

2024 WILDFIRE MITIGATION PLAN



1.0 Executive Summary

Tacoma Power is committed to the safe and reliable delivery of electric power to its customers. In keeping with Tacoma Public Utilities' mission to deliver clean, reliable services essential to quality of life, Tacoma Power prepares response plans to natural and human-caused emergencies like windstorms, snowstorms, floods, earthquakes, accidents, and wildfires.

The frequency and severity of large-scale wildfires in the western United States has been increasing over the last decade. The temperate rainforests west of the Cascade Mountains have historically had limited wildfire activity, but with warmer temperatures, reduced snowpack, and drought, the risk of large-scale wildfires is anticipated to almost double by the middle of this century. [1]

Recognizing the increasing threat of wildfires, in 2023 the Washington State Legislature passed House Bill 1032 that requires all Washington State electric utilities prepare a wildfire mitigation plan (WMP) by October 31, 2024, and update that plan a minimum of every three years.

This wildfire mitigation plan identifies utility roles and responsibilities, risk drivers, prevention strategies, community outreach and public awareness programs, restoration strategies, and metrics to track plan performance and continuing performance key indicators.

The plan documents and builds on efforts Tacoma Power has already started to mitigate wildfire risk, including proactively engaging with our peer utilities and emergency service providers, enhancing our distribution system protection, and developing crew practices that minimize the risk of initiating a wildfire.

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2.0 Wildfire Mitigation Plan Overview

2.1 Purpose of the Wildfire Mitigation Plan

Tacoma Power recognizes that reducing the risk of a utility-caused wildfire is essential to the safe operation of the electric system and to protect the public. To that end, Tacoma Power has developed a wildfire mitigation plan (WMP) that documents programs, policies, and procedures designed to mitigate wildfire risk. These existing programs, policies, and procedures have been implemented to reduce the risk of starting a wildfire, make the electrical system more resilient to damage from wildfires, and ensure the safety and health of customers and employees.

The WMP follows the requirements of HB 1032 for all identified sections of a WMP. The WMP will be reviewed, updated, and refined a minimum of every three years.

2.2 WMP Location

<https://www.mytpu.org/outages-safety/safety-information/>

2.3 Codes, Standards, and Guidelines Reference Table

Codes, Standards, and Guidelines – Name and Description	Document, Page Number, or Citation
HB 1032 – By October 31, 2024, and every three years thereafter, each Investor-owned and Consumer-owned Utility must review, if appropriate revise, and adopt its wildfire mitigation plan	Section 4, (1)
IEEE C2-2023 National Electric Safety Code (NESC)	
IEEE 1366-2022 IEEE Guide for Electric Power Distribution Reliability Indices	
Tacoma Power Standard FAC-003 V15.0 Transmission Vegetation Management (TVMP)	

3.0 Utility Overview

3.1 Utility Description

Tacoma Power is a public utility providing electrical power to Tacoma, Washington, and the surrounding areas. Tacoma Power serves the Cities of Tacoma, University Place, Fircrest, and Fife, and provides service to parts of Steilacoom, Lakewood, Federal Way, and unincorporated Pierce County. Tacoma Power is a division of Tacoma Public Utilities, the largest department in Tacoma city government. Tacoma Public Utilities' operating divisions include Tacoma Power, Tacoma Water, and Tacoma Rail.

Tacoma Power's energy portfolio is mostly sourced from clean, renewable hydroelectric power. About 46% of Tacoma Power's electricity is generated at four hydro projects on four rivers in western Washington. These hydro projects include:

- The Cowlitz River Project.
- The Nisqually River Project.
- The Wynoochee River Project.
- The Cushman Hydroelectric Project.

3.2 Utility Information Table

Utility Name	Tacoma Public Utilities
Territory Size	~180 square miles (see Figure 1)
Territory Makeup	68.7% Urban (inhabited w/no vegetation) 7.9% Agriculture 7.2 % Evergreen Forest 5.3% Mixed Forest 3.7% Wetland 2.9% Shrub/Scrub 1.5% Deciduous Forest 1.3% Open Water 0.9% Herbaceous 0.6% Barren Land
Service Territory Wildland Urban Interface [2]	7.6% Wildland Urban Interface 32.3% Wildland Urban Intermix
Customers Served	166,770 Residential 20,205 Commercial/Industrial
Utility Equipment Makeup	2,036 circuit miles Distribution 352 circuit miles Transmission 79 Substations 23 BPA Customer Substations
Hydroelectric Generation	Cowlitz River Project Nisqually River Project Cushman Hydro Project Wynoochee River Project
Has developed protocols to pre-emptively shut off electricity in response to elevated wildfire risks	Yes
Has previously pre-emptively shut off electricity in response to elevated wildfire risk	No

Table 1. Utility Information.

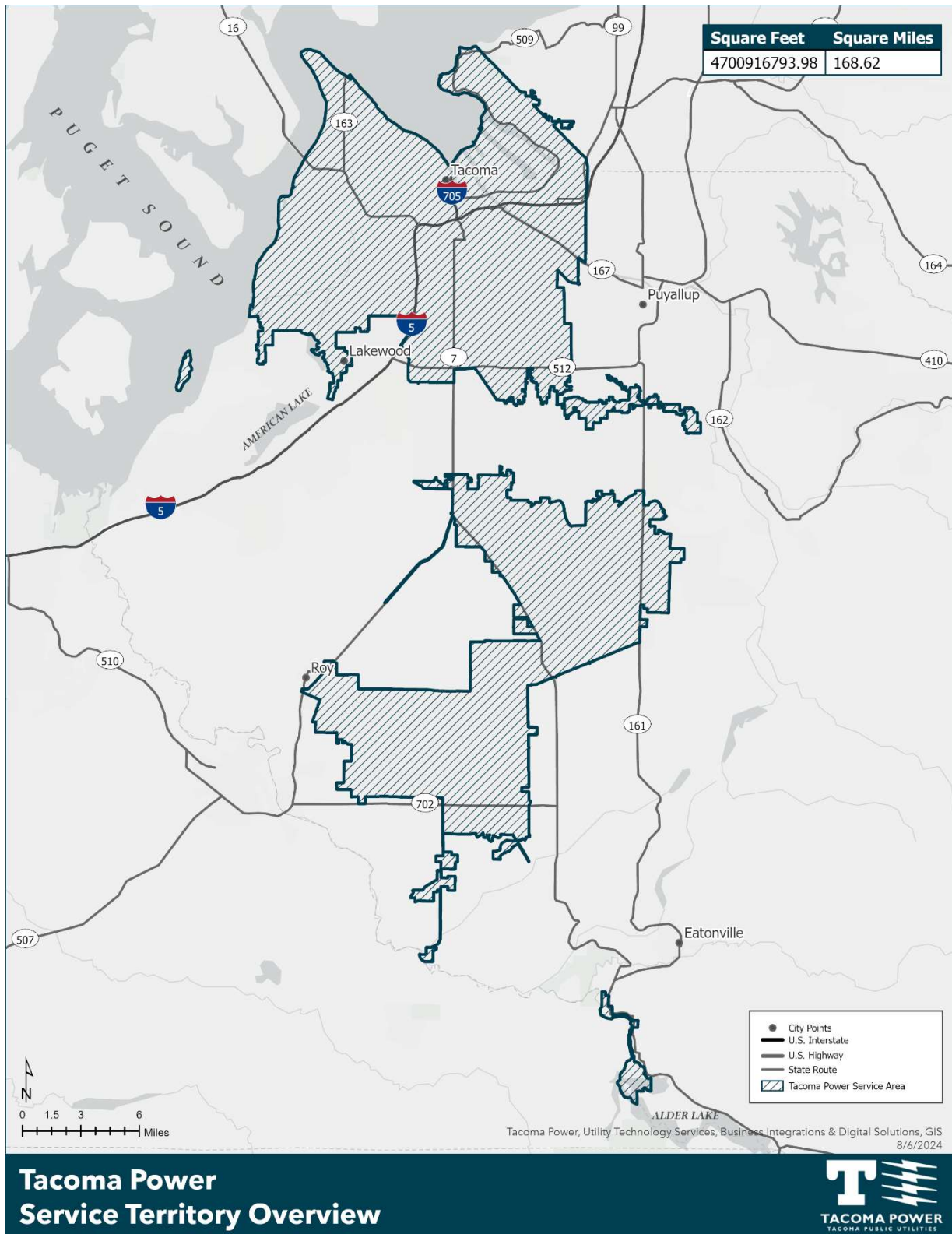


Figure 1. Tacoma Power Service Territory Boundaries.

