, and PSE continues to improve and iterate on its wildfire risk model.
Fire Weather Monitoring and Risk Mitigation	Publicly available fire weather forecasts can contribute to situational awareness and help utilities prepare for imminent fire weather conditions. Technologies that provide real-time awareness of current weather serve to further inform decision-making during active fire weather events.	Fire weather forecasts are typically generated for broad swaths of PSE's service area, which creates difficulty in identifying specific operational mitigation approaches. Real-time weather monitoring stations can provide more granular information but will require substantial investment for sensor systems and meteorologists to interpret the data.
Inspection Technology	Remote sensing and imagery technologies provide valuable information about utility assets and the surrounding environment that is not available via traditional inspection techniques. PSE's current technology evaluations include: 1. Infrared (IR) and thermal imaging 2. LiDAR (Light Detection and Ranging) 3. Drone deployment of IR and LiDAR vs. traditional aircraft approach 4. Satellite imagery for real-time evaluation of large portions of PSE's service area	IR and thermal imaging can be used to identify the risk of future failures. PSE's preliminary testing using IR and thermal inspections devices did not proactively identify risks of future failures. Additional LiDAR testing would provide very granular data, but it is expensive and data processing can take months. PSE is currently evaluating the viability of deploying both technologies via drone, which should improve efficiency.
Pre-Wildfire Season Inspections	Traditional inspection techniques identify short-term mitigation opportunities prior to the start of fire season.	PSE conducts ground and aerial inspections of assets in higher fire risk areas for the purpose of identifying defective equipment or encroaching vegetation that requires attention prior to fire season.

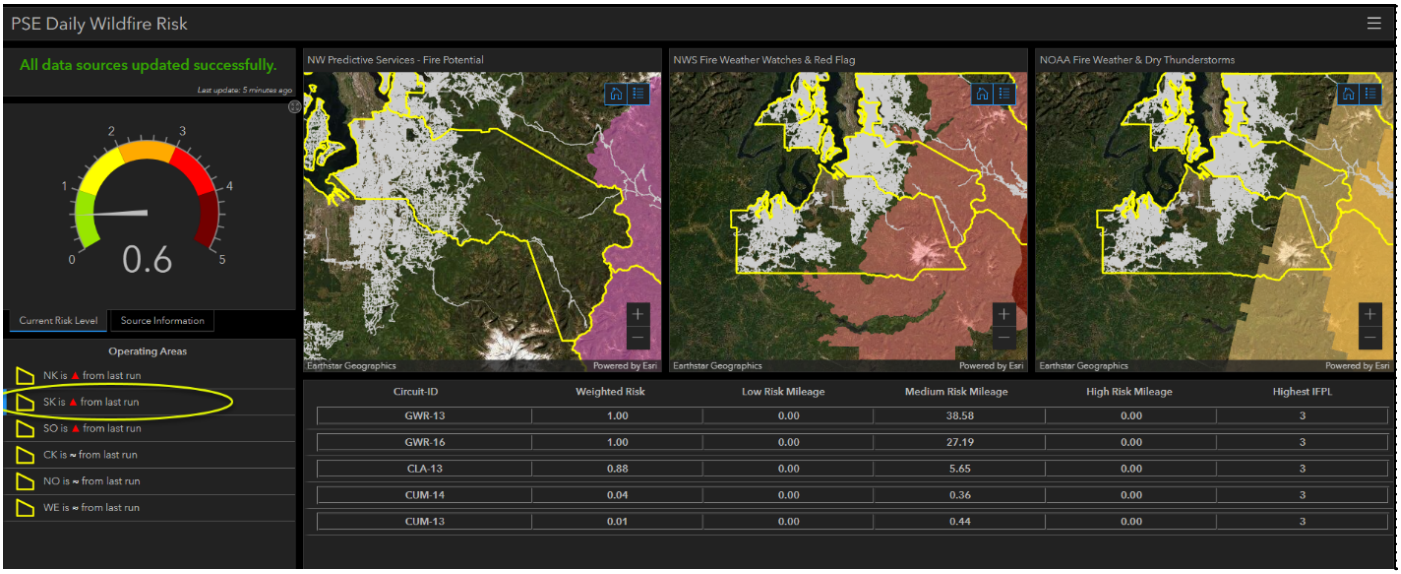
4.1.2. DAILY WILDFIRE RISK DASHBOARD

To give System Operators awareness of which circuits represent a higher risk for wildfires, PSE developed a real-time dashboard to represent the distribution overhead system overlaid with WHP, which depicts the relative potential for wildfire that would be difficult for suppression resources to contain, based on wildfire simulation modeling. This map contains five classifications: very low, low, moderate, high, and very high. For the 2023 Daily Wildfire Risk dashboard, the risk is calculated as described below.

Relative risk scores range from zero to five, where the circuit with the highest risk receives a score of five. Each circuit's score is determined by three factors: vegetation management, environmental, and consequence. The vegetation management score is based on the cycle length and year last managed. The environmental score is determined by the length of overhead wire intersecting moderate, high, or very high WHP, and weighted by WHP severity as well as the type of conductor. The consequence score is also determined by length of overhead wire intersecting different weighted consequence risks such as WUI.

This annual score is added to real-time wind conditions to give system operators an indication of conditions in the field. This information is used to assess risk and make operational decisions. Currently, National Oceanic and Atmospheric Administration (NOAA) Fire Weather & Dry Thunderstorms, the NWS Fire Watches & Red Flag Warnings, and the Northwest Predictive Services (NWPS) from the Northwest Interagency Coordination Center contribute to the daily assessment. NOAA and NWS both contribute 40 percent of the risk score, and the NWPS contributes the other 20 percent of the score. Risk is determined by the length of overhead wire intersecting any of the areas of concern from any of these sources and weighted by the severity of the concern.

Image 1: Daily Wildfire Risk Dashboard



Circuit-ID	Weighted Risk	Low Risk Mileage	Medium Risk Mileage	High Risk Mileage	Highest IFPL
GWR-13	1.00	0.00	38.58	0.00	3
GWR-16	1.00	0.00	27.19	0.00	3
CLA-13	0.88	0.00	5.65	0.00	3
CUM-14	0.04	0.00	0.36	0.00	3
CUM-13	0.01	0.00	0.44	0.00	3

Image 2: Daily Wildfire Risk Dashboard with fire weather warnings

Circuit-ID	Weighted Risk	Low Risk Mileage	Medium Risk Mileage	High Risk Mileage	Highest IFPL
GWR-13	1.00	0.00	38.58	0.00	3
GWR-16	1.00	0.00	27.19	0.00	3
CLA-13	0.88	0.00	5.65	0.00	3

4.1.3. FIRE WEATHER MONITORING AND RISK MITIGATION

As part of the effort to expand situational awareness, PSE is investigating Fire Monitoring solutions and pursuing potential partnerships with interested parties, such as DNR, to monitor certain high-risk portions of the service area. In 2023, PSE will assess where weather monitoring stations should be installed and continue to evaluate the benefits of utilizing cameras. Weather monitoring stations will be pivotal for making informed operational decisions during high-risk wildfire events including when to enact a PSPS.

PSE's Daily Wildfire Risk Dashboard gives our real-time operations team visibility to forecasted and current fire weather conditions throughout PSE's service area. This situational awareness is then focused to a more granular identification of risk analysis based on the routing of overhead electrical infrastructure within the higher risk geographical areas. Operational risk mitigation actions are established within PSE's wildfire mitigation operational procedures, as further defined herein, and are based on the risk indicators from the Daily Wildfire Risk Dashboard.

During the months of June through October, fire weather conditions may be elevated in PSE's service area. System Operators monitor fire weather forecasts within PSE area, identify any anticipated fire weather conditions that meet the criteria of defined action thresholds, and communicate the anticipated fire weather conditions as defined by operating procedures.

Fire Weather Conditions

The following fire weather conditions will require PSE's real-time operations teams to consider changes to protection schemes or other actions to mitigate the possibility of an ignition event:

- Fire Weather Watch: Issued to alert fire officials and firefighters of potentially dangerous fire weather conditions within the next 24 to 36 hours. A Fire Weather Watch will turn into a Red Flag Warning 12-24 hours before the forecasted fire weather conditions are expected to occur.
- Red Flag Warning: Issued to alert fire officials and firefighters of potentially dangerous fire weather conditions within the next 12 to 24 hours.

Actions to Prevent Ignition

In the event of a Red Flag Warning in addition to forecasted winds in a higher risk portion of its service area, PSE's operational procedures may trigger one or more of several different actions:

- Selective de-energization: De-energizing sections of transmission lines that will not result in a loss of service to customers.
- Switch disablement: Disabling automatic switching schemes on higher-risk transmission lines.
- Revising work practices: Halting remote/manual line testing practices on higher-risk transmission lines without first performing a complete field patrol by qualified electrical workers.
- Recloser blocking: Disabling automatic reclosing functions of protective devices located on higher risk transmission and overhead distribution lines.
- Instantaneous trip: Enabling instantaneous trip settings on protective devices to ensure immediate fault isolation with no intentional time delay.
- Work cancellations: Evaluating the cancellation of scheduled customer work and construction activities in affected areas.

4.1.4. IGNITION AND FIRE RELATED EVENT TRACKING

As PSE prepares for the 2023 wildfire season, we are developing additional operational procedures to ensure that timely, consistent, and easily retrievable documentation is available for events where PSE personnel have identified the presence of a likely ignition or fire.

One of the lessons learned from past wildfire seasons is that event logs should separate out events that are specific to wildfire risk understanding. As a result, PSE implemented a new tracking system in June 2022 to improve how we record and compile incidents with evidence of ignition. These logs now include flags to indicate evidence of scorch marks, sparks, or other indicators, and are checked daily during wildfire season and compiled and reported out monthly at Wildfire Task Force meetings with leadership.

