
AMERICAN
PUBLIC
POWER
ASSOCIATION
Powering Strong Communities

American Public Power Association (APPA)

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Three Types of Electric Utilities

	Public Power	Rural Cooperatives	Investor-Owned Utilities
MODEL	Publicly owned, not for profit	Privately owned, not for profit	Publicly owned, for profit
ACCOUNTABLE TO	Community	Members	Shareholders
SHARE OF UTILITIES	60%	20%	6%
SHARE OF CUSTOMERS	14%	13%	68%
SHARE OF GENERATION	10%	5%	37%

Public Power Overview

2,000
public power utilities provide electricity to
54
million people* in

49
states and

5
U.S. territories

*Based on U.S. Census Bureau stats of 2.6 people per household/meter

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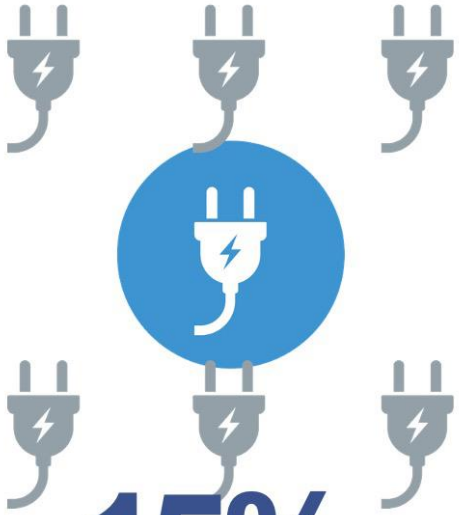
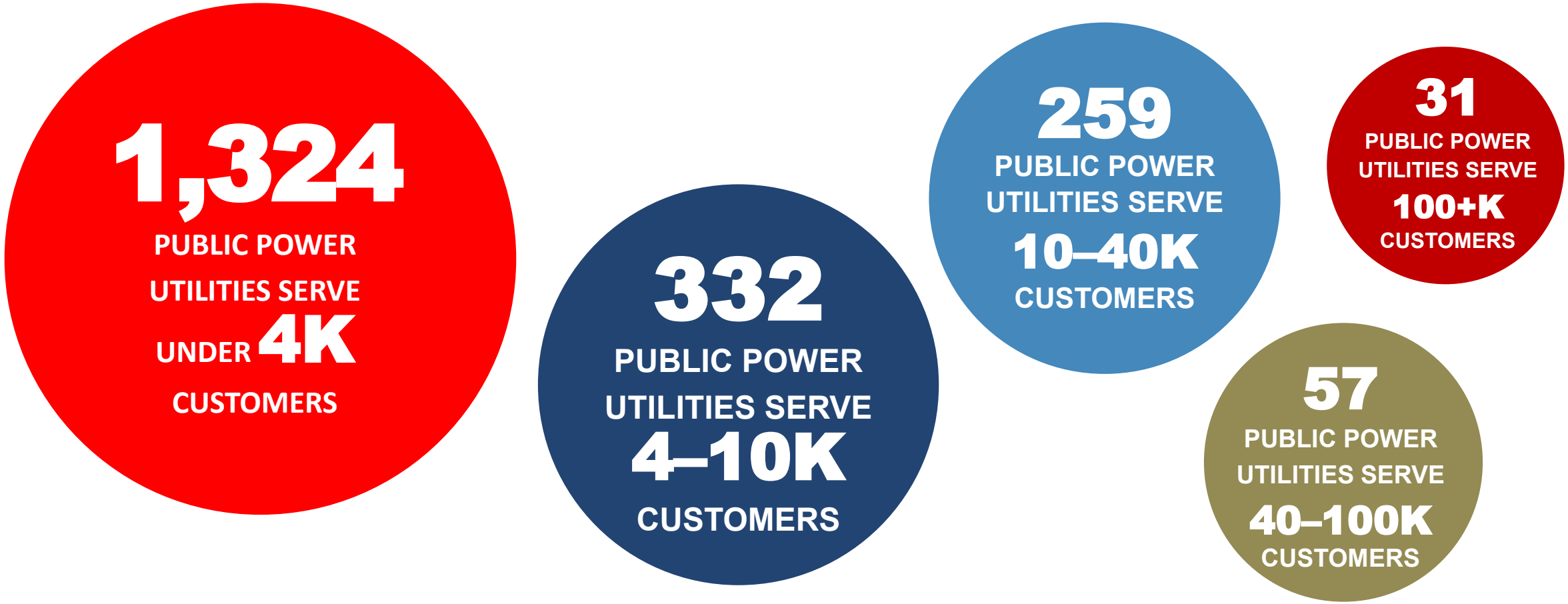


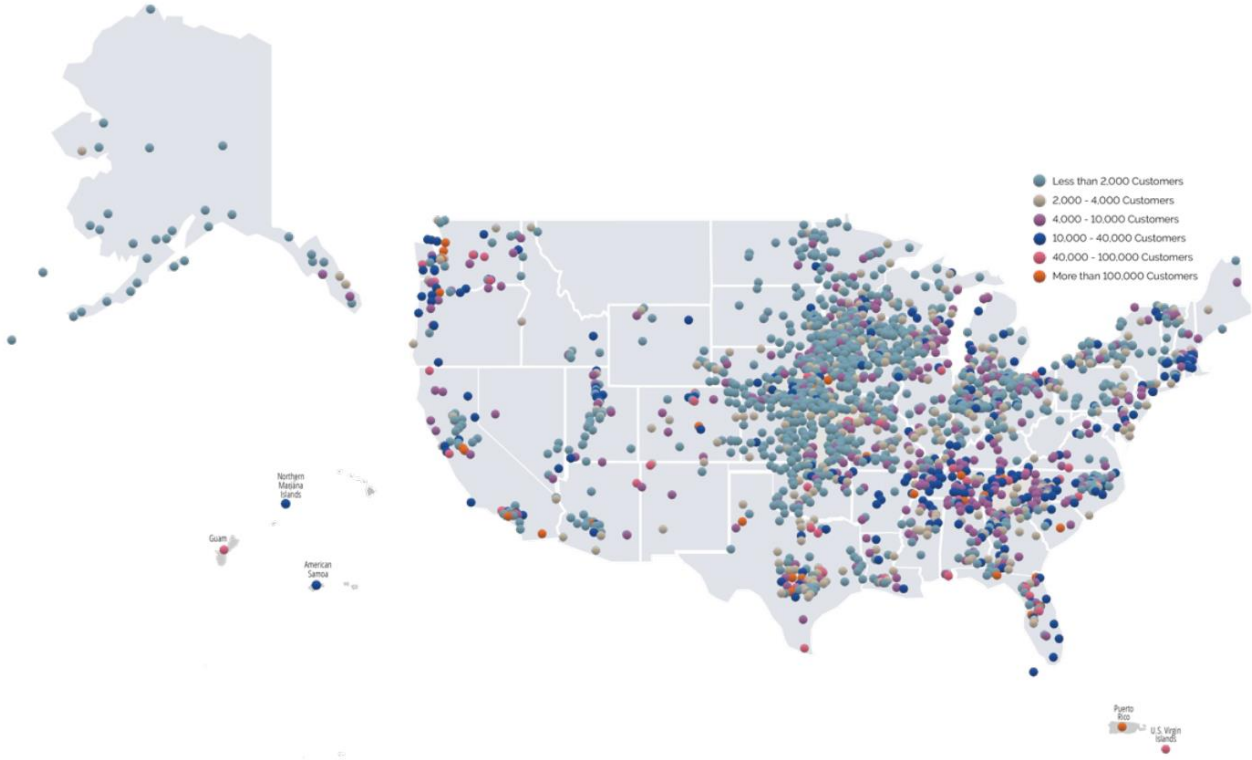
15%
of electricity customers in the U.S. are served by public power

How Many Customers Do Public Power Utilities Serve?

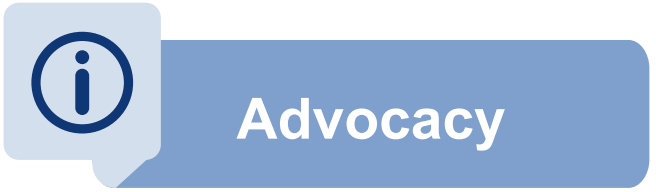


About the American Public Power Association (APPA)

- The voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide
- We serve our nearly 1,500 utility members & 220 corporate members
- Public Power serves **1** in **7** Americans