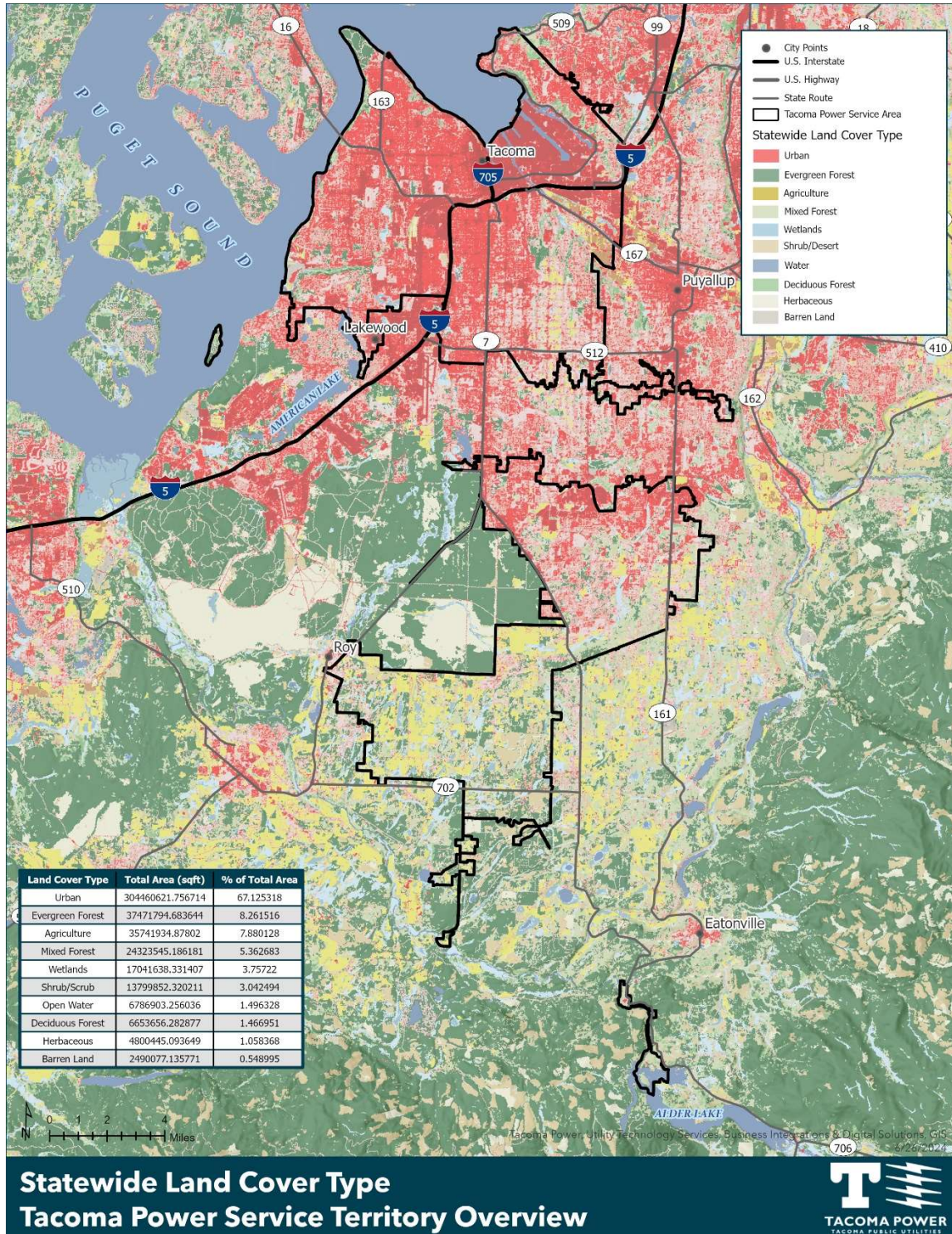


Figure 2. Statewide Land Cover Type – Tacoma Power Service Territory Overview.

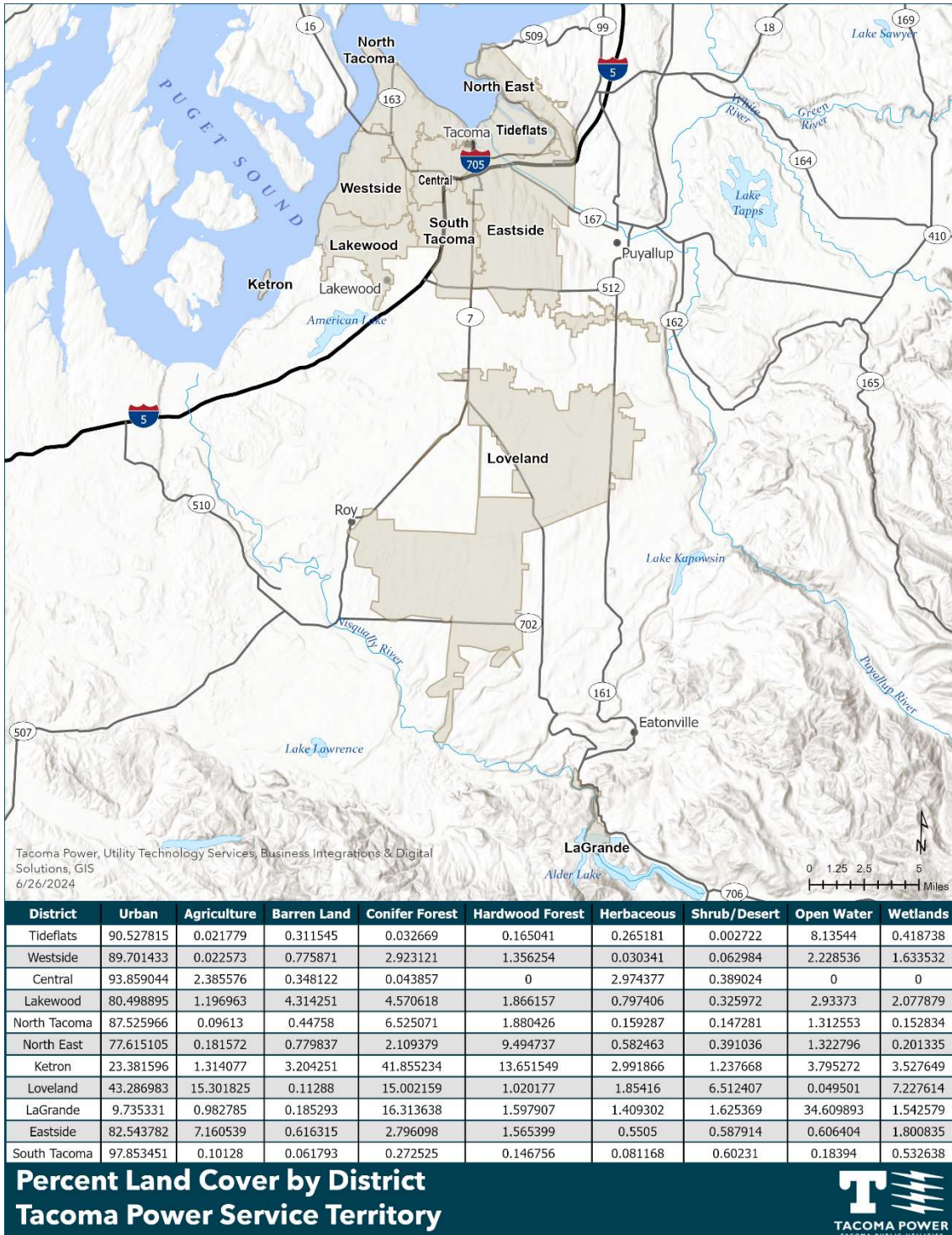


Figure 3. Percent Land Cover by District – Tacoma Power Service Territory.

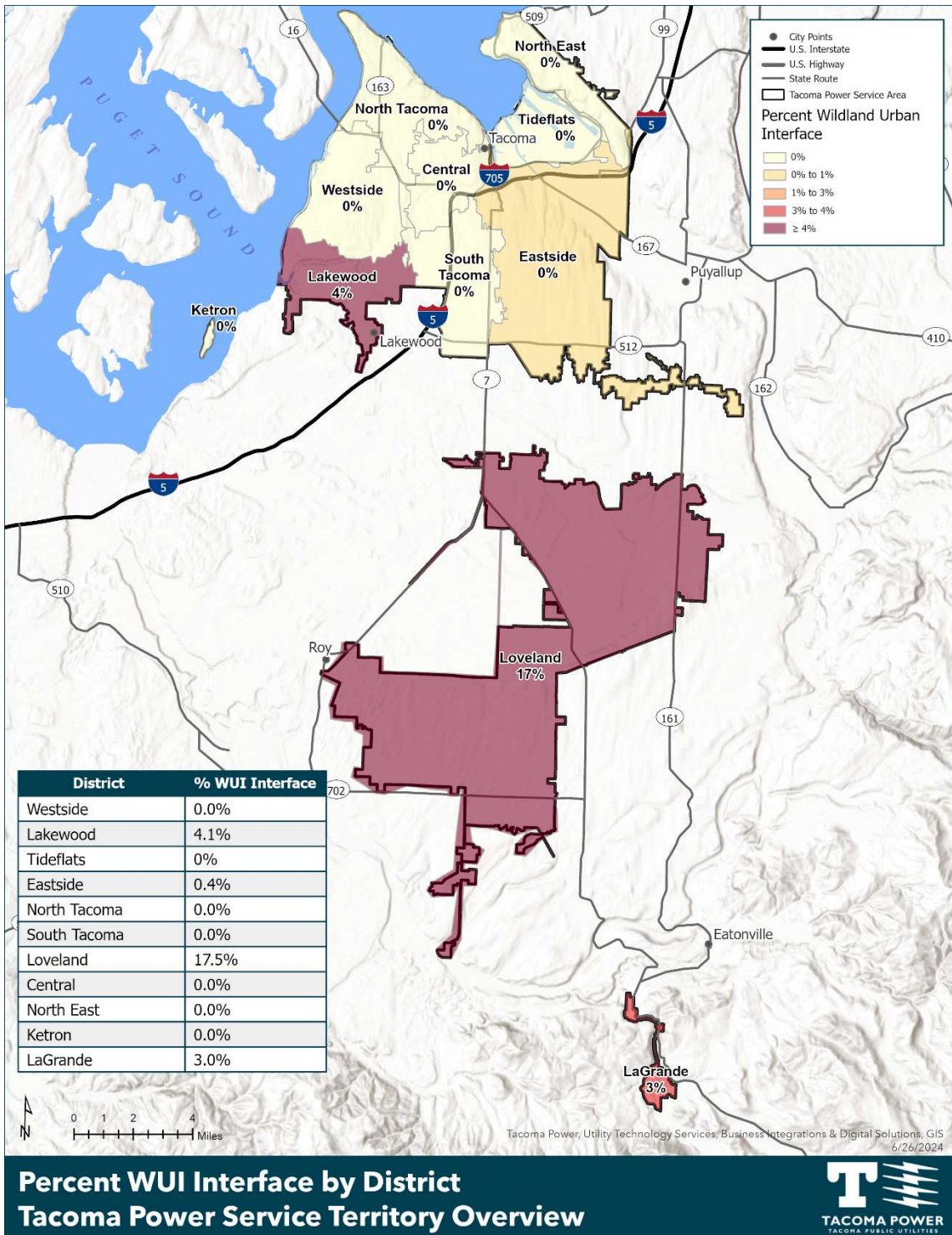


Figure 4. Percent WUI Interface by District – Tacoma Power Service Territory Overview.