Transmission and distribution logging procedures vary slightly due to the use of different outage management systems, but the new procedure is similar for both groups of operators. Specifically, operators:

- Develop dedicated identifying codes and terminology within the Outage Management System platform for a variety of scenarios in which field personnel have identified the presence of arcing energy or signs of a fire.
- Identify the equipment/device involved in the event.
- Ensure event logs are stored in such a manner that data is easily retrievable and able to be analyzed and incorporated into future PSE wildfire mitigation and response plans.

Developing specific procedures for fire-related event logging enhanced our ability to report on wildfire season experiences, identify trends for correction, and improve situational awareness for planning and maintenance engineers. These datasets will be pivotal in improving PSE's understanding of infrastructure driven risk.

4.1.5. ENHANCED INSPECTION TECHNOLOGY

PSE is currently evaluating several emerging technologies and the possible application for wildfire preparedness and resiliency.

- Aerial inspection methods such as LiDAR are common in the utility industry already, but these methods are usually leveraged for vegetation management and engineering activities. LiDAR can be a valuable tool, but it typically requires the use of an aircraft, and the associated data processing is often time consuming.
- Thermal/IR inspections have the potential to identify failing insulators by picking up heat signatures or coronas from electricity tracking from conductors to other parts of the structure. This technology can be deployed via aircraft or ground-based vehicles.

To address the challenges of aircraft deployment and data processing time, PSE has used a drone capable of carrying LiDAR, Thermal/IR, and HD camera packages. This drone, combined with a data processing solution pared down to an "a la carte" approach for the specific application of data collection, greatly reduces the cost of inspections and speeds up data processing time. Additionally, it may allow repeatable and routine data collection for the purposes of developing growth models to further improve prioritization and increase situational awareness in higher fire risk areas.

LiDAR/IR/HD Camera drone compared with normal 8 MP camera drone

In 2022, PSE conducted a pilot project to evaluate the use of satellite imagery combined with machine learning and artificial intelligence. The goal of this project was to enable faster and more efficient assessments of large portions of PSE's overhead system (approximately thousands of miles at a time). This technology is advancing very rapidly, and while image quality just a few years ago did not have the details necessary for wildfire mitigation purposes, the newest offerings have accuracies of less than a foot; and they are continually improving. Additionally, the satellite cameras use color spectrums not visible to the naked eye, which can enable early detection of trees stressed by drought.

The pilot was conducted on higher wildfire risk distribution circuits and transmission lines, as identified by our wildfire risk model, specifically with the intent of deploying this technology for the purpose of wildfire risk reduction. Initial testing of satellite imagery applications has shown potential for identifying trees at risk of growing into conductors, but more testing is needed to determine efficacy for pre-wildfire season mitigation activities. Additionally, more testing is needed to evaluate the effectiveness of satellite imagery for identifying individual hazard trees.

4.1.6. PRE-WILDFIRE SEASON INSPECTIONS

PSE conducts several types of inspections on higher risk areas prior to the start of wildfire season, which is generally accepted in Washington State as July 1. In limited circumstances, these inspections may be delayed as a result of access restrictions due to snow. These inspections are planned by PSE Asset Management and executed by the Electric First Response and Vegetation Management groups. These inspections are conducted with the purpose of identifying situational conditions that may have changed from the previous inspections, such as trees and brush, asset health and location, new structures or encroachments, accessibility, egress, new or replaced infrastructure, and surrounding community changes.

Qualified electrical workers and certified arborists conduct these inspections primarily from the ground, and sometimes aerially, for hard-to-reach areas, such as PSE's cross-country transmission lines. Identified areas of concern are mitigated as soon as possible, which in almost all cases is prior to fire season. For example, if inspectors find equipment issues, they are submitted to PSE's Engineering department and any imminent concern is addressed immediately. In addition, any vegetation that has potential to fall or has grown into conductors is trimmed or removed.

4.2. FAULT REDUCTION

Fault reduction strategies are designed to reduce wildfire risk by prioritizing reliability programs that strengthen PSE's infrastructure in higher wildfire risk areas, and decreasing the number of faults that may result in a potential ignition event.

Table 3: PSE's strategic approach to reducing faults

APPROACH	APPLICATIONS AND BENEFITS	IMPLEMENTATION CONSIDERATIONS
Enhance Vegetation Management	Vegetation Management activities targeted specifically at wildfire prevention can reduce limb and tree caused faults. Pre-fire season inspections identify vegetation that may encroach on conductors during the summer growing season. Targeted off right-of-way tree removal provides benefits for both fire mitigation and reliability.	Annual inspections prior to wildfire season ensure that vegetation of concern is identified and addressed every year as opposed to normal maintenance cycles, which are typically performed every 3 to 6 years. PSE will continue to prioritize pre-wildfire season inspections and allocate the resources necessary to identify and address vegetation that has the potential to grow or fall into overhead electrical conductors in areas with the highest wildfire risks.
Public Safety Power Shutoffs (PSPS)	De-energizing electrical systems can prevent ignition events.	PSPS is an complex and impactful mitigation strategy for wildfire, which requires development of substantial planning, operations, and communications protocols, and can result in extended outages for customers. PSE has begun to initiate the planning and customer engagement processes necessary to develop a PSPS plan that can be executed in a manner that minimizes impacts to customers and communities in higher wildfire risk areas.
Deploy Covered Overhead Conductors	Covered conductors (tree wire) can reduce faults from limbs and animals. Tree wire has less probability of arcing when contacted by external sources as compared to bare conductor.	PSE is continuing to mature this program to replace bare conductor with tree wire for the purposes of improved reliability. Implementation currently includes 12 circuits in higher wildfire risk areas with tree-wire projects.
Strategic Undergrounding	Underground lines are not likely to trigger a wildfire event, unless there is an equipment failure in an access enclosure or above ground transformer.	Undergrounding lines can reduce the chance of an outage caused by external sources such as tree failures. There are currently 10 undergrounding projects in higher wildfire risk areas.
Asset Management	PSE's asset management approach for reliability purposes offers additional benefits for wildfire mitigation.	Numerous business cases comprise the wildfire asset management strategy. Every pole undergoes an inspection on a 10-year cycle. See section 4.2.4 for additional asset management strategy.

4.2.1. ENHANCE VEGETATION MANAGEMENT

Vegetation-related wildfire risk in PSE's service area differs between Central and Western Washington. Central Washington is more sparsely treed than Western Washington, but it has more days with elevated fire weather conditions. Additionally, Central Washington experiences more wind in the summer than Western Washington, which generally translates to a higher wind threshold for tree or other vegetation failure.

Because of the different environmental conditions between these two areas of PSE's service area, strategies for reducing wildfire risk due to vegetation also differ. Central Washington has less risk of whole tree failure simply because of the reduced exposure and the wind-hardening effects of the trees that are in the vicinity of PSE's system. Western Washington has many more trees in proximity to the lines, and whole tree failure along with limb outages are not only more common than in Central Washington, but also much more difficult to mitigate due to tree density.

From an annual inspection and off-cycle trimming perspective, the risk mitigation approach for Central Washington and Western Washington is the same: inspect higher wildfire risk areas every year prior to the growth season and trim or remove any tree that poses a risk of growing or falling into the conductors in that year.

Where risk reduction strategies and actions will differ is in the hazard tree approach and funding prioritization given to the two areas. The following subsections describe PSE's approach to pre-wildfire season vegetation management activities as well as a longer-term grid hardening strategy that would have benefits for wildfire risk reduction.

4.2.1.1. PRE-WILDFIRE SEASON TRIMMING AND REMOVAL

PSE conducts pre-wildfire season vegetation inspections and any follow-up work prior to the beginning of wildfire season each year. These inspections are conducted on the higher wildfire risk distribution circuits and transmission lines as identified by PSE's most recent risk assessment for wildfire. Any trees that could encroach on live conductors during the summer are trimmed back to ensure clearance from conductors for the entire growing season. In 2022, PSE trimmed 2,040 trees that inspectors identified to be at risk of contacting overhead conductors during the summer wildfire season.

Conducting annual inspections on distribution circuits and transmission lines augments PSE's standard vegetation management practices for reliability, and it is focused on the upcoming wildfire season and on the higher risk distribution circuits and transmission lines. Distribution circuits have vegetation management conducted every four or six years (four years for urban areas, six for rural areas) for reliability purposes, and the vegetation inspection is done at that time. Annual inspections in higher wildfire risk areas exceed historical practices.

4.2.1.2. HAZARD TREE REMOVAL

PSE prioritizes removal of hazard trees in higher wildfire risk areas differently than removal for reliability reasons. For reliability, tree removal is typically targeted at locations in PSE's service area that have the most tree related outages, which is on the west side of the Cascade Mountains, where higher wildfire risk and tree related outages correlate.

PSE's assets in Central Washington typically perform well from a tree-related outage standpoint as compared to the rest of PSE's system. Therefore, targeting hazard tree removal in Central Washington regularly to reduce wildfire risk takes a different approach than hazard tree removal programs focused on reliability.

With PSE's robust tree trimming plan, less than ten percent of outages are caused by trees within the right-of-way. Inspecting and trimming trees annually in higher wildfire risk areas ensures that trees within the right-of-way do not contact electrical conductors and cause an outage or ignition.

However, most of the tree-caused outages are from trees or branches that fall from outside of the right of way. In the last few years, a significant percentage of dead and dying trees in Central Washington have been removed or trimmed during pre-wildfire season vegetation mitigation efforts. Over the next several years, PSE will continue to target hazard trees during pre-wildfire season vegetation patrols and evaluate the efficacy of increasing the scope of existing hazard tree removal efforts in higher wildfire risk areas.

4.2.2. PUBLIC SAFETY POWER SHUTOFF

PSE is in the in the process of developing a PSPS plan that will reflect the wildfire risks in PSE's service area based on the specifics of the system topography, geographic area, and impacts on ingress and egress. The PSPS plan will consider potential impacts to communities of not having power, which brings other risks and hardships, particularly for vulnerable communities and individuals. The PSPS plan will also incorporate lessons learned from other utilities that have implemented PSPS plans. As described in section 6 of this Plan, PSE will continue to engage with potentially affected communities and customers in higher wildfire risk areas of PSE's service area to solicit valuable community feedback that will inform development of PSPS-related procedures and communications. The first three community engagement sessions were held in Kittitas and Pierce Counties during the months of June, July, and October 2022.

