



Electric Generation in Wildfire Mitigation Plans

PNNL-SA-214891

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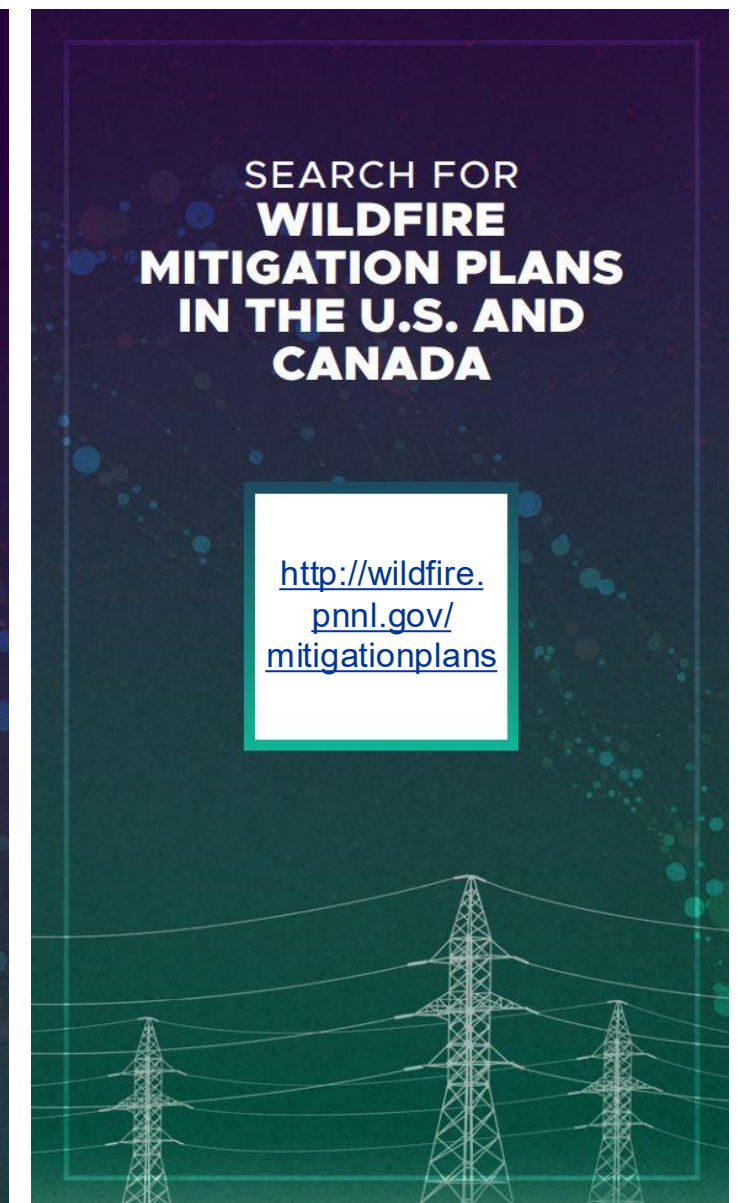
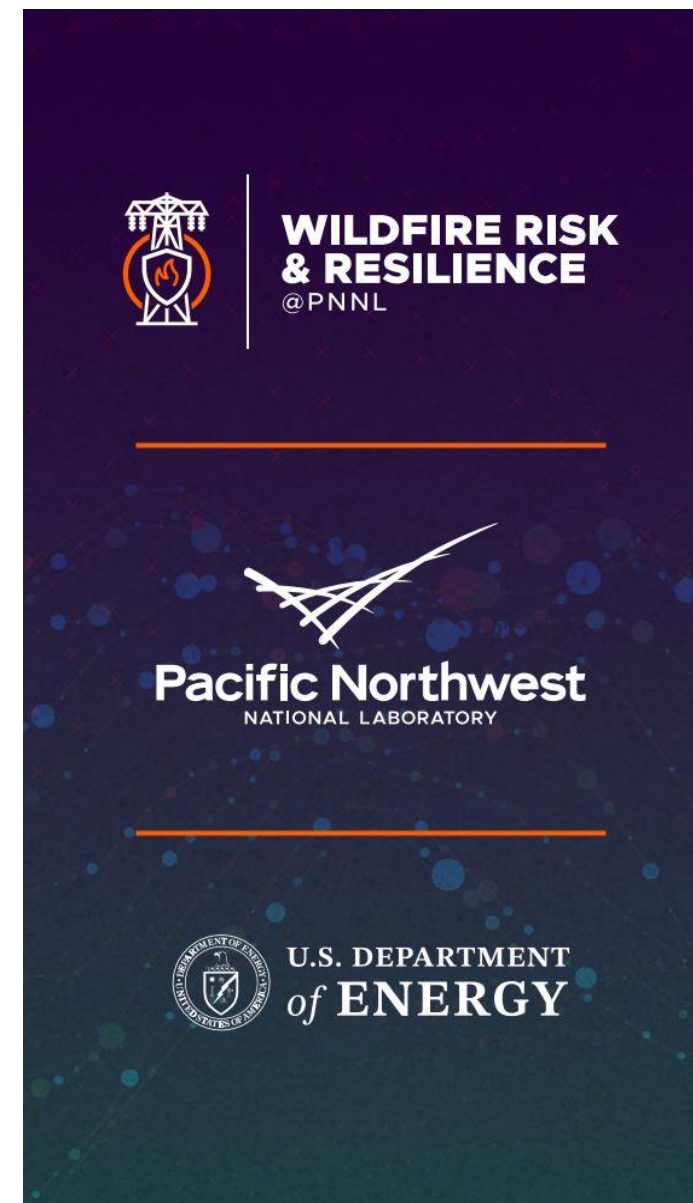
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Background