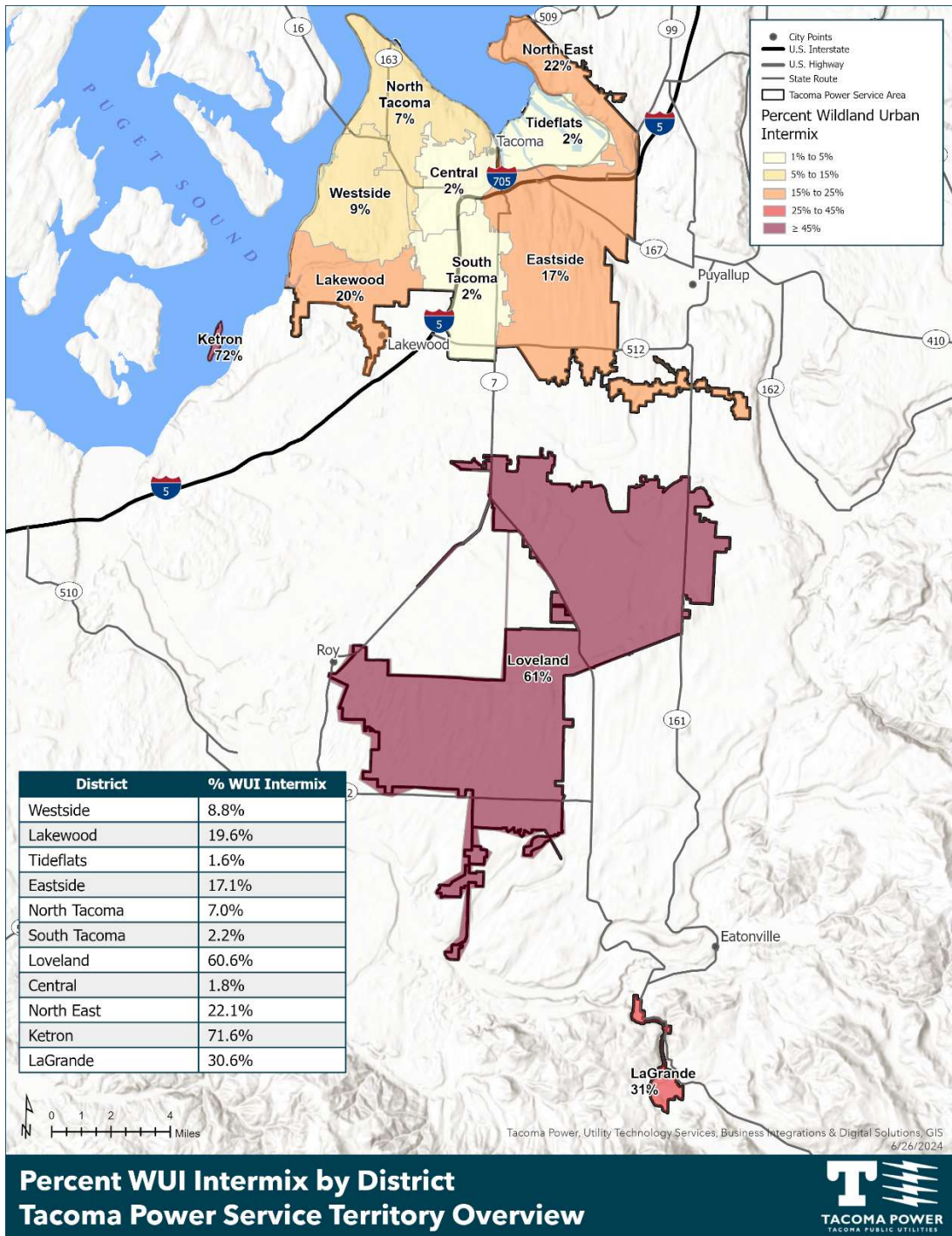


Figure 5. Percent WUI Intermix by District – Tacoma Power Service Territory Overview.

4.0 Wildfire Mitigation Plan Objectives

The main goals of the WMP are to:

- Decrease the likelihood that Tacoma Power’s assets or operations will start or contribute to a wildfire.
- Develop procedures for revising electric system operation as needed based on increased situational awareness.
- Increase the electric system’s resiliency to potential wildfire damage.
- Develop a wildfire damage recovery plan.
- Incorporate industry best practices and technologies to mitigate wildfire risk.
- Develop and monitor metrics to measure and track WMP performance.
- Educate Tacoma Power customers about wildfire hazards with community outreach and public awareness campaigns.

4.1 Minimizing Likelihood of Wildfire Ignition

The following programs, design changes, and actions are underway to minimize the risk of fire ignition:

- Requiring covered wire and animal guards on targeted new distribution equipment.
- Implementing substation relay automation upgrades, including on feeders historically impacted by vegetation during late spring, early fall, and summer timeframes.
- Installing covered wire on the center phase of new three-phase feeder construction located in areas with vegetation overhang.
- Improving situational awareness through weather monitoring resources.
- Maintaining an effective vegetation management schedule.

4.2 Electric System Resiliency

- Adding additional protective devices to distribution lines.
- Maintaining an effective pole replacement program. Continue pole condition assessment program to identify poles reaching end of life. Replace poles based on assessment priorities and in alignment with the NESC.

5.0 Roles and Responsibilities

5.1 Utility Roles and Responsibilities

Tacoma Power currently employs an incident response structure for all unplanned outages or anticipated outage events. Additional monitoring will be employed prior to a fire weather incident. Although the response to elevated fire danger or an active fire may differ somewhat from an unplanned outage incident response, Tacoma Power will keep the same personnel to respond to these incidents and use the same Incident Command Structure (ICS) organizational structure (see Table 2).

Tacoma Power Wildfire Mitigation Plan Specific Roles			
WMP Role	Department	Name	ICS Role
<i>Owner of Tacoma Power WMP</i>	<i>Transmission and Distribution</i>	<i>System Planning, Operations, and Asset Management Manager</i>	<i>Planning Section Chief</i>
	<i>Transmission and Distribution</i>	<i>Construction and Maintenance Manager</i>	<i>Deputy Operations Section Chief</i>
	<i>Transmission and Distribution</i>	<i>Engineering Manager</i>	<i>Deputy Planning Section Chief</i>
<i>Situational Awareness Monitoring</i>	<i>Tacoma Power Emergency Management</i>	<i>Emergency Manager</i>	<i>Emergency Operations Center Liaison</i>
	<i>Transmission and Distribution</i>	<i>System Planning, Operations, and Asset Management Manager</i>	<i>Planning Section Chief</i>
	<i>Transmission and Distribution</i>	<i>Engineering Manager</i>	<i>Deputy Planning Section Chief</i>
<i>Direct Changes to System Operations</i>	<i>Transmission and Distribution</i>	<i>System Operations Manager</i>	<i>Operations Section Chief</i>
	<i>Transmission and Distribution</i>	<i>Construction and Maintenance Manager</i>	<i>Deputy Operations Section Chief</i>

Table 2. Tacoma Power Wildfire Mitigation Plan Specific Roles.

5.2 Coordination with Local Utility and Infrastructure Providers

Tacoma Power, in coordination with Tacoma Public Utilities, has standardized utility-wide Incident Activation Level criteria. These activation levels incorporate National Incident Management System/Incident Command System (NIMS/ICS) standards and uses common language to better align activations and provide clear communication with our outside partner agencies, local utilities, and infrastructure partners.

Tacoma Power coordinates with city and county Emergency Management teams representing respective regions of Tacoma Power's infrastructure to ensure situational awareness of incidents is known, resource requests are processed, and overall communication is delivered to increase efficiency and response efforts.

Tacoma Power maintains close communication pathways with our electrical industry partners for transmission services. These relationships rely on coordination of outages by providing advanced notice of planned outages as well as timely notification following any unplanned outages. Current communication pathways at Tacoma Power aid in this coordination.

5.3 Coordination with Local Tribal Entities

The majority of Tacoma Power's service territory resides on the historical lands of the Puyallup Tribe of Indians who defers most of their emergency response to Pierce County Department of Emergency Management (PCDEM). Coordination and communication with the Puyallup Tribe of Indians during an incident will be relayed through PCDEM.

For communication with tribal entities at Tacoma Power's remote hydroelectric facilities, direct communication pathways have been established through Tacoma Power Generation's Emergency Action Plan (EAP) for lands that could be impacted. Emergency response is directly communicated to the Nisqually Indian Tribe for Tacoma Power's Nisqually Hydroelectric Project and the Skokomish Indian Tribe for Tacoma Power's Cushman Hydroelectric Project.

5.4 Emergency Management/Incident Response Organization

Tacoma Power uses the National Incident Management System/Incident Command System (NIMS/ICS) standard in all its emergency response plans, including T&D's Emergency Response Plan (ERP) and Generation's EAP. Using NIMS/ICS systems allows Tacoma Power to communicate in a manner understood amongst all emergency response agencies and allows Tacoma Power to integrate into local EMAs responses for any type of incident, including "Red Flag" and fire weather incidents.

In addition to adopting NIMS/ICS into Tacoma Power's emergency response efforts, the Tacoma Power Emergency Manager routinely takes part in local EMA planning and training efforts and invites State, County, City, and Tribal entities and others to Tacoma Power emergency response training. During activation, Tacoma Power actively shares information related to the activation/incident with our State, County, City, and partner utilities throughout the activation event using primarily phone contact and e-mail.

To build better communication and coordination with the fire first responders, Tacoma Power Emergency Management established and facilitates a semi-annual pre- and post-wildfire season coordination meeting with all Pierce County electric utilities, Pierce County fire entities, PCDEM, and South Sound 911 which also includes fire dispatch. The coordination group meetings lead to better coordination and communication during an incident and produces tools that aid both electric utilities and fire entities during response.

6.0 Wildfire Risk and Drivers Associated with Design, Construction, Operation, and Maintenance

6.1 Service Territory Wildfire Likelihood

Using publicly available GIS datasets from the Missoula Fire Sciences Laboratory (see [Wildfire Hazard Potential | Missoula Fire Sciences Laboratory \(firelab.org\)](https://www.firelab.org/)), the following wildfire hazard potential (WHP) maps display overall wildfire risk for Tacoma Power’s service territory and transmission corridors.