4.2.2.1. HISTORY OF PSPS

Over the last decade, California, as well as much of the Western United States, has experienced record-breaking wildfires. These fires have resulted in devastating loss of life and billions of dollars in damage to property and infrastructure. Electric utility infrastructure has historically been responsible for less than 10 percent of reported wildfires; however, fires attributed to power lines comprise roughly half of the most destructive fires in California's history. In response, an effort to reduce the risk of fires caused by electric infrastructure was developed involving temporarily turning off power to specific areas, which is called a Public Safety Power Shutoff (PSPS).

In 2012, the California Public Utilities Commission (CPUC) gave electric utilities the authority to shut off electric power to protect public safety. This allows the energy companies to shut off power for the prevention of fires where strong winds, heat events, and related conditions are present.

4.2.2.2. PSPS PLANNING

Key elements of the PSPS plan that PSE is developing will include a static risk model, situational awareness to forecasted and real-time fire weather conditions, customer education and communication strategies, and documented operations procedures that will ensure appropriate and consistent actions that seek to balance meaningful risk mitigation relative to the potential negative consequences and risks of a shut-off.

Robust risk modeling and situational awareness, along with careful system re-configuration steps, are critical to balance the negative

impacts and risks to customers experiencing a PSPS. These negative impacts may include disruption of essential electrical power supply to health care and long-term care facilities, community cooling centers, essential power for residential customers dependent on oxygen, communication infrastructure, internet service, wastewater systems, irrigation, firefighting resources, and traffic control, which can affect access and egress during a fire. Another reason to minimize the size of the outage is that re-energization following a PSPS requires the de-energized system to be inspected in its entirety before those lines and facilities can be safely re-energized. The inspection is necessary to ensure that no damage has occurred to the system that would compromise its integrity, safe operation, and safe re-energization. Therefore, the larger the area of the PSPS, the longer it takes to patrol, and the longer customers are without essential energy service. PSE will continue to work with state and local partners to fund opportunities to create the necessary granular and dynamic risk models and local weather forecasting tools that other jurisdictions have created to enable utilities to understand ignition potential and wildfire propagation based on real-time conditions and forecasted weather.

Due to the potential negative impacts to customers of a PSPS, it is important to provide appropriate notification to customers of a potential or impending PSPS. As noted in section 6 of this Plan, both communications and real-time operations tools and processes will need to be developed and additional staff resources allocated to PSPS communications. This will be part of our PSPS planning process.

PSE hosted community engagement meetings for wildfire preparedness and mitigation during the summer of 2022 in higher wildfire risk areas. These meetings provided an opportunity to educate customers about our specific wildfire risk reduction efforts for higher wildfire risk areas in PSE's service area. Through a facilitated conversation, PSE gathered feedback from our community partners and customers on potential future wildfire risk mitigation measures, including the development of our PSPS plan. These collaborative meetings served to further inform PSE on the adverse impacts that would be experienced by our customers and communities during a PSPS and help us begin to identify solutions to potentially address those adverse impacts. PSE used the meetings as opportunities to obtain customer feedback on communication and notification preferences, as well as asking customers to update their contact information on their PSE accounts to tailor potential PSPS communications strategies.

Additional work is underway in developing PSPS capabilities. In 2023, PSE contracted with an external vendor who will help us mature our risk model and identify PSPS zones and thresholds of when to enact a PSPS in its service territories. Other bodies of work that are planned for 2023 include identifying what communication platforms will be used to keep customers and response partners informed throughout a PSPS, determining where additional situational awareness tools such as cameras and weather stations should be placed, and identifying how to address the valuable feedback received at community engagements this past summer.

PSE recognizes that once PSPS zones are identified they may include highly impacted communities, vulnerable populations, and customers dependent on life-saving medical devices. To address potential equity concerns related to a PSPS, PSE will work with interested parties to determine appropriate measures to address the heightened impact for these customers and community members. Other peer utilities have proven successful in working with established embedded community agencies, both public and private, to provide additional resources or services to these community members. For example, the Kittitas County Fire Departments have portable generators that they distribute to individuals in need during power outages to help operate their necessary medical devices.

PSE is developing operational and communication plans and protocols for PSPS and will work with the PSE teams and personnel identified in the Roles and Responsibility Matrix of the Wildfire Task Force Charter as well as response partners and the communities of the identified PSPS zones to ensure all planning considerations are taken into account.

4.2.3. DEPLOY COVERED OVERHEAD CONDUCTORS AND STRATEGIC UNDERGROUNDING

PSE has programs that both improve reliability and have wildfire risk reduction benefits. These programs are described in this section and the benefits of the different approaches for wildfire risk reduction are described in Table 2: Fault Reduction.

In addition to PSE's long history of addressing the "areas of greatest reliability concern" as required by WAC 480-100-393(3)(a), in 2017 PSE formalized a focus on 135 circuits that historically had poor reliability performance with high customer minutes of interruption (CMI) and high circuit System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) performance. This became the Worst Performing Circuit (WPC) plan.

Different reliability strategies are applied to these worst performing circuits, including tree wire, underground conversions, overhead rebuilds, and adding new feeder ties until the circuit improves by 50 percent. Covered Conductor (CC), commonly called tree wire, has been deployed in PSE's distribution system since the mid-1990s. CC helps reduce the frequency of overhead distribution line outages and arcing when tree limbs contact the lines by providing a layer of insulation around the conductor.

The Targeted Reliability Business Plan included in PSE's MYRP supports distribution electric reliability needs that result in solutions that have high positive benefit-cost ratios. This plan includes overhead or underground rebuilds, tree wire upgrades, underground conversions, feeder ties, root-cause analysis identified improvements, and other reliability improvements. This is a programmatic plan to improve the customer reliability experience across PSE's approximately 965 distribution circuits outside of the 135 WPCs. This plan is different from many other business plans that are asset-focused because the WPC and Targeted Reliability plans are focused on circuit performance.

The Underground Conversion Business Plan will programmatically convert a targeted subset of PSE's electric distribution feeder system to underground. The purpose of this plan is to improve system reliability by reducing exposure to hazards and to substantially improve the resiliency of the distribution system during major events, which is where the value of this more expensive solution is gained. While outages on feeder lines are less frequent than on radial lines, they are a significant contributor to overall company SAIDI, so decreasing feeder outages will have a measurable impact at the overall system level. This plan is different from the Targeted Reliability Business Plan because it proactively targets highest risk feeders exclusively for underground conversion. While past performance is taken into

account, expected future performance and risk based on exposure and high customer counts are assessed to enhance predictive reliability, specifically targeting more heavily loaded high-exposure feeders. In addition to improving reliability, converting overhead lines to underground removes many of the wildfire risks due to arcing that can occur due to tree damage and overhead equipment failure.

4.2.4. ASSET MANAGEMENT

PSE manages several grid modernization programs that have reliability as well as wildfire prevention benefits. The wildfire mitigation benefits are detailed in Table 2. Program descriptions are provided below.

Pole Program: This is a programmatic plan to address pole health, extend pole life, and address poor condition assets before they fail and result in an outage. The objective of this plan is to ensure that PSE's pole assets are reliable and resilient to the many external forces experienced. At the time of inspection, PSE will perform treatment that defends against insect damage, extending the life of a healthy pole for 10 years. If poles are found to be deficient, they are remediated through reinforcement and replacement. The pole program is on a 10-year cycle throughout the service area.

Copper Replacement: The Resilience Enhancement-Copper Conductor Replacement Business Plan (Copper Conductor Replacement Business Plan) focuses on replacing aging smaller overhead copper (CU) conductors in PSE's primary distribution system. Investments will prioritize sections located in higher wildfire risk areas in addition to historically focusing on sections with the greatest degradation based on history of outages and/or splices on the conductor.

Distributed Energy Resources (DER) and Micro-grid Enablement: PSE has identified the need to address technical constraints of circuit design to ensure that, as PSE's DER portfolio scales, peak DER capacity output on a circuit will not be limited. PSE's system has not been designed to accept high amounts of reverse power flow, which may occur depending on the number of DERs on a circuit. PSE predicts that up to five percent of its circuits may have high DER penetration. Based on current data surrounding solar photovoltaic, there are high penetrations in Kittitas and Whatcom counties.

Reverse power flow from DER production can result in voltage imbalances that impact reliability and power quality, which in turn limits available hosting capacity. With PSE's work to build transparency of where DERs can be hosted through hosting capacity analysis and maps, PSE expects circuits today with the greatest hosting capacity will attract higher numbers of DERs. PSE expects the specific circuits will be refined from interest through the DER Request for Proposal (RFP) process and PSE will review and improve those circuits as necessary with the intent of enabling DERs where they maximize benefits as identified in the DER RFP and to minimize or avoid DER curtailment.

Thoughtful planning to manage and integrate these resources could allow PSE flexibility to implement more sensitive protection schemes or enact a PSPS on certain line segments while minimizing outages. PSE will also incorporate equity and named communities into defining the specific investments that will be made. PSE's plan targets enabling 14 circuits in 2023, 17 additional circuits by 2024, and 24 additional circuits by 2025. As outlined in the MYRP, PSE will develop a more defined circuit improvement scope and adjust the plan as necessary.

4.3. FAULT PROTECTION

Fault reduction strategies are intended to prevent normal operation of utility fault protection equipment from igniting dry grass or vegetation during fire weather events. Automatic reclosing schemes are essential for the fast restoration of service but can also result in arcing events in isolated cases.

As the utility industry adapts to a changing wildfire environment, manufacturers are also developing new equipment that is designed to operate in a manner that will not cause arcing or otherwise be a source of ignition for wildfires. Much of this technology is relatively new but may present opportunity for risk mitigation in specific applications.