- Sponsored by the U.S. Department of Energy's Grid Deployment Office, PNNL created a database of all known and discrete utility Wildfire Mitigation Plans (WMPs) from across the United States and Canada.
- The goal is to provide a single consolidated location for access to all WMPs. Plans are organized by various metadata:
 - Location of the authoring utility or entity
 - Year or range of years of the plan implementation period
 - Type of utility or entity
- The database is a component of a larger research program to establish credible industry metrics to assess and mitigate wildfire risk.
- To help make sense of hundreds of WMPs and their contexts, PNNL produced a series of citable short decks, organized by technical topics.



Generation in Utility Wildfire Mitigation Plans

- There are few references to electric generation in utility wildfire mitigation plans.
- All references to generation that were found for this analysis are organized into the table.
- Generating facilities may have wildfire management practices as part of operational protocols, reported separately from these plans.

Examples of Generation within WMPs

- Transmission-induced generation curtailment
- Facility evacuation by emergency services
- Distributed generation as mitigation to maintain electric service during de-energization
- Provision of emergency generators to customers on de-energized circuits
- Generation and energy storage assets as potential sources of ignition

Transmission-Induced Generation Curtailment

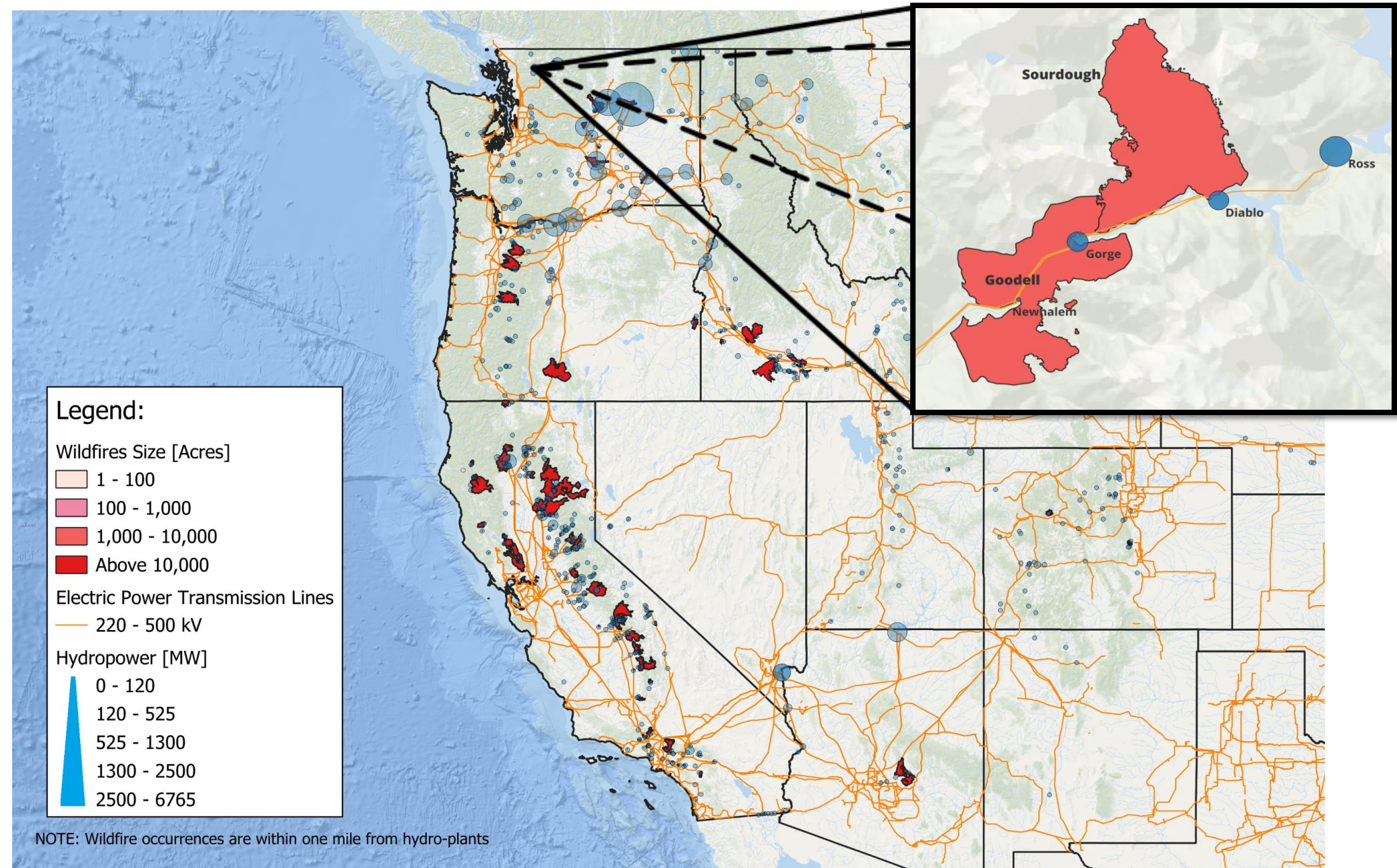
- Most references to generation-specific curtailment found in WMPs are in the context of hydropower. Hydropower facilities and associated transmission lines within the Wildland-Urban Interface (WUI) or rural, forested areas are more susceptible to wildfire impacts than urban areas ([SCL 2024, pg. 7](#)).