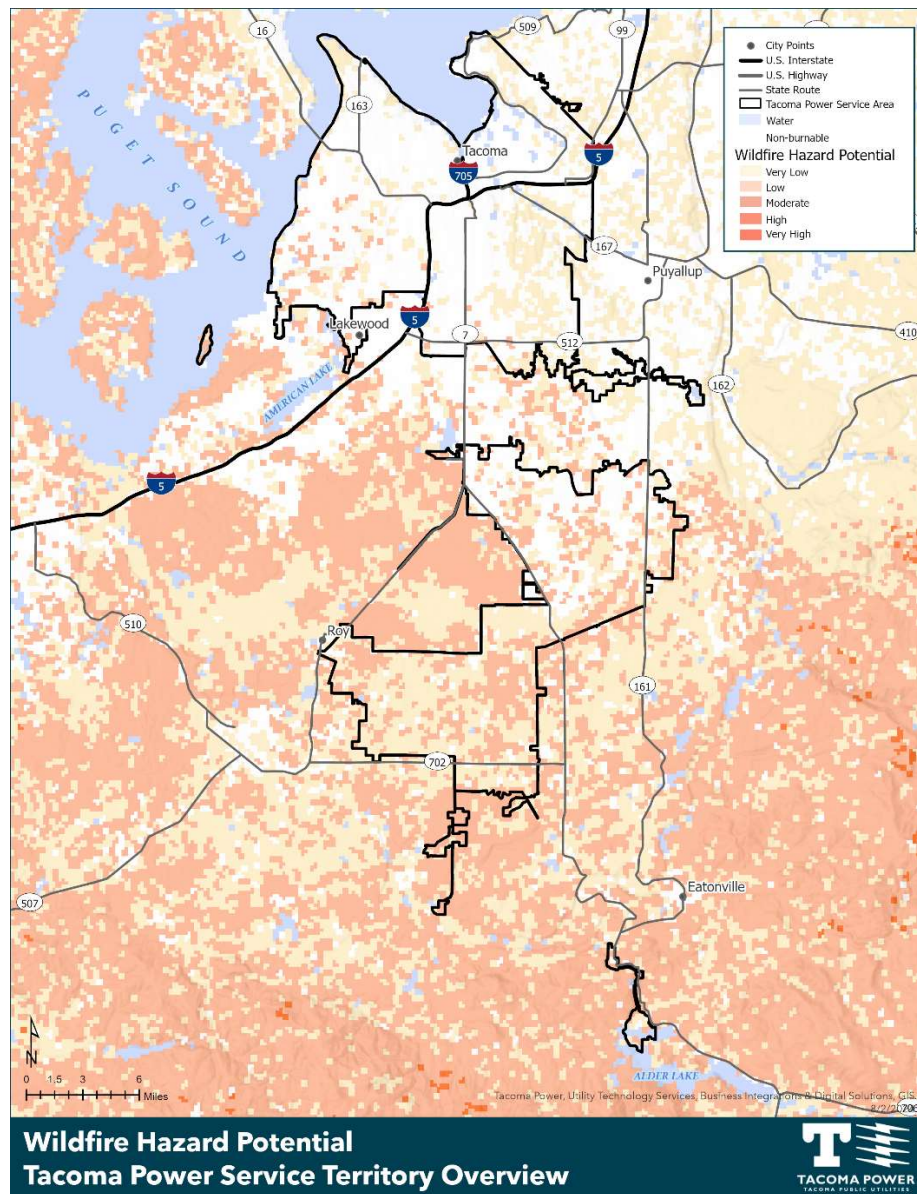


Figure 6. Wildfire Hazard Potential – Tacoma Power Service Territory Boundaries.

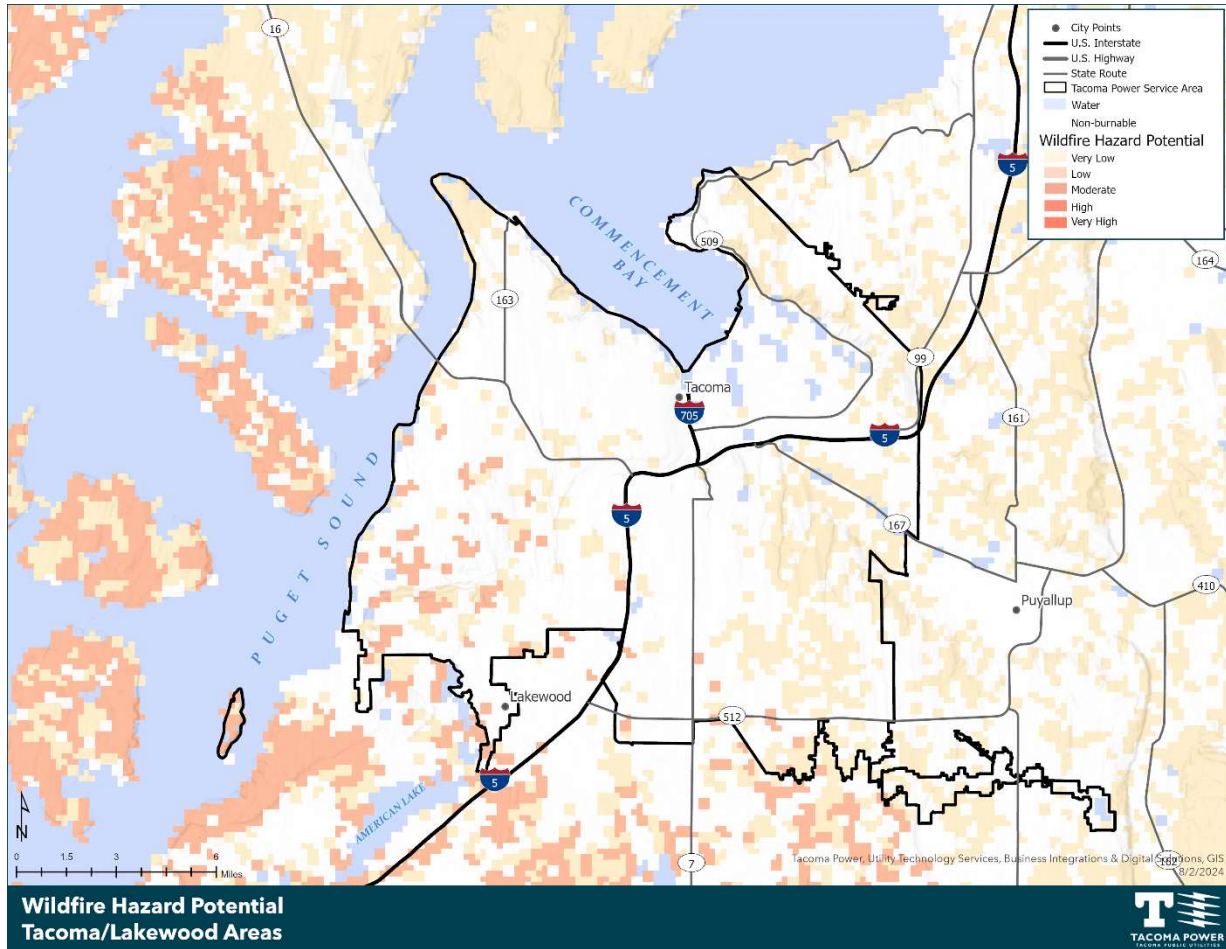


Figure 7. Wildfire Hazard Potential – Tacoma/Lakewood Areas.

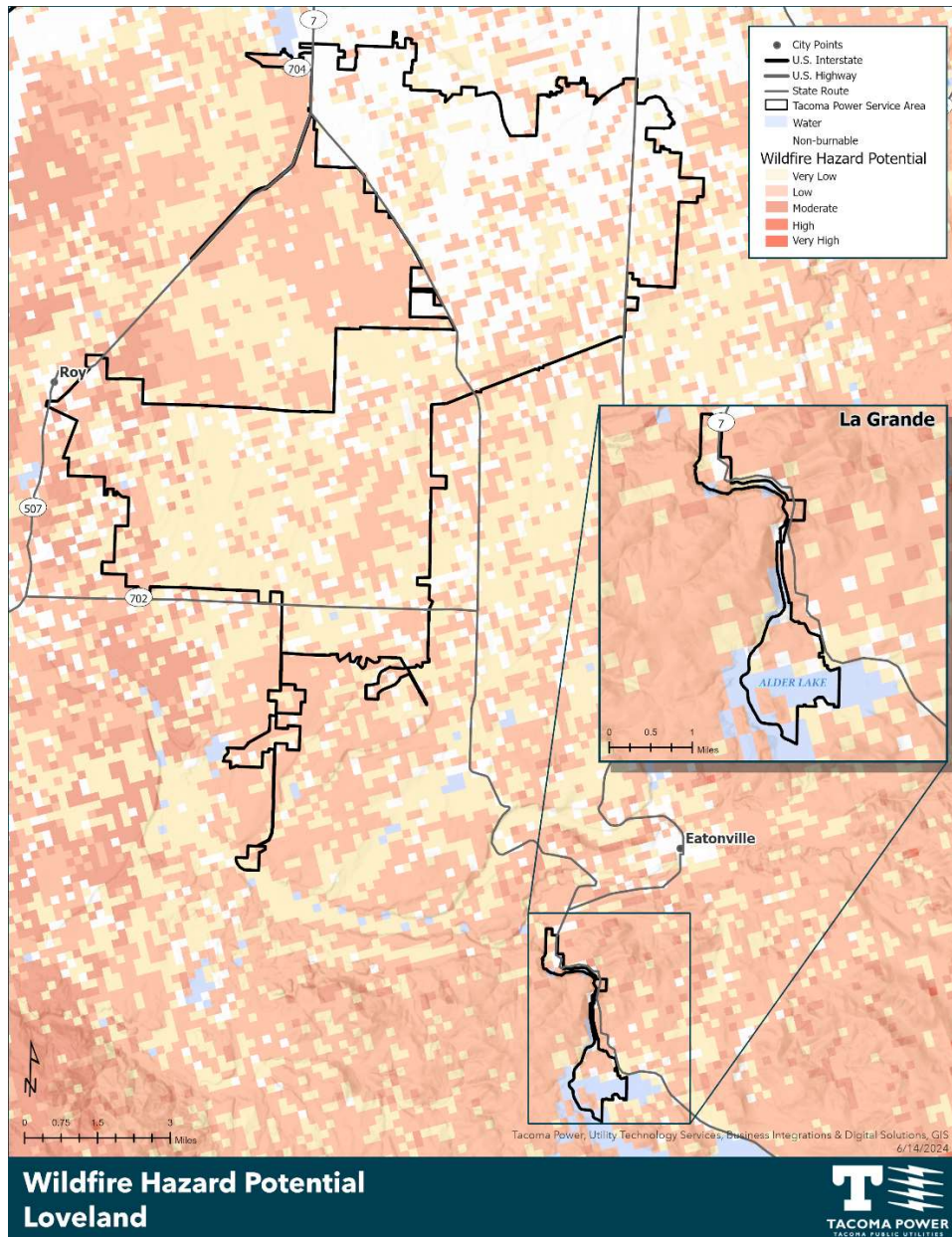


Figure 8. Wildfire Hazard Potential – Loveland/La Grande and Alder Dam.