Table 4: PSE's strategic approach to fault protection, benefits, and implementation considerations

APPROACH	APPLICATIONS AND BENEFITS	IMPLEMENTATION CONSIDERATIONS
Reclose Blocking	Preventing the automated reclosing function of protective devices after a fault lessens the risk of an ignition.	PSE's automated reclosing devices provide benefits to customer reliability by reclosing protective devices after a fault. In higher wildfire risk situations, PSE disables this reclose scheme to prevent the risks of inadvertently closing into a fault.
Arc suppression fuses	Arc suppression-style fuses significantly reduce the arcing and expulsion of hot metal in contact with ground vegetation, which can be experienced with standard fuse designs. The fuse has built in mechanisms that neutralize the arc, reducing the chance of ignition in the surrounding environment.	Fire-safe fuses are an emergent technology. They are not in widespread use and can have unintended impacts to the protection scheme of a circuit such as not coordinating with standard fuses downstream.
Other System Re-Design Equipment	There are system redesign approaches that may provide benefits for wildfire mitigation: 1. Low Flammable oil transformers with higher ignition point. 2. Insulator bonding to prevent stray current heating metallic components. 3. Pole wraps can reduce the likelihood of pole failure during a fire. 4. Fiberglass cross arms are less likely to track electrical current to the pole.	These new technologies require testing, additional training to install and maintain, and evaluation to successfully incorporate into PSE's system.

4.3.1. RECLOSE BLOCKING AND AUTOMATION

Reclosers are a reliability tool installed to automatically open and close to restore outages that are momentary, which are the majority of PSE's faults. In higher wildfire risk situations, PSE disables reclosers to prevent the risks of inadvertently closing into a fault that could result in an ignition. By turning off reclosing on applicable protective devices, the circuit can be configured to operate in fire protection mode rather than reliability mode. Reclose blocking prevents the immediate restoration attempt and possible secondary fault. Before re-energization, line crews are dispatched to visually inspect the circuit. Only after a line is declared clear of any damage or fault sources will the circuit be re-energized.

PSE has implemented a process to turn off reclosing on higher wildfire risk circuits when high wind thresholds are exceeded along with a corresponding Red Flag Warning. To increase the availability of this mitigation and to reduce outages as much as possible for customers, PSE has expanded SCADA control to substation circuit breakers, which are necessary to enable remote operations. The Substation SCADA program will bring SCADA capabilities to PSE's distribution circuits through equipment upgrades and improvements. SCADA implementation includes installation of controllers, relays, sensors, software, and information technology upgrades for telemetry and communication. These upgrades typically apply to the 12.5kV distribution system and enable data collection and communication between equipment to function automatically or controlled remotely if needed. The 2022 approved MYRP includes 44 SCADA projects targeting high wildfire risk circuits. Along with reliability benefits, the Distribution Automation (DA) program has the additional benefit of adding more SCADA control for key distribution devices.

The Distribution Automation Business Plan drives deployment of smart technology to reduce the size and duration of outages that customers experience, having piloted this technology as far back as 2016. Specifically, Distribution Automation automates outage restoration on PSE's distribution system by identifying the faulted section of the electric system, remotely operating switches to isolate the permanently faulted sections, and then automatically closing switches to restore power to the non-faulted sections. The DA system collects information from devices and determines the optimal switching to restore power to the largest number of customers in less than five minutes. The faulted section will remain without power until crews can repair the damage. Strategic deployment of the DA schemes will reduce customer minutes of interruption, SAIDI, by reducing the number of customers experiencing a sustained service interruption from any one outage event. Distribution reclosers deployed by this plan allow the distribution system to respond quickly and automatically and switch around an outage event. There are 9 DA projects proposed on higher wildfire risk circuits.

The Recloser Business Plan will address the addition of new reclosers for reliability/ sectionalizing purposes on a subset of PSE's feeder circuits company-wide and replacement of aging/obsolete (oil filled and Joslyn/SEL-351J) reclosers and sectionalizers. These specialized

protective devices sectionalize and reduce the number of customers impacted by a permanent fault on the main line feeder. PSE has prioritized areas with the highest customer minutes of interruption (CMI) and is also evaluating adding wildfire risk reduction to the prioritization in addition to CMI. This plan's objectives are to increase situational awareness for PSE's operators and enable faster outage restoration by providing increased data points and automation. The installation of reclosers will also support the Distribution Automation Business Plan, but metrics for that plan are accounted for separately to prevent double counting of costs and benefits.

Transmission Automation is a method of automatic switching that uses sensors to detect transmission line faults. Once a fault is detected, a centralized controller performs automatic switching to isolate the faulted line section and restore the remaining sections. This method, called Transmission Line Automated Switching, improves on the existing automatic switching method that uses trial-and-error, rather than sensors, to determine the location of a transmission line fault.

There are additional control and protection settings beyond recloser blocking that can reduce risk and outage restoration time that PSE is exploring in 2023. These initiatives will not only reduce wildfire risk but will improve reliability all year long.

4.3.2. ARC SUPPRESSION FUSES

PSE is evaluating new technology for fuses that suppress the arc that occurs when the fuse operates. The fuse uses an interrupting medium (silver element and boric acid) and rod mechanism inside the fuse tube for arc extinction, creating low arcing voltage and mild exhaust during fault interruption. The power fuse interrupting rating greatly exceeds that of conventional distribution cutouts that use a fuse tube and link design, and it considerably reduces the loud noise of the exhaust common to cutouts under fault interrupting conditions.

Under normal conditions, the fusible element's temperature is well below its melting temperature and does not melt. When a fault occurs that is large enough to melt the fuse element, an arc is initiated and elongated by the unit's spring, pulling the arcing rod up into the boric acid interrupting media. The heat produced decomposes the boric acid liner inside and produces water vapor and boric anhydride, which helps to de-ionize the arc. The by-products extinguish the arc at a natural current zero.

PSE installed two arc suppression fuses in 2022 and plans to install six more in 2023 to verify constructability and efficacy.

4.3.3. OTHER SYSTEM RE-DESIGNED EQUIPMENT

PSE will replace other system equipment in high-risk areas as well. For example, replacing mineral oil transformers with FR3-filled units can significantly reduce the chance of catastrophic failure and fire. FR3 has a flash and fire point of 330°C and 360°C respectively – more than twice that of mineral oil. FR3 is self-extinguishing and will not continuously burn if ignited. Another example is leakage current tracking along insulators that can cause heating at the point where wood cross arms attach to wood poles. Replacing the cross arm with fiberglass can block this leakage current and prevent pole-top fires. In a similar vein, bonding the base of transmission insulators to ground prevents leakage current from reaching the pole and safely shorts out flashover voltage.

In 2022, PSE developed fire mitigation standards applicable to higher wildfire risk areas to incorporate new equipment such as FR3-filled service transformers, arc suppression fuses, and fiberglass cross-arms in the system designs. These standards went into effect in 2023 and are updated as new wildfire mitigation technologies are discovered and wildfire risk awareness improves.

4.3.4. EVALUATING APPROACHES TO REDUCING WILDFIRE RISKS

Risk Spend Efficiency, or RSE, is a way to evaluate the cost-per-unit benefit of capital and O&M investments by using risk and cost-based analytics to prioritize work. RSE will help PSE evaluate the relative cost-effectiveness of potential initiatives. While RSE does not take into account everything, such as operational or resource constraints, it can still guide how PSE allocates funding, and efforts to efficiently mitigate risk. Our expectation is that by calculating an RSE for the wildfire mitigation efforts, PSE will be able to compare proposed work and improve the cost-per-unit benefit of investments.

It's calculated as follows:

$$\text{Risk Score} = \text{Likelihood of Event} \times \text{Consequence of Event}$$

$$\text{Total Cost} = \text{Forecast Cost of the Mitigation}$$

Likelihood of Event

The likelihood of an event is derived from the likelihood of a fault occurring, the likelihood of that fault causing an ignition, and the likelihood of that ignition spreading. The first two can be estimated using internal operations information and data analytics.

PSE is building an outage model based on historical unplanned outages and weather data to predict where future outages may occur. By using the outage model, we can begin identifying trends in equipment types and age that lead to increased line faults.

By leveraging the enhanced ignition tracking that commenced in June 2022, we can estimate (based on limited data) that for every thousand unplanned outages, there is approximately one ignition event. An 'ignition event' in this case refers to a line event resulting in visible scorch marks or arcing as reported by field personnel. The likelihood of a spark spreading into a fire can be estimated based on historical wildfires data in Washington State or by using a match-drop simulator.

Consequence of Event

The consequence of a fire can be derived from acres burned, number of structures destroyed, and lives impacted. This variable is more difficult to objectively quantify in a thoughtful way. Many peer utilities use insurance data sets to estimate cost per acre burned while others purposefully avoid using financial value of damage to the property and instead view all structures as equal to avoid creating a model that would prioritize work in certain areas at the expense of named communities. The simplest way to take this into account is to estimate the dollar cost per acres burned, with modifiers for population and structure density.

Total Cost

The planning, construction, and ongoing support costs of wildfire mitigation.

As the outage model improves (by adding more historical data, weather stations, equipment condition), so will the estimates for RSE. At this time, PSE is building an RSE understanding with the help of wildfire consultants and identifying data and process constraints. With support from wildfire risk partners to quantify localized wildfire risk, grid hardening and mitigation tactics can be calculated by 2024.

5. OPERATIONAL PROCEDURES AND EMERGENCY RESPONSE

5.1. RESPONSE OPERATIONS AND COORDINATION

When a wildfire or WUI fire incident is anticipated or has entered an area in which PSE service equipment is located, PSE's Response Operations and Coordination protocols will commence.

PSE's Energy System Restoration Plan is the base plan document for gas and electric emergency response procedures, and it incorporates the use of recognized Incident Command System principles. The standard elements of the Energy System Restoration Plan apply to any emergency regardless of cause, in which emergency response activities are required. In early 2023, PSE further refined internal Wildfire Emergency Operations Protocols in order to clarify roles and responsibilities during a wildfire incident. These protocols are not intended to replace the Energy Restoration Plan, rather they further refine responsibilities specific to a wildfire related incident.

