SMUD 2019
Wildfire Mitigation Plan

Public Review Draft

Powering forward. Together.

SMUD®
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1. Introduction

Over the last few years California has seen some of its most devastating and destructive wildfires. Climate change is recognized to be a large contributing factor (long hot spells, low moisture, etc.). This is the new (ab) normal, requiring a new way of thinking about wildfire mitigation planning.

In response, Senate Bill (SB) 901 authored by Senator Dodd, was enacted in 2018, requires every electric utility to prepare a wildfire mitigation plan (WMP).

SB 901 amended Public Utilities Code (PUC) section 8387. Section 8387 generally requires every publicly owned utility to construct, maintain, and operate its electrical facilities to minimize the risk of wildfire posed by those facilities. As amended by SB 901 section 8387 more specifically requires every publicly owned utility to prepare and present a WMP to its governing body by January 1, 2020, and annually thereafter.

The WMP must include vegetation management (VM) programs, inspection and maintenance programs, protocols for deactivating automatic reclosers and for de-energizing power lines in severe weather conditions. The plans are required to identify priority customers, such as first responders and local agencies, health care providers, water and telecommunication facilities, groups that assist children, elderly, mobility impaired and other vulnerable populations, and include communication programs for those customers. The plans need to describe how service will be restored after a wildfire and include processes for (i) measuring the performance of the plan measures, (ii) identifying and correcting any deficiencies in the plan and (iii) auditing implementation of the plan.

This document outlines SMUD’s activities that meet or exceed accordance with these requirements.
As one of the largest publicly owned, locally governed, electric utilities in California, SMUD serves over 600,000 customers in its 900 square mile service area in the Sacramento County area, and operates a federally licensed hydroelectric project in El Dorado County known as the Upper American River Project (UARP). SMUD also has facilities in Placer and Solano Counties. SMUD does not serve distribution customers in its (UARP) area.

SMUD has never experienced a catastrophic wildfire involving its facilities. SMUD’s service area has a much lower wildfire risk profile than other areas in the State that have suffered destructive wildfires in recent years. This is largely due to its more urban environment, flatter terrain, grasslands and other fuel sources outside forested areas and fewer wind events. Even in the UARP area SMUD is fortunate to have a lower risk environment. There are fewer structures and no distribution service.

1.1 Policy statement
SMUD’s overarching goal is to provide safe, reliable and economic electric service to its local community. In order to meet this goal, SMUD constructs, maintains and operates its electrical lines and equipment in a manner that minimizes any risk of catastrophic wildfire posed by its electrical lines and equipment.

1.2 Purpose
This WMP describes the range of activities that SMUD is taking to mitigate the threat of power-line ignited wildfires, including its various programs, policies and procedures. This plan is subject to direct supervision by SMUD’s Board of Directors and primary responsibility for its implementation resides with the Chief Grid Strategy and Operations Officer.

This plan meets or exceeds the requirements of PUC section 8387 for publicly owned electric utilities to prepare a WMP by January 1, 2020, and annually thereafter. Reference Table 1 on page 8 for plan compliance and corresponding sections.
## 1. Introduction

### Table 1. Plan compliance with Public Utilities Code 8387(b)

<table>
<thead>
<tr>
<th>SB901 Requirement</th>
<th>Description</th>
<th>Plan Section Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) (A)</td>
<td>An accounting of the responsibilities of persons responsible for executing the plan.</td>
<td>9.1.1</td>
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<tr>
<td>(2) (B)</td>
<td>The objectives of the wildfire mitigation plan.</td>
<td>1.2, 1.3</td>
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<tr>
<td>(2) (C)</td>
<td>A description of the preventive strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.</td>
<td>3</td>
</tr>
<tr>
<td>(2) (D)</td>
<td>A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan’s performance and the assumptions that underlie the use of those metrics.</td>
<td>9.3.1</td>
</tr>
<tr>
<td>(2) (E)</td>
<td>A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.</td>
<td>9.2.1</td>
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<tr>
<td>(2) (F)</td>
<td>Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</td>
<td>6.1.1, 7.2</td>
</tr>
<tr>
<td>(2) (G)</td>
<td>Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities and operators of telecommunications infrastructure.</td>
<td>7.1, 7.2</td>
</tr>
<tr>
<td>(2) (H)</td>
<td>Plans for vegetation management.</td>
<td>6.4</td>
</tr>
<tr>
<td>(2) (I)</td>
<td>Plans for inspections of the local publicly owned electric utility’s or electrical cooperative’s electrical infrastructure.</td>
<td>6.3</td>
</tr>
<tr>
<td>(2) (J)</td>
<td>A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility’s or electrical cooperative’s service territory. The list shall include, but not be limited to both of the following:</td>
<td>4.3</td>
</tr>
<tr>
<td>(2) (J) (i)</td>
<td>Risks and risk drivers associated with design, construction, operation and maintenance of the local publicly owned electric utility’s or electrical cooperative’s equipment and facilities.</td>
<td>4.3</td>
</tr>
<tr>
<td>(2) (J) (ii)</td>
<td>Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility’s or electrical cooperative’s service territory.</td>
<td>5.1</td>
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</tbody>
</table>
## 1. Introduction

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<tr>
<th>SB901 Requirement</th>
<th>Description</th>
<th>Plan Section Number</th>
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<tr>
<td>b (2) (K)</td>
<td>Identification of any geographic area in the local publicly owned electric utility’s or electrical cooperative’s service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire threat district based on new information or changes to the environment.</td>
<td>5.1</td>
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<tr>
<td>b (2) (L)</td>
<td>A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.</td>
<td>4.3</td>
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<tr>
<td>b (2) (M)</td>
<td>A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.</td>
<td>8</td>
</tr>
<tr>
<td>b (2) (N)</td>
<td>A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:</td>
<td></td>
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<tr>
<td>b (2) (N) (i)</td>
<td>Monitor and audit the implementation of the wildfire mitigation plan.</td>
<td>9.4</td>
</tr>
<tr>
<td>b (2) (N) (ii)</td>
<td>Identify any deficiencies in the wildfire mitigation plan or its implementation and correct those deficiencies.</td>
<td>9.4</td>
</tr>
<tr>
<td>b (2) (N) (iii)</td>
<td>Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes or commission rules.</td>
<td>9.3.1</td>
</tr>
<tr>
<td>b (3)</td>
<td>The local publicly owned electric utility or electrical cooperative shall present each wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies and interested parties, and shall verify that the wildfire mitigation plan complies with all applicable rules, regulations, and standards as appropriate.</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on the internet web site of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility’s or electrical cooperative’s governing board.</td>
<td>10</td>
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1.3 Objectives

The primary objectives of this WMP are to:

1. Minimize the probability that SMUD’s transmission and distribution (T&D) system may be the origin or contributing source for the ignition of a wildfire;

2. Implement a wildfire plan that embraces safety, prevention, mitigation and recovery as a central priority for SMUD; and

3. Create a WMP that is consistent with state law and objectives.

SMUD has evaluated the prudent and cost-effective improvements to its physical assets, operations and training that can help to meet these objectives.

The secondary objective of this WMP is to improve the resiliency of SMUD’s line standards and construction. As part of the development of this plan, SMUD assesses new industry practices and technologies that will reduce the likelihood of an interruption (frequency) in service and improve the restoration (duration) of service. In addition, SMUD reviews available fire investigation reports for fires throughout California to understand root causes that can be addressed.

This WMP outlines the actions SMUD is taking to reduce the risk of potential wildfire-causing ignitions associated with SMUD’s electrical infrastructure. This plan outlines the activities and programs that SMUD has put in place to enhance public safety, improve grid reliability and explore new technologies to help reduce overall wildfire ignition risk.

This WMP also addresses customer outreach and communication programs for customers that may be impacted during de-energization events. SMUD’s long standing and continued cooperation with local agencies are also discussed and outlined.

The WMP also provides methodologies to measure the effectiveness of specific wildfire mitigation strategies. Where a particular action, program component, or protocol is determined to be unnecessary or ineffective, SMUD will assess whether a modification or replacement is merited. This plan will also help determine if more cost effective measures would produce the same or improved results.
2. SMUD

2.1 SMUD profile

Headquartered in Sacramento, California, SMUD owns and operates an electric system that has provided retail electric service since 1946. SMUD generates, transmits and distributes electricity within a 900-square-mile territory that includes the principal parts of Sacramento County, and a small adjoining portion of Placer County (see Figure 1).
SMUD is the nation’s sixth-largest community-owned electric utility, recognized internationally for its innovative energy efficiency programs and use of renewable power technologies. As a municipal utility, SMUD is governed by a seven-member popularly elected Board of Directors that determines policy and appoints the Chief Executive Officer and General Manager who is responsible for SMUD’s overall management and operations.

SMUD owns, operates and has ownership interests that are critical to maintaining the flow of power from generating facilities through the transmission lines to SMUD’s service area. These assets are located in the geographic areas of Sacramento, El Dorado, Solano and Placer counties.

2.2 The service area
SMUD is the primary distributor of electric power within an area of approximately 900 square miles in central California. The service area includes the State Capital, Sacramento, the populous areas principally to the northeast and south of the City of Sacramento and the agricultural areas to the north and south.

SMUD’s electric system supplies power to a population of approximately 1.5 million with a total annual retail load of approximately 10,776 million kilowatt hours (kWh) for the year ended December 31, 2017. As the capital of the nation’s most populous state, Sacramento benefits from the historically stabilizing influence of a large government sector. Sacramento is home to the State government headquarters, the Sacramento County seat, the City government and various special districts that combine to make government the largest single employment sector in the Sacramento area. Information technology, transportation, education and health services, leisure and hospitality, and construction serve as the other major sectors of employment and industry in the area.

SMUD’s annual peak load has averaged 3,030 Megawatts (MW) over the last three years, with SMUD’s record peak load of 3,299 MW occurring on July 24, 2006. In 2017, SMUD recorded its second highest peak load of 3,157 MW.

2.3 The electric system
SMUD owns and operates a vertically integrated electric system that includes generation, transmission and distribution facilities.

SMUD supplies power to its bulk power substations through 230 kilovolt (kV) and 115 kV transmission systems. This system transmits power from SMUD’s generation plants and interconnects with Pacific Gas & Electric (PG&E) and the Western Area Power Administration (WAPA). Power is distributed throughout Sacramento County via a 69 kV sub-transmission system except for the City’s downtown area, which is served from the 115 kV transmission systems. The downtown area is served from 115/12 kV and 115/21 kV substations. The distribution system serving the remainder of SMUD’s service territory is comprised of 69/12 kV and 69 kV substations with overhead and underground distribution circuits.