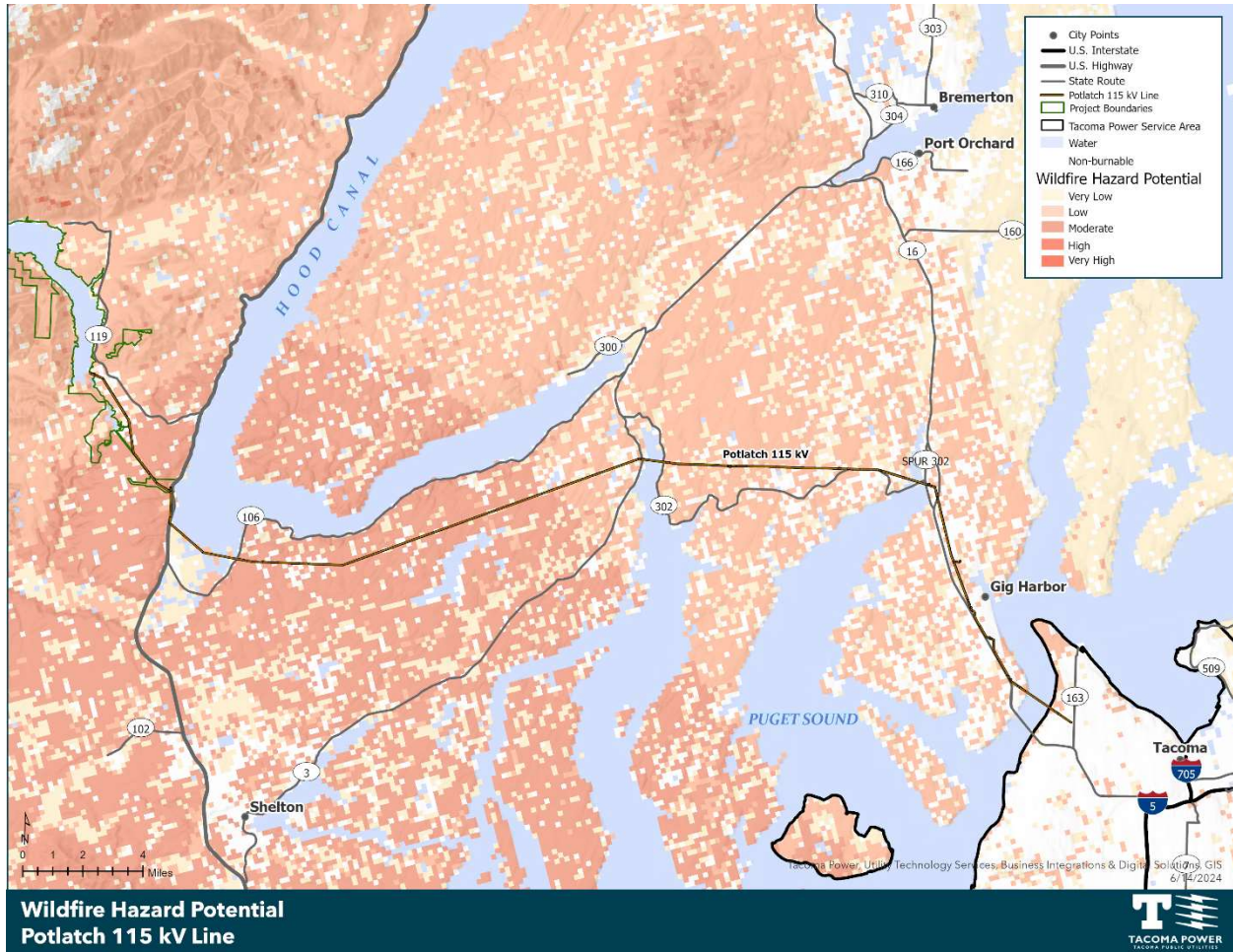


Figure 9. Wildfire Hazard Potential – Potlatch 115 kV Transmission Line.

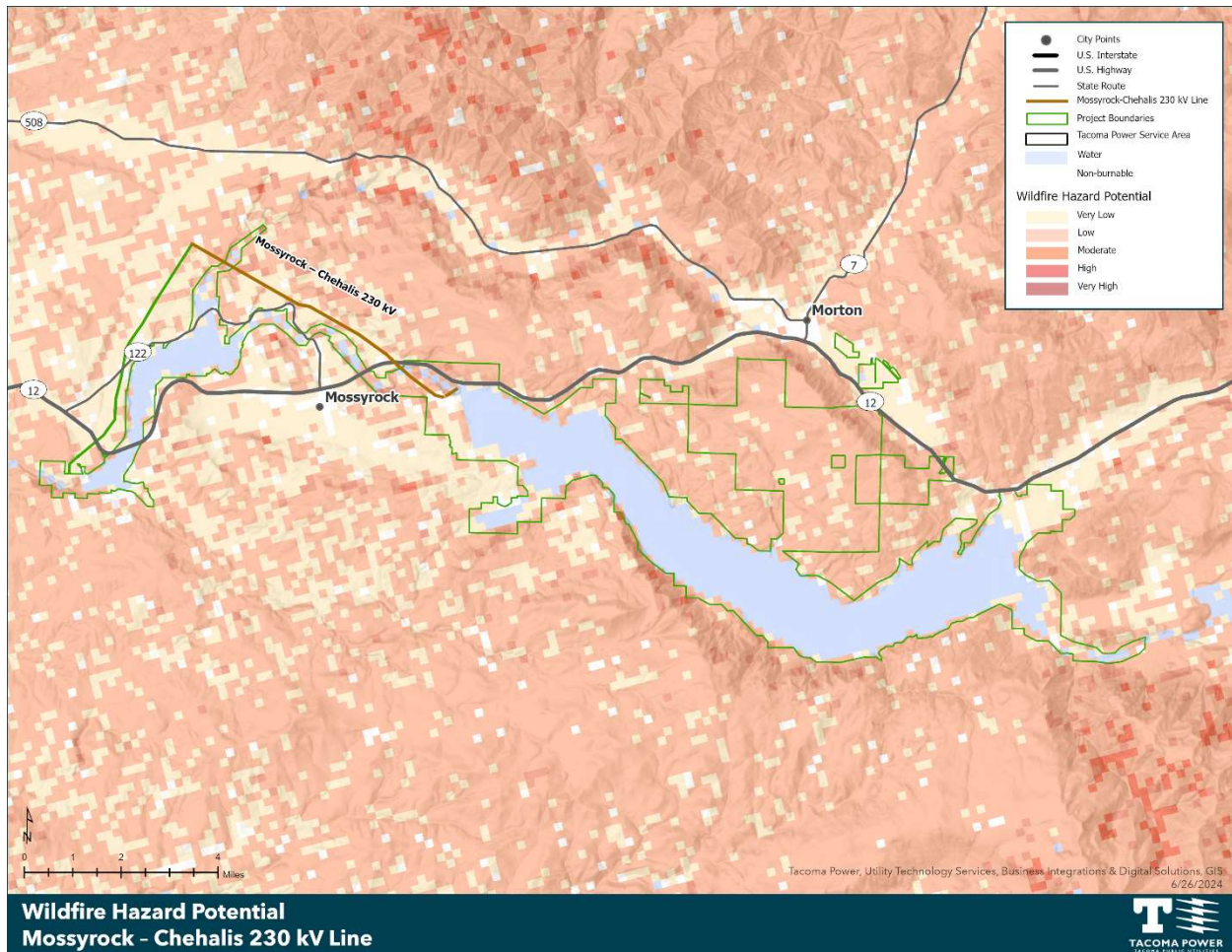


Figure 10. Wildfire Hazard Potential – Cowlitz River Hydroelectric Project.

Most of Tacoma Power’s service territory has a moderate to very low wildfire hazard potential. Some portions of the land adjacent to the transmission system, in particular the line within the Cowlitz River Hydroelectric Project, are in the vicinity of terrain with a higher wildfire hazard potential. This transmission line has wide spacing, high elevation, and well-maintained corridors with regular vegetation management.

6.1.1 Wildland Urban Interface/Intermix (WUI)

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 wildland or vegetative fuels. Currently, 20% of Tacoma Power’s service territory includes customers and infrastructure in areas designated as Wildland Urban Interfaces or Intermixes.