5.2. ROLES AND RESPONSIBILITIES

System Operations	• Wildfire risk monitoring • Operational readiness conference call • Situational briefing call • Electronic status updates, if the Emergency Coordination Center (ECC) is not open
Director, Electric Operations	• Protection measure direction • Activating PSE Ops Section presence near fire command
Load Office	• Transmission strategy, as applicable
ECC Director	• Activation of the ECC, if during the situation briefing activation is requested
Communications and Community Engagement	• Customer messaging and community engagement as appropriate • Situation report key messaging points, if ECC is activated
Business Services	• Communication with major customers as appropriate
Government Relations	• Communication with elected officials as appropriate
Municipal Relations	• Communication with officials from municipal departments as appropriate

Electric System Operations within PSE has the authority for operational response activities in response to wildfire incidents that pose a risk to PSE's electric infrastructure. Electric System Operations in consultation with the Director of Electric Operations shall activate the wildfire plan elements based on risk thresholds and available fire risk data.

PSE's response priorities in the event of a wildfire incident are as follows:

- Safety of PSE personnel, first responders, and the public
- Stabilization of PSE infrastructure
- Preservation of property

5.3. FIRE COMMAND INTERFACE

When a wildfire has the potential to impact PSE infrastructure, Electric System Operations may elect to position a PSE Operations Section Chief and Deputy Chief near the fire service command post to maintain situational awareness and coordinate with fire service

personnel, if needed.

5.4. SITUATIONAL AWARENESS

Electric System Operations is responsible for monitoring weather related information on a daily basis throughout the year, including weather information related to wildfire risk. When a risk falls within prescribed action thresholds, Electric System Operations will share information as prescribed within this document, to ensure response readiness.

PSE uses the following sources to monitor wildfire activity:

- National Weather Service Seattle: https://www.weather.gov/sew/
- National Weather Service Spokane: https://www.weather.gov/otx/
- Northwest Interagency Coordination Center: https://gacc.nifc.gov/nwcc/
- PSE Wildfire Dashboard
- Washington State Department of Natural Resources Burn Risk Map: https://burnportal.dnr.wa.gov/
- Washington State Incident Information Map: https://inciweb.nwcg.gov/?state=49

5.5. ACTIVATION THRESHOLDS

The following fire weather conditions warrant the activation of PSE's internal wildfire response protocols when a wildfire risk is within a PSE service area or threatens encroachment within a PSE service area. This includes evaluating the specific conditions to determine appropriate action.

- **Fire Weather Watch:** Issued to alert fire officials and firefighters of potentially dangerous fire weather conditions within the next 24 to 36 hours. A Fire Weather Watch will turn into a Red Flag Warning 12-24 hours before the forecasted fire weather conditions are expected to occur.
- **Red Flag Warning:** Issued to alert fire officials and firefighters of potentially dangerous fire weather conditions within the next 12 to 24 hours.
- **Fire Weather Watch or Red Flag Warning with forecasted wind gusts in excess of 50 MPH:** High winds in combination with low humidity and dry fuels increase the threat of wildfires. Following the notification to the Director, Electric System Operations will coordinate an operational readiness conference call to determine appropriate actions and will include leadership decision-making representation.

5.6. EXTERNAL COORDINATION

PSE's Business Continuity and Emergency Management department has long-standing, established relationships with emergency management agencies throughout our system, including agencies at the city, county, and state level. These relationships extend to fire departments and regional authorities as well.

During an emergency event, PSE communicates with these agencies through situation reports. Agencies have been provided emergency phone numbers as well as the PSE Emergency Coordination Center phone number. Additionally, PSE's Government Relations, Municipal Relations and Business Services organizations respond to questions as needed.

Prior to an emergency event, PSE participates in various emergency planning and coordination meetings, including seasonal readiness meetings, serving on county and state emergency committees, participating in exercises, after-action debriefs and improvement planning meetings. PSE's Emergency Management Department also participates in industry emergency response and mutual aid committees through the Edison Electric Institute (EEI) and the Western Electric Institute (WEI). PSE is also a member of the Western Region Mutual Assistance Group (WRMAG).

Although, dates have not been established, PSE plans to participate in 2023 County Emergency Management Summer Hazards Workshops that typically occur around the beginning of wildfire season. These summer hazards workshops are sponsored by the County Emergency Management Agency and focus on extreme heat events, including summer long-range weather forecasts predictions, extreme heat preparedness events, high smoke events, and wildfire/WUI events. Presenters include PSE, the NWS, DNR, and County Emergency Management Agencies. Additional presenters may be included depending on County Emergency Management Agency preferences. The audience includes first responders, County and Local emergency management, 911 centers, public health, the Department of Transportation, and school districts.

PSE also participates in the Washington State Department of Natural Resources Utility Wild-land Prevention Advisory Committee.

5.7. RECOVERY

If PSE infrastructure has been damaged as a result of a wildfire, restoration personnel may not perform assessment and restoration

work until fire command or the agency in authority has deemed the area safe for entry. Once entry is possible, and the safety of PSE personnel has been cleared, standard assessment, repair and restoration activity may commence.

5.8. RESOURCES AND CONTACTS

- National Weather Service: https://www.weather.gov
- Northwest Interagency Coordination Center: https://gacc.nifc.gov/nwcc/
- Washington State Department of Natural Resources Burn Risk Map: https://burnportal.dnr.wa.gov/
- Washington State Incident Information Map: https://inciweb.nwcg.gov/?state=49
- PSE Wildfire Dashboard

5.9. WA DNR DISPATCH CENTERS

- Pacific Cascade Region, Castle Rock, WA 360-575-5089
- South Puget Sound Region, Enumclaw, WA 360-802-7031
- Northwest Region, Sedro Woolley, WA 360-854-2878
- Olympic Region, Forks, WA 360-374-2800
- Central Washington Interagency Dispatch Center, 509-884-3473
- Northeast Washington Interagency Dispatch Center, 509-685-6900
- DNR Coordination Center, Olympia, WA 360-902-1300. DNR Webpage: https://dnr.wa.gov

6. COMMUNICATION AND OUTREACH

Effective external and internal communication is essential for coordinated prevention and response to wildfire risks. PSE is committed to keeping customers and impacted communities informed and engaged in our wildfire program.

PSE has three primary focus areas for communications and outreach for the wildfire program:

- **Education and awareness:** Help customers understand the wildfire risk in their service area, and PSE's role in mitigating that risk, including potential future Public Safety Power Shutoffs (PSPS). Enable customers to take necessary preparedness actions to minimize the inconvenience and hazards of a loss of energy service due to emergency response or a potential PSPS.
- **Equitable customer involvement:** Understand customer concerns and aspirations and include this feedback in our wildfire planning. Identify vulnerable and hard to reach populations and specific communication and resource needs in these communities to provide equitable outreach to customers. Establish partnerships with local leaders, organizations and resources to help customers prepare for wildfire season and potential PSPS.
- **Timely communications during an emergency:** During high wildfire risk conditions, or during an active wildfire, provide customers with updates about any impacts to PSE service, including potential PSPS. Develop tools and messages and use established best practices to provide timely information.

In 2022, PSE launched its communication and public outreach efforts for the wildfire program. In summer 2022, we hosted a series of community meetings in high wildfire risk areas to obtain feedback from community members regarding community considerations and communications channels in the event of a Public Safety Power Shutoff. The valuable feedback collected during these meetings will help us mature our wildfire communications and outreach plan moving forward.

In 2023, PSE will focus on the following wildfire-related communication and community outreach activities:

- Pre-wildfire season customer education and awareness campaign
- Emergency response communication during an active wildfire
- Public Safety Power Shutoff communications and outreach planning

6.1. PRE-WILDFIRE SEASON CUSTOMER EDUCATION AND AWARENESS CAMPAIGN

At the start of each wildfire season, PSE will develop customer communications with a focus on wildfire preparedness. This communication has two goals: 1) raising customer awareness about PSE's wildfire preparedness and mitigation activities, and 2) educating customers about how they can help prevent and prepare for wildfires by connecting them with resources from the Department of Natural Resources or other partner agencies.

The pre-wildfire season customer education campaign will include general awareness as well as targeted communication and engagement channels, such as:

- PSE.com landing page featuring the Wildfire Plan and links to resources from the Department of Natural Resources or other partner agencies
- Social media (organic and paid), email, earned media and printed bill inserts (for advance, seasonally relevant information only)
- Outreach to community organizations, agencies and jurisdictions (including partners that serve vulnerable and hard-to-reach populations)
- Direct mailers and emails may be sent to customers along identified higher wildfire risk distribution circuits

As part of this education and awareness campaign, particular focus will be given to reaching vulnerable and hard-to-reach populations, and we expect to use new tools which may include:

- Translated/trans-created educational materials
- A web-based accessibility and translation tool on PSE.com
- Engagement and information sharing with jurisdictions and community organizations serving vulnerable populations and highly impacted communities
- Tabling at key locations or community events in higher wildfire risk communities
- Development of meeting-in-a-box content for PSE Community Engagement team members, who are already connecting with community organizations on other topics daily

6.2. EMERGENCY RESPONSE COMMUNICATION DURING AN ACTIVE WILDFIRE

PSE plans for and responds to many types of emergencies, including wildfires. Sometimes, PSE will turn off electric or natural gas service in response to an active emergency to keep our crews, first responders and the public safe. While PSE's de-energization of electric lines during an emergency has some elements in common with a Public Safety Power Shutoff, it is important to ensure that customers and the community understand the difference between the two responses. Emergency de-energization takes place during an active wildfire, at the request of emergency management to keep first responders and the public safe. This is an existing safety measure that PSE uses today. By contrast, a PSPS would de-energize certain lines in high-risk areas prior to an active wildfire, to help prevent one from starting. This tool is still in the development process (see 6.3) and is not yet in use by PSE.

In the event of an emergency de-energization, PSE will work to provide customers, the community, and other interested persons with accurate and timely information. Communication will take place through channels and via processes commonly used during storms and other emergencies. The objective will be to provide, if known, the cause of the service disruption, the nature of the disruption (such as whether the disruption is due to system damage or is for safety at the request of emergency responders), and an estimated time of service restoration when known.