APPA Role in Supporting Public Power Utilities



Advocacy

Connects utilities with policymakers and represents their interests

Education & Training

Provides webinars, workshops, and peer learning

Technical Assistance

Offers toolkits, templates, and planning support

Community Engagement

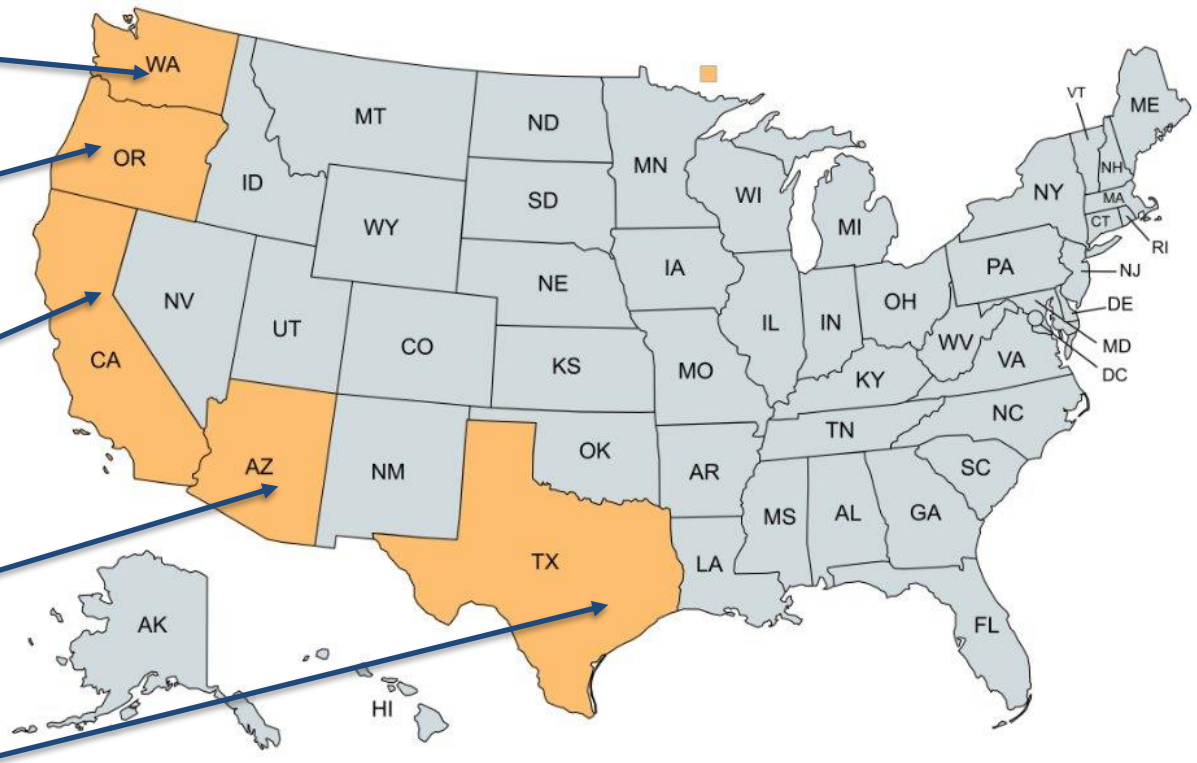
Facilitates collaboration and mutual aid

Challenges for Public Power Utilities

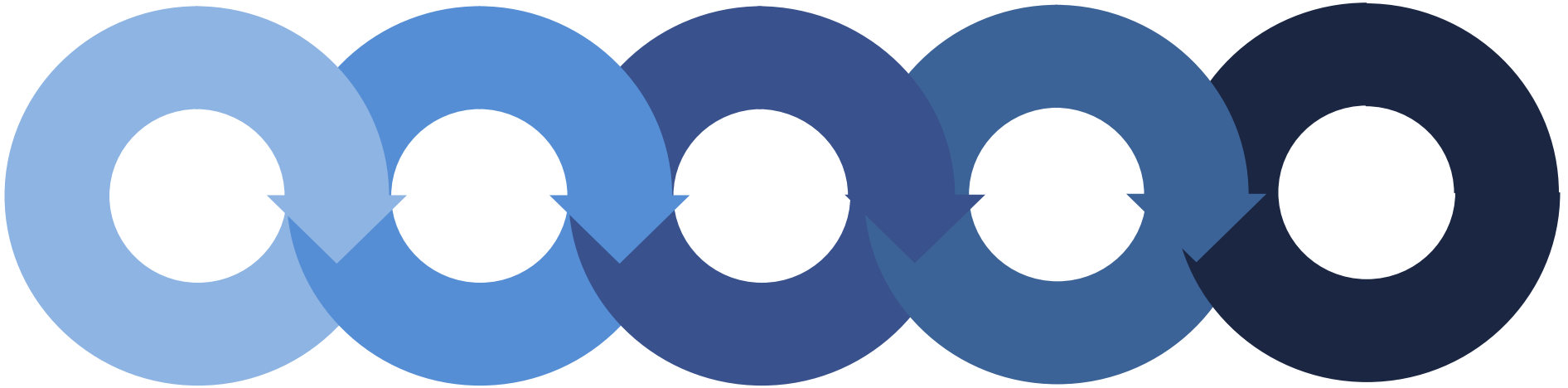
- **Federal permitting delays** slow wildfire mitigation, grid hardening, and recovery efforts
- **Vegetation management** and **hazard tree removal** on federal lands often require months or years for approval
- Limited access to **ROWs and maintenance roads** hinders emergency response
- Infrastructure upgrades like **pole replacements** or **undergrounding lines** face long approval timelines
- **Financial risk and liability** from wildfires can lead to lawsuits, even when utilities are not at fault
- Smaller utilities struggle with **unaffordable claims** and **lack of insurance coverage** in fire-prone areas

Project Overview: Argonne National Laboratory-APPA Wildfire Risk Mitigation

- Snohomish County PUD, WA
- Eugene Water & Electric Board, OR
- Placer County Water Agency, CA
- Salt River Project, AZ
- Austin Energy, TX



Common Wildfire Mitigation Strategies in Public Power



Vegetation and terrain data

Weather and fire danger indicators assessments

Remote sensing and AI tools

PSPS protocols

Community risk assessments

Real-World: Key Findings from WMP Review

	Vegetation Data	Weather Data	Remote Sensing	AI Tools	PSPS Criteria	Community Risk Assessments
Austin Energy	Vegetation management data	Real-time data feeds	Pano AI system (360-degree ultra-HD cameras)	Pano AI system	PSPS protocols	Collaboration with local fire departments
EWEB	Vegetation and terrain data	Weather and climate indicators	Situational awareness tools	Situational awareness tools	PSPS criteria and thresholds	Community risk and vulnerability assessments
PCWA	Fuel reduction and forest management data	Watershed health monitoring	Hazard tree removal mapping	N/A	N/A	Collaboration with local agencies
SRP	Vegetation and fuel load assessments	Meteorological data (wind speed, humidity, temperature)	AI-enabled infrared cameras (SmokeD)	AI-enabled infrared cameras (SmokeD)	PSPS program	Collaboration with U.S. Forest Service
SnoPUD	Vegetation and terrain data	Weather and fire danger indicators	Grid monitoring and smart devices (SnoSMART project)	Grid monitoring and smart devices (SnoSMART project)	PSPS planning	Wildfire threat analytics & mapping

APPA Programs Addressing Wildfire Risk for Public Power

Wildfire Mitigation Planning Resources

APPA curates toolkits, templates, and guidance to help utilities develop and implement wildfire mitigation plans tailored to their service areas

Education & Peer Learning

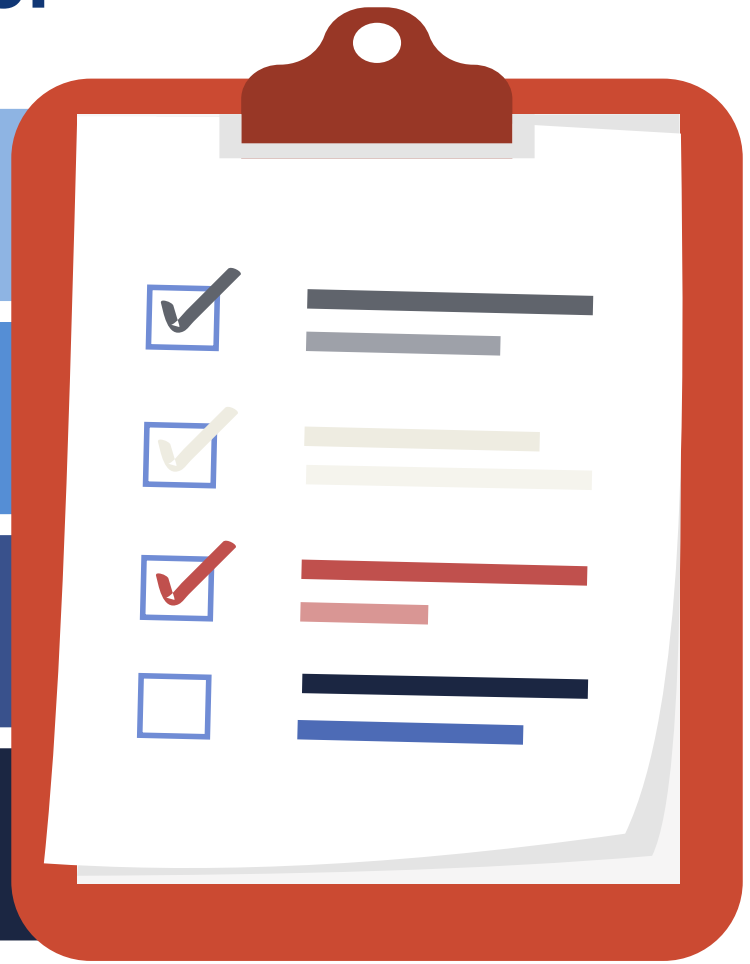
APPA hosts webinars, working groups, and peer exchanges focused on wildfire mitigation strategies, risk assessment, and operational best practices

Federal Advocacy & Policy Engagement

APPA advocates for streamlined federal permitting, improved vegetation management access, and liability protections for public power utilities operating on federal lands