- The natural gas-fired Grayson Power Plant is the only local generation source for Glendale Water & Power; all other electricity is imported from nearby utilities, including the Los Angeles Department of Water and Power and Southern California Edison. While the WMP does not include language related to curtailing Grayson, it does refer to Grayson as a critical alternative to imported electricity in the case of disruptions from these neighboring utilities ([GWP 2024, pg. 43](#)).

- [illegible]

Impact of Wildfire Occurrences (2010-2023) on Hydroelectric and Power Line Infrastructure

- Between **2010 and 2023**, a total of **322 wildfires** occurred within **one mile** of hydroelectric plants.
- From **2019 to 2023**, **99 wildfires** were recorded in the same proximity.
- Out of those, **35 events** involved fires larger than **1,000 acres**.

Image: PNNL-SA-205536



Recent Wildfire Impacts on Hydropower Operations

Wildfire	Year	Region	Affected Capacity	Impacts	Damages	Contributing Factors
Goodell	2015	SCL	2.1 GW	Shutting down of three dams on Skagit River due to transmission damage and smoke effects	\$100,000 in lost revenue per day, \$900,000 for power purchases and lost generation, \$2.2 million overall	Low snowpack, early snowmelt
Sourdough	2023	SCL	2.1 GW	Disconnection/powering down of two out of three dams on Skagit River	\$2.6 million for power purchases, SCL burned through its rate stabilization account, ratepayer surcharges	Low precipitation in Ross Lake, abnormally hot May and June
-	2024	Churchill Falls Hydro, Canada	5.4 GW reduced to 0.9 GW	Limited operation, evacuation of the plant	Damaged transmission	-
-	2023	Hydro Quebec	677 MW imports into ISO-NE	Transmission interruption due to smoke	Hydro Quebec required \$500,000 in operational costs	Heat and smoke from intense forest fires in Quebec
Thompson Fire	2024	PG&E	645 MW	Hyatt Hydro Powerplant temporarily shut down due to de-energized PG&E lines	Minor damage to non-essential infrastructure	Intense heat wave, possibly arson
King Fire	2014	SMUD, California	267 MW	PSPS for 5 days	No reported damages	