Between 1990 and 2010, the WUI grew 41% in terms of new houses and 33% in terms of land area. When development occurs in the WUI, wildfires pose a greater risk to homes and lives. Wildfires become harder to fight, and wildfires can’t be allowed to burn naturally. WUI growth also increases the likelihood of human caused ignitions. [3]

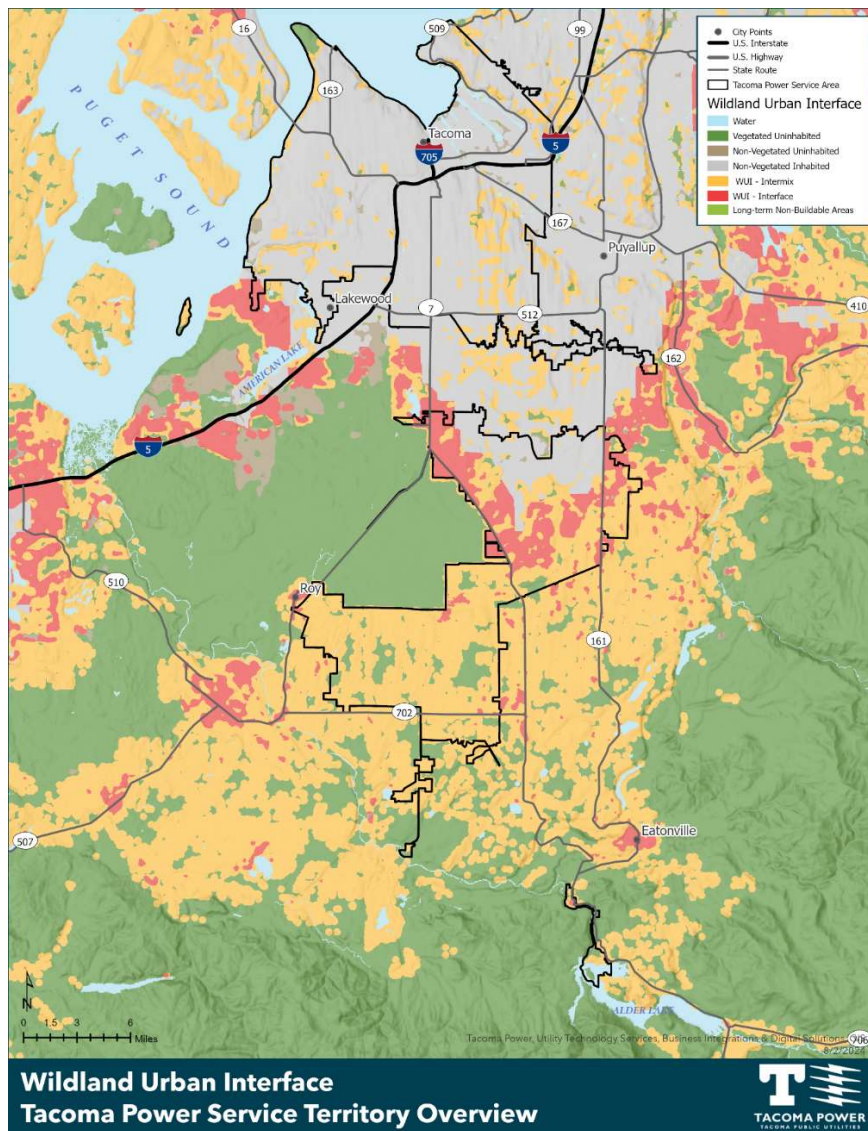


Figure 11. WUI – Tacoma Power Retail Service Territory Overview.



Figure 12. WUI – Tacoma/Lakewood Areas.

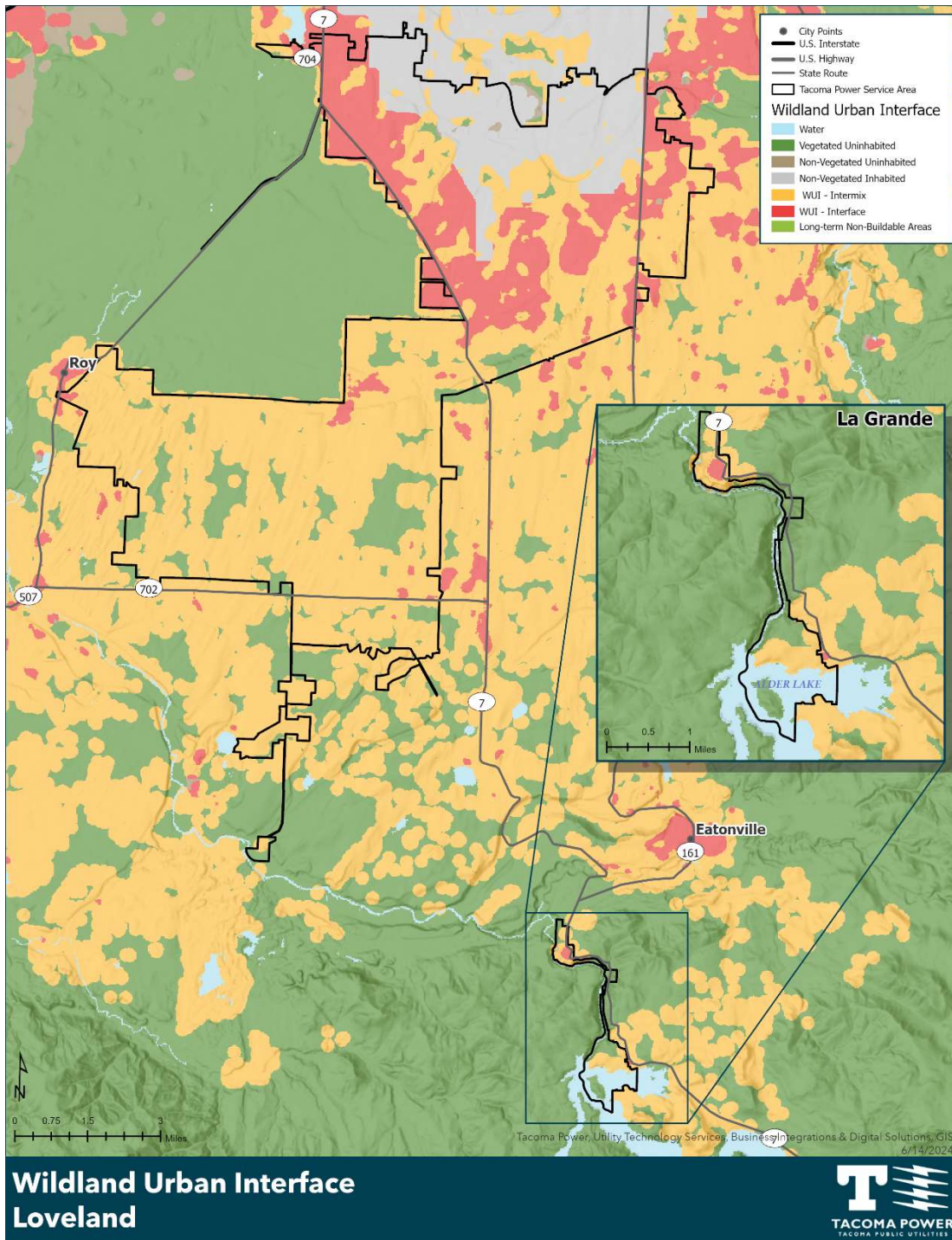


Figure 13. WUI – Loveland/La Grande and Alder Dam.

6.2 Electric Utility Safety Risks

The following broad categories have the potential for a utility caused ignition:

- Weather – A combination of low humidity and high wind.
- Vegetation – Tree and other vegetation contacts with power lines.
- Foreign Contacts – Vehicle, construction, balloon, and animal strikes to poles and wires.
- Equipment Failure – Failure of poles, transformers, wires, guys, and other electric utility equipment.
- Insulator contamination.
- Vandalism.
- Worksite related ignition.

7.0 Wildfire Prevention Strategies

7.1 Weather Monitoring

7.1.1 Current Strategy Overview

Tacoma Power uses several resources for weather monitoring and wildfire risk awareness. Resources currently used are:

- FEMS (Fire Environment Mapping System) – this site can help forecast fire weather by showing past, present, and future states of temperature, humidity, precipitation, and wind. See <https://www-wfweb.fs2c.usda.gov/application/fems>.
- Windy.com – this site can help forecast fire weather by showing forecasted temperature, precipitation, and wind. See <https://windy.com>.
- Department of Natural Resources (DNR) Wildfire Dashboard – this site provides data for tracking current and new fires nationally, in the Pacific Northwest and Department of Natural Resources fires. This site also shows fire teams deployed, number of fires year to date, and acres burned. See <https://experience.arcgis.com/experience/6cdda73cf6154949a1fae76ccb2900a0>.
- WFCA (Western Fire Chiefs Association) – this site helps track fires, including growth and containment. The site also provides wildfire risk awareness for air ops related to the fire in the area. See <https://wfca.com/fire-map>.
- NWS Fire Weather – this site provides an interactive map showing fire zones across the United States and can be used to determine fire zones within Tacoma Power’s service territory when “Red Flag” warnings are issued. <https://www.weather.gov/wrh/fire?wfo=sew>
- VIIRS Thermal Hotspots and Fire Activity – a mapping product of NASA’s Land, Atmosphere Near real-time Capability for EOS (LANCE) Earth Observation Data. See <https://www.earthdata.nasa.gov/learn/find-data/near-real-time/viirs>.

7.1.2 Planned Updates

Tacoma Power will be reviewing and potentially adding the following resources to improve their wildfire risk awareness.

- Washington DNR Industrial Fire Precaution Levels <https://www.dnr.wa.gov/ifpl>.
- United States National Weather Service Fire Danger Home Page <https://www.weather.gov/fire/>.
- Fire Information for Resource Management System (FIRMS) US/Canada <https://firms.modaps.eosdis.nasa.gov/usfs/map/#d:24hrs;@-112.5,45.0,4.7z>
- Wildland Fire Assessment System (WFAS) Fire Danger Rating [Fire Danger Rating \(wfas.net\)](https://www.wfas.net).
- Meteorological Assimilation Data Ingest System (MADIS) Data Stream, data from commercial and personal weather stations uploaded to this site <https://madis-data.ncep.noaa.gov/MadisSurface/>.
- Western Electricity Coordinating Council (WECC) – Western Interconnection Wildfire Outlook.
- As new public and private weather and risk monitoring resources become available, Tacoma Power will evaluate their usefulness and possibly add them as a weather monitoring resource.

7.2 Design and Construction Standards, Guidelines, and Practices

7.2.1 Current Strategy Overview

Tacoma Power has several ongoing efforts to address resiliency, reliability, and wildfire mitigation. They include:

- Continuing to upgrade substation circuit protection devices from electro-mechanical to microprocessor-based relays. This will simplify and speed up changing protection settings in response to elevated fire risk.
- Installing covered wire as the center phase on new distribution primary feeder (backbone) circuit stringing projects to minimize phase to phase outages due to tree branches, balloons, trees leaning into the wire, avian, or animal contact.
- Replacing #6 Cu overhead wire.
- Adding fusing for small wire laterals at distribution circuit intersect points.
- Requiring animal protection measures, including:
 - Covered wire jumpers from cutouts to transformers and capacitors.
 - Covered jumpers to line switches.
- Crossarm mounted avian protection devices are used in identified locations.