Disaster Response & Mutual Aid Support

APPA coordinates mutual aid networks and provides resources to help utilities prepare for and respond to emergencies



Public Power Wildfire Mitigation Resources

Public Power Wildfire Mitigation Plan Template

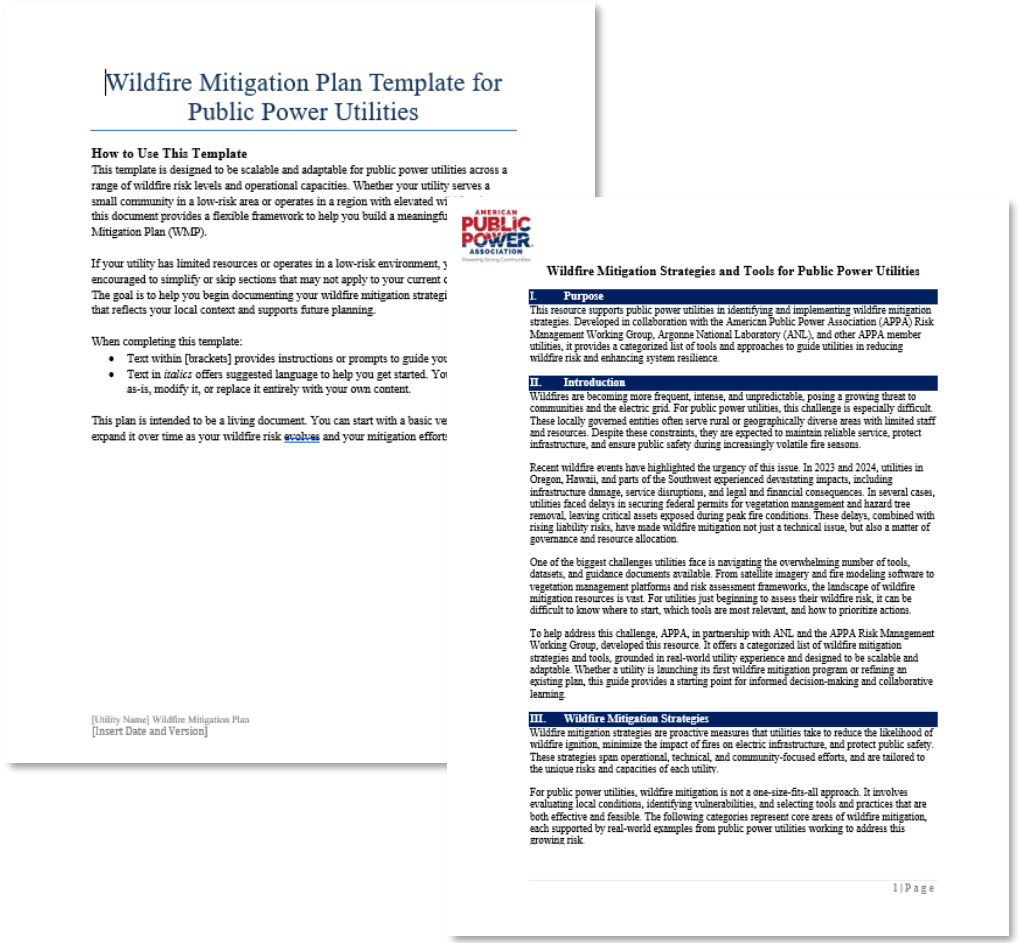
- Scalable framework for public power utilities across varying wildfire risk levels

Wildfire Mitigation Strategies and Tools for Public Power Utilities

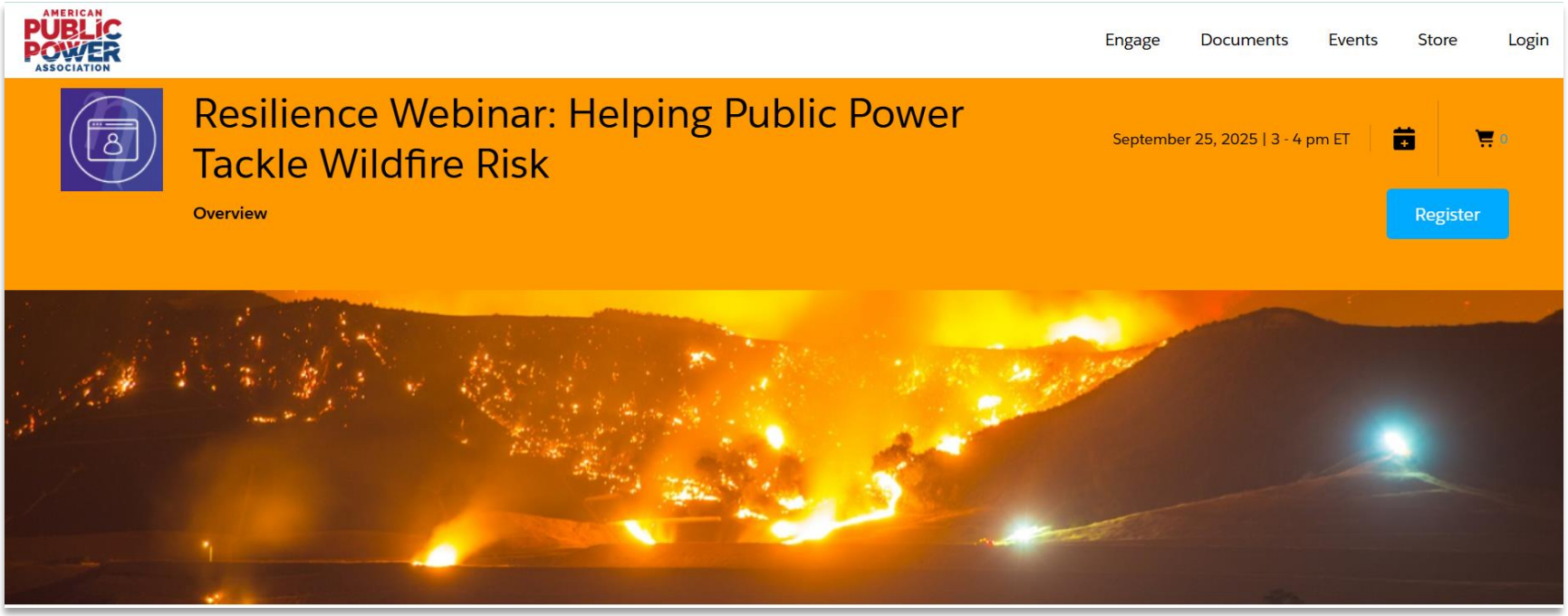
- Categorized approaches to reduce wildfire risk and boost resilience

Public Power Feedback

- Both resources are undergoing review with public power members



Upcoming Webinar – Resilience Webinar: Helping Public Power Tackle Wildfire Risk



Thursday, September 25 | 3:00 – 4:00 PM ET via Zoom Virtual

The webinar is open to everyone registered

Registration Link: TBD

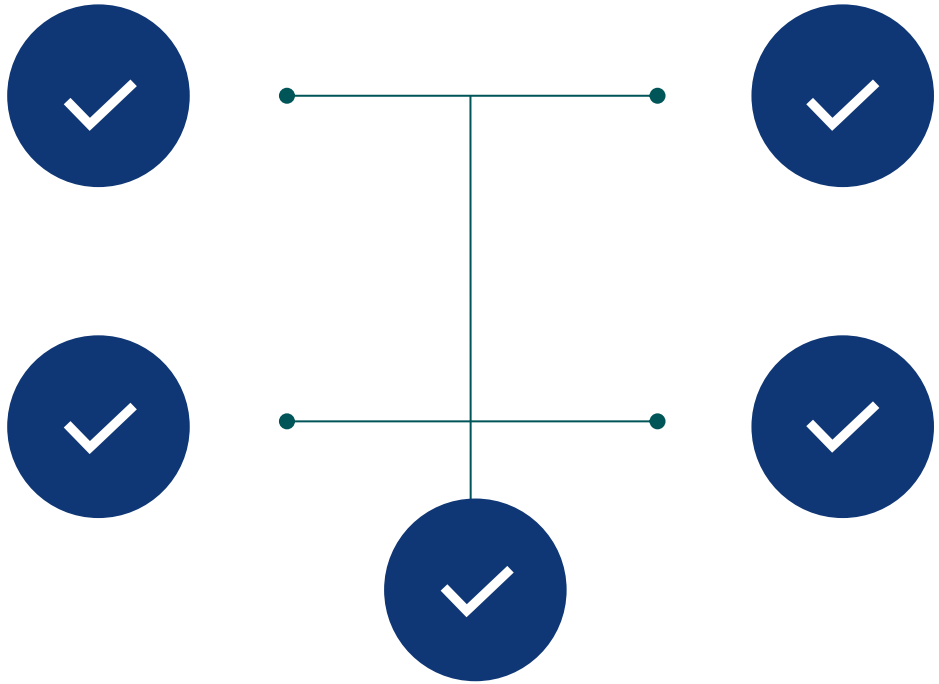
Collaboration Opportunities

Streamline Permitting Processes

Help expedite approvals for vegetation management and infrastructure upgrades on state and federal lands

Expand Funding Access

Support grant programs and ensure public power utilities are eligible for wildfire mitigation and resilience funding



Facilitate Data Sharing

Provide access to wildfire risk maps, weather data, and modeling tools to support local planning

Integrate Public Power in State Planning

Include public power utilities in energy security, emergency response, and wildfire mitigation planning

Support Regional Coordination

Encourage mutual aid agreements and cross-jurisdictional collaboration among utilities and emergency agencies

Thank you!