Table adapted from: Shahnawaz A Siddiqui, Pablo R Méndez-Curbelo, Sohom Datta, et al. Implications of Wildfires on Hydropower Operations: Case Studies. TechRxiv. March 08, 2025

Facility Evacuation by Emergency Services

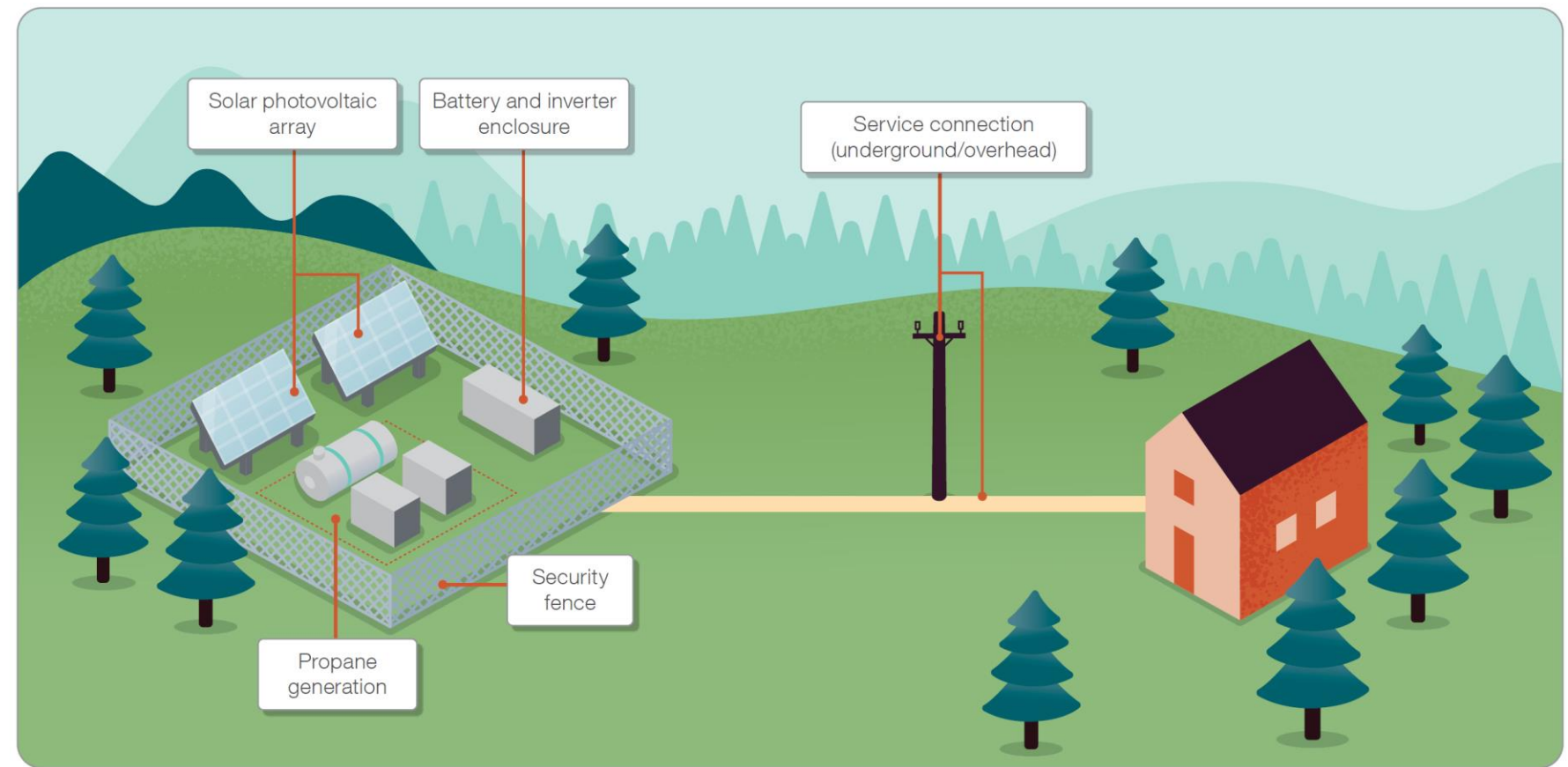
Because WMPs are focused on reducing ignition risk, facility evacuation is not typically included. This analysis found one case in which a WMP mentioned emergency management to respond to a wildfire, and evacuation was included in this context.