Key customer communication strategies during wildfire-related disruptions may entail the use of a variety of traditional and digital media tools to provide updates and information, depending upon the nature of the disruption. Tools may include:

- Local news media, including broadcast, digital and print
- Social media, using PSE's existing social media platforms as well as those of news outlets and community partners
- Digital advertising channels

Additionally, direct customer communications, which may involve the use of multiple PSE service channels, including:

- Emails and outbound calls to directly affected customers and elected officials
- Telephonic service available through PSE's customer representatives and Interactive Voice Response (IVR) platform
- Updates and information on PSE.com and the MyPSE mobile app
- Deployment of community engagement team members

6.3. PUBLIC SAFETY POWER SHUTOFF COMMUNICATION AND OUTREACH PLANNING

6.3.1. SUMMARY OF WORK

In 2022, PSE held a series of community meetings in identified higher wildfire risk areas, including Cle Elum, Roslyn, Ronald and Greenwater. Objectives for these community meetings included educating customers about PSE's 2022 Wildfire Mitigation and Response Plan, wildfire preparedness and response efforts, and the potential development of a Public Safety Power Shutoff plan for use in their communities. PSE gathered feedback through small-group discussions focused on community concerns and customer communication needs during any future potential PSPS events.

During these meetings, PSE identified community feedback trends that were consistent across the service areas where we engaged. Community-specific concerns and recommendations for potential community partnerships and local communication channels were also heard. PSE documented summary reports detailing this customer feedback, which were posted on PSE's wildfire webpage and shared with meeting attendees via email. PSE is applying the feedback gathered at these meetings, as well as feedback gathered during ongoing coordination with fire response agencies, to aid in the development of PSE's Public Safety Power Shutoff communications approach and the evolution of our broader wildfire communications. For more details on the 2022 community meeting series, please view the meeting summaries at pse.com/wildfireplan.

6.3.2. IN PROGRESS AND PLANNED FOR 2023

In 2023, PSE will incorporate community feedback into PSPS planning efforts, both from an operational and a communications perspective. Additionally, systems, tools, processes and materials for a PSPS scenario that PSE does not currently have as part of our communications toolkit will be developed. These might include automated systems for proactive notifications based on customer preferences, trans-created materials in multiple languages, interactive online tools, and specialized notifications and outreach to customers with medical needs. The goal is to provide customers with timely and frequent updates about a potential or active PSPS and enable customers to take necessary preparedness actions to minimize the inconvenience and hazards of a loss of energy service due to PSPS.

In December 2022, PSE hired a dedicated communications and engagement lead for wildfire and PSPS efforts. The new communications lead will collaborate with the Wildfire Task Force and other communications and community engagement team members to accomplish the following:

- Identify audiences that should be included in PSPS engagement, including but not limited to directly affected customers, people who rely on electricity for medical equipment, low-income populations, people who speak non-English languages at home,

senior citizens, Tribes, local fire and emergency responders, emergency shelters, elected officials and city staff, and community-based organizations

- Continue to meet with people in communities that may experience a PSPS in the future to develop relationships and identify existing local communications channels that can be leveraged in a PSPS scenario
- Identify and partner with community leaders and trusted voices to extend the reach of vital information to the greatest number of residents and customers
- As new communities are identified as being high-risk/requiring PSPS, hosting community meetings to gather community-specific feedback and to identify local resources
- Participate in Operations PSPS planning efforts to ensure the incorporation of communications and outreach processes
- Partner with Operations and IT to develop a communications tool that can quickly provide updates to customers as PSPS evolves
- Develop a PSPS communications and engagement plan, including templated messaging and materials that prioritizes communication with vulnerable and hard-to-reach customers and incorporates best practices from other utilities
- Share updates with affected communities as our PSPS planning efforts develop

PSE will continue to evolve its communications and engagement efforts as PSPS plans develop and community needs are identified.

7. CONCLUSION

Energy is an essential service, and safety is PSE's top priority. PSE is proud to have served customers and communities across Washington State for nearly 150 years, and we are committed to delivering energy that is clean, safe, reliable, affordable and equitable. This Plan reflects those priorities in its comprehensive approach to wildfire mitigation and response. It is a portfolio of risk management, operations, emergency management, communications, training and continuous improvement of programs and procedures.

In the last year, PSE has made great strides in maturing this Plan and the Wildfire Mitigation and Response Program. Through dedicated program staffing and increased involvement of teams across the company, PSE has added governance structure, matured outage and gridded risk modeling, advanced our PSPS planning, and built stronger relationships with partner agencies and high wildfire risk communities.

PSE is resolved to engage a broad range of interested persons and evaluating risks to adaptively manage implementation of this Plan. We look forward to ongoing discussions with the Utilities and Transportation Commission, as well as with customers and public sector and community partners, about this important topic.

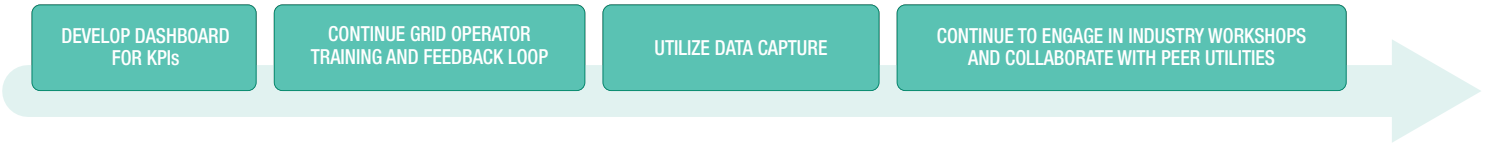
APPENDIX A-1: EXECUTION AND CONTINUOUS IMPROVEMENT

DEFINITION AND OBJECTIVE

Effective plan execution requires staff focused on identifying and incorporating best practices to ensure PSE's plan effectively and adaptively addresses evolving wildfire risks within PSE's service area.

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
Staffing	Asset Management-Wildfire Engineer	• Engineer focused on: • Implementing holistic strategies and processes for reducing wildfire risk and improving reliability and resiliency. • Developing and implementing asset management strategies for long-term system hardening in higher wildfire risk areas. • Engaging with the industry and vendors to align with best practices and evaluate the potential for integrating new technologies or approaches to reduce wildfire risk. • Working with standards to improve equipment specification and exploring new technologies.
	Communications Initiatives Consultant	Communications Initiatives Consultant focused on: • Developing and implementing a strategic communication workplan that aligns with the objectives set forth in Wildfire Mitigation and Response Plan. • Help in developing, exercising, and continuously improving communication specific wildfire response plans. • Engaging directly with customers, answering questions, and acting as a liaison between the customer and Wildfire Mitigation and Response Program. • Managing the communications and public engagement components of PSE's Wildfire Mitigation and Response Program. • Assists in developing, coordinating, and implementing of new communications tools to support PSE's Wildfire Mitigation and Response Program.
	Data Scientist	Data Scientist focused on: • Leveraging data, internal and external, to develop different operational models for a predictive approach to wildfire mitigation. • Collaborating with different external entities to ensure PSE is on the front lines of latest wildfire mitigation efforts. • Developing visualization for real-time monitoring and evaluation of data models.
	Data Capture Capability	• 2022- Developed and implemented improved methods for capturing and logging fire ignition data.
	Wildfire Program Manager	Program Manager focused on: • Leading PSE's ongoing development and implementation of our corporate wildfire risk reduction strategies. • Assembling and leading multi-disciplinary teams to ensure mitigation implementation aligns with overall corporate objectives. • Ensuring that equity is embedded into planning and execution of wildfire mitigation strategies.
Governance	Charter	In 2023- Established a Charter for the Wildfire Mitigation Task Force.
Lessons Learned	Root Cause Analysis (RCA)	2022- Began evaluating the use of existing reliability RCA processes for application in wildfire risk reduction.
	2022 experience	2022- Continued to develop risk model, including burn potential and fire propagation, likelihood, and consequence of ignitions; continued engagement with DNR advisory committee.
	Industry sharing	• 2023- Attended WEI Wildfire Planning and Mitigation Conference March 2023. • Ongoing meetings and discussions with peer utilities. • Avista bi-annual meetings focused on risk prevention.



APPENDIX A-2: SITUATIONAL AWARENESS

DEFINITION AND OBJECTIVE

Situational awareness tools and technology provide a comprehensive understanding of real-time wildfire risk throughout PSE's service area. System Operators can then use the information needed to execute mitigation actions in advance of a fire weather event.

KEY PERFORMANCE METRICS

- Miles of high-risk overhead power lines inspected pre-wildfire season

* Metrics listed under key accomplishments in italics

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
Pre-Wildfire Season Inspections	Ground and helicopter inspections	• *2022 – Inspected and addressed tree and equipment issues on 9 transmission circuits and 21 distribution circuits, totaling 281 miles of transmission/ 460 miles of distribution.*
Assess Risk	Risk Modeling	• 2023 – Updated internal risk model, no longer takes vegetation cycle into account and the weighting of consequence and probability have been adjusted from 40/60 to 30/70, respectively.
	Annual risk rating	• 2022 & 2023- Updated risk rating.
Fire Weather Monitoring and Risk Mitigation	Daily Dashboard	• 2022 & 2023– Updated real-time dashboard with new risk classifications and additional real-time environmental data to monitor fire weather conditions.
	Ignitions and fire tracking	• 2022 – Developed enhanced data capture procedures to enable more granular tracking and ongoing trend analysis of ignition and wildfire events.
Inspection Technology	Aerial and thermal inspection devices	• 2022 – Completed pilot for satellite imagery that will feed predictive modeling.

APPENDIX A-3: FAULT REDUCTION

DEFINITION AND OBJECTIVE

Reduce wildfire risk by preventing the interaction of utility infrastructure and the environment through incorporating a variety of fault reduction strategies tailored to the wildfire environment.