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Pacific Northwest NATIONAL LABORATORY

U.S. DEPARTMENT of ENERGY
Grid Deployment Office

Utility Wildfire Mitigation Plans

Overview and Database

PNNL-SA-211943 PNNL-SA-212056

PNNL-SA-211307 PNNL-SA-211619

PNNL-SA-214891

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August 27, 2025

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WILDFIRE RISK & RESILIENCE

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Wildfire Resiliency Standards & Metrics for Utilities

Emerging Wildfire Risk State TA

Wildfire Risk: Utility Business Models

WMP Database

Standards & Metrics Develop-ment

Technical Assistance for Utilities

Regional Risk & Wildfire Workshop (CESER - GDO)

Targeted State Support

Legislative & Industry Trends

Technical Advisory Committee

Pacific Northwest
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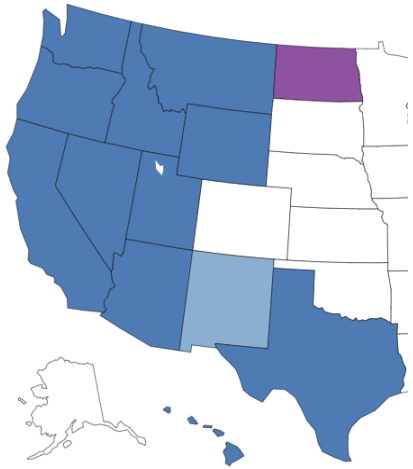
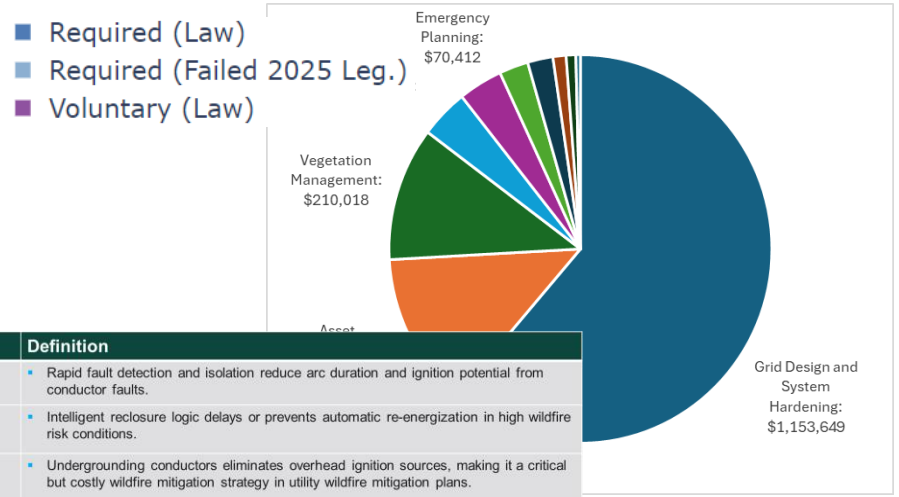
Wildfire Mitigation Plans (WMPs) Briefing

- Laws and legislation for WMPs
- Where and when have WMPs issued
- What's usually in the WMPs
- Wildfire Mitigation Plans Database
- WMP AI analysis tool





Technology / Technique	Definition
Fast Trip Systems	▪ Rapid fault detection and isolation reduce arc duration and ignition potential from conductor faults.
Adaptive Reclosures	▪ Intelligent reclosure logic delays or prevents automatic re-energization in high wildfire risk conditions.
Undergrounding Conductor	▪ Undergrounding conductors eliminates overhead ignition sources, making it a critical but costly wildfire mitigation strategy in utility wildfire mitigation plans.
Covered Conductor	▪ An overhead power line with a non-insulated but weather-resistant covering over the conductor, designed to reduce contact-related faults and wildfire ignition risks
Advanced Fire-Safe Devices for Monitoring and Controls	▪ Replacement of traditional expulsion-type fuses and surge arresters with devices that minimize ignition risks in wildfire-prone zones.
Dynamic Line Rating (DLR)	▪ Adjusts transmission line capacity in real time based on temperature, wind, and conductor conditions.
Topology Optimization and Improvements	▪ Reconfigures the grid's structure to improve reliability, minimize losses, and reduce wildfire or overload risks

Utility Wildfire Mitigation Plans Database

http://wildfire.pnnl.gov/mitigationplans

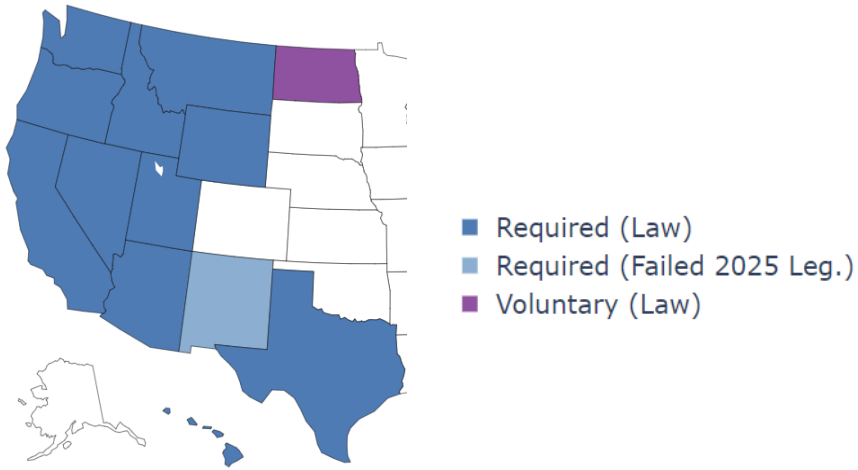
409
Number of Wildfire Mitigation Plans

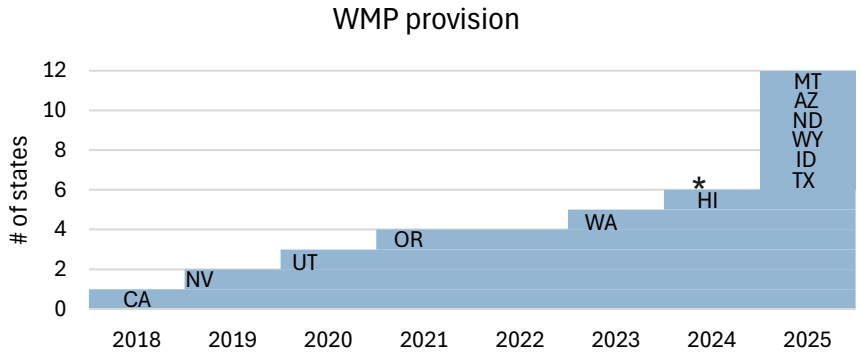
170
Number of Utilities Represented

9
Years Represented (2019-2028)

18
Number of States Represented

Timeframes for WMP Requirements





*Hawaii requires WMPs through Commission Order No. 41033, which achieves the same objective as legislatively directed WMPs and is included in summary information here. Oklahoma 2025 legislation directs utilities to comply with Commission requirements and the National Electric Safety Code but does not require WMPs explicitly at this time and is not included here.

California introduced the first legislation requiring Wildfire Mitigation or Wildfire Protection Plans (WMPs) in 2018. Since then, **eleven additional states have enacted legislation pertaining to WMPs**.

Four states, Utah, Oregon, Washington, and Hawaii, implemented requirements for WMPs between 2022 and 2024.

Six states passed legislation to either mandate WMPs or clarify requirements of and benefits from them as part of their 2025 legislative sessions.

Existing laws require submission of a WMP to the state Public Utilities Commission (PUC) or governing board for approval. Some states specify WMP content legislatively, while others leave content to PUC direction. Some states apply legislative mandates only to regulated utilities, while others apply them to all utilities regardless of oversight structure.

Special Provisions Connected to WMPs

State	Wildfire Mitigation Planning	Modified Liability	Modified Damages	Payment Fund or Bond Authorization
AZ	Law	Law	Law	
CA	Law	Law		Law
HI	Commission Order	Law		
ID	Law	Law	Clarification of Law	
KS			Law	
MT	Law	Law	Law	
ND	Law	Law		
NV	Law			
OR	Law		Law	
TX	Law	Law		
UT	Law	Law	Law	Law
WA	Law			
WY	Law	Law	Law	

New Mexico, Oklahoma, Oregon, and South Dakota proposed 2025 legislation that did not pass.

Laws or commission order Not addressed

The legislative approach to linking WMPs to modified liability and damages varies by state with no clear pattern.

Six states require WMPs as a component of qualifying for reduced risk or reduced damages.

Other states limit liability or damages by statute without linkage to WMP requirements.

In states where the WMP is linked to modified liability and damages there is also no clear pattern on whether the Plan must be *approved* or *filed* to qualify for the benefit.

Timeframes for Special Provisions

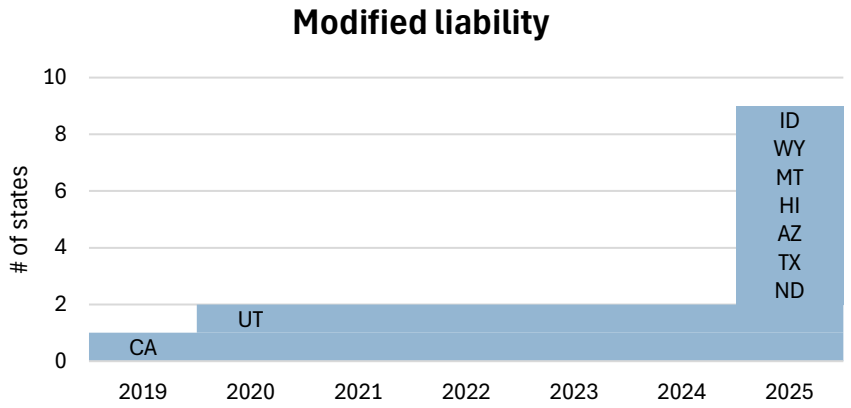
Unlike the gradual adoption of WMP legislation from 2019 to the present, states saw a rapid acceleration in liability and damages modifications in 2025.

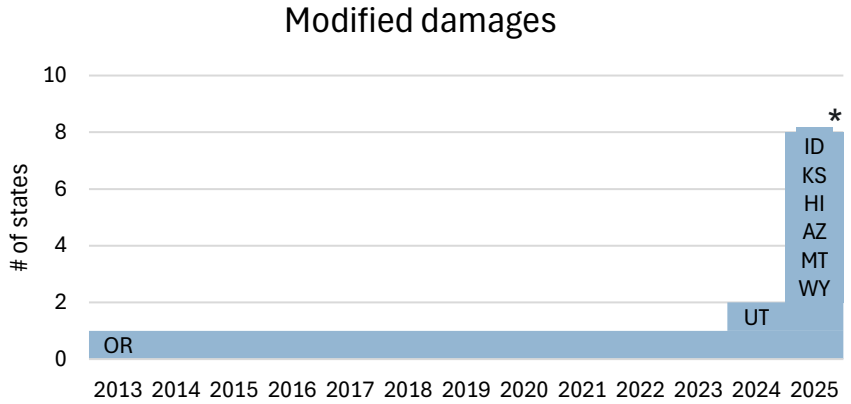
In some cases, WMP legislation is tied to legal protections for utilities.

- Arizona, Idaho, Montana, Utah, and Wyoming have passed legislation conferring a modified liability standard to utilities with a WMP that has been approved by state regulators.
- Similar legislation has been introduced in New Mexico.

States have also passed legislation modifying liability without WMP requirements.

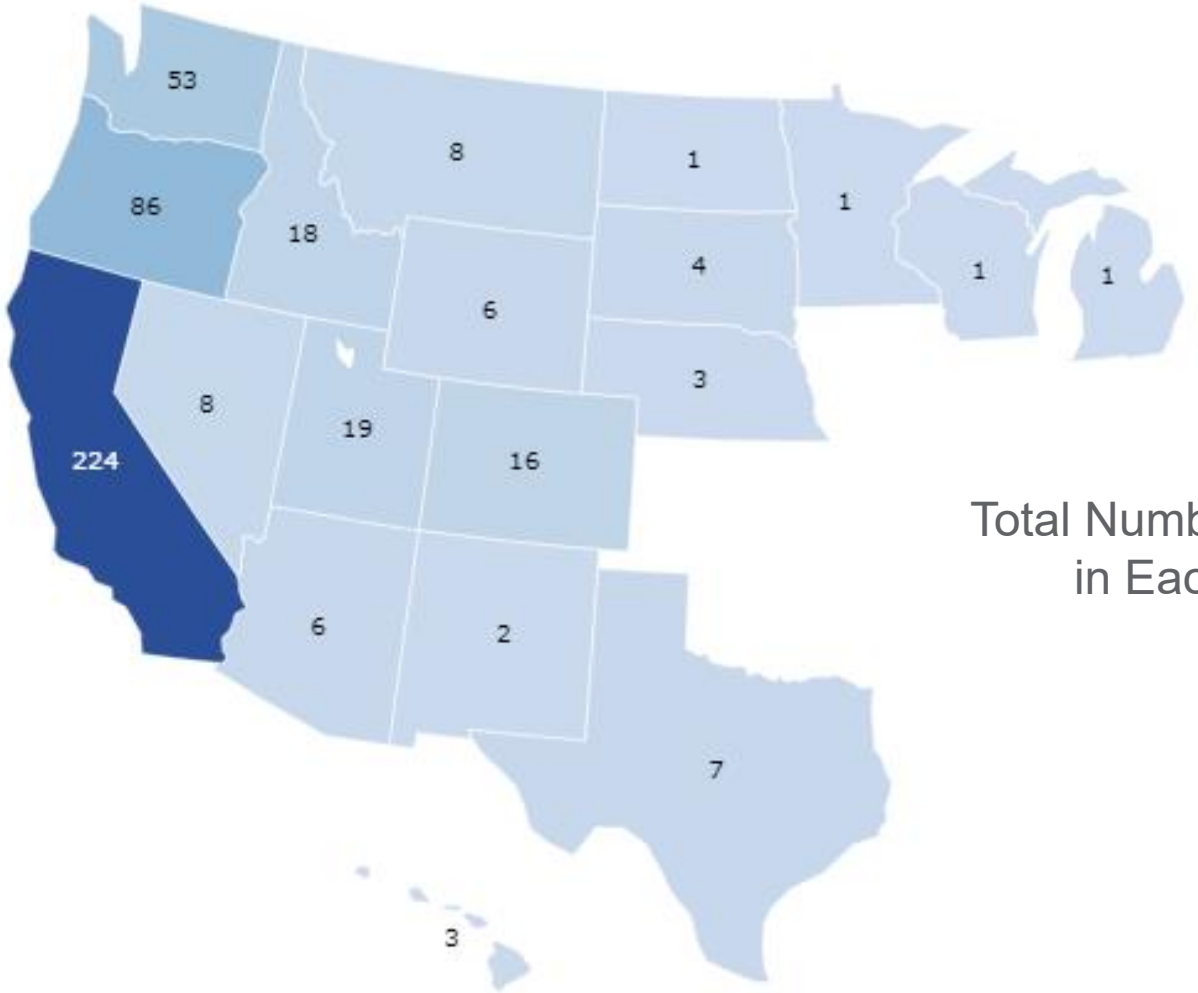
- Oregon was the first state to adopt modified damages, doing so without any WMP requirements.
- Utah adopted WMP requirements and modified damages in separate bills.
- North Dakota passed a bill in 2025 which allows for optional submission of WMPs, but WMPs are not required for the liability modifications.





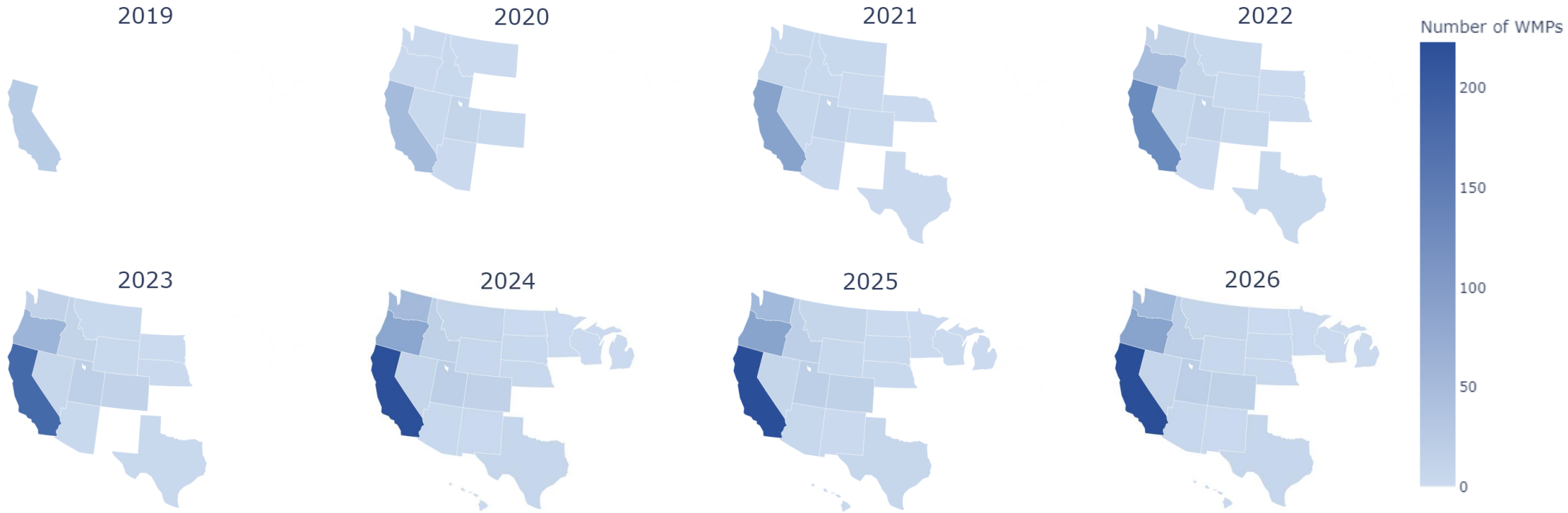
* ID law clarifies application of existing statute to utilities.

Spatial Distribution of WMPs



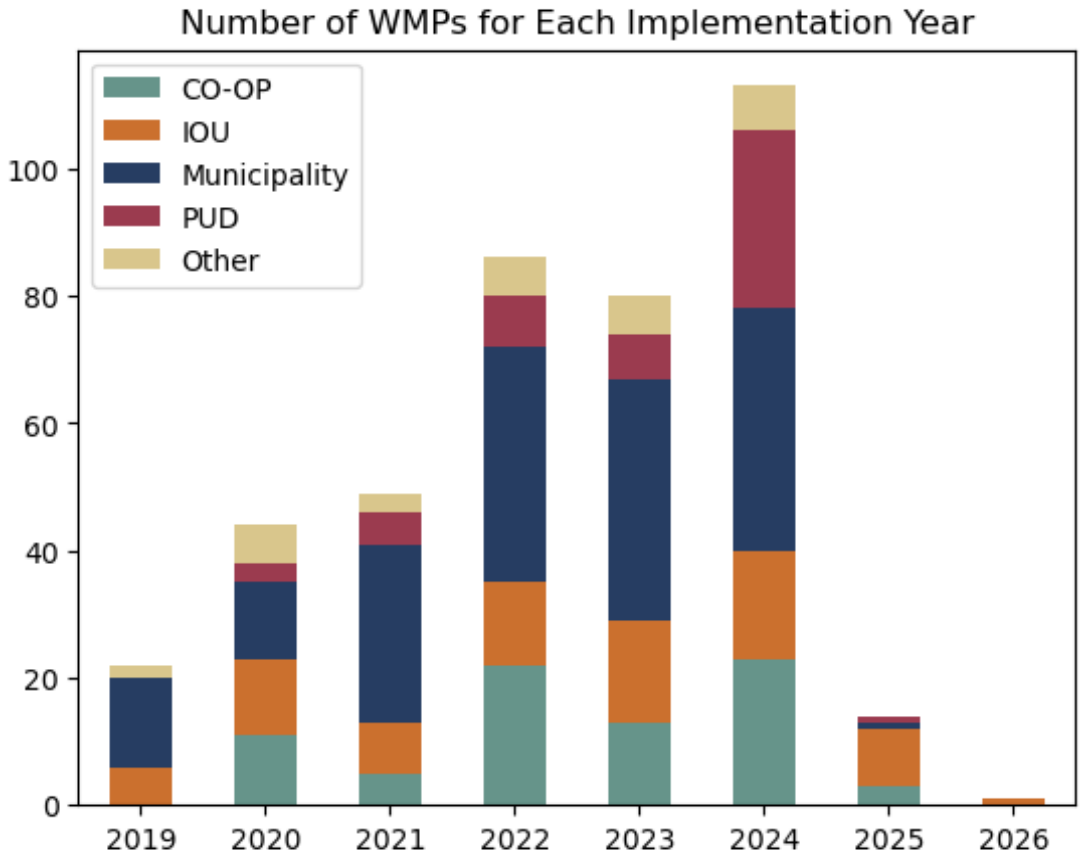
Total Number of WMPs
in Each State

Cumulative Distribution of WMPs



- These figures show the total number of WMPs in a state in a given implementation year, from 2019 to 2026.
- The shading in each state represents the cumulative total number of WMPs, including any WMPs for that year plus all the years prior going back to 2019, when the first WMPs were published in California.
- The practice of creating WMPs started in California in 2019 and has spread to other states in the coastal and interior West in the years since.

Temporal Distribution of WMPs

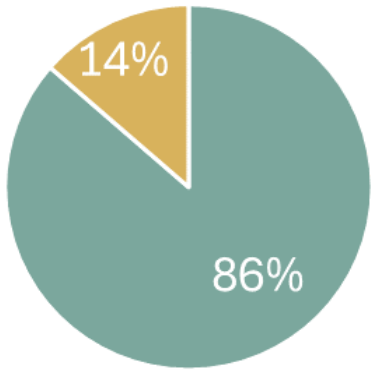


Common mitigation investments in a WMP

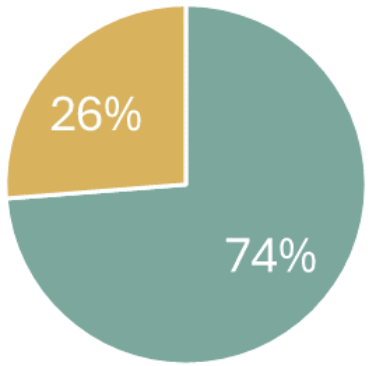
- **Grid Design and System Hardening**: Pole replacement and reinforcements, installation of automation equipment and covered conductor installations
- **Vegetation Management**: Inspection schedules, application of herbicides, pruning, tree removal procedures, and more advanced methods
- **Wildfire Condition Monitoring**: Situational awareness (aerial surveillance data) and forecasting modeling to predict wildfire conditions
- **Operational Response**: Tracking wildfires, immediate reactive de-energizing, new technologies
- **Public Safety Power Shutoff (PSPS)**: Selective de-energization of power lines to avoid igniting wildfire

Capital spending makes up most of wildfire mitigation spending for many utilities

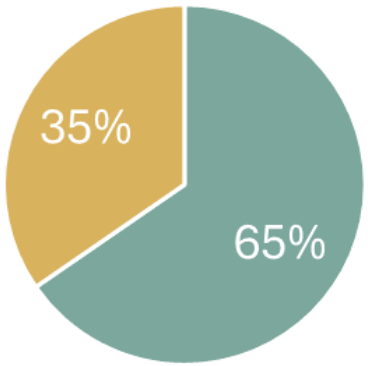
- Capital spending represents 55-86% of total wildfire mitigation spending across four utilities where the split between capital and operational spending was reported.
- For investor-owned utilities, prudently-incurred capital spending can become part of regulated rate base, meaning costs are recovered through ratepayers with a potential return on investment for the utility.



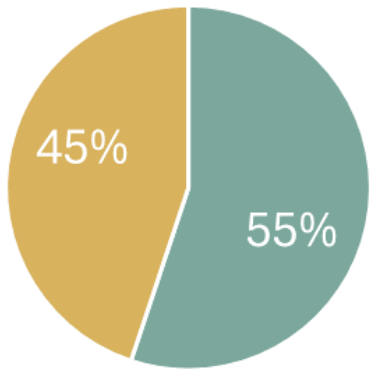
Xcel Energy
$1.9 billion proposed wildfire mitigation spending 2025-2027 (Xcel Energy 2025)



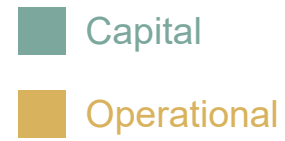
Rocky Mountain Power
$64.8 million in wildfire mitigation spending 2024-2026 (Rocky Mountain Power 2024)



Avista
$52 million in wildfire mitigation spending 2024 (Avista Corporation 2025)



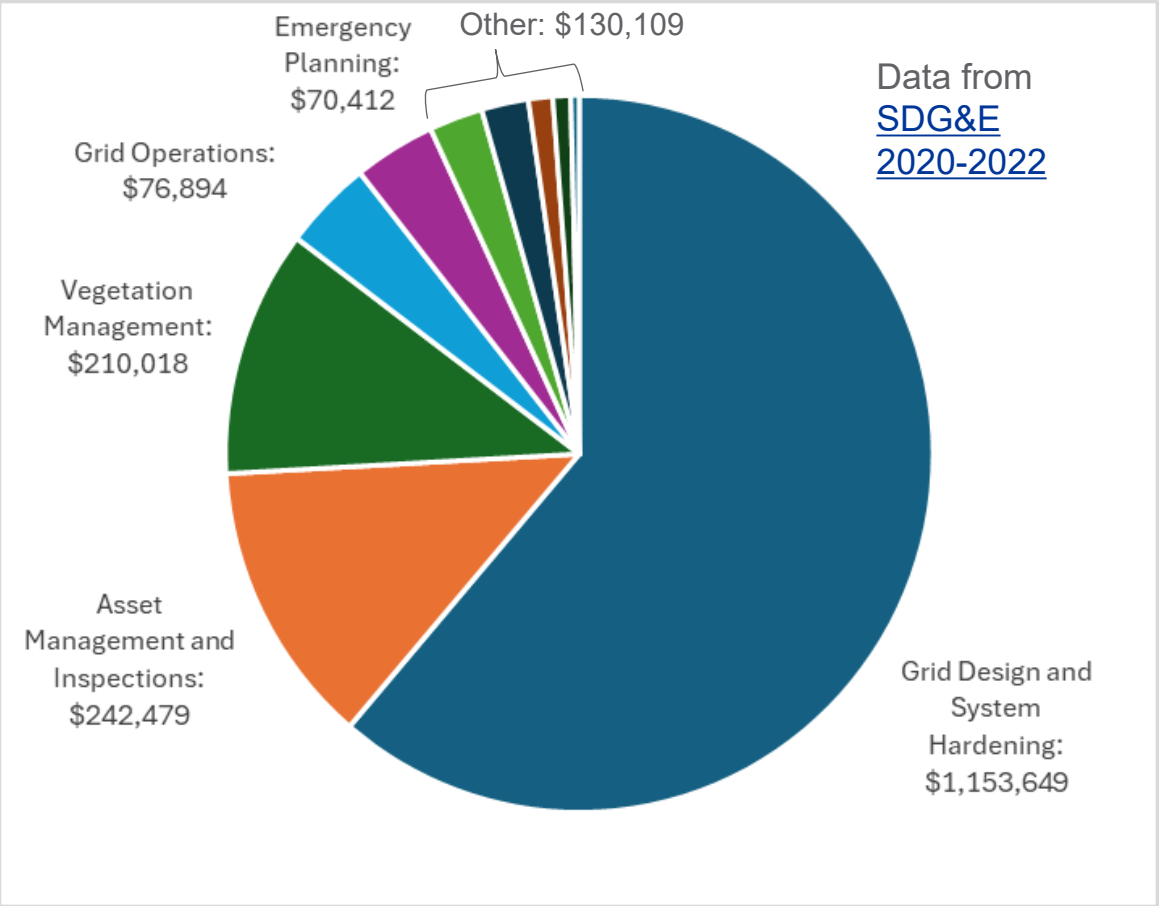
Portland General Electric
$110 million - $135 million in wildfire mitigation spending forecast for 2025 (PGE 2025)
*graph shows average of reported ranges



San Diego Gas & Electric 2020-2022 Wildfire Mitigation Expenditures (in thousands of USD)

Vegetation Management includes tree trimming, pole brushing, and LiDAR inspections. Costs range from $50,000 to $400,000 per mile depending on the terrain and location of the line.

Asset Management & Inspections includes drone inspection, patrols, analysis, and GIS integration.



*WMPs for case studies chosen for the availability of data.

Grid Design and System Hardening Cost / Mile Breakdown:

Alternatives Cost Comparison	Cost Per Mile
Strategic Undergrounding	$2,660,460
Covered Conductor	$1,211,000
Traditional Hardening	$1,050,000

As undergrounding is more expensive than other system hardening techniques, it is reserved for circuits in High Fire Threat Districts as well as in areas where undergrounding can substantially reduce PSPS events, as undergrounded lines are considered to have no ignition risk.

Why are Advanced Grid Technologies important strategies for wildfire mitigation?

- Advanced Grid Technologies (AGTs) are modern infrastructure, control solutions and protection schemes and that are designed to enhance power system efficiency, operational flexibility, safety and resilience both at transmission and distribution scale.

"Blue-sky" reliability benefits	Wildfire mitigation
▪ Prevention of thermal overloads and line congestion. ▪ Enable bidirectional power flow and integration of distributed, demand-side resources. ▪ Fault detection and sectionalization to prevent high impact cascading failures. ▪ Optimization of power flow by rerouting electricity under changing grid conditions such as renewable variability or peak load congestion.	▪ Early detection, monitoring and preventing escalation of wildfire-causing conditions. ▪ Enhanced controls for efficient sectionalization and post-event recovery ensuring minimum service disruptions. ▪ Optimized power delivery and maintenance of power quality during in-event periods.

Examples of Advanced Grid Technologies in Wildfire Mitigation Plans

Technology / Technique	Definition
Fast Trip Systems	▪ Rapid fault detection and isolation reduce arc duration and ignition potential from conductor faults.
Adaptive Reclosures	▪ Intelligent reclosure logic delays or prevents automatic re-energization in high wildfire risk conditions.
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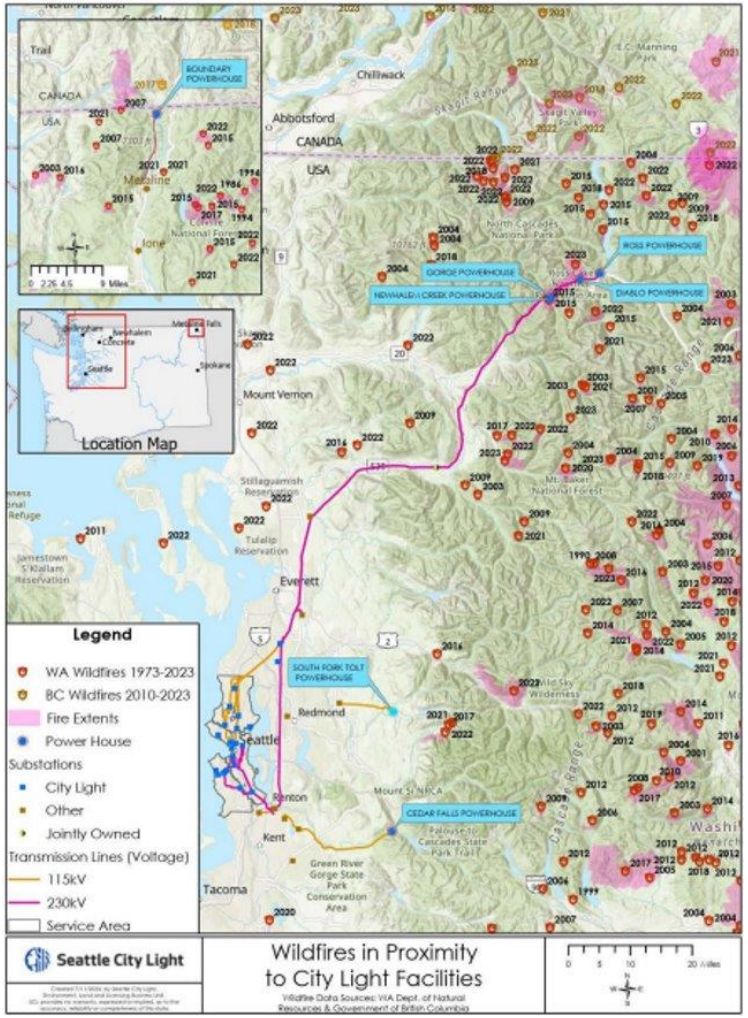
Generation in Wildfire Mitigation Plans

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



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

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What is a metric?

A metric is a quantifiable value that reflects the status or performance of a system. Changes upward or downward can inform or influence decision-making.

Metric applications in wildfire mitigation plans (WMPs):

- Evaluating performance and/or effectiveness
- Risk-based assessment of hazards (includes forecasting and situational awareness)
- Risk mitigation prioritization
- Resource allocation and investment
- Demonstration of regulatory compliance
- Public accountability and transparency

Customer Engagement Examples

Metric Name	Meaning
Percent of Customers Notified Prior to Initiation of PSPS Event	▪ Number of Affected Customers Notified divided by Number of Affected Customers (SCE 2021, pg. 538)
Percent of Medical Baseline Customers Notified Prior to Initiation of PSPS Event	▪ Number of Affected Medical Baseline Customers Notified divided by Number of Affected Medical Baseline Customers (SCE 2021, pg. 538)
Number of Mailers sent to customers related to Wildfire Mitigation Activities	▪ Used to quantify community outreach (SMUD 2023-2025, pg. 52)
Visitation of Community Resource Centers (CRCs) and Community Crew Vehicles (CCVs) during PSPS events	▪ Resources intended to provide information and services (SCE 2021, pg. 291)
Number of PSPS events triggered where no de-energization occurred	▪ Number of instances where utility notified the public of a potential PSPS event but no de-energization followed (SCE 2021, pg. 539)

System Hardening Examples

Metric Name	Meaning
Number of Wildlife Guards Installed	▪ Wildlife guards are intended to reduce animal (especially bird) related ignitions (SDG&E 2020-2022 pg. 262).
Number of Lightning Arrestors Installed	▪ Lightning arrestors are primarily installed to protect equipment from electrical surges, but can also help dissipate the electrical energy of a lightning strike (PG&E 2023-2025, pg. 507).
Miles of Conductor Undergrounded	▪ Replacing overhead distribution cables with underground cables reduces ignition risk (PG&E 2023-2025, pg. 453).
Number of poles replaced	▪ Wood poles can be replaced with steel or ductile iron (SMUD, 2023-2025, pg. 32).
Number of SCADA Reclosers Installed	▪ SCADA (Supervisory Control and Data Acquisition) reclosers allow operators to control the recloser remotely, including disabling the reclosing function (SMUD 2023-2025, pg. 40).

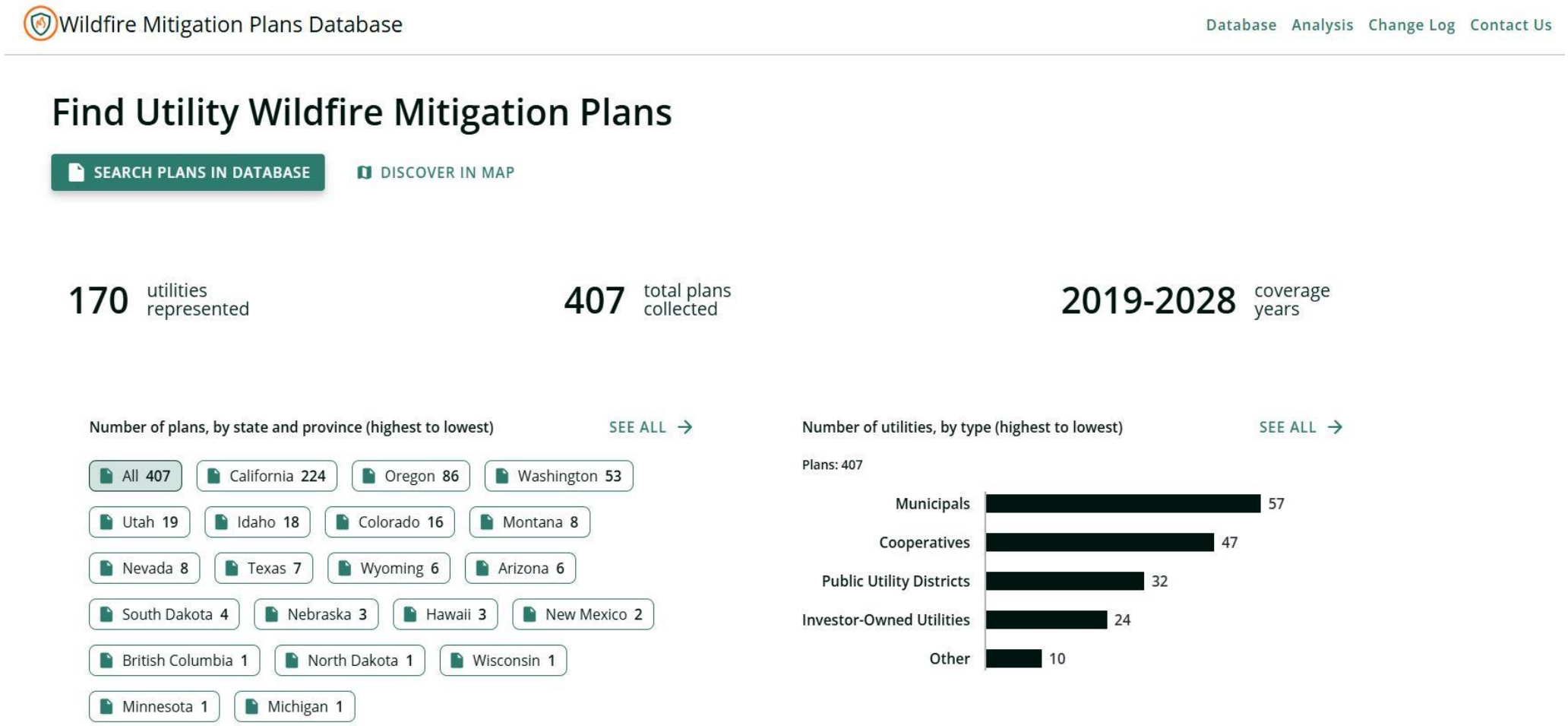
Vegetation Management Examples

Metric Name	Meaning
Miles of vegetation managed	▪ Total miles of line (both distribution and transmission are usually tracked) where vegetation management activities are performed (HCE 2023, pg. 40). ▪ Accomplished in cycles for both distribution and transmission lines through means such as ground and aerial patrols, LIDAR, and infrared sensing (SCE 2023-2025, pg. 14) ▪ Several derivative/similar metrics including "*Percentage of circuit miles inspected for vegetation compliance*", "*Number of routine vegetation inspections completed*", "*Vegetation inspections by type (routine, off-cycle, detailed, or emergency*" or "*HTFD-specific miles managed for vegetation*" (SDG&E 2020-2022, pg. 445)
Number of trees trimmed or removed	▪ Total number of trees pruned or eliminated for compliance or risk reduction during a reporting period (often further broken out by type – routine, enhanced, or hazardous – or on a per mile basis) (LADWP 2023-2025, pg. 34)
Count of direct vegetation-caused ignitions and/or outages	▪ Number of ignition events or power outages explicitly caused by vegetation contact (often normalized by overhead conductor miles or within/outside HTFD areas) (Kootenai Electric Co-op 2025, pg. 19)
Counts of trees fallen into lines	▪ Reducing the number of tree falls between years is one component of a wildfire mitigation strategy (Avista 2023, pg. 4).
Maximum allowable clearance distance	▪ Case-by-case distance between vegetation and the transmission line; determined by subject matter experts in cases where a standard vegetation height of 25 feet below the maximum sag of the transmission lines cannot be met due to legal or physical constraints (BPA 2024, pg. 16)

Risk Assessment Examples

Metric Name	Meaning
Risk Associated with Value Exposure	▪ Derived from modeling; considers population, buildings and critical facilities; enhances the ability to visualize and understand risks effectively (Xcel Energy SPS 2024, pg. 24)
Risk Associated with Ignition Location	▪ Derived from modeling; considers the probability of ignition, the fire spread potential, and the consequence of the fire spread (Xcel Energy SPS 2024, pg. 24)
Consequence Score	▪ Derived from modeling; used to estimate wildfire hazard after ignition (SCE 2023-2025, pg. 395)
Fire Risk	▪ Risk rating assigned to counties based on several variables relating to fuels, population, historic fire data, and other variables to determine the most vulnerable areas in a service territory (APS 2025, pg. 19).
Wildfire Risk Tiers	▪ Geospatial characterizations of wildfire hazards in the service territory. Includes calculating Hazard Fire Areas (HFAs), a locally scored and weighted metric where population and utility infrastructure are considered (Xcel Energy SPS 2024, pg. 14) ▪ Using an established wildfire risk modeling methodology, this metric divides the service territory into three Tiers of calculated risk (3 = highest; 1 = lowest) to identify where to implement de-energizing programs in locations where powerlines are more likely to ignite wildfires (Chelan PUD 2024, pg. 19).

Navigate to: https://wildfire.pnnl.gov/mitigationplans



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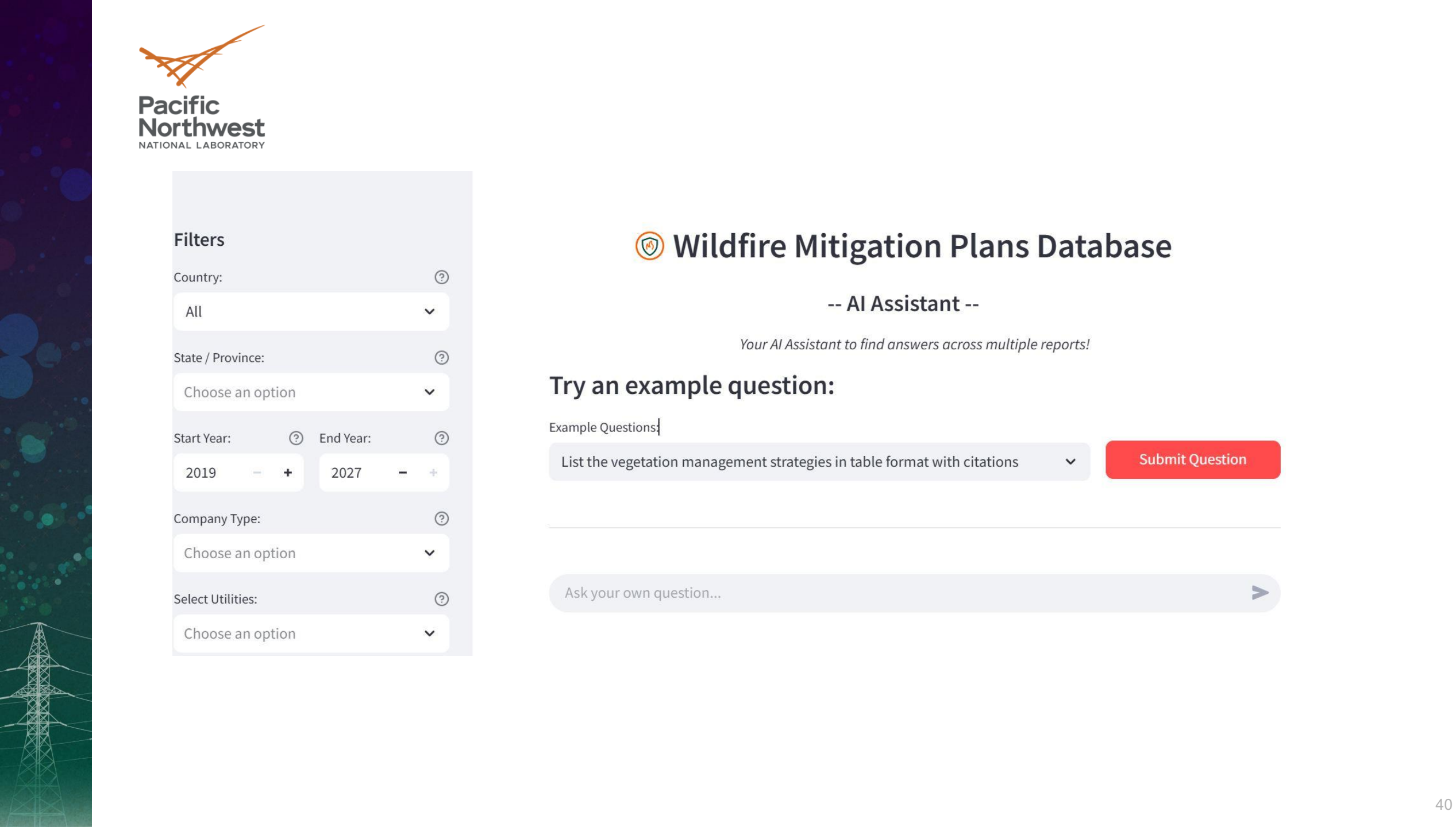

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Thank you

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