OFFICE OF ENERGY INFRASTRUCTURE SAFETY'S

EVALUATION OF 2021 WILDFIRE MITIGATION PLAN UPDATE

PACIFICORP

Contents

Introduction and Background

This Action Statement represents the assessment of the California Public Utilities Commission's (CPUC) Wildfire Safety Division (WSD)[1] on the 2021 Wildfire Mitigation Plan (WMP or Plan) of PacifiCorp (PC or the utility).[2] This Plan is an update for the comprehensive 2020-2022 plan submitted by PC in 2020. PC submitted its 2021 WMP Update on March 5, 2021, in response to guidelines provided by the WSD.[3] Assembly Bill (AB) 1054[4] mandates that the WSD complete its evaluation of WMPs within three months of submission, unless the WSD issues an extension.[5]

PacifiCorp's 2021 WMP Update is approved.

1. Legal Authority

In 2018, following the devastating wildfires in 2016 and 2017, the California Legislature passed several bills increasing oversight of the electrical corporations' efforts to reduce utility-related wildfires.[6] AB 1054 created the WSD at the CPUC and tasked it with reviewing annual WMPs submitted by electrical corporations under the CPUC's jurisdiction. As of July 2021, the WSD will become the Office of Energy Infrastructure Safety (Energy Safety) within the California Natural Resources Agency (CNRA).[7]

The main regulatory vehicle for the WSD to evaluate electrical corporations' wildfire risk reduction efforts is the WMP, which was first introduced in Senate Bill (SB) 1028[8] and further defined in SB 901,[9] AB 1054, and AB 111. Investor-owned electrical corporations (hereafter referred to as "utilities") are required to submit WMPs assessing their level of wildfire risk and providing plans for wildfire risk reduction. The CPUC evaluated the utilities' first WMPs under the SB 901 framework in 2019.[10]

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[1] Because the WSD transitioned to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021, any references herein to WSD actions that post-date this transition should be interpreted as actions taken by Energy Safety or for which Energy Safety will take responsibility. Section 10 of the associated Resolution provides further detail on the transition of the WSD to Energy Safety.

[2] In this document references to Pacific Power refer to the subsidiary of PacifiCorp that serves California.

[3] The Commission approved 2021 WMP guidelines in Resolution WSD-011.

[4] Stats. of 2019, Ch. 79.

[5] Pub. Util. Code § 8386.3(a).

[6] In this document "utility" should be understood to mean "electrical corporation."

[7] *See* AB 111, Stats. of 2019, Ch. 81.

[8] Stats. of 2016, Ch. 598.

[9] Stats. of 2018, Ch. 626.

[10] See Rulemaking (R.) 18-10-007.

AB 1054 and AB 111 transferred responsibility for evaluation and approval or denial of WMPs to the WSD; AB 1054 provides, "After approval by the division, the commission shall ratify the action of the division."[11] The WSD must ensure utility wildfire mitigation efforts sufficiently address increasing utility wildfire risk. To support its efforts, the WSD developed a long-term strategic roadmap, Reducing Utility-Related Wildfire Risk (2020).[12] This strategic roadmap informs the WSD's work in updating the WMP process and guidelines and the WSD's evaluation of the WMPs.

2. Multi-Year Plan Process

In February and March of 2020, the utilities[13] submitted their three-year 2020-2022 WMPs. The WSD conducted its evaluation and either approved, conditionally approved, or denied the Plans. In the case of conditional approval, the WSD identified items missing or incomplete in the Plans on a scale of severity, with Class A Deficiencies representing issues that required resolution through a Remedial Compliance Plan (RCP).[14] The 2020 Class B Deficiencies required resolution through Quarterly Reports,[15] and Class C Deficiencies were to be resolved in the 2021 WMP Update.

In 2020, the WSD issued a conditional approval of PC's WMP. PC submitted its RCP[16] to resolve Class A Deficiencies on July 27, 2020. WSD released its evaluation[17] of PC's RCP on December 30, 2020, and provided direction to address "insufficient" responses in PC's updated 2021 Plan. PC submitted its first Quarterly Report on September 9, 2020, to resolve 2020 Class B

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[11] Pub. Util. Code § 8386.3(a).

[12] The Wildfire Safety Division's strategic roadmap Reducing Utility-Related Wildfire Risk (2020) (accessed July 19, 2021): https://energysafety.ca.gov/who-we-are/strategic-roadmap/

[13] Here we refer to all utilities that submitted a WMP in 2020: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), Liberty Utilities, Trans Bay Cable, LLC, and Horizon West Transmission, LLC; hereafter in this Action Statement "utilities" refers to the three large utilities, SDG&E, PG&E, and SCE, unless otherwise specified.

[14] An RCP "must present all missing information and/or articulate the electrical corporation's plan, including proposed timeline, to bring the electrical corporation's WMP into compliance." *See* Resolution WSD-002 at 17.

[15] "Class B issues are of moderate concern and require reporting on a quarterly basis by the electrical corporation to provide missing data or update its progress in a quarterly report." *See* Resolution WSD-002 at 18.

[16] PC's Remedial Compliance Plan of July 27, 2020 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/r.18-10-007-pacificorp-remedial-compliance-plan-7-27-20.pdf

[17] The WSD's evaluation of PC's Remedial Compliance Plan, issued December 30, 2020 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/pacificorp-rcp-action-statement-20201230.pdf

Deficiencies.[18] The WSD released its draft evaluation of PC's Quarterly Report on January 21, 2021, and also issued direction to address "insufficient" responses in its 2021 WMP Update.[19]

3. 2021 Evaluation Process

On November 16, 2020, the CPUC adopted updated WMP requirements (Guidelines) and procedures for the 2021 WMP Plan Year pursuant to Public Utilities Code (Pub. Util. Code) Section 8389(d).[20] The updates to the 2021 WMP Guidelines are intended to streamline the reporting and evaluation process. Pursuant to the adopted Guidelines, large utilities submitted 2021 WMP Updates on February 5, 2021; small and multi-jurisdictional utilities (SMJUs) and independent transmission operators (ITOs) submitted 2021 WMP Updates on March 5, 2021.

The 2021 WMP submissions are updates of the 2020-2022 WMPs and are intended to show progress since 2020 and report changes from the 2020 WMP. Importantly for 2021, the WSD amended its review process and will no longer issue conditional approvals. Instead, where the WSD found critical issues with 2021 submissions, the WSD issued a Revision Notice requiring the utility to remedy such issues prior to completion of the 2021 WMP Update evaluation. Upon receipt of the utility's response to the Revision Notice, the WSD could determine that the response was sufficient to warrant approval, although additional ongoing reporting or other conditions may be required, or the response was insufficient such that denial of the WMP is warranted due to the utility inadequately reducing wildfire risk and its potential impact to public safety.

The WSD evaluated 2021 WMP Updates according to the following factors:

- Completeness: The WMP is complete and comprehensively responds to the WMP statutory requirements and WMP Guidelines.
- Technical feasibility and effectiveness: Initiatives proposed in the WMP are technically feasible and are effective in addressing the risks that exist in the utility's service territory.

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[18] PC's Quarterly Report of September 9, 2021 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/pacificorp-first-quarterly-report-on-2020-wmp-9-9-2020.pdf
Subsequent Quarterly Reports addressing conditions requiring ongoing reporting will be evaluated as part of utilities' 2021 WMP Updates.

[19] The WSD's draft evaluation of PC's first Quarterly Report, issued on January 21, 2021 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2020/pacificorp-qr-action-statement.pdf.
The WSD issued an extension to the large investor-owned utilities to respond to insufficient Quarterly Reports until February 26, 2021.

[20] See the adopted 2021 WMP Guidelines: https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf (accessed July 19, 2021).

- Resource use efficiency: Initiatives are an efficient use of utility resources and focus on achieving the greatest risk reduction at the lowest cost.
- Demonstrated year-over-year progress: The utility has demonstrated sufficient progress on objectives and program targets reported in the prior annual WMP.
- Forward-looking growth: The utility demonstrates a clear action plan to continue reducing utility-related wildfires and the scale, scope, and frequency of Public Safety Power Shutoff (PSPS) events.[21] In addition, the utility is sufficiently focused on long-term strategies to build the overall maturity of its wildfire mitigation capabilities while reducing reliance on shorter-term strategies such as PSPS and vegetation management.

To conduct its assessment, the WSD relied upon PC's WMP submission and subsequent updates, responses to Revision Notices, if any, input from California Department of Forestry and Fire Protection (CAL FIRE), input from the Wildfire Safety Advisory Board (WSAB), public comments, responses to the WSD's data requests, utility-reported data, and utility responses to the Utility Maturity Survey.

Upon completion of its review, the WSD determined whether each utility's 2021 WMP Update should either be:

- Approved (approval may include the requirement to address certain issues in the utility's subsequent WMP and/or through existing ongoing reporting processes), or,
- Denied (the utility does not have an approved WMP for 2021 and must reapply for approval in 2022).

4. Cost Recovery

This document does not approve costs attributable to WMPs, as statute requires electrical corporations to seek cost recovery and prove all expenditures are just and reasonable at a future time in their General Rate Cases (GRC) or an appropriate application. Nothing in this Action Statement nor CPUC's Resolution should be construed as approval of any WMP-related costs.[22]

1. Summary of key findings

Pursuant to Pub. Util. Code Section 8386.3(a), this Action Statement is the totality of the WSD's review of PC's 2021 WMP Update. PC's 2021 WMP Update is approved.

[21] A Public Safety Power Shutoff (PSPS) event, also called a de-energization event, is when a utility proactively and temporarily cuts power to electric lines that may fail in certain weather conditions in specific areas to reduce electric facility-caused fire risk.

[22] The WSD's approval and the Commission's ratification do not relieve the electrical corporation from any and all otherwise applicable permitting, ratemaking, or other legal and regulatory obligations.

1.1. Areas of Significant Progress

The WSD finds that PC has made significant progress over the past year and/or has matured in its mitigation strategies for future years in the following areas:

- PC has made advancements in its risk-assessment methodology, implementing its new Localized Risk Assessment Model (LRAM). PC has piloted incorporating CalAdapt climate data into the LRAM to analyze the projected climate forecasts and identify how its fire weather risk score will change by 2030. PC plans to continue to integrate this climate data projection into its model for long-term wildfire mitigation strategies.
- PC has improved its asset inspections protocol, increasing the frequency of inspections in areas of high fire risk, heightening the priority when finding a problem relating to wildfire risk, and piloting new technologies to assist in enhanced visual inspections.
- PC has implemented an electronic planning and tracking system for vegetation inspections, a significant improvement from its previous paper-based system.
- PC has made improvements to its PSPS protocol, added new PSPS forecasting criteria to better measure the impacts of short-term drying on fuels, and is subdividing PSPS primary zones into smaller areas, which is expected to limit the geographical scope of any future PSPS events. PC has also added a meteorologist and emergency manager[23] to its wildfire mitigation staff and created a dedicated PSPS webpage for customer outreach and communication.

1.2. Revision Notices

The WSD did not issue a Revision Notice to PC in this WMP Update review cycle.

1.3. Key Areas for Improvement and Remedies

The WSD evaluated 2021 WMP Updates with a particular focus on how the utility's chosen mitigations and strategies will drive down the risk of utility-related wildfires as well as the scale, scope, and frequency of PSPS events. The WSD approves PC's 2021 WMP Update; however, the WSD finds that PC must focus over the next year on the following areas set forth in Table 1 below. While continued progress toward maturity is important in all areas of a utility's WMP, the WSD finds these areas to be key for PC to continue to drive down utility-related wildfire risk. The WSD expects PC to take action to address these key areas and report on progress made over the year in a Progress Report due by 5:00 p.m. on November 1, 2021, and in its 2022 WMP Update. The WSD will closely monitor progress in each of these areas over the coming year.

[23] Joint IOUs Workshop on 2020 Public Safety Power Shutoff Events, held on March 29, 2021.

In addition to Table 1 below summarizing key areas for improvement, each key focus area and any required follow-up are denoted by a table in the respective detailed evaluation section.

Table 1: Key areas for improvement and remedies.

Utility-#	Issue title	Issue description	Remedies required and alternative timeline if applicable
PC-21-01	Failure to follow format for Section 7.3.b, subparts 1-5, of 2021 WMP Guidelines	PC does not follow the format for Section 7.3.b of the 2021 WMP Guidelines for all of the mitigation initiatives provided in its 2021 WMP Update. Specifically, PC omits the subpart 1-5 headers, along with some the corresponding details, from many of its mitigation initiative discussions. This makes it difficult to identify key information, such as "Progress on initiative" or "Future improvements to initiative".	PC must include and address all components of the WMP Guidelines Section 7.3.b "Detailed information on mitigation initiatives by category and activity," including all subparts 1-5, for each of its initiatives. PC must follow and address all other WMP Guidelines components in its future submissions.
PC-21-02	Lack of consistency in approach to wildfire risk modeling across utilities	The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. The WSD recognizes that the utilities have differing service territory characteristics,	The utilities[24] must collaborate through a working group facilitated by Energy Safety[25] to develop a more consistent statewide approach to wildfire risk modeling. After the WSD completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group.

[24] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document.

[25] The WSD transitioned to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

		differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in their approaches to wildfire risk modeling statewide.	A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.
PC-21-03	GIS and non-spatial data discrepancy	PC's weather station GIS data does not match the non-spatial data included in its 2021 WMP Update, nor does it match the numbers provided in response to a data request (see Appendix 11.2 for more information). PC reports that it completed installation of ten weather stations in 2019 and two in 2020, which brings its current total to twelve. However, PC's GIS weather station data, submitted as part of its 2021 WMP Update, only includes ten GIS data points.	PC must provide complete, accurate, and the most current information, including GIS data, pertaining to all of its program targets and performance.
PC-21-04	Limited evidence to support the effectiveness of covered conductor	The rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full	The utilities[27] must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including: 1. The effectiveness of covered conductor in the field in

[27] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document.

		understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope[26] and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk.	comparison to alternative initiatives. 2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk.
PC-21-05	Reconductoring projects not prioritized based on wildfire risk	PC states that it is replacing small diameter copper and iron conductors "throughout PacifiCorp's California service territory" instead of focusing on areas of highest risk.	PC must demonstrate that its copper and iron reconductoring projects prioritize locations with the highest wildfire risk, both in scope and timing.
PC-21-06	No separate process for replacing expulsion fuses and tracking progress	PC does not currently have a separate method established for replacing expulsion fuses and tracking these replacements.	PC must demonstrate that its current methods are adequate for tracking and assessing the need for expulsion fuse replacements. If its methods are not sufficient, PC must enhance its current operations to properly identify, analyze, and track expulsion fuse replacements.
PC-21-07	Limited explanation for how initiatives reduce PSPS impacts	PC fails to explain how initiatives will reduce PSPS impacts despite selecting some initiatives (such as covered conductor	PC must clearly explain how all initiatives reduce scale and scope of PSPS.

[26] Limited in terms of mileage installed, time elapsed since initial installation, or both.

		installation) specifically to reduce PSPS risk.	
PC-21-08	Lack of details on automatic recloser settings and associated wildfire risk reduction	PC fails to provide the actual recloser settings utilized during heightened wildfire risk.	PC must: 1. Provide the automatic recloser settings described on p. 173 of its 2021 WMP Update, including: a. The "more restrictive system operating procedures" used; and b. The thresholds of heightened wildfire risk for initiating the procedures described in (a). Provide a timeline for when it intends to develop a metric demonstrating the effectiveness of using automatic reclosers, as described on p. 94 of its 2021 WMP Update.
PC-21-09	Inadequate justification of initiative-selection process	PC does not provide any risk-spend efficiency (RSE) estimates for its mitigation initiatives. Without the quantified risk reduction values, PC's qualitative approach to justify the initiative-selection process is insufficient and lacks transparency.	PC must include the quantified, risk reduction outputs from its recently developed risk model to elaborate on its decision-making process to include a thorough overview of the initiative-selection procedure. The overview must show the rankings of the decision-making factors (i.e., compliance-based activities, geographic wildfire tiers, operation efficiencies, etc.) and pinpoint where quantified, risk reduction values and RSE estimates are considered in the initiative-selection process. The WSD recommends a cascading,

			dynamic "if-then" style flowchart to accomplish this prioritization requirement.
PC-21-10	Inadequate approach to PSPS	PC's 2021 WMP Update lacks specific short-term PSPS reduction commitments, sufficient justification, and mitigation initiative targets, apart from covered conductor.	PC must: 1) Acknowledge that, based on its own triggering criteria, it is subject to risk of PSPS in the near-term and describe its vision for reducing potential use of PSPS next fire season, normalized for changes in weather;[28] 2) Provide a firm commitment to a quantifiable reduction in risk of a) frequency, b) scope (i.e., customers impacted), and c) duration of PSPS events during the plan term, including timelines for achieving these reductions; and 3) Identify which initiatives in its 2021 WMP Update are contributing to the goals in (2) above.

In addition to the key areas for improvement listed in Table 1 above, the WSD lists additional issues for continued improvement to increase the maturity of PC's wildfire mitigation capabilities in the evaluation sections below. These additional issues are denoted by bullet points. The WSD expects PC to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

1.4. Maturity Model Evaluation

The Wildfire Safety Division introduced a maturity model (the Utility Wildfire Mitigation Maturity Model) in 2020, providing a method to assess utility wildfire risk reduction capabilities and examine the relative maturity of individual wildfire mitigation programs. In 2020, the

[28] PSPS metrics requested via the WMP Guidelines have been purposefully designed to address changes in weather year over year in order to provide data for comparative analysis across utilities and years. They therefore already use normalized metrics that take into consideration changing weather conditions. For instance, PSPS duration in customer hours (normalized) reflects "Customer hours of PSPS per Red Flag Warning overhead circuit mile day." The expectation is that the utilities show how their other mitigation initiatives reduce their need to use PSPS as a tactic.

utilities completed a survey setting a baseline for maturity as well as anticipated progress over the three-year plan period. In 2021, the utilities again completed the survey, enabling the WSD to monitor progress and ascertain potential improvements to maturity based on progress to date.

The WSD makes the following key findings regarding PC's maturity progress in 2021:

- PC self-reports steady growth in Risk Assessment and Mapping,[29] a category that saw a significant increase in spend in 2020 (comparing planned spend to actual spend).[30] Compared to its peers, PC is reporting higher growth and planned spend (per circuit mile) in this category over the 2020-2022 WMP cycle.
- In contrast, PC shows no growth in the Asset Management and Inspections category from its initial projection and reports a 34% decrease in spend in 2020 (between planned and actual). PC's Grid Operations and Protocols category tells a similar story, with no growth from its initial 2020 maturity score to its projected end score (by 2023), along with a 100% decrease in spend in 2020 (between planned and actual) and zero spend projected for the remainder of the WMP cycle.
- There are inconsistencies between maturity scores and spend in PC's Emergency Planning and Preparedness and Resource Allocation Methodology categories. PC reports no cycle spend in either of these categories, yet projects maturity growth over the WMP cycle, including its highest self-reported maturity (and highest possible score of a 4.00 by the end of the WMP cycle) for Emergency Planning and Preparedness. PC was asked about the Emergency Planning and Preparedness discrepancy in a phone call with WSD staff and followed-up with a written response (see Appendix 11.2).

2. Wildfire Safety Advisory Board Input

The Wildfire Safety Advisory Board (WSAB) provided recommendations on the 2021 WMP Updates of PC, Bear Valley Electric Service, Inc. (BVES) and Liberty Utilities, LLC. (Liberty) on May 13, 2021.[31] The WSD has considered the WSAB's recommendations and incorporates its input throughout this Action Statement. The WSAB's recommendations on the small and multi-jurisdictional utilities focused on the following areas:

- Risk Assessment, Mapping & Resource Allocation;
- Vegetation Management: Inspections, Strategies and Pilots;

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[29] PacifiCorp 2021 Maturity Survey.

[30] PacifiCorp 2021 WMP Update, Table 12.

[31] The WSAB's "Recommendations on the 2021 Wildfire Mitigation Plan Updates of Small and Multi-Jurisdictional Utilities," approved May 12, 2021, and issued May 13, 2021, can be read here (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/misc/wsd/wsab-2021-wmp-smju-recommendations-issued-5.13.21.pdf

- System Design and Management: Grid Hardening, Operations, Inspections, and Emerging Technology;
- Emergency Planning and Communication: Emergency Preparedness, Stakeholder Cooperation, and Community Engagement.

3. Public and Stakeholder Comment

The following individuals and organizations submitted comments by April 14, 2021, and reply comments by April 21, 2021, on PC's 2021 WMP Update:

- Green Power Institute (GPI)
- Public Advocates Office at the Public Utilities Commission (Cal Advocates)
- Rural County Representatives of California (RCRC)

The WSD has evaluated comments and incorporates the following stakeholder input into this Action Statement:

- PC should provide all information required by the WMP Guidelines in sufficient detail to allow the WSD to effectively evaluate its initiatives (GPI).
- If it is not yet doing so, PC should consider conducting fuel sampling to support its efforts at determining fuel moisture content (GPI, RCRC).
- More information is needed about PC's initiatives' potential to reduce the risk of PSPS, particularly covered conductor installation (GPI).
- PC's 2021 WMP Update lacks detail on its automatic recloser operations (Cal Advocates).

4. Discussion

The following sections discuss in detail PC's 2021 WMP Update, including progress over the past year, issues, and remedies to address by the next annual submission.

4.1. Introductory sections of the WMP

The first two sections of the WMP Guidelines[32] require the utility to report basic information regarding persons responsible for executing the plan and adherence to statutory requirements. Section 1 requires contact information (telephone and email) for the executive with overall responsibility and the specific program owners. In addition, all experts consulted in preparation of the WMP must be cited by name and include their relevant background/credentials. Contact information and names may be submitted in a redacted file.

[32] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 14-21 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

Section 2 requires the utility to specify where each of the 22 requirements from Section 8386(c) of the Public Utilities Code are satisfied. Each utility shall both affirm that the WMP addresses each requirement AND cite the section and page number where it is more fully described.

PC minimally satisfied all 22 requirements from Section 8386(c) of the Public Utilities Code.

Issues and Remedies

While the WSD did not identify key areas for improvement in the introductory sections of PC's 2021 WMP Update, the WSD finds the following issues and associated remedies. The WSD expects PC to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

The WSD finds issues associated with six of the statutory WMP requirements:

- ISSUE: Requirement 5 (Section 4.1 of PC's 2021 WMP Update), PC did not provide an adequate discussion of how performance against 2020 metrics has informed the plan.
    - REMEDY: In its 2022 WMP Update, PC must provide more details on lessons learned from the 2021 WMP Update, with a particular focus on how performance against metrics used has informed its 2022 WMP Update.
- ISSUE: Requirement 8 (Section 7.3.5 of PC's 2021 WMP Update), multiple mitigation initiatives in this section are either missing required information (e.g., 7.3.5.14), refer to other sections of PC's 2021 WMP Update (e.g., 7.3.5.8), and/or include very brief descriptions (e