- The WMP for Grant County PUD No. 2 lists the roles and responsibilities of various officers involved in wildfire mitigation, including the Emergency Management Coordinator, who is responsible for facility evacuation ([Grant PUD 2024, pg. 10](#)).
- This WMP also includes language about coordinating with Tribal authorities to facilitate evacuation of a PUD facility ([Grant PUD 2024, pg. 8](#)).

Distributed Generation as Mitigation to Maintain Electric Service during De-energization

Widespread deployment of distributed energy resources (DER) and remote grid systems requires investments in advanced grid capabilities, including for reverse power flow. Because these systems have resilience benefits, including during PSPS events, investments in DER and remote grids support wildfire mitigation ([PSE 2023, pg. 26](#)).

Other investments in distributed generation to respond to transmission-induced generation outages include rooftop PV and portable generators ([GWP 2024, pg. 43](#); [NV Energy 2020, pg. 144](#)).



Depiction of potential remote grid system; [PSE 2024, pg. 16](#)

Provision of Emergency Generators to Customers on De-energized Circuits

- In most cases, generation is discussed in the context of mitigating reliability impacts of PSPS, including emergency generation ([SCE 2023-2025, pg. 317](#)), temporary microgrids ([PG&E 2023-2025, pg. 944](#)), and battery storage ([BVES 2023-2025, pg. 139](#)).
- Some utilities, including Pacific Gas & Electric Company and Anaheim Public Utilities, offer rebates for backup generation for customers reliant on life support and other qualified customers ([PG&E 2023-2025, pg. 935](#); [APU 2024, pg. 46](#)).



[APU 2024, pg. 46](#)

Generation and energy storage assets as potential sources of ignition

- The frequency of generation asset inspections is broken up by risk. SCE quantifies and adds up the ignition and consequence risk associated with each of its generation facilities, allowing them to prioritize the facilities with the highest risk. They inspect the top 75% of risk yearly and the remaining 25% of risk every two years ([SCE 2023-2025, pg. 311](#)).
- Energy storage is included in inspection and vegetation management efforts. The Portland General Electric WMP outlines risk mitigation efforts related to energy storage, such as monitoring for failure and construction standards to physically separate assets from flammable material ([PGE 2025, pg. 112](#)).
- Few utilities specifically discuss hydropower curtailment in their WMPs; among them are Centralia City Light, which has plans to curtail the Yelm Hydro Project during high-risk periods to avoid ignition risk ([Centralia City Light 2024, pg. 20](#)).

Representation of Wildfire Risk to Generation Assets in WMPs

- One common practice for risk assessment in WMPs is the inclusion of maps quantifying fire threat to landscapes, such as wildfire hazard potential. Plans may make references to overlaying these maps with asset maps, but such overlays are not included in the WMPs, which only state that the practice is possible and useful for approximating wildfire risk to those assets ([Klickitat 2024, pg. 14](#), [Central Electric Co-op 2024, pg. 33](#)).
- Portland General Electric did overlay fire growth potential with the vulnerability of assets and resources to generate "Conditional Impact" data. However, this was not limited to PGE assets; the motivation was to quantify the exposure and susceptibility of people and property, wildlife, infrastructure, and surface drinking water ([PGE 2025, pg. 249](#)).

Citation, Contacts, and Project Links

Please cite this slide deck as:

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For more information,
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All WMPs used in this analysis can be found at:

<https://wildfire.pnnl.gov/mitigationPlans>

Thank you