2.4 Purpose and vision
SMUD’s Board of Directors has established the following mission and vision statements: “SMUD’s purpose is to enhance the quality of life for our customers and community through creative energy solutions. SMUD’s vision is to be the trusted partner with their customers and community, providing innovative solutions to ensure energy affordability and reliability, improve the environment, reduce our region’s carbon footprint and enhance the vitality of our community.”
2.5  Goal and objectives

For more than seventy years, SMUD has provided safe, reliable and affordable electricity, excellent customer service, community value, innovation and environmental leadership to its customers.

The Board has adopted a set of Strategic Directions (SD) with related metrics, which it considers essential in the continued success of the organization and its service to its customers. These include safety, reliability, competitive rates, enterprise risk management (ERM), access to credit markets, customer relations, environmental leadership and resource planning. SMUD’s Board SDs are used as a guide in the decisions made about SMUD’s policies and operations. The Board continually reviews and refines these guidelines to make sure it meets its customer’s energy needs both now and in the future.

Some of the general elements in SMUD’s business strategy are:

- Safe and reliable energy and environmental protection: Developing and maintaining a sustainable and reliable power supply to meet peak demand growth consistent with state mandates for renewable energy and reduced carbon emissions.
- Customer and community services: Working closely with customers to provide the information, tools and incentives to assist them to more efficiently manage energy use, which will contribute to meeting greenhouse gas (GHG) emission targets and managing peak demand requirements.
- Long term financial stability: Managing price, volumetric and credit risks associated with energy and natural gas procurement and SMUD’s finances to meet funding needs and maintain fair and reasonable energy rates.
- Workforce planning & development: Attracting, developing and retaining an inclusive, skilled and engaged workforce that reflects SMUD’s values and is committed to achieving SMUD’s mission.
- Operational independence and local control: Retaining local decision-making authority and operational independence.
- Community and Collaboration: Collaborating regionally to attract new businesses and grow existing business to diversify and strengthen the Sacramento economy.
- Long-term infrastructure investment: Maintain and improve SMUD’s infrastructure in a cost-effective manner to ensure sustainable delivery of reliable energy and address economic and environmental concerns.
- Risk management: Maintain an ERM program designed to act as an early warning system to monitor changes in, and the emergence of, risks that could impact SMUD’s business objectives.
3. Overview of preventive strategies and programs

This WMP addresses the preventive strategies and programs adopted by SMUD to minimize the risk of its electrical lines and equipment causing catastrophic wildfires. The strategies and programs included in the WMP are evolving and are subject to change. As new technologies, practices and networks develop, and other environmental influences or risks are identified, changes to address them may be incorporated into future iterations of the WMP which is, in effect, a living document.

This WMP integrates and interfaces with various operating policies and asset management and engineering principles which are themselves subject to change. As appropriate, the current version of documents are incorporated either as appendices to this WMP or by reference.

The following is a summary of SMUD’s programs and activities that support wildfire prevention and mitigation.
### 3. Overview of preventive strategies and programs

#### Table 2 Mitigation programs/activities

<table>
<thead>
<tr>
<th><strong>Design and construction</strong></th>
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</thead>
<tbody>
<tr>
<td>Replace wood poles with non-wood poles in certain areas</td>
</tr>
<tr>
<td>Ester-based insulating fluid (Envirotex FR3) in transformers</td>
</tr>
<tr>
<td>Non-expulsion equipment in Pole Clearing Area (PCA)</td>
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<tr>
<td>Light Detection and Ranging (LiDAR) Ortho, Oblique and Hyper Spectral Imagery</td>
</tr>
<tr>
<td>Potential installation of fire monitoring cameras on towers in the Upper American River Project (UARP) transmission corridor</td>
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<tr>
<td>Increase overhead wire spacing to reduce wire to wire contact</td>
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<table>
<thead>
<tr>
<th><strong>Inspection and maintenance</strong></th>
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<tbody>
<tr>
<td>Transmission line aerial patrols (helicopter)</td>
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<tr>
<td>Transmission line ground patrols</td>
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<tr>
<td>Transmission line infrared inspections (helicopter)</td>
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<tr>
<td>Transmission line splice assessment program</td>
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<tr>
<td>Transmission and distribution wood pole intrusive inspections</td>
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<tr>
<td>Transmission and distribution vegetation right-of-way maintenance</td>
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<tr>
<td>Transmission and distribution annual pole clearing program</td>
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<tr>
<td>Distribution detailed line inspections</td>
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<td>Distribution line patrols</td>
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<tr>
<td>69 kilovolt (kV) and Pole Clearing Area 12 kV infrared inspections (helicopter)</td>
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<td>Visual inspections of distribution substations</td>
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<table>
<thead>
<tr>
<th><strong>Operational practices</strong></th>
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<tbody>
<tr>
<td>Disabling reclosing during fire season</td>
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<tr>
<td>Transmission and distribution system vegetation management</td>
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<tr>
<td>Work procedures and training for persons working in locations and conditions of elevated fire risks</td>
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<td>Safety and physical security protection teams</td>
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<tr>
<td>Increased staff for line and vegetation management crews in preparation of storm</td>
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<td>Existing relationship with local government and fire safe councils</td>
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<tr>
<td>Transmission encroachment program</td>
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</tbody>
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1 Additional information: https://www.cargill.com/bioindustrial/envirotemp/fr3
### 3. Overview of preventive strategies and programs

#### Situational/conditional awareness
- Weather monitoring stations in targeted areas in the UARP
- Potential installation of cameras in key locations
- Coordinate and collaborate with Fire Safe Councils and County Office of Emergency Services throughout the year to prepare for red flag warnings (RFW) and high fire risk events
- Contractor safety training and orientation for transmission and distribution vegetation management work
- Monitors daily California Department of Forestry and Fire Protection website and active fires in California
- Shade Tree Program

#### Response and recovery
- Planned de-energization during fire season
- Critical event communications process and procedures
4. Risk analysis and risk drivers

SMUD uses its existing ERM framework to identify and assess enterprise level risks. SMUD’s ERM framework takes into consideration both quantitative and qualitative factors to determine the level of inherent and residual levels of a particular risk. An inherent risk level refers to the risk before any mitigations or controls are in place while the residual risk level refers to the risk after all mitigations and effective controls are considered.

4.1 Enterprise risk assessment

The ERM framework has a strong governance structure stemming from SMUD’s Board of Director’s Strategic Direction and overseen by an executive body, the Enterprise Risk Oversight Committee (EROC). The framework requires that all enterprise risks be owned by an Executive and managed at the Director level.

The ERM framework is a 5-step process and is integrated with SMUD’s internal audit process to check for assurance of proper control implementation. The framework requires continuous communications and consultation throughout the life of the risk. The 5-step ERM process is shown in Figure 2. Figure 3 describes what the objective of each step are.
4. Risk analysis and risk drivers

Figure 2 SMUD’s enterprise risk management process

Figure 3 ERM 5-step process

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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</table>
| Identify | • Find, recognize and describe risks  
• Identify all hazards, threat and opportunities |
| Analyze | • Comprehend the nature of risk and determine the level of risk  
• Bow-tie analysis |
| Plan & Evaluate | • Compare results of risk analysis with criterias  
• Prioritize risks |
| Respond | • Modify risk by developing control plans  
• Implement control plans |
| Monitor & Review | • Continue to monitor risks and controls  
• Review and improve ERM framework  
• Risk reporting |
During a risk evaluation, the Director, manager, stakeholders and subject matter experts (SMEs) are consulted. ERM staff gathers pertinent information to conduct the evaluation which includes a root cause analysis. Information gathered includes key risk drivers, key risk impacts, mitigations, processes, procedures, controls and internal/external risk trend. SMUD uses a commonly used framework called the bow-tie method for its root-cause analysis. This method allows easy visualization of the relationship between the risk event, its drivers and impacts as well as preventive and mitigation activities. In addition, the method also allows for a structured risk analysis where quantification is not possible or desired. SMUD’s ERM framework takes into consideration impacts to SMUD’s finances, legal, regulatory and compliance, operations, reputation, public safety and workforce.

4.2 Climate change

The National Aeronautics and Space Administration (NASA) defines climate change as the change in the usual weather conditions and patterns found in a region. More specifically, it is a change in the average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the globe. According to NASA, scientists think that the Earth’s temperature will keep increasing for the next 100 years. “This would cause more snow and ice to melt. Oceans would rise higher. Some places would get hotter. Other places might have colder winters with more snow. Some places might get more rain. Other places might get less rain.”

California has already been experiencing the impacts of climate change including prolonged droughts, increased coastal flooding and erosion and tree mortality. The state has also seen increased average temperatures, more extreme heat days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level and precipitation patterns, the intensity of extreme weather events is also changing. Extreme weather events and resulting hazards, such as heat waves, wildfires, droughts and floods are already being expected.

California’s Fourth National Climate Assessment issued in November 2018 says that “climate change is expected to increase the frequency and intensity of wildfires,” consistent with many expert predictions that climate change would increase the risk of large and severe wildfires, including a potential increase in the total area burned. A number of climate-related factors have contributed to the increasing risk of wildfires. The severity of wildfires is generally a function of the condition of the combustible vegetation material involved, terrain or setting and weather conditions. Tree stress and mortality, including damage due to insect infestations such as the bark beetle exacerbate fire hazards turning into a perfect tinderbox, causing catastrophic fires. In addition, as air temperatures rise, forests and land are drying out, also increasing fire risks and creating weather conditions ripe for fire ignition and expansion.

Fire season has historically extended from early spring through the late fall, due to the dry and hot nature of these months in SMUD’s geographic region. As a result of the increase in length, wildfire destruction in California, increase in population density, development in the wildland-urban interface (WUI) and extreme weather conditions, there’s a growing need for year-round fire prevention and preparedness.

---

4.3 Enterprise safety and wildfire risk

Following SMUD’s ERM assessment process, SMEs were consulted in conducting a bow-tie analysis for wildfires which could potentially involve SMUD equipment. SMUD does not have a history of starting wildfires where SMUD owned equipment was involved. Rather, the SMEs focused on hypothetical causes of powerline sparks that could potentially start a fire.

SMUD operates and maintains approximately 3,900 circuit miles of overhead distribution lines and approximately 470 circuit miles of overhead transmission lines across its service area. The bow-tie analysis was conducted to identify SMUD’s vulnerabilities, exposure to and impacts from a wildfire as well as, to identify current controls and mitigations to prevent wildfire occurrence, velocity and impact.

Figure 4 provides the risk bow tie, which summarizes the assessment process.

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**Figure 4** SMUD’s wildfire risk bow tie

<table>
<thead>
<tr>
<th>Key Risk Drivers</th>
<th>Triggering Event</th>
<th>Key Risk Impacts</th>
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<tbody>
<tr>
<td><strong>Contact from object</strong></td>
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<tr>
<td>• Animal</td>
<td></td>
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<tr>
<td>• Balloons</td>
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<td>• Vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Vehicle</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment/Facility Failure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Capacitor Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Conductor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Crossarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Insulator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Splice/Clamp/Connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Transformer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unspecified</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wire to Wire Contact/Contamination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Weather</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Third Party Acts/Vandalism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Acts of SMUD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wildfires involving SMUD equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serious Injury/Fatality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Financial</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Infrastructure/Property Damage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Local Agency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental and Ecological</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reputational</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Customer and Community</strong></td>
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</tr>
</tbody>
</table>

*Figure 4 Drivers and impacts are indicators that a risk event could occur, not a reflection of actual or threatened conditions.*
4. Risk analysis and risk drivers

4.3.1 Fire risk drivers
Powerline equipment is generally the same across all utilities; a small niche of manufacturers and suppliers are used to procure equipment for construction of facilities. Slight variances in design and construction may be expected between utilities. SMUD staff evaluated other utilities’ fire causes and applied its own field experience to determine the potential risk drivers. Four categories were identified as potential for causing powerline sparks and ignitions:

- Contact from objects
- Equipment/facility failure
- Wire-to-wire contact/contamination
- Other

SMUD staff identified the following drivers associated with each category. These are discussed below but may not be limited to the following.

4.3.1.1 Contact from objects
The majority of overhead powerlines throughout the world are installed as bare wire on top of insulated poles and structures. Overhead powerlines are kept at a certain distance from the ground and from adjacent objects, based on the voltage level and applicable design criteria, to prevent contact and faults. With thousands of miles of overhead powerlines, however, contacts from objects are anticipated by utilities and can occur throughout the year.

Animals and highly conductive mylar balloons are some of the objects that come into contact with powerlines which can cause sparks and arcs. While protection equipment such as circuit breakers, reclosers and fuses are installed to isolate the faults, there are time delays (within fractions of a second or seconds) associated with when the equipment senses the fault and proceeds to isolate (or “trip”) the faulted section. The time delays are instant to the human, but not quite fast enough to prevent all sparks prior to tripping. Emitted sparks, molten metal or burnt foreign objects can fall on, and potentially ignite, any fuels underneath or near the powerline.

Vegetation such as trees, branches, palm fronds, etc., can come into contact with powerlines at any time which can also cause sparks or arcs. Sometimes, the stress of contact is large enough to cause a connector or pole to fail which will lead to wires falling and touching the ground. In some instances, the tree or branch may continue leaning on the powerline and continue sparking or catch on fire due to resulting sparks.

Additionally, vehicles contacting poles or supporting guy wires can damage or break the pole. The heavy, broken pole in turn can put too much stress on connectors or crossarms and cause wires to break and fall to the ground potentially emitting sparks and arcs.

4.3.1.2 Equipment failure
All man-made equipment fails, at some point or another during its life. Failure modes can be discrete (internal) or destructive (materials ejected). Failure components such as hot line clamps, connectors and insulators can result in wire failure and cause the wire to fall to the ground. The energized conductors can emit sparks prior to breaker or fuse tripping/isolating. Transformers and capacitor banks can have internal shorts that can potentially be destructive and eject materials which could cause a fire.

4.3.1.3 Wire-to-wire contact/contamination
When two or more energized conductors come into contact with each other they will cause sparks and possible material to be ejected. There are many factors that could lead to such an occurrence. Any type of shaking of the pole or high winds may cause the powerlines to sway and touch. A shaking pole can be caused by vehicle contact or livestock rubbing against a pole supporting guy wires. Certain types of faults (shorts) down the line can cause powerlines to gallop (bounce and buck).

Contamination on insulators can create a path for electricity to flow. This unintended path can track and cause a fault. Typical causes are ash, dust, debris
and bird excrement on the insulator. These causes can usually be determined by burn marks along the insulator.

4.3.1.4 Other

SMUD’s powerlines traverse through many parts of its service territory which include residential properties, along road rights-of-way (ROW), within business parking lots, etc.

Non-SMUD construction projects could be a possible cause of ignition as well since commercial and residential development are continually occurring in Sacramento County. Even though contractors take all precautions to keep their workers safe, construction equipment can and on occasion, come into contact with powerlines. Although unintentional, these contacts may cause damage to powerlines, poles and supporting equipment which may cause sparks and trigger fires in the vicinity.

SMUD equipment can also be vandalized and damaged, which may cause sparks and fires.

SMUD takes pride in a properly trained and well-informed workforce. Crews perform switching, construction and maintenance on facilities daily. The tools and vehicles they use can be sources of sparks or ignition. For example, driving a truck over dry grass/brush can cause the dry grass/brush to ignite. As such, SMUD trucks are equipped with fire suppression equipment and staff are properly trained to respond and in the proper use of the fire suppression equipment.

During RFW periods in the UARP, crews working in remote sites limit hot-work (such as welding, grinding, cutting etc.) to prevent an ignition. As a precaution, designated staff assigned as a fire-watch, may stay behind after work completion for up to thirty minutes to ensure a fire doesn’t start after work crews leave a remote site. In particular, SMUD’s VM contract crews have on-site fire suppression equipment, ex. fire rake, water backpack and shovels. On remote sites where a masticator is being used, crews have a 200 gallon or greater water tank on hand for fire suppression and perform a one-hour fire watch after work is complete.

4.4 Key risk impacts

If one of the risk drivers listed above were to occur, resulting in a fire ignition or wildfire incident, there would be many potential consequences for SMUD. The worst-case scenarios could include:

- Personal injuries or fatalities to the public, employees and contractors
- Damage to public and/or private property
- Damage and loss of SMUD owned facilities and assets
- Impacts to reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to SMUD’s creditworthiness, or ability to borrow money or purchase insurance
- Environmental and ecological damage
- Damage to SMUD’s reputation and loss of public confidence
- Customer and community impacts
- Bankruptcy

SMUD recognizes the impacts that wildfires can have on the company, community and local economy.
5. SMUD’s asset overview

SMUD provides electricity to its customers via substations and T&D line assets. Table 3 depicts a high-level description of SMUD’s T&D assets.

Table 3. Asset description

<table>
<thead>
<tr>
<th>Asset Classification</th>
<th>Asset Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission line assets</td>
<td>Assets include conductor, transmission structures and switches operating at or above 69 kilovolt (kV) (only 69 kV lines that tied to generation are considered transmission).</td>
</tr>
<tr>
<td>Distribution line assets</td>
<td>Assets include overhead conductor, underground cabling transformers, voltage regulators, capacitors, switches, line protective devices and street lighting operating at less than 69 kV (all 69 kV lines not tied to generation are considered distribution).</td>
</tr>
<tr>
<td>Substation assets</td>
<td>Assets include major equipment such as power transformers, voltage regulators, capacitors, reactors, protective devices, relays, open-air structures, switchgear and control houses.</td>
</tr>
</tbody>
</table>
5.1 Fire threat assessment in SMUD service territory

SMUD directly participated in the development of the CPUC’s Fire-Threat Map\(^5\), which defines a Statewide high fire threat district (HFTD). SMUD has incorporated the HFTD map into its construction inspection, maintenance, repair and clearance practices, where applicable.

In the HFTD map development process, SMUD served as a territory lead, and worked with utility staff and local fire and government officials to identify whether any areas of SMUD’s service territory are at an elevated or extreme risk of power line ignited wildfire. It was determined through that process, and affirmed by both a peer review and a team of independent nationwide experts led by the California Department of Forestry and Fire Protection (CAL FIRE), that SMUD’s service area is properly situated outside the HFTD. SMUD also worked with PG&E to ensure that areas where its UARP facilities exist are properly designated within the HFTD. Based on these processes, the existing environment and current information, SMUD believes that the HFTD map appropriately identifies the level of wildfire risk within SMUD’s service territory and UARP. SMUD will continue to evaluate factors that may indicate the CPUC should expand the HFTD to include additional areas.

The CPUC Fire-Threat map identifies Tier 3, extreme fire risk, Tier 2, elevated fire risk, and areas outside of the HFTD. Figure 5 below depicts the CPUC Fire-Threat Map and SMUD’s location within the map.

\(^5\) Adopted by CPUC Decision 1-12-024
Table 4 shows the breakdown of SMUD's T&D assets by CPUC tiers.

Table 4. Overview of SMUD’s T&D assets in CPUC tiers

<table>
<thead>
<tr>
<th>Asset</th>
<th>Total</th>
<th>Outside HFTD</th>
<th>Tier II</th>
<th>Tier III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Line-miles</td>
<td>Line-miles</td>
<td>Line-miles</td>
<td>%</td>
</tr>
<tr>
<td>Total OH transmission</td>
<td>468.1</td>
<td>335.2</td>
<td>82</td>
<td>18%</td>
</tr>
<tr>
<td>69 kV transmission lines</td>
<td>37.8</td>
<td>6.9</td>
<td>30.9</td>
<td>82%</td>
</tr>
<tr>
<td>115 kV transmission lines</td>
<td>47.0</td>
<td>47.0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>230 kV transmission lines</td>
<td>382.5</td>
<td>280.5</td>
<td>51.5</td>
<td>13%</td>
</tr>
<tr>
<td>Total OH distribution</td>
<td>3871</td>
<td>3868</td>
<td>1.9</td>
<td>0.05%</td>
</tr>
<tr>
<td>Total OH lines-miles</td>
<td>4339</td>
<td>4203</td>
<td>84</td>
<td>1.9%</td>
</tr>
<tr>
<td>Total substations</td>
<td>236</td>
<td>236</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

As indicated in the table above, SMUD’s assets are located both within HFTD areas (including Tier 2 and 3) and areas not deemed within the HFTD (referred to as non-tier or outside HFTD in this document). Approximately one quarter of SMUD’s 468 overhead line-miles are located within the HFTD; of that approximately 10% are located within Tier 3, that are deemed “Extreme Fire Threat.” None of SMUD’s 236 substations are located within the HFTD.
5. SMUD’s asset overview

Figure 6 below shows the UARP area where all of SMUD’s Tier 2 and Tier 3 assets reside.

*Figure 6* CPUC Tier 2 and Tier 3 areas for SMUD's UARP
6. Wildfire prevention strategy and programs

SMUD had a great foundation to build upon when it started preparing its new WMP. SMUD already has a robust set of measures to address potential wildfire risks. The WMP will incorporate existing efforts and identify process moving forward to supplement them where a need is identified. We regularly coordinate with our local fire safe councils and other first response agencies. We also participate with emergency operations activities in our system areas. We have robust VM programs with accelerated VM Trimming Cycles and are using enhanced technologies including LiDAR and Hyper-Spectral Imagery (these technologies can help identify diseased trees and trees that are a risk to our lines). We also have robust inspection and maintenance programs that include aerial patrols with helicopters, infrared (IR) inspections using helicopters (which can detect heat from power equipment before an event occurs) and regular ground inspections of all facilities (including core testing of the wood poles). We are looking at potential system improvements such as the use of non-sparking equipment in key areas (e.g., use of CAL FIRE exempt fuses), replacing wood poles with steel and the use of covered conductor alternatives. We have protocols for disabling automatic reclosers and for de-energizing lines to protect public safety (some conditions that factor into these protocols include: RFW, forecasted temperatures above 100, winds exceeding design standards, low humidity). We also have an Outage Communications Plan that we will enhance to address potential de-energization events (we will include targeted messaging for affected areas that will set expectations and identify support resources). See the following table for activities that address key wildfire risk factors.
6. Wildfire prevention strategy and programs

Table 5. Activities that address wildfire risk factors

<table>
<thead>
<tr>
<th>Activity</th>
<th>Risk Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>• Vegetation management&lt;br&gt;• Fuels reduction&lt;br&gt;• Piloting use of LiDAR and Hyper-Spectral Imagery</td>
</tr>
<tr>
<td>Equipment/facility failure</td>
<td>• Routine maintenance&lt;br&gt;• Focused design and construction standards to reduce ignition sources&lt;br&gt;• Transmission and distribution line detailed inspections and annual patrol&lt;br&gt;• No reclosing during fire season&lt;br&gt;• Non-expulsion fuses and arrestors&lt;br&gt;• Intrusive pole testing and pole replacement&lt;br&gt;• De-energization of lines during certain conditions</td>
</tr>
<tr>
<td>Contact from object(s)</td>
<td>• Animal/Bird guards&lt;br&gt;• Raptor construction (increased line spacing)&lt;br&gt;• Increased vegetation clearances</td>
</tr>
<tr>
<td>Wire to wire contact</td>
<td>• Weather station and monitoring</td>
</tr>
<tr>
<td>Other</td>
<td>• SMUD worker/contractor education on fire ignition sources from normal work activities&lt;br&gt;• Fire watch 30 minutes after work completion in high risk areas</td>
</tr>
</tbody>
</table>

6.1 Distribution grid operational practices

6.1.1 Disabling reclosing during fire season
For the purposes of this document, fire season is defined as:

- May 1 to October 1, or
- RFW in effect for areas inside or immediately surrounding the PCA, as directed by the CAL FIRE or SMUD’s incident commander

SMUD disables automatic reclosing on certain substation and line reclosers that extend into the PCA. In some cases, the reclosers are completely bypassed if automatic reclosing cannot be disabled. See Figure 8 for graphic of the PCA.

6.1.2 Planned de-energization during fire season
During fire season, SMUD has elected to take certain measures to mitigate the risk of wildfires in the PCA, that could potentially migrate to Tier 2 and Tier 3 areas in El Dorado County and Amador County a few miles to the East. When weather conditions that precede wildfires are forecasted and a wildfire threat is imminent, SMUD’s Distribution System Operations (DSO) personnel have the authority to de-energize select distribution circuits in the PCA. DSO personnel will use individual or multiple de-energization triggers listed below, as well as power system knowledge to make de-energization decisions. This decision requires a balancing of all these factors as well as a knowledge of the area and operation of the power system; no single element is determinative. DSO relies on weather data from various sources, including Wunderground.com and SMUD’s internal Energy Management System.
6. Wildfire prevention strategy and programs

Triggers for de-energization of PCA circuits:
- Imminent fire danger
- Customer or community impacts
- RFW in effect for areas inside or immediately surrounding the PCA
- Critically dry vegetation that could serve as fuel for a wildfire
- Low humidity levels
- Temperatures over 100°F
- Winds projected beyond 12kV design criteria (56 mph)
- Mandatory fire orders in effect (as directed by any Agency Incident Commander)
- On-the-ground, real-time observation from SMUD or other agency field staff

SMUD’s DSO personnel have the authority to de-energize portions of the distribution grid during emergency conditions when requested by Local Police or Local Fire officials. These are handled individually, and don’t fall under SB901 requirements.

6.2 Transmission grid operational practices

SMUD’s electrical transmission system includes 17 major substations and 485 circuit miles of overhead and underground transmission lines. SMUD’s Valley overhead electrical transmission system consists of approximately 7 miles of 69 kV, 51 miles of 115 kV, and 240 miles of 230 kV transmission lines. SMUD’s UARP overhead electrical transmission systems consist of approximately 30 miles of 69 kV and 136 miles of 230 kV transmission lines. Most of the UARP transmission lines are located within El Dorado county and transverse between the CAL FIRE’s Severity Zone 1, and the CPUC’s Fire Threat Map Tier 2 or Tier 3 areas.

6.2.1 Disabling reclosing

All Valley 115 kV, 230 kV and UARP 69 kV, 230 kV transmission auto reclosers are disabled and will remain disabled to mitigate wildfire risks.

6.2.2 Planned de-energization during fire season

SMUD’s Power System Operators (PSO) have the authority to de-energize portions or all of the Valley and UARP transmission line(s) for safety, reliability, conditions beyond design criteria, threat of wildfires and during emergency conditions when requested by local law enforcement or fire officials.

During active fire season, as declared by CAL FIRE, the PSO is authorized to de-energize portions or all of the Valley and UARP transmission line(s) when there is imminent fire danger, mandatory fire orders are in effect, and/or the transmission system is experiencing conditions beyond design criteria. The PSO will take a combination of many factors into consideration when implementing de-energization procedures, which include the triggers listed below, as well as power system knowledge. De-energization decisions require a balancing of all these factors as well as a knowledge of the area and operation of the power system; no single element is determinative.

- Extreme fire danger threat levels, as classified by the National Fire Danger Rating System
- A RFW declaration by the National Weather Service
- Low humidity levels lower than what is required for a RFW
- Sustained winds exceeding design standards
- Site-specific conditions such as temperature, terrain and local climate
- Critically dry vegetation that could serve as fuel for a wildfire
- On-the-ground, real-time observation from SMUD or other agency field staff

The PSO utilizes various operational and situational awareness tools to determine when de-energization is appropriate. The tools are listed below:

- Weather data telemetered into SMUD’s Energy Management System; such as wind speed, wind direction, air temperature, barometric pressure, relative humidity
6. Wildfire prevention strategy and programs

- CAL FIRE Incidents Information, http://cdfdata.fire.ca.gov/incidents/incidents_statesevents
- CAL FIRE California Statewide Fire Map, http://www.fire.ca.gov/general/firemaps
- GIS based tools

6.3 Infrastructure inspections and maintenance
SMUD performs a multitude of time-based inspections on its T&D facilities. A description of the inspections is summarized in the following sections.

6.3.1 Transmission line inspections
SMUD’s Transmission Lines are grouped in two inspection areas. UARP region includes all lines East of Folsom going up to the hydro dams in the Sierras. Valley region comprises of all transmission lines in Sacramento County or SMUD’s service territory.

6.3.1.1 Aerial patrols (helicopter)
SMUD uses helicopters to perform aerial inspections of transmission lines. During these patrols, line inspectors inspect the condition of line structures and attachments, any structural problems and safety hazards, damage to insulators, vibration dampers, hardware, conductors, static shield wires, optical ground wires, signs of hot spots, vegetation growth and tower identification signs (aerial signs).

Aerial patrols are performed twice a year on all lines in the UARP and once a year in the Valley.

6.3.1.2 Ground patrols
Line inspectors use a combination of walking and driving when conducting ground patrols. They visit transmission tower sites to make detailed visual inspections and on occasion they complete IR inspections. The line inspectors utilize binoculars to detect any damage to above ground components. Line inspectors may climb towers identified with severe corrosion or deformation to determine the corrective action required.

Ground patrols are performed annually on all lines in the UARP, and every two years on all lines in the Valley.

6.3.1.3 Infrared (IR) inspections (helicopter)
The line inspectors use IR cameras to inspect transmission lines as part of one of the helicopter patrols. An IR camera is used to identify “hot spots” on current carrying components of the transmission line. Hot spots could be an indication of loose connections that may fail. The images are saved and written reports are prepared, which document the conditions found. The documentation identifies the location, problem found, date and time of the IR inspection. When the thermographer identifies abnormal conditions, these are reported for investigation and correction as necessary. Items identified for correction are reported and scheduled for correction.

IR inspections are performed annually on all lines in the UARP, and every two years in the Valley.

6.3.1.4 Wood pole intrusive inspections
Intrusive inspections require sample material be taken for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. Wood poles are subjected to an intrusive inspection to determine and identify problems such as rot and decay. The inspection is performed using a calibrated drill bit that records the resistance and pressure required to drill a fixed diameter hole to a measured depth. The results are produced as a graph on a depth scale which is used to find voids and decay within the pole.

Wood poles over fifteen years old, which have not been subject to intrusive inspections are intrusively inspected and tested within a maximum interval of 10 years. Wood poles that pass the intrusive inspections are retested within a maximum interval of 20 years.

6.3.1.5 Vegetation right-of-way maintenance
Both line inspectors and VM Planners visually inspect the T&D ROW for encroachments, access road conditions and safety hazards. An annual helicopter patrol is also conducted to specifically inspect for vegetation issues that could threaten SMUD facilities.
The Vegetation ROW Maintenance Program’s approach is to clear the ROW of incompatible species and to maintain low-growing diverse plant communities that are compatible with electrical facilities by using Integrated Vegetation Management (IVM) Wire Zone-Border Zone Management which is the industry standard. This is a long-term approach which supports system reliability through reclaiming the ROW and managing for future workload. This approach allows for ongoing monitoring of vegetation corridors to prevent encroachment into the Minimum Vegetation Clearance Distance (MVCD) and also ensures SMUD facilities meet or exceed state laws and industry standards.

Vegetation ROW inspections are performed annually on all transmission, 69 kV, and 4 kV lines in the UARP, and one to three years on T&D lines in the Valley.

6.3.1.6 Splice assessment program
This program is designed to assess the integrity of transmission conductor splices. The technology used by an outside contractor uses an x-ray machine that encompasses a splice and takes an x-ray image of the splice. Inspectors then evaluate the image to determine the internal condition of the splice. This allows staff to identify splices that are potentially close to failure. A special type of in-line splice connector corrector is installed to strengthen the splice when needed.

6.3.2 Distribution line inspections
SMUD performs various inspections on distribution lines to ensure safety, reliability and consistency with standards in California Public Utility Commission (CPUC) General Order (GO) 95, GO 128 and GO 165.

6.3.2.1 Detailed line inspections
Line inspectors use a combination of walking and driving when conducting detailed line inspections (DLIs). They visit each SMUD pole to make detailed visual inspections. The line inspectors utilize binoculars to detect any damage to above ground components attached to the pole. The inspectors look for broken or loose hardware; mechanical damage to any component; the condition of guy wires and anchors; condition of insulators and conductors; condition of disconnects and fuse holders; condition of risers and conduits; condition of transformers, reclosers and cap banks. Ground conductors, moldings, signs, and other minor hardware is also inspected. Similar inspections are performed on pad-mounted equipment and equipment installed below grade in vaults or building basements.

DLIs are performed every five years on all overhead distribution equipment and pad-mounted equipment, and every three years on underground equipment.

6.3.2.2 Line patrols
Line Patrolmen patrol their designated service area and track their progress with a GIS enabled visualization tool. The use of the tool ensures that all devices within SMUD’s service territory are patrolled. The Patrolmen are looking for obvious signs of defects, structural damages, broken hardware, sagging lines and vegetation clearance issues. Any anomalies found are addressed based on severity of the defect.

Line patrols are performed annually on all distribution lines and equipment.

6.3.2.3 69 kV and Pole Clearing Area 12 kV infrared (IR) inspections (helicopter)
SMUD performs helicopter IR inspections on 69 kV circuits in the Valley and 12 kV circuits within the PCA. See section 6.3.1.3 for additional description.

69 kV and PCA 12 kV IR inspections are performed every other year in the Valley.

6.3.2.4 Wood pole intrusive inspections
Distribution wood pole intrusive inspections follow the same criteria as Transmission wood poles. See section 6.3.1.4.

6.3.2.5 Annual pole clearing program
The pole clearing program is an annual requirement to clear vegetation around poles that have certain CAL FIRE non-exempt equipment on it in the PCA (see Figure 8 on page 51 for map). This program is in compliance with California Public Resource Code 4292. The code calls for clearing vegetation within a
6. Wildfire prevention strategy and programs

10-foot radius of a pole or tower on which non-exempt equipment is attached, unless such pole or tower meets certain criteria that makes it exempt from the clearance requirements. SMUD contracts this activity out for completion prior to May 15th of each year.

6.3.3 Distribution substation inspections
SMUD performs various inspections on substations to ensure safety and reliability. SMUD inspections meet or exceed standards in CPUC GO 174.

6.3.3.1 Visual inspections
Substation inspectors visit each SMUD substation to visually inspect the facility and all equipment within. The inspectors look for broken or loose hardware; vandalism or damage to any equipment; oil or gas leaks; perimeter fence security; condition of the buss, insulators and other hardware; condition of the control house; conditions of the poles/structures and lines exiting the substation; condition of the disconnects and fuses for signs of damage and connectivity.
Visual inspections are performed 10 times per year.

6.4 Vegetation management
SMUD’s VM program is responsible for the patrol, work plans and quality control (QC) audits of the actual tree work for the T&D system in the Sacramento county service territory, as well as the Transmission system in the UARP. These activities are performed year-round in order to remain in compliance with applicable Federal FAC 003-4 and State regulations, including Public Resources Codes section 4292 and 4293; they also meet or exceed the standards in CPUC GO 95 Rule 35.

6.4.1 Distribution system vegetation management
SMUD performs routine vegetation maintenance, such as pruning and removal, on a time-based interval. This interval consists of one, two, and three-year ground-based field patrols to ensure compliance with state regulatory requirements. The field patrols are ground based inspections of tree and conductor clearances and hazard tree identification. The results of the patrols are targeted areas for vegetation pruning or removal.

SMUD hires contracted tree crews to complete the identified annual vegetation work (pruning and removal) needed to ensure public safety and electric reliability as well as reduce wildfire risk in SMUD’s service territory (Sacramento County). During the tree work, the contractor aims to achieve up to 12 feet of clearance, unless otherwise directed by SMUD VM staff. The contractor also clears vegetation from SMUD’s secondary voltage, service drops and pole climbing space on an as needed basis. SMUD’s contractors follow American National Standards Institute (ANSI) A300 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the pruning cycle.

6.4.2 Transmission system vegetation management
SMUD VM Planners perform annual ground-based field patrols to ensure compliance with state and federal regulatory requirements (Public Resource Code 4293) and alignment with standards in CPUC GO 95 Rule 35 and FAC 003-4. The field patrols are ground based inspections of tree and conductor clearances and hazard tree identification. Additionally, SMUD completes annual aerial patrols to address the ongoing challenge of tree mortality due to drought and various insect vectors.

SMUD hires contracted tree crews to complete the identified annual vegetation work (pruning and removal) needed to ensure public safety and electric reliability as well as reduce wildfire risk in SMUD’s service territory (Sacramento County).

During the tree work, the contractor follows the planner’s prescription to achieve the desired clearance. SMUD’s contractors follow ANSI A300 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the pruning cycle. Additionally, SMUD’s transmission VM program aligns with ANSI A300 Part 7 IVM standard.
6. Wildfire prevention strategy and programs

6.5 Fire mitigation construction

6.5.1 Ester-based insulating fluid (Envirotemp FR3) in transformers

Envirotemp FR3 fluid is a natural ester derived from renewable vegetable oils – providing improved fire safety, transformer life/loadability and environmental benefits that are superior to mineral oil and unsurpassed by any other dielectric coolant. SMUD began purchasing and installing pad mounted and pole mounted transformers with FR3 fluid in 2004. All new distribution transformers installed since 2004 and moving forward contain FR3 fluid. This includes replacements for old transformer and new installations.

6.5.2 Non-Expulsion Equipment in PCA

The PCA is deemed for targeted additional wildfire mitigation measures. A capital program is in place and scheduled for overall replacement of expulsion type equipment. SMUD may have to replace poles, lines, or equipment as ongoing activities. For this reason, SMUD crews will install non-expulsion equipment (CAL FIRE exempt equipment) if any construction activity occurs in the PCA.

6.5.3 Weather stations

SMUD has 14 weather stations within its service territory and UARP, eight are in the Sacramento Metropolitan area and six in the UARP. Of the six in the UARP, four new weather stations were installed in 2018 and are positioned on towers located within the HFTDs to support SMUD’s de-energization procedures. Data from weather stations installed in SMUD’s service territory and UARP assist in the real-time monitoring of weather conditions for situational awareness and to help inform implementation of mitigation measures such as de-energization of transmission lines.

6.6 System enhancement capital projects

SMUD forecasts and plans for upcoming work several years in advance. This planning process allows adequate level of staffing and funding for needed projects. This section identifies the specific upcoming projects that help reduce SMUD’s wildfire risk.

6.6.1 Install non-expulsion devices in PCA

Projected Start Date: 2020
Expected Completion: 2022

This project will target SMUD’s PCA to reduce the risk of wildfires by installing non-expulsion equipment (CAL FIRE exempt equipment). Existing overhead fuses and fuse holders will be replaced with non-expulsion type fuses. Existing arresters will be replaced with new arrestors that have arc protection.

6.7 Pilot projects

Pilot projects are initiated to explore technologies and practices that are new to SMUD. These projects are intended for SMUD staff to evaluate the effectiveness and benefits of the technologies or practices. Based on the results of the pilots, SMUD may elect to integrate the technologies or practices into its various ongoing maintenance programs. These such projects are described below.

6.7.1 LiDAR\(^6\), ortho, oblique and hyper spectral imagery

Start Date: 2017
Expected Completion: 2022

SMUD contracted with an external vendor to utilize LiDAR and remote sensing to supplement or enhance traditional “boots on the ground” vegetation patrols. Both LiDAR and Hyperspectral Imagery is obtained from rotary and fixed wing aircraft. The technology measures vegetation clearance distances from the conductor in both “as flown” and modeled conditions. Modeling is taking all the engineering calculations for maximum load and wind ratings to calculate clearance distances in a “worse-case scenario”. The Hyperspectral and Ortho Imagery is used to pinpoint tree speciation and supports detecting tree health or condition that may not yet be visible to the naked eye. The vendor captured LiDAR data along the transmission corridors in the UARP, as well as the portions of Sacramento county designated as

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\(^6\) Additional Information: https://www.cargill.com/bioindustrial/envirotemp/fr3
\(^7\) Additional Information: http://cdfdata.fire.ca.gov/pub/fireplan/fupload/fppguides126.pdf
\(^8\) Additional Information: https://www.neonscience.org/lidar-basics
6. Wildfire prevention strategy and programs

CAL FIRE’s State Responsibility Area (SRA) for both T&D circuits. Any vegetation issues discovered through LiDAR will be addressed in a timely manner.

6.7.2 Install fire monitoring cameras on towers in UARP transmission corridor

Projected Start Date: 2020  
Expected Completion: 2022

Fire monitoring cameras are a new technology tool that helps reduce the risk of wildfires. The technology works by sending an alarm to operators when the camera detects a fire in its field of vision. This technology seems straightforward but has its own technical challenges. For example, the camera needs a means of sending real-time information through a communication network back to the operator’s screens. SMUD’s UARP transmission corridor travels through some remote locations of the Sierra Nevada mountain range where cell networks may not be available.

SMUD staff is looking to pilot the use of these cameras to see how it may help reduce SMUD’s wildfire risk. The pilot project is in the early stages of development and project milestones haven’t been outlined yet.

6.8 Workforce Training

SMUD has work rules and complementary training programs for its workforce to help reduce the likelihood of the ignition of wildfires.
7. Response Guidelines

7.1 Emergency preparedness and Response

As a local governmental agency, SMUD has planning, communication and coordination obligations pursuant to the California Office of Emergency Services’ (OES) Standardized Emergency Management System (SEMS) Regulations, adopted in accordance with Government Code section 8607. The SEMS Regulations specify roles, responsibilities and structures of communications at five different levels: field response, local government, operational area, regional and state. Pursuant to this structure, SMUD regularly coordinates and communicates with the relevant safety agencies as well as other relevant local and state agencies, as a peer partner.

SMUD interacts with our emergency response agencies on a peer-to-peer relationship as SMUD’s version of OES. As part of our response to a storm, fire, rotating outage, black start events, etc., we collaborate with the local OES and provide an agency representative (liaison) to the county (and/or city) Emergency Operations Centers (EOC) to ensure good communication and coordination. Our two primary coordination points are Sacramento County OES and El Dorado County Sheriff’s Office OES (for the UARP region). Additionally, we maintain good relationships with Yolo (gas pipeline) and Placer County (service territory and UARP) OES, and to a lesser extent with Solano (wind farm) and Yuba (Camp Far West) counties.

For typical winter storms and emergency events, SMUD Emergency Preparedness staff contact the local OES and establish themselves as the duty officer for coordination. They also invite them to send agency representatives into SMUD’s EOC. These representatives can include: City of Sacramento Assistant Fire Chief, Sac Metro Fire Battalion Chief, Folsom Fire Battalion Chief, local cities, Sacramento County Office of Emergency Services and other local critical infrastructure agencies, ensuring coordination for our service territory.

SMUD has employees who serve as utility representatives when needed at the State Operations Center for the California Utilities Emergency Association (CUEA), which provides a direct link for critical infrastructure coordination to the California State Operations Center.
7. Response guidelines

7.2 Public and agency communications for a potential wildfire

Public safety is a guiding principle at SMUD. Shutting off the power may be the safest approach and makes sense if the risk of a wildfire starting and spreading is severe. While SMUD's measures are designed to mitigate wildfire danger the result could be interruption of electrical service.

SMUD proactively communicates to customers and key stakeholders through multiple channels about preparing for potential curtailments, and the power restoration process. SMUD recognizes that many entities and individuals are particularly vulnerable during extended power outages and makes every effort to provide up to date information to these populations prior to, during and after an event.

This proactive communication is utilized for:

1) A wildfire threat to localized circuits within the SMUD service territory that results in localized de-energization.

2) A wildfire threat to SMUD's UARP hydroelectric generation and transmission system that results in a de-energization event causing a capacity/energy shortage (rotating outages).
7. Response guidelines

SMUD’s Contact Center, social media and website will provide ongoing and available resources for communication and education for the overall customer base.

SMUD also proactively communicates before potential emergency events about our efforts to prepare for and reduce wildfire risk.

In advance of peak fire season, SMUD will conduct ongoing education communication about how to prepare for emergencies in the event of a wildfire, natural disaster or major outage.

SMUD’s Public Information Specialists will provide ongoing mass media communication via traditional news media channels and via social media communication via Facebook and Twitter to provide customers and the community with information about an emergency or potential emergency.

SMUD’s Government Affairs Representatives will reach out to the elected officials and executive staff of local governments, SMUD’s state delegation, federal representatives and appropriate agency staff to provide initial contact and ongoing communications by email and phone with messages for their constituents.

Customers will be directed to the smud.org website for information where they’ll be able to find:

- Wildfire Policy and Procedure brochure
- Information on how we mitigate fire risk
- Emergency preparedness tips guide
- Links to additional resources
- Rotating outage map
- Frequently Asked Questions on the shutoff process

In the time leading up to potential or imminent safety shutoffs, SMUD does its best to establish or maintain contact with customers it believes may be impacted (via the various channels mentioned above) and keep the media, local agencies and the public aware of the number of customers affected and SMUD’s activities and restoration efforts.

Key stakeholders, federal, state and local elected officials, City and County executive staff and first responders are also contacted via a variety of channels and personnel. SMUD has specific personnel assigned to elected officials and agencies, and to critical customers including water and telecommunications utilities, potentially affected by a shutoff.

7.2.1 Event communications

SMUD’s goal is to provide as much advance notice as possible of a public safety power shutoff. SMUD will communicate with customers and key stakeholders in advance of an event, whenever possible. SMUD will make every effort to communicate directly and indirectly to all impacted customers but timelines may vary depending on severity and urgency of the circumstances.

Whenever possible, SMUD will provide potentially impacted customers with notice before implementing any de-energization action, using all available channels to reach customers and other stakeholders with outage information. Sudden onset of conditions could impact its ability to provide advanced notice to customers.

SMUD will launch proactive automated pre-recorded phone calls to customers in the impacted areas/neighborhoods advising when the outage is called and direct them to smud.org/outages for up-to-date information. smud.org has been updated with features to further enhance customer communications before and during de-energization events.

The Contact Center IVR (Interactive Voice Response) will have real-time recorded information informing each group of customers that may be impacted before the rotating outages begin. Messages will be customized and updated as needed for each specific event.
7. Response guidelines

Among SMUD’s vulnerable customers are those enrolled in the Medical Equipment Discount Rate program (MED rate). These customers rely on specialized medical equipment like oxygen concentrators and in-home dialysis cyclers for their health. A qualified health professional certifies the equipment in use at the home is essential to keep these customers healthy. Currently, SMUD has approximately 9,200 customers who rely on specialized medical equipment and who are enrolled in the MED rate program. SMUD will send these customers an email or letter each year to remind them of the risk of wildfire danger, to have an emergency back-up plan if an outage occurs and refer them to smud.org/WildfireSafety for more information.

7.2.2 Government agencies and essential service providers

De-energization is a last resort to maintain public and customer safety during extreme fire risk conditions. If extreme fire danger resulted in de-energization or planned rotating outages, SMUD will provide proactive communications to alert key stakeholders and essential and critical customers like governments, agencies, utilities, healthcare and communications accounts to provide as much notice as possible to minimize the impact on our customers and community.

The following customer categories are considered essential and/or critical service providers:

- Jurisdictions and functional agencies providing essential fire, police and prison services
- Government agencies essential to national defense
- Hospitals and skilled nursing facilities
- Communication utilities, as they relate to public health, welfare, and security, including telephone utilities
- Radio and television broadcasting stations used for broadcasting emergency messages, instruction, and other public information related to the electric curtailment emergency
- Water and sewage treatment utilities identified as necessary for services such as firefighting
- SMUD interacts regularly with local elected officials, its state delegation, its federal representatives and key critical facilities customers to keep them updated on its wildfire mitigation efforts. SMUD also works closely with staff members of regional and local governments, functional agencies, public utilities, nonprofits and other service providers on collaborative strategies and partnership opportunities.

Examples of SMUD’s communication and engagement with elected officials, government agencies and commercial customers include:

- Regular in-person briefings with federal, state, and local elected officials and key staff on wildfire risk mitigation and other utility-related issues with comprehensive “leave-behind” materials
- Meetings with regional and local government staff and elected officials focused on individual districts, communities, and neighborhoods and mitigation opportunities
- Regular in-person and/or digital communication with critical facilities and key customers through SMUD Strategic Account Advisors
- Interagency projects, collaborative staff training efforts, and regular communication with first responders and essential service providers
- Cross-SMUD participation with the El Dorado County Wildfire Mitigation Stakeholder Group and at other El Dorado County government, public and community meetings
- Ongoing communication, collaboration and support for local Fire Safe Councils and other fire prevention agencies and nonprofits
- Particular effort is made to provide support for SMUD’s MED Rate customers.
8. Restoration of Service

If a transmission or distribution line has been de-energized in anticipation of a wildfire threat, SMUD Troubleshooters or Patrolman must perform additional steps prior to re-energization. In an event of a wildfire where distribution poles or transmission structures were burned, additional steps must be taken to rebuild the lines.

8.1 Steps to restoration of service
SMUD work crews must take several important steps prior to restoring electrical service after a de-energization event.

- **Patrol.** SMUD crews patrol the line to look for vegetation in lines and any obvious damage that may prevent safe energization. Depending on the length of the lines, and number of circuits, the patrols can take a long time to complete.

- **Repair.** During patrol, crews look for potential damage to the lines and poles. Where equipment damage is found, additional crews are dispatched with new materials to repair or replace damaged equipment. In some cases, VM crews may be called in to help clear an area of downed trees or branches that have fallen into the power lines while it was de-energized.

- **Test.** Once the lines and poles are safe to operate, crews test the infrastructure by closing the fuse, or breaker to re-energize the line segment.

- **Restore.** Power is restored and the outage communication system provides notification of power restoration to customers.

8.2 Reconstruction after a wildfire
When infrastructure is damaged during a wildfire event, a lot of work is required to plan and execute the rebuilding effort. After local police and fire officials give the clearance, SMUD work crews can then proceed with the assessment and rebuilding effort.
8. Restoration of service

- **Assessment.** SMUD crews must patrol each line segment to determine the extent of damage that has occurred. The patrol involves assessing equipment access issues, any cleanup/debris removal issues and determining personal protective equipment requirements for the crews. SMUD works with the local agency in charge of the fire to access impacted areas as soon as the area is deemed safe by fire officials. VM team are part of this phase to assess the damaged by the wildfire that require addressing.

- **Planning.** After initial assessment, SMUD supervisors, managers and engineers meet to plan the needed work. The team will work with system operations to prioritize the restoration efforts, targeting the circuits that serve the most critical infrastructure needs.

- **Mobilize.** Based on the size and complexity of the rebuild/restoration efforts, SMUD will coordinate the crews and material needs internally if possible. Mutual aid and contractors may be used on an “as needed” basis to provide additional support. VM crews will begin clearing the right of way and any dangerous trees that pose a threat to the restoration crews. SMUD maintains a critical material vendor list and has contracts it can draw on for labor and material needs; though in instance of widespread catastrophic damage necessary materials and labor could experience shortages that may delay work.

- **Rebuild.** The rebuild effort lead by SMUD will commence as soon as areas become safe and accessible. The lines will be rebuilt with a mix of temporary and/or permanent structures as determined during planning. The initial efforts will be to get the lines up and restore the damaged circuits. Depending on the extent of damage, demolition may be performed concurrently or after crews start installing new facilities. SMUD will incorporate new materials and technologies as indicated and available.

- **Restore.** SMUD, mutual aid, or contract crews will restore electric services to homes and businesses as soon as possible after the wildfire. Depending on the extent of damages, residential and business customers may have to perform repairs on their facilities and pass inspections by local agencies prior to having full electric service restored. These are coordinated on an as needed basis.
9. Performance metrics and monitoring

This section identifies SMUD’s management responsibilities for overseeing this WMP and includes the operating departments and teams responsible for carrying out the various activities described in the previous chapters. This section also identifies the controllable metrics which are used to demonstrate compliance with this WMP.

9.1 Accountability of the plan

SMUD’s Chief Grid Strategy and Operations Officer has overall responsibility for the WMP. The Chief Energy Delivery Officer and Chief Customer Officers are responsible for executing the various components of the WMP.

9.1.1 SMUD operating unit responsibility specific to each component of the plan

The table on page 43 lists Departments and Workgroups that are responsible for the various components of SMUD’s WMP.
9. Performance metrics and monitoring

Table 6. Accountability of the groups responsible for the WMP components

<table>
<thead>
<tr>
<th>Mitigation Activities</th>
<th>Responsible Department and Workgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk analysis</td>
<td>Treasury &amp; Risk Management</td>
</tr>
</tbody>
</table>

### Wildfire prevention strategy and programs

- Disable reclosers
- Planned de-energizations
- T&D line patrols
- Aerial patrols
- 69kV & Transmission line infrared inspections
- Wood pole intrusive inspection
- Splice assessment
- Detailed line inspections
  - Grid Assets: Line Assets
- Substation visual inspections
  - Grid Assets: T&D Substation Maintenance
- Vegetation management
- Pole clearing program
  - Grid Assets: Vegetation Management

### Fire mitigation construction

- FR3 fluid
- Non-expulsion equipment
  - Distribution Operations & Maintenance: Design & Standards
- Weather stations

### System enhancement capital projects

- Install non-expulsion equipment in Pole Clearing Area
- Feasibility study of 4kV lines in Upper American River Project area
  - Transmission Line Design

### Pilot projects

- Light Detection and Ranging and Hyper-Spectral Imagery
  - Grid Assets: Vegetation Management
- Fire monitoring cameras

### Emergency preparedness

- SMUD Emergency Operations Centers
  - Workforce and Enterprise Services: Facilities Operations
- Public and agency communications for wildfires
  - Customer & Community Services: Revenue Operations, Commercial & Industrial Account Solutions, Communications Marketing & Community Relations
9.2 Metrics
This section provides the metrics used to measure the performance of the WMP and outlined programs.

Table 7. Metrics

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Specific metric</th>
<th>Indicator</th>
<th>Measure of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL FIRE perimeter data set</td>
<td>Powerline fires in SMUD’s service territory</td>
<td>Sum of acres affected</td>
<td>No material increase</td>
</tr>
<tr>
<td>SMUD outage database</td>
<td>Fire events recorded with fire reference</td>
<td>Count of events</td>
<td>Reduction in general trend of events</td>
</tr>
<tr>
<td>SMUD outage database</td>
<td>Service interruption events with fire reference</td>
<td>Count of events</td>
<td>Reduction in general trend of events</td>
</tr>
<tr>
<td>SMUD outage database</td>
<td>Power Line Down</td>
<td>Count of events</td>
<td>Reduction in general trend of events</td>
</tr>
<tr>
<td>SMUD outage database</td>
<td>Events recorded in the State Responsibility Area and Upper American River Project area with no cause found</td>
<td>Count of events</td>
<td>Reduction of outages with no cause found</td>
</tr>
</tbody>
</table>

In the initial years, SMUD anticipates that there will be relatively limited data gathered through these metrics. However, as the data collection history becomes more robust, SMUD will be able to identify areas of its operations and service territory that are disproportionately impacted. SMUD will then evaluate potential improvements in the plan.

PUC section 8387 subsection b(2)(E) requires a discussion of how the application of previously identified metrics to previous WMP performances has informed the WMP. This discussion is not applicable to the initial Plan. SMUD expects to include discussion on this issue in its next annual plan.

9.3 Performance metrics
This section lists metrics used to evaluate SMUD’s inspection and maintenance programs.

9.3.1 Programmatic metrics
Work is identified in annual work plans and areas that remain incomplete are flagged. These areas may be field verified and open work notifications are regularly reviewed to allow management to prioritize work in accordance with current risks. SMUD’s target is always to complete 100 percent of the work within the initially scheduled time frame; however, emergencies or other unforeseen contingencies can occur that requires material and labor resources to be otherwise assigned. In this instance delayed work will be prioritized in following time periods. All work is completed within time periods to allow for the safe and reliable operation of the electric system in accordance with applicable requirements and industry standards.

9.2.1 Metrics and assumptions for measuring WMP performance
SMUD will track the following metrics to measure the performance of this WMP.

Do not expect outage events in the UARP since SMUD does not have distribution customers in El Dorado County.
## 9. Performance metrics and monitoring

### Table 8. Programmatic metrics

<table>
<thead>
<tr>
<th>Program</th>
<th>Target</th>
<th>Metric Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution Line Inspections</td>
<td>95 - 100%</td>
<td>Perform all detailed line inspections within the compliance period set in General Order (GO) 95/165 by the end of the year. The inspections must be completed within the specified time intervals set for each inspection type. See section 6.4.1 for a detailed description of the program.</td>
</tr>
<tr>
<td>Distribution Wood Pole Intrusive Tests</td>
<td>95 - 100%</td>
<td>Perform all wood pole intrusive tests scheduled for the year. SMUD’s goal is to perform wood pole tests within 10 years of installation, and 10 years thereafter. SMUD is on its fourth year of a re-baseline program to get all poles on the 10-year schedule. See section 6.3.2 for a detailed description of the program.</td>
</tr>
<tr>
<td>Distribution Annual Line Patrol</td>
<td>95 - 100%</td>
<td>Perform all annual distribution line patrols within the compliance period set in GO 95/165. See section 6.4.2 for a detailed description of the program.</td>
</tr>
<tr>
<td>Annual Pole Clearing Program</td>
<td>95 - 100%</td>
<td>Complete all vegetation clearing activities within the Pole Clearing Area (PCA) prior to the beginning of fire season of each year. See section 6.3.2.5 for a detailed description of the program.</td>
</tr>
<tr>
<td>Transmission Structure Patrols</td>
<td>95 - 100%</td>
<td>There are three inspection regions for transmission structure patrols. The Upper American River Project (UARP) region is patrolled every year, and the Valley regions are patrolled every other year. The goal is to perform all scheduled patrols prior to the end of the year. See section 6.3.1.2 for a detailed description of the program.</td>
</tr>
<tr>
<td>Transmission Aerial Patrols (Helicopter)</td>
<td>95 - 100%</td>
<td>Aerial patrols are performed twice a year in the UARP, and once a year in the Valley (in permissible areas). The goal is to perform all scheduled patrols prior to the end of the year. See section 6.3.1.1 for a detailed description of the program.</td>
</tr>
<tr>
<td>Transmission IR Patrols (Helicopter)</td>
<td>95 - 100%</td>
<td>Infrared (IR) patrols are performed once a year in the UARP, and every other year in the Valley (in permissible areas). The goal is to perform all scheduled patrols prior to the end of the year. See section 6.3.1.3 for a detailed description of the program.</td>
</tr>
<tr>
<td>69 kilovolt (kV) IR Helicopter Patrols</td>
<td>95 - 100%</td>
<td>IR patrols on the 69 kV in the Valley are performed every other year (in permissible areas). The goal is to perform all scheduled patrols prior to the end of the year. See section 6.4.3 for a detailed description of the program.</td>
</tr>
<tr>
<td>Pole Clearing Area</td>
<td>95 - 100%</td>
<td>SMUD will continue to annually manage the PCA to ensure compliance with PRC 4292 to prevent ignition and propagation of fire caused by SMUD electric overhead assets.</td>
</tr>
<tr>
<td>Distribution Vegetation Pruning/Clearing</td>
<td>95 - 100%</td>
<td>SMUD will continue to annually patrol and complete respective tree work to insure compliance with PRC 4293 to prevent ignition and propagation of fire caused by SMUD electric overhead assets.</td>
</tr>
<tr>
<td>Transmission Vegetation Pruning/ Clearing</td>
<td>95 - 100%</td>
<td>SMUD will continue to annually patrol and complete respective tree work to insure compliance with PRC 4293 and NERC FAC-003-4 to prevent ignition and propagation of fire caused by SMUD electric overhead assets.</td>
</tr>
</tbody>
</table>
9. Performance metrics and monitoring

9.4 Monitoring and auditing of the WMP
The WMP will be reviewed annually. This annual review will align with SMUD’s existing business planning process. This review will include an assessment of the WMP programs and performance.

SMUD’s business planning process includes budgeting and strategic planning for a 3-5 year planning horizon.

9.4.1 Accountability
SMUD’s Chief Grid Strategy and Operations and Chief Energy Delivery Officers (collectively referred to as Chiefs) will be responsible for monitoring and auditing the targets specified in the WMP to confirm that the objectives of the WMP are met.

9.4.2 Identify deficiencies in the WMP
At any point in time when deficiencies are identified, the Chiefs or their delegates are responsible for correcting the deficiencies.

9.4.3 Monitor and audit the effectiveness of inspections
SMUD has existing quality control processes embedded into its existing general practice. However, for certain programs, there is a formal quality control process. The following depicts a few of these programs.

9.4.4 Written Processes and Procedures
The operational areas conduct their work according to written processes and procedures. Having written processes and procedures provides for consistency in the execution of programs and activities.

9.4.5 Programmatic QA/QC processes
SMUD applies the following processes:

9.4.5.1 Distribution system inspections
SMUD’s Maintenance Planning group manages T&D line and substation assets. A key component in managing assets is the development of comprehensive inspection and maintenance programs. The Maintenance Planning group develops inspection and maintenance programs driven by the need to ensure the safe operation of T&D line and substation facilities, reduce risk of power-related wildfire, to meet federal and state regulatory requirements, to achieve reliability performance within mandated limits and to optimize capital and O&M investments. In addition, TDMP regularly monitors inspection and corrective maintenance records, as well as diagnostic test results to adjust maintenance plans and develop new programs. Where possible, SMUD uses best industry practices in development of the maintenance plans.

SMUD’s inspection and maintenance programs focus on the following objectives:

- Ensure employee and public safety
- Minimize risk of wildfire posed by power lines and equipment
- Maintain regulatory and SMUD policy compliance
- Improve the availability and reliability of the system
- Employ industry best practices
- Extend the useful life of equipment
- Minimize the total cost of equipment ownership

Maintenance Planning develops and issues annual inspection work plans during the last quarter of the current year for the following year, and are maintained in SAP, SMUD’s Enterprise Asset Management (EAM) system.

SMUD’s Grid Assets department is responsible for performing the inspections and corrective maintenance. When deficiencies are found, corrective maintenance notifications are created in SAP. The priority for corrective maintenance is to remove safety hazards immediately and repair minor deficiencies according to the type of defect, severity and HFTD tiers. Inspection notifications are monitored throughout the year to ensure timely completion via regular internal reports using SAP data. Enterprise applications are used to deploy, visualize and validate work based on business rules. These applications provide the visibility and monitoring of work required to make informed decisions and to achieve compliance with our inspection and maintenance programs.
9. Performance metrics and monitoring

9.4.5.2 Vegetation management (VM)
SMUD’s vegetation clearing/pruning activities are performed by contractors. The contractors are quality audited by SMUD (VM) personnel. Distribution system related work and contractors are field audited and approximately 7% of the tree work (pruning and removal) is reviewed. This QA effort is tracked in an excel spreadsheet to monitor program effectiveness and overall tree work performance. For transmission, SMUD VM staff perform a QC audit of 100% of the transmission system related work performed by the contractor. For both T&D QA efforts all deficiencies are reissuued to the contractor management team and required corrective action is completed. Distribution QC is only on SMUD contractors and consists of approximately 7% sample of tree work.

9.4.6 Internal audit
SMUD’s internal audit, known as Audit and Quality Services (AQS) provides independent, objective assurance and consulting services to the Board of Directors and management designed to add value and improve SMUD’s operations. The AQS mission is to enhance and protect organizational value by providing risk-based and objective assurance advice and insight. The work of AQS provides reasonable assurance regarding the achievement of objectives in the following areas:

- Adherence to plans, policies and procedures
- Compliance with applicable laws and regulations
- Effectiveness and application of administrative and financial controls
- Effectiveness and efficiency of operations
- Reliability of data
- Safeguarding assets
- Accuracy of the SD monitoring reports

As part of AQS’ process to develop its annual audit plan, AQS assesses all enterprise risks and performs audits over a variety of processes across electric T&D as well as substation assets.
10. Independent evaluation, public comment and board presentation

SMUD conducted extensive stakeholder outreach during its preparation of the WMP. SMUD personnel met with local fire safe councils, OES and healthcare organizations. In addition, SMUD invited federal, state and local agencies, representatives of utilities, telecommunication providers, and critical care customers to attend stakeholder outreach meetings where information regarding the preparation and contents of the WMP were provided. A draft of the WMP was posted on SMUD’s website and made available for public comment for over thirty days. Interested parties were also invited to comment on the plan at the time it was presented to SMUD’s Board of Directors in a noticed public meeting.

Public comment
A draft copy of the WMP is being made available to the public for comment for a minimum period of 30 days.

- The draft WMP is available on SMUD’s website (smud.org/wildfiresafety). Public comments will be addressed in the final WMP.
- SMUD will also provide an opportunity for public comments on the draft WMP at a regularly scheduled Board Meeting.

SMUD Board Committee meetings are open and accessible to the public. Meeting notices and agendas are posted, at a minimum, 72 hours in advance at the SMUD office and on SMUD’s website. Those who are unable to attend the meeting in-person can livestream the meeting or view a recording on SMUD’s website.

Board presentation
(This section to be completed after SMUD’s board presentation in Fall 2019)

Independent evaluation
SMUD will issue a public request for qualification, consistent with SMUD’s current procurement practice, to identify the best qualified independent evaluator to evaluate SMUD’s WMP. SMUD will contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review to assess the comprehensiveness of this WMP. The independent evaluator’s report will be posted to SMUD’s website and presented to SMUD’s Board of Directors at a noticed public meeting.
11. Appendix

This section contains supporting information to the document.

Appendix A Definitions

Definitions

*Distribution System Operations (DSO)*: SMUD’s DSO personnel is responsible for directing the safe and reliable operation of SMUD’s Distribution system while operating within current policies and procedures during normal and emergency situations. Distribution system operators prepare, check and administer the execution of safe and reliable switching procedures. DSO will monitor and maintain equipment loading levels to prevent damage to equipment. This group is also responsible for updating outage information timely and accurately so that information can be provided to internal and external customers.

*Fire Hazard*[^10]: “Hazard” is based on the physical conditions that give a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts.

*Fire Hazard Severity Zone*[^11]: CAL FIRE is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. CAL FIRE created a Fire Hazard Severity Zone map using a computer model that assigns hazard scores based on factors such as fire history, existing and potential fuel (natural vegetation), flame length, blowing embers, terrain and typical weather for the area. There are three hazard zones in state responsibility areas: moderate, high and very high.

*Fire Risk*: “Risk” is the potential damage a fire can do to the area under existing conditions, including any modifications such as defensible space, irrigation and sprinklers and ignition resistant building construction which can reduce fire risk. Risk considers the susceptibility of what is being protected.

*Hardening*: Modifications to electric infrastructure to reduce the likelihood of ignition and improve the survivability of electrical assets.


High Fire Threat District (HFTD)\textsuperscript{12}: The HFTD identifies areas of elevated and extreme fire risk related to electric utility facilities. These areas are reflected in a map adopted by the CPUC after an extensive public process. It is a composite of two maps:

1. Tier 1 High Hazard Zones (HHZs) on the U.S. Forest Service - CAL FIRE joint map of Tree Mortality HHZs ("Tree Mortality HHZ Map"). Tier 1 HHZs are zones in direct proximity to communities, roads, and utility lines and are a direct threat to public safety.

2. Tier 2 and Tier 3 fire-threat areas on the CPUC Fire-Threat Map. Tier 2 fire-threat areas depict areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility associated wildfires. Tier 3 fire-threat areas depict areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility associated wildfires.

Pole Clearing Area (PCA): SMUD defined area where poles with non-exempt equipment have annual vegetation clearing and/or pruning within a 10-foot radius in compliance with PRC 4292 prior to the start of fire season, currently May 1 of each year. The custom-defined PCA boundary includes SRA boundary and adjacent areas with similar vegetation, and portions of a Local Responsibility Area (LRA) in the southern part of Sacramento County. This boundary area exceeds the current SRA boundary due to similar vegetation and risk of ignition. Overhead electrical facilities crossing into and within the boundary of the PCA fall under special operating conditions and fall under enhanced maintenance programs.

Power System Operations (PSO): SMUD’s PSO personnel analyze, direct, monitor, control and/or operate SMUD’s Gas Pipelines and Electric Generation and Transmission Systems and associated facilities in a safe, reliable and efficient manner during routine and emergency situations. This position has the responsibility and authority to support and implement real-time actions.

Red Flag Warning (RFW)\textsuperscript{13}: A term used by fire-weather forecasters to call attention to limited weather conditions of particular importance that may result in extreme burning conditions. It 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

In some states, dry lightning and unstable air are criteria. A Fire Weather Watch may be issued prior to the RFW.

State Responsibility Area (SRA): “The California Board of Forestry and Fire Protection classify areas in which the primary financial responsibility for preventing and suppressing fires is that of the state. California Department of Forestry (CDF) has SRA responsibility for the protection of over 31 million acres of California’s privately-owned wildlands.”

Transmission and Distribution (T&D): At SMUD, for line maintenance purposes, the transmission system includes 230 kV, 115 kV, and 69 kV lines tied to generation facilities. The distribution system includes 69 kV lines not tied to generation facilities and 21 kV, 12 kV, and 4 kV lines.

\textsuperscript{12} Source: http://www.cpuc.ca.gov/FireThreatMaps/

\textsuperscript{13} Source: https://w1.weather.gov/glossary/index.php?word=Red%20Flag%20Warning
Upper American River Project (UARP)\textsuperscript{14}: SMUD’s 688MW hydroelectric system in the Sierras East of Placerville. The system consists of a series of hydroelectric dams and high voltage transmission lines that traverse parts of the American River and bring hydro power to SMUD’s service territory in Sacramento County.

Wildfire\textsuperscript{15}: “Also called wildland fire, uncontrolled fire in a forest, grassland, brushland or land sown to crops.” “Fire danger in a wildland setting varies with weather conditions: drought, heat and wind participate in drying out the timber or other fuel, making it easier to ignite. Once a fire is burning, drought, heat and wind all increase its intensity. Topography also affects wildfire, which spreads quickly uphill and slowly downhill. Dried grass, leaves and light branches are considered flash fuels; they ignite readily, and fire spreads quickly in them, often generating enough heat to ignite heavier fuels such as tree stumps, heavy limbs and the organic matter of the forest floor. Such fuels, ordinarily slow to kindle, are difficult to extinguish. Green fuels—growing vegetation—are not considered flammable, but an intense fire can dry out leaves and needles quickly enough to allow ready ignition. Green fuels sometimes carry a special danger: evergreens, such as pine, cedar, fir and spruce, contain flammable oils that burst into flames when heated sufficiently by the searing drafts of a forest fire.”

Wildfire Mitigation Plan (WMP): As amended by SB 901, section 8387 of the Public Utilities Code (PUC) more specifically requires every publicly owned utility to prepare and present a wildfire mitigation plan to its governing body by January 1, 2020, and annually thereafter.

Appendix B Reference for definitions

References

- Public Utilities Code, Chapter 6. Wildfire Mitigation [8387], http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=8387&lawCode=PUC
- General Order 95\textsuperscript{16}, contains rules for the design, construction, maintenance, inspection, repair and replacement of overhead utility lines. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K464/209464026.pdf
- General Order 165\textsuperscript{16}, Inspection Requirements for Electric Distribution and Transmission Facilities. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K552/209552704.pdf
- General Order 166\textsuperscript{16}, Standards for Operation, Reliability and Safety During Emergencies and Disasters http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K451/209451792.pdf
- General Order 174\textsuperscript{16}, Rules for Electric Utility Substations http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M031/K879/31879476.PDF

\textsuperscript{14} Source: https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources/Upper-American-River-Project
\textsuperscript{15} Source: https://www.britannica.com/science/wildfire
\textsuperscript{16} SMUD is not subject to CPUC jurisdiction, but has developed design and operation standards, and maintenance programs that meet or exceed the regulations in GO 95, GO 128, GO 165, GO 166, and GO 174.
Appendix C Acronym glossary

ANSI (American National Standards Institute)
AQS (Audit and Quality Services)
CPUC (California Public Utilities Commission)
DILI (Detailed Line Inspections)
DSO (Distribution System Operations)
EAM (Enterprise Asset Management)
ERM (Enterprise Risk Management)
EROC (Enterprise Risk Oversight Committee)
ESRI (Environmental Systems Research Institute)
FAC (Facilities Design, Connections and Maintenance)
GHG (Greenhouse gas)
GO (General Order)
HFTD (High Fire Threat Districts)
IR (Infrared)
IVM (Integrated Vegetation Management)
KV (Kilovolt)
KWH (Kilowatt Hours)
LIDAR (Light Detection and Ranging)
LRA (Local Responsible Area)
MW (Mega Watts)
NASA (National Aeronautics and Space Administration)
O&M (Operations & Maintenance)
OEC (Emergency Operations Centers)
OES (Office of Emergency Services*)
PCA (Pole Clearing Area)
PSO (Power System Operations)
PUC (Public Utilities Code)
QA (Quality Assurance)
QC (Quality Control)
RFW (Red Flag Warning)
SB (Senate Bill)
SD (Strategic Direction)

SEMS (Standardized Emergency Management System)
SME (Subject Matter Expert)
T&D (Transmission and Distribution)
UARP (Upper American River Project)
VM (Vegetation Management)
WAPA (Western Area Power Administration)
WMP (Wildfire Mitigation Plan)
WUI (Wildland-Urban Interface)

Appendix D Reference for SMUD plans

SMUD’s Pole Clearing Area Map

Figure 8 SMUD’s Pole Clearing Area overlapping CAL FIRE’s SRA and Herald Fire’s Local Responsible Area (LRA)
Figure 9 CAL FIRE – Fire Threat Predictions around SMUD Service Area and UARP Facilities