7.2.2 Planned Updates

Tacoma Power has several resiliency and reliability projects that are ongoing, planned, and/or in evaluation phase, including:

- Review construction standards and update for wildfire mitigation improvements.
- Continue to replace #6 Cu overhead wire.
- Replacing substation electro-mechanical relays with microprocessor-based relays. This program will target at least one substation per year with consideration given to substation locations with higher wildfire risk, as determined by the frequency of vegetation related faults on the distribution circuits in late spring, early fall, and summer timeframes.
- Adding line reclosers at distribution circuit mid-points and normally open tie points to limit impacts of outages and increase protection response.
- Purchase and install reclosers that limit reclosing fault energy.
- Continue installations of single phase reclosers on selected small wire laterals.

7.3 Fuel and Vegetation Management

7.3.1 Current Strategy Overview

Tacoma Power schedules inspections on all transmission right-of-way four times per year. All circuits, including both transmission and distribution, are inspected every two years to maintain a two-to-four-year tree trimming cycle. Complete circuit tree trimming is scheduled every four years and hot spots are trimmed on a two-year cycle. When ground vegetation or tall grass is identified to be a fire risk, mowing, brush clearing, spraying, and noxious weed removal are employed to minimize fuel on rights-of-way.

Right-of-way inspections also identify and report the following issues:

- Any observed broken or damaged electrical equipment or structures.
- Conditions of Tacoma Power signs and placards.
- Gate and culvert conditions.
- Road conditions.
- Unauthorized access points.
- Unapproved structures or trespasses.
- Garbage and abandoned vehicles.
- Illegal activities.

Tacoma Power trims approximately 700-circuit miles per year, utilizing six to eight tree trimming crews year-round.

7.3.2 Planned Updates

- Evaluate the use of drone-based LiDAR surveys to identify vegetation encroachment on overhead power lines.
- Evaluate the use of satellite imagery to monitor vegetation growth and health.
- Use PLS-CADD's Danger Tree Locator feature to identify vegetation clearance violations to transmission lines under multiple wind and sag conditions.

7.4 Asset Inspections and Response

7.4.1 Current Strategy Overview

- Conduct wood pole inspections on an 11-year cycle.
- Conduct LiDAR surveys for transmission infrastructure on an approximate 10-year cycle.
- Inspect distribution switches in high ignition potential zones prior to every fire season.
- Inspect the La Grande and Potlatch 115kv transmission lines and hardware periodically with Tacoma Power drones.
- Equip bucket trucks and crew pickup trucks for line crews and tree crews with Cold Fire™ extinguishers during dry season.
- Equip transmission crews working in wildfire risk areas with a 300-gallon water pump tank during dry season.
- Perform infrared (IR) Inspection on switch poles for overheating components.
- Clear any overgrown vegetation around the base of switch poles.

7.4.2 Planned Updates

- Consider implementing an aerial drone inspection program for transmission and distribution. The inspection would include use of hi-resolution imagery, infrared imagery, and possibly LiDAR.
- Continue to enhance the T&D asset management program.
- Inspect La Grande, Potlatch, and Mossyrock transmission lines and hardware every two years in the future with rotating inspection cycles.

7.5 Workforce Training

7.5.1 Current Strategy Overview

Several types of risk reduction practices have been implemented for the line and tree crews engaged in high voltage and vegetation management work in wildland areas during elevated wildfire risk seasons. These practices include:

- Provide pole fire and basic fire extinguishing training for line and tree crews.
- Added fire risk assessment to line and tree crew tailgate forms for daily tasks.
- Discuss fire risk assessments during weekly line and wire crew briefings when high fire risk weather is likely.
- Equip line and tree crews with additional water type extinguishing equipment during summer months to extinguish any work site ignitions.
- Provide 300-gallon water tanks on pallets to pre-treat work areas and possibly extinguish small ignitions at work sites in WUI areas.
- Operations vehicle purchasing specifications no longer allow downward directed exhaust exits.
- Provide fire blankets for equipment use in grass areas.
- Maintain relationships with local fire entities through continued facilitation of the Pierce County Utility and Fire Entity Wildfire Coordination Group meetings.

7.5.2 Planned Updates

- Send engineering and operations personnel to wildfire conferences for ongoing wildfire mitigation training and best practices.
- Build relationships with fire entities that would respond to incidents near our remote facilities by extending the Utility and Fire Entity Wildfire Coordination Group meetings to their respective areas.

7.6 Relay and Recloser Practices

7.6.1 Current Strategy Overview

- All distribution feeder circuit breakers are SCADA-controlled.
- Approximately 25% of distribution circuit relays are microprocessor based.
- Substation distribution feeder circuit breaker status is remotely monitored via SCADA, and SCADA can be used to change operational modes. Tacoma Power current distribution feeder relay design practices call for expanding the operational modes to improve operational flexibility. These expanded operational modes have been implemented at multiple substations.
- Distribution reclosers outside of the substation are manually disabled when necessary.

7.6.2 Planned Updates

- Implement changes to the distribution feeder relay logic at additional substations to expand operational modes. This relay logic control gives electric system dispatchers more flexibility to respond to various conditions. These controls will be available via SCADA.
- Upgrade distribution feeder circuits from electromechanical relays to microprocessor relays to allow for implementation of expanded operational modes. At least two substations per year will be upgraded with these changes.
- Deploy reclosers with reduced arcing fault energy during reclosing actions. Locations with high fire risk will be prioritized. These reclosers will be SCADA-controlled.
- Retrofit certain existing Distribution Reclosers outside the substation to be SCADA monitored and controlled.

7.7 De-Energization/Public Safety Power Shutoff

7.7.1 Current Strategy Overview

In the event of extreme weather conditions that dramatically increase the risk of wildfire, some electric utilities have elected to preemptively de-energize portions of their system to avoid becoming the source of ignition. A Public Safety Power Shutoff (PSPS) is a controversial practice and carries significant risks of its own. Some of these risks include:

- Loss of water supply to homeowners on private wells. Also, the potential loss of production wells and pumping facilities that may be needed to fight wildfires.
- Loss of power to customers on medical support equipment or requiring refrigerated medications.
- Loss of traffic signals worsening traffic congestion during a public evacuation.
- Disruptions to internet and mobile phone service for emergency communication.
- Economic impacts to local businesses.
- Lack of air conditioning for medically vulnerable populations.
- Difficulty notifying all customers impacted by a PSPS when a PSPS is under consideration and when a PSPS will be initiated.
- Power restoration delays due to required patrol and inspection of the system, potentially only during daylight hours, that had been de-energized prior to re-energization.

While Tacoma Power feels the risks associated with a PSPS would in most any scenario outweigh the risk of the electric system igniting a catastrophic wildfire, Tacoma Power will reserve the use of a PSPS as a mitigation tool of last resort.

To ensure the safety of the public and first responders, Tacoma Power will always maintain the option to de-energize a portion of the system in response to a request by EMAs or because of a known public safety issue.

7.7.2 Planned Updates

Tacoma Power will develop a protocol describing the conditions of when a PSPS would be under consideration and a community outreach plan to communicate how a PSPS would be initiated.

8.0 Community Outreach and Public Awareness

8.1 Current Community Outreach and Public Awareness Program

Tacoma Power’s current outreach related to the WMP mainly consists of interagency connections to the participants of the Pierce County Electric Utility and Fire Departments/Districts Pre/Post-Wildfire Coordination Group. This group is made up of representatives from PCDEM, South Sound 911 (SS911), all power utilities that reside in Pierce County, including Tacoma Power, Puget Sound Energy (PSE), Lakeview Light and Power (LLP), Peninsula Light Company (Pen Light), and the other nine power utilities that make up the Pierce County Cooperative Power Association (PCCPA), as well as all fire entities that have response requirements within Pierce County. This coordination group was established in July of 2021 to meet regularly and discuss ways to improve response during a fire incident in Pierce County. The group currently meets twice a year, once pre-wildfire season to discuss the forecasted outlook for the upcoming wildfire season and how to mitigate any concerns, and once post-wildfire season to discuss any lessons learned and how to improve mitigation efforts in the future.

In the event of a planned outage, Tacoma Power maintains a “Critical Care Customers List” that identifies customers to be notified who are on life-sustaining equipment and whose lives would be in immediate jeopardy if power service to their home was unexpectedly interrupted. An additional list of Tacoma Power’s “Key Accounts” such as local hospitals or critical infrastructure operators is maintained and are notified of planned outages as well. Tacoma Power also works closely with the City of Tacoma Emergency Management and PCDEM prior to and during incidents to maintain an accurate list of evacuation shelters to help reduce the impact of unexpected loss of power at those facilities.

8.2 Planned Updates

Tacoma Power has a variety of communication channels to reach its customers, and will use these to provide wildfire safety, prevention, and preparedness materials. Working together with subject matter experts within Tacoma Power, the communications team would create relevant and timely materials designed to ensure key messages about wildfire prevention, safety, and preparedness for customers.

Tacoma Power would employ two strategies to communicate wildfire information to their customers:

- Educating the public in advance about safety measures and how they can be prepared.
- Real time notifications about an active situation.

Tacoma Power’s many communications channels would be used for this and in an active situation, Tacoma Power will notify customers using similar tools used during power outages.

Additionally, Tacoma Power will adhere to the “life and safety” provision in federal language access laws, ensuring customers who speak and understand a language other than English also have access to materials they can understand.

Proposed tactics to communicate wildfire awareness and safety information:

- Bill insert message.
- MyAccount (on-line account portal) message.
- Information on the MyTPU.org homepage
- Dedicated wildfire information webpage.
- Information in our digital customer communications.
- Social media posts.
- Informing media partners.
- Flyers for community outreach events and available in the Tacoma Power customer service lobby.
- Tacoma Power customer service lobby screen message.
- Internal employee communication.