KEY PERFORMANCE METRICS

- Miles of bare conductor upgraded
- Miles of conductor undergrounded
- Miles of covered conductor installed

* Metrics listed under key accomplishments in italics

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
Deploy Covered Conductor and strategic undergrounding	Defined investments	• *2022- 0 miles of bare conductor upgraded.* • 2023 – Planned 4.4 miles of bare conductor upgrades. • *2022- 4.9 miles of conductor undergrounded.* • 2023 – Planned 4.4 miles of conductor undergrounding. • *2022 – Installed 2.1 miles of covered conductor.* • 2023 – Planned 5.7 miles of covered conductor.
Asset Management	Defined investments	• 2022 – Replaced poles on 9 circuits. • 2023 – Planned replacement of reject poles on 9 circuits. • 2023 – DER projects planned.
Vegetation Management	Pre-wildfire season trimming	• 2022- Trimmed 2,400 trees. • 2023- To be addressed with completed inspections.
	Pre-wildfire season hazard Tree Removal	• 2022- Removed 21 trees. • 2023- To be addressed with completed inspections.
Public Safety Power Shutoffs	Operational planning	• 2023 – Secured a contract with a consultant to determine PSPS zones and execution thresholds. • 2023 – Create a work back plan to be fully capable of implementing a PSPS.
	Community engagement and customer education	• 2022 – Hosted three community engagement meetings in higher risk wildfire areas.

2024 – 25 PROJECTS PLANNED → 2025 – 14 PROJECTS PLANNED → 2026 – 12 PROJECTS PLANNED

APPENDIX A-4: FAULT PROTECTION

DEFINITION AND OBJECTIVE

Fault reduction strategies are intended to prevent normal operation of utility fault protection equipment from igniting dry grass or vegetation during fire weather events. Several common fault protection tactics include altering automatic reclosing and protective device settings.

KEY PERFORMANCE METRICS

- SCADA upgrades to circuit breakers
- Distribution Automation schemes installed
- Number of fiberglass arms installed
- Number of SCADA-enabled reclosers installed

* Metrics listed under key accomplishments in italics

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
Reclose Blocking	SCADA enablement	• *2022 – 3 upgrades completed.* • 2023 – 10 upgrades planned.
	DA and TA	• *2022 – 2 Transmission Automation upgrades completed.* • 2023 – 2 Distribution Automation upgrades planned.
Other System Re-Design Equipment	Reclosers	• *2022 – 4 SCADA –enabled reclosers installed.* • 2023 – 24 SCADA –enabled recloser installations planned.
	FR3 filled transformers	• 2022 – Piloted FR3 transformers.
	Fiberglass cross arms	• 2022 – Piloting fiberglass cross arms.
Arc Suppression Fuses	New technology	• 2023 – New arc suppression fuse in trial.

2024 – 33 PROJECTS PLANNED

2025 – 25 PROJECTS PLANNED

2026 – 1 PROJECTS PLANNED

APPENDIX A-5: PROCEDURES AND EMERGENCY RESPONSE

DEFINITION AND OBJECTIVE

PSE's operating procedures in higher wildfire risk areas and during wild-land fire weather events require proactively monitoring our system and maintaining situational awareness as well as closely coordinating our emergency response activities with many other entities.

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
Eternal Coordination	Workshops	• 2022 – Attended Six county summer hazard workshops.
	Wild-land Fire Prevention Task Force	• 2022 – Attended meetings and participated in discussions with DNR. • 2023 – Participating in the Utility Wild-land Fire Prevention Advisory Committee.
Operational Procedures	Roles and Responsibilities	• 2023 – Updated internal Wildfire Operational Response documents to establish greater granularity of roles and responsibilities.
	Activation thresholds	• 2022 – Established thresholds and protocols to guide evaluation of operational actions. • 2022 – Proactively responded to 16 Red Flag Warnings during the months of June through October.
	Training	• 2022 & 2023 –Trained staff on updated procedures prior to wildfire season.
Fire Command Interface	Situational awareness and coordination	• 2022 – Established real-time communication with Incident Command while fires at Bolt Creek and Vantage Hwy. were active.

EXPAND ON COLLABORATION WITH DNR, FIRE DISTRICTS, AND OTHER UTILITIES IN THE AREA

ANALYZE DATA CAPTURED THROUGH SOFTWARE UPDATES FOR DAILY LOGGING

DETERMINE ADJUSTMENTS TO OPERATIONAL PROCEDURES BASED ON DATA ANALYSIS

APPENDIX A-6: COMMUNICATIONS AND OUTREACH

DEFINITION AND OBJECTIVE

Effective external and internal communication is essential for coordinated prevention and response to wildfire risks. PSE is committed to keeping our customers and impacted communities informed and engaged in our wildfire program. Communications and outreach for the wildfire program includes education and awareness, equitable public involvement and timely communications during an emergency.

KEY PERFORMANCE METRICS

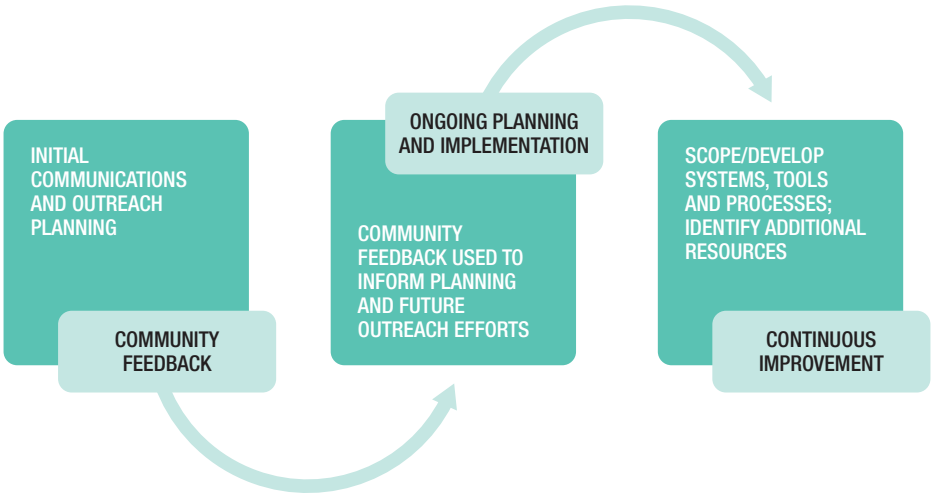
- Unique page views: pse.com/wildfirepreparedness

* Metrics listed under key accomplishments in italics

PLAN MILESTONES

Key Strategy	Process	Key Accomplishments 2022-2023
General communication and outreach tools	Webpage	• *2022- Received 1,931 unique page views for the PSE wildfire page during April-December 2022: pse.com/wildfirepreparedness* • 2023 – Continuously updating webpage to include program updates, community meeting announcements and other time-sensitive information. • 2022 – Launched the Wildfire Program webpage in April (pse.com/wildfireplan). • 2022 – Refreshed webpage content and incorporating additional resources and educational materials as they are developed.
	Fact sheets/ FAQs	• 2022 – Developed a fact sheet in both English and Spanish with information about wildfire mitigation, preparedness and PSPS. • 2023 – Creating frequently asked questions document to address questions raised at community meetings and via stakeholder comments and feedback.
	Meeting in a box	• 2022 & 2023 – Developing a suite of materials about PSE's wildfire program, including fact sheets, FAQs and a slide deck, for use at community meetings or presentations.
	Email inbox	• 2022 – Created wildfire.response@pse.com email inbox and a comment submission form for customers and the public to submit comments or questions about the wildfire program.
Pre-wildfire season awareness and education	Education and awareness campaign	• 2022 & 2023 – Launching annual pre-season education campaign for customers in all of PSE's service areas with information about how PSE mitigates wildfire and how customers can prepare for wildfire season. • 2022 & 2023 – Tools include direct mail, bill inserts, PSE.com landing page content, and social media content.
	Community and stakeholder outreach	• 2022 & 2023 – Identifying opportunities to partner with local community organizations or emergency response agencies to attend community events and provide educational resources about PSE's wildfire mitigation program and PSPS.
	Media engagement	• 2022 – Identified key media publications and community newsletters for proactive outreach ahead of fire season. • 2022 & 2023 – Reached out to media publications ahead of fire season to publish wildfire preparedness content.
Emergency response communications during an active wildfire	Existing emergency communication tools	• 2022 – Used existing storm/emergency communication channels to share information about proactive electrical service interruptions during the Bolt Creek Fire for public and first responder safety.

PSPS communications and outreach	Community meetings	• 2022 – Held three community meetings in areas with high wildfire risk, including Cle Elum, Roslyn, Ronald and Greenwater, with 129 total attendees both in-person and virtually. • 2022 – Mailed 5,450 letters and sent 4,075 emails with information about community meetings and a fact sheet to all customers served by higher wildfire risk circuits. • 2023 – As new areas are identified as high-risk and having potential for PSPS, the need for additional community meetings will be evaluated.
	Vulnerable populations outreach	• 2022 – Contacted community organizations serving vulnerable populations ahead of community meetings. • 2022 & 2023: Continuing to identify and meet with impacted communities in areas with high wildfire risk to share resources and information and leverage established relationships and methods for reaching these communities.
	PSPS communications and outreach	• 2023 – Developing a communications plan, template messages, tools, and channels to communicate with customers and stakeholders in the lead up to and during a PSPS event.



APPENDIX B: INVESTMENTS BY BUSINESS PLAN WITH WILDFIRE RISK REDUCTION BENEFITS

PSE's 2020–2025 investments in grid modernization programs that also have benefits to risk reduction for wildfire areas. These dollars are based on the estimates of the proportion of the planned investments for those programs that will provide wildfire risk reduction benefits. This estimate reflects only the assumed amount of investment that will occur in higher wildfire risk areas as well as the wildfire risk impact.

Business Plan	Wildfire Risk Impact			$ Investment (Millions)	Relevant Investments
	High	Medium	Low		
Resilience Enhancement - Copper Conductor Replacement	X			1.7	Replace aging #6 and smaller copper conductor. This conductor is losing mechanical strength as it ages and has an increasing risk of failure. Prioritize the 0.9 miles in wildfire impact zones
Distribution Automation (DA)		X		7.2	Prevent reclosing into faults by using grid sensors to locate faults and remotely operate switches to isolate faulted sections.
Circuit Enablement - DERs and Microgrids			X	11.9	Remove constraints from the electric system to allow for Distributed Energy Resources and Microgrids to lessen impact of wildfire outages.
Circuit Enablement - EV			X	1.3	Prevent overloading the circuit due to increasing Electric vehicle utilization.
Poles Inspection and Remediation	X			11.7	Identify, repair, and replace failing poles and inspect pole-mounted equipment.
Underground Conversions	X			39.9	Directly remove exposure and ignition source.
Reclosers			X	2.7	Install new 3-phase reclosers throughout the system to improve reliability and allow for additional sectionalizing. Also, replace aging/obsolete reclosers.
Resilience Enhancement - Expanded			X	0.2	Drone inspection to identify failing equipment, radial feeder microgrid enablement to lessen impact.
Targeted Reliability - Root Cause Analysis			X	0.1	Framework for tracking and learning from equipment failures.
Substation SCADA			X	11.7	SCADA control for sectionalizing and DA enablement.
Transmission Automation		X		3.3	Prevent reclosing into faults on the transmission system.
Worst Performing Circuits	X			64.8	7 priority wildfire circuits, and 31 other wildfire circuits are WPC, direct reliability improvements.
Wildfire Mitigation	X			9.2	Fuse, transformer, crossarms replacement, fast tripping, rebuilds and underground conversions.

APPENDIX C: CHRONOLOGY OF THE PSE WILDFIRE PROGRAM (2018–2023)[1]

PSE's investments in grid modernization programs that also have benefits to risk reduction for wildfire areas. These dollars are based on the estimates of the proportion of the planned investments for those programs that will provide wildfire risk reduction benefits. This estimate reflects only the assumed amount of investment that will occur in higher wildfire risk areas as well as the wildfire risk impact.

Year	Event / Action
11/2018	Camp Fire: Deadliest and most destructive wildfire in California history occurred.
01/2019	Board of Directors Presentation, Natural Disaster and Electric System Risk: Information update on PSE's electric system with emphasis on insights from California wildfire events.
Q2 2019	PSE explores integrated asset management software solutions. This is a framework for other asset analytics such as wildfire. Reviewed vendors.
03/2019	Wildfire Risk Assessment - Assessment of internal department tactics to mitigate fire risk meeting with Enterprise Risk Management.
06/2019	ESRI overhead wire fire risk assessment USFS wildfire hazard created.
07/2019	Substitute Senate Bill 5305 created the Task Force and became effective July 28, 2019.
07/2019	Additional helicopter flyover inspection of cross-mountain transmission lines #1. Transmission Maintenance and Inspection Plan requires helicopter flyover of IP transmission line, but this is in addition to that requirement.
07/2019	Completed for Operations/EFR.
07/2019	Additional 3rd Serviceman added in Kittitas County.
07/2019	Four additional reclosers with SCADA control installed in Kittitas County.
07/2019	Fire hazard area pole inspections completed.
07/2019	Fire hazard area vegetation inspections completed.
08/2019	ESRI overhead wire fire risk assessment DNR WUI Risk Map created. In 2019, PSE mapping overlaid the overhead electric system with the Wild-land Urban Interface High Risk Communities map available from the Washington DNR. The mileage in "High Risk" areas and a double-weighted mileage of "Extreme Risk" area exposure was used to give relative Risk Exposure among all circuits. The 19 distribution circuits and 5 transmission circuits comprising the top ~50% of risk were prioritized for 2020 fire mitigation.
08/2019	Prioritized circuits for risk.
09/2019	Additional helicopter flyover inspection #2 completed.
11/2019	PSE XSGL Insurance Renewal, included wildfire program review.
11/2019	Attended Pacific Northwest Utility Wildfire Working Group hosted by Avista. PSE and other utilities in attendance.
11/2019	Attended 2nd Wildfire Task Force Meeting Lead by Department of Natural Resources.
12/2019	PSE explored high-speed clearing (broken wire) technology.
Q1-Q2 2020	PSE Asset Management identified the priority wildfire risk circuits for 2020 planning. All said high-risk distribution circuits have been inspected by vegetation crews, identifying sites for vegetation trimming to be complete by July 1. Recent efforts include an enhanced root cause analysis of larger outages led by Electric System Planning and efforts to improve the failure forensics analysis for line equipment led by Electric Standards. Efforts made to specifically track fire-related events where sparking, flame, and live wire down events occur. In order to improve situational awareness for system operators and to improve the circuit risk scoring, additional risk mapping and real-time situational data is being compiled on top of PSE's circuit maps. A wildfire dashboard is being created for use by system operations in guiding operation decisions. The 2020 wildfire season will be a test bed for this real-time situational awareness tool. Building off the 2019 season and using best practices identified in conjunction with numerous other entities, notably the Western Energy Institute, PSE continues to develop tools and processes to understand, reduce, and react to wildfire risks.

1 This chronology may not be fully exhaustive in capturing all efforts relative to PSE's wildfire

Q1 2020	Operational Process Tree created– Communication processes and decision tree for making system changes based on situational data.
Q2 2020	Internal and cross-agency communication and coordination completed.
02/2020	Attended 3rd Washington State Department of Natural Resources (DNR) Taskforce Meeting.
Q2 2020	Developed process improvement for operational decisions and communication around wildfire risks before PSPS discussions. • Gearing up towards a PSPS or any operational decisions, reclose blocking. • Standard operating procedure for system operators' response to wildfire risk
03/2020	High-risk distribution circuit analysis completed.
03/2020	PSE change management processes for wildfire mitigation and operation decisions created.
03/2020	Kickoff to create distribution design standards for wildfire risk areas.
04/2020	First version of the internal Wildfire Mitigation Plan created.
05/2020	Proposed ESRI Wildfire Situational Awareness Map for daily and annual risk assessment.
05/2020	Top 50% (~ 20 Distribution Circuits) high-risk circuit's equipment inspections and vegetation management completed by wildfire season.
06/2020	Completed aerial inspection helicopter flyover of cross-mountain transmission lines (additional to FAC-008 compliance inspection).
06/2020	Wildfire Pre-season report written.
07/2020	Wildfire Internal safety messaging developed.
07/2020	PSE Daily and Annual Wildfire Risk dashboards created with real-time weather and red-flag warnings; testing of the system begins.
08/2020	Consistent safety messaging for August on Wildfire Prevention was distributed internally to all employees.
10/2020	PSE Daily and Annual Wildfire Risk dashboards released to production.
12/2020	Attended Avista Wildfire Meeting.
01/2021	Attended King County Emergency Management engagement.
Q2 2021	Explored HIF relay technology, firmware necessary for SEL being tested in lab.
Q2 2021	Completed helicopter IR scan of Cascade White River transmission line.
04/2021	Wildfire dashboard training rolled out through an online training tool, incorporated operator feedback into tool.
04/2021	Wildfire Prevention and Response Plan updated.
04/2021	Wildfire Mitigation and Response plan shared with WUTC.
05/2021	Top 50% (~ 20 Distribution Circuits) High-risk circuit equipment inspections and vegetation management completed by wildfire season.
05/2021	CLE-11: FR3 transformers and non-expulsion fuses pilot project. Demonstration to develop alternative system design standards and materials for high-risk areas.
05/2021	Pole wrap installed at four locations in Kittitas County, six poles at each location.
05/2021	Pilot trial of Osmose overhead detail inspection ODI conducted as part of summer 2020 pole inspections for Pole Program.
05/2021	PSE Yellow Book and Work Practice Safety updated.
06/2021	Aerial inspection helicopter flyover of cross-mountain transmission lines (additional to FAC-008 compliance inspection).
09/2021	Revised PSE talking points around wildfires. Post Wildfire season review/lesson learned conversation.
10/2021	Explore Satellite inspections and situational awareness work with AiDASH.
11/2021	UTC wildfire open meeting presentation.
12/2021	Wildfire Asset Engineer hired.
Q1 2022	Engineering Complete for 2022 System Hardening Proof of Concept Equipment Trial, including fiberglass arms on CAS-16.

02/2022	Developed tracking and RCA for system-caused ignitions (Feb. 2022 – ongoing).
02/2022	Wildfire Circuit Priority List for 2022 created and distributed internally.
03/2022	PSE Wildfire Region Binary Map was created.
04/2022	Wildfire Program Manager hired.
04/2022	Wildfire Mitigation and Response Plan updated.
05/2022	Pierce County Emergency Management Summer Hazards Workshops; King County; Whatcom County.
05/2022	Trained System Operations staff on new Wildfire Operational Protocols.
06/2022	Attended Kittitas Community outreach event.
06/2022	Attended Thurston County Emergency Management Summer Hazards Workshops.
06/2022	Data Scientist hired.
06/2022	Began capturing ignitions.
06/2022	Aerial inspection helicopter flyover of cross-mountain transmission lines (additional to FAC-008 compliance inspection).
06/2022	Wildfire Community Meeting for West Cle Elum area.
07/2022	Top 50% (~ 20 Distribution Circuits) High-risk circuit equipment inspections and vegetation management completed by July 1st
07/2022	Conducted Wildfire Community Meeting for Greenwater area.
Q2 2022	PSE began participating in quarterly Pierce County Wildfire Mitigation collaboration meetings with local Fire Chiefs, Tacoma Power, and Lakeview Light and Power.
10/2022	Conducted Wildfire Community for South Cle Elum area.
11/2022	Attended and presented at WUTC wildfire open meeting.
12/2022	Wildfire Mitigation Communications Consultant hired.
12/2022	Developed constructions standards for higher wildfire risk areas.
01/2023	Established a Charter for the Wildfire Mitigation Task Force.
01/2023	Updated the PSE wildfire risk model.
02/2023	Wildfire Circuit Priority List for 2023 created and distributed internally.
02/2023	Updated Wildfire Operational Protocols and developed a pre-season checklist.
Q2 2023	Attended various County Emergency Management Summer Hazard workshops.
05/2023	Trained staff on updated wildfire operational protocols.

PUGET SOUND ENERGY

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