Additional resources to share using Tacoma Power’s communication tools:

- DNR Flyer – “Fire Prevention, Defend Your Home from Wildfire”
- DNR – [Defensible Space – Prepare Your Home](#)
- National Fire Protection Association (NFPA) – [Firewise USA](#)

9.0 Restoration of Service

Typically, Tacoma Power will patrol the affected portion of the system prior to restoration. Immediately prior to energizing, Tacoma Power makes positive contact with any Tacoma Power crews working in the area.

10.0 Evaluating the Plan

10.1 Metrics and Assumptions for Measuring Plan Performance

Description of Reliability Indices

Tacoma Power calculates six reliability indices, excluding data associated with Major Events. For an in-depth description of these reliability indices, refer to IEEE Standard 1366:

- Average Service Availability Index (**ASAI**) — measures the overall reliability of the system and represents the percent of time a customer has power.
- System Average Interruption Duration Index (**SAIDI**) — measures the number of minutes the average customer is without power for a sustained interruption (greater than five minutes).
- System Average Interruption Frequency Index (**SAIFI**) — measures the number of times the average customer experiences a sustained interruption (greater than five minutes) in service.
- Customer Average Interruption Duration Index (**CAIDI**) — measures the average amount of time an affected customer is without power and is equal to **SAIDI** divided by **SAIFI**.
- Momentary Average Interruption Event Frequency Index (**MAIFIE**) — measures the frequency with which the average customer experiences a momentary (less than five minutes) interruption in service. In 2012, tracking and evaluation began for **MAIFIE**.

Other Abbreviations Used:

- Average number of customers per outage (**ACO**) — denotes the average number of customers out of service per outage.
- Customer Minutes of Interruption (**CMI**) — total combined time customers are without power.
- Momentary Average Interruption Event Probability Index (**MAIPIE**) — the probability that a given interruption is momentary. This is a new metric developed by Tacoma Power in 2021 to track resiliency performance and is equal to **MAIFIE** divided by the sum of **MAIFIE** and **SAIFI**.

RELIABILITY INDICES		
INDEX	SIX-YEAR ROLLING AVERAGE PERFORMANCE (2018-2023)	CURRENT YEAR'S PERFORMANCE (2023)
SAIFI	0.60 outages	0.60 outages
SAIDI	63.78 minutes	55.17 minutes
CAIDI	106.97 minutes	92.31 minutes
ACO	89 customers/outage	88 customers/outage
ASAI	99.9858%	99.9898%
MAIFI	0.43	0.30
MAIPI	42%	33%

Table 3. Reliability Indices, Six-Year Average Compared to Current Year.

Cause	# Outages	SAIDI	%
DEFECTIVE	65	11.55	21%
HUMAN	55	10.87	19%
TREE	87	9.31	17%
OTHER-UNKNOWN	150	9.39	17%
WEATHER	73	8.96	16%
PLANNED	507	5.11	9%
ANIMAL	152	0.66	1%
OVERLOAD	7	0.14	0%
LOOSE	4	0.01	0%
Totals	1,100	56.00	100%

Table 4. Rank of Outage Causes Based on SAIDI.

SIGNIFICANT OUTAGES IN 2023					
RANK	DATE	DAILY SAIDI (min)	LOCATION	CAUSE	CLASSIFICATION
1	03/26/2023	6.90	Stadium	Animal - Squirrel	Not Major Event
2	11/15/2023	4.38	Pearl 115 kV Line	Human – CCT testing	Not Major Event

Table 5. 2023 Significant Outages, including Major Events.

10.2 Identifying and Addressing Areas of Continued Improvement in the Plan

Upgrade/Maintenance Programs	2023 Actual	2024 Projected	2025 Projected	Comments
Substation Feeder Relay Upgrades (# of substations)	0 substations	1 substation	1 substation	

10.3 Monitoring the Performance of Inspections

Inspections	2023 Actual	2024 Projected	2025 Projected	Comments
Wood Pole (# of poles)	6,183	4,400	4,500	2023 Included Transmission Inspection Cycle
Vegetation Management Distribution (# of circuit miles)	599 mi.	640 mi.	600 mi.	2024 includes some “out of cycle” trimming
Vegetation Management Transmission (# of circuit miles)	142 mi.	133 mi.	139 mi.	

11.0 Appendix A – Definitions

Circuit Breaker: Distribution circuit breaker providing protection for 12.47kV distribution circuit. Located inside substation.

Circuit Miles: A circuit mile is the total length of separate circuits in miles, regardless of how many conductors are used in each circuit.

Cold Fire™: Cold Fire™ is a fire extinguishing agent that cools 21 times faster than water, putting out fires faster with less water. It is available premixed in portable fire extinguishers or in bulk for mixing with reservoirs or refillable fire extinguishers.

Distribution System: The final stage in the delivery of electric power carrying electricity from the transmission system to individual consumers.

Emergency Response Plan: An emergency response plan (ERP) is a written document that outlines the steps an organization will take in response to a critical event. The goal of an ERP is to minimize the impact of the event on emergency operations and to protect people and property. ERPs can help organizations prepare for and respond to a variety of emergencies, including fires, hurricanes, wildfires, chemical spills, and disease outbreaks.

Feeder: A three-phase power line that transmits electricity from the substation to branch circuits, also known as “laterals.”

Incident Command System (ICS): A standardized approach to the command, control, and coordination of emergency response providing a common hierarchy within which responders from multiple agencies can be effective.

Infrared (IR): Electromagnetic radiation with wavelengths longer than visible light but shorter than microwaves. The use of infrared cameras to remotely determine the temperature of objects is known as thermography.

Megawatt-Hour (MWh): A unit of electrical energy, equivalent to 10⁶ watt-hours.

National Incident Management System (NIMS): A systematic, proactive approach to guide all levels of government, non-governmental agencies, and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from the effects of incidents. NIMS provides stakeholders across the whole community with the shared vocabulary, systems, and processes to successfully deliver the capabilities described in the National Preparedness System. NIMS provides a consistent foundation for dealing with all incidents, ranging from daily occurrences to incidents requiring a coordinated Federal response.

Public Utility Board: The five-member board oversees the operations of Tacoma’s electric and water utilities and industrial freight-switching railroad. The Tacoma City Council appoints the board members, and they serve five-year terms, unpaid.

Recloser: A class of switchgear designed for use on overhead electricity distribution networks to detect and interrupt transient faults. Reclosers are essentially rated circuit breakers with integrated current and voltage sensors and a protection relay, optimized for use as a protection device.

Relay: An electromechanical, solid state electronic, or microprocessor-based device typically located within substations, switching stations, or switchyards that detects electrical faults and operates circuit breakers to open (de-energize) and, in some cases, close (re-energize) automatically.

Red Flag Warning (RFW): A term used by fire-weather forecasters to call attention to limited weather conditions of importance that may result in extreme burning conditions. The warning is issued when it is an on-going event, or the fire weather forecaster has a high degree of confidence that Red Flag criteria will occur within 24 hours of issuance. Red Flag criteria occurs whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, if before spring green-up or after fall color, and the National Fire Danger Rating System (NFDRS) is high to extreme and the following forecast weather parameters are forecasted to be met:

- A sustained wind average 15 mph or greater
- Relative humidity less than or equal to 25 percent and
- A temperature of greater than 75 degrees F
- A Fire Weather Watch may be issued prior to the RFW.

SCADA: SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA is a computer-based system for gathering and analyzing real-time data to monitor and control equipment that deals with critical and time-sensitive materials or events. In the case of the transmission and distribution elements of electrical utilities, SCADA will monitor substations, transformers, circuit breakers, and other electrical assets. Equipment can be controlled or reset remotely using SCADA.

Substation: A substation is a part of an electrical generation, transmission, and distribution system. Substations transform voltage from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels. A substation may include transformers to change voltage levels between high transmission voltages and lower distribution voltages, or at the interconnection of two different transmission voltages.

Switching Station: A switching station is a substation without transformers and operating only at a single voltage level. Their primary function is switching, connecting, and disconnecting transmission lines or other components to and from the system.

Switchyard: A switching station located directly adjacent to or near a generating station.

System Hardening: Electric system hardening, also known as grid hardening or storm hardening, is the process of upgrading electric equipment to make it stronger and more resilient in severe weather and to reduce the risk of wildfires.

Transmission System: The bulk delivery of electrical energy from a generating site to an electrical substation. At Tacoma Power, the transmission system is comprised of 115kV and 230kV lines.

Utility Vegetation Management: Utility vegetation management is a series of activities that assist utilities in removing unwanted and hazardous vegetation from power lines and other electrical system equipment.

Wildfire: Also called wildland fire, a wildfire is an unplanned, unwanted fire burning in a natural area, such as a forest, grassland, or prairie.

Wildfire Mitigation Plan (WMP): A wildfire mitigation plan (WMP) is a document that outlines how to reduce the risk of wildfires. WMPs are used by electrical utilities to describe how they will maintain and operate their equipment and power lines to minimize the risk of wildfires along with their emergency response and recovery procedures.

Wildlands: The National Wildfire Coordinating Group (which coordinates programs of participating wildfire management agencies nationwide), refers to an area in which development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland Urban Interface/Intermix (WUI): The WUI is the zone of transition between unoccupied land and human development. The WUI is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Wildland Urban Interface and Wildland Urban Intermix are differentiated based on housing and vegetation density. The interface is higher density, three or more structures per acre, and less than 50% vegetation cover.

12.0 Appendix B – References

- [1] A. W. Dye and a. et., Simulated Future Shifts in Wildfire Regimes in Moist Forests, JGR Biogeosciences, 2024.
- [2] arcgis, "The Wildland-Urban Interface," [Online]. Available: <https://storymaps.arcgis.com/stories/7016c437623a445997c072a05e26afbb>. [Accessed 8 2024].
- [3] V. C. Radeloff and a. et, "Rapid growth of the US wildland-urban interface raises wildfire risk," *Proceedings on th eNational Academy of Sciences*, vol. 115, no. 13, 2018.

13.0 Appendix C – Reportable Wildland Fires Within Service Territory

- No reportable wildland fires within Tacoma Power’s service territory in years 2021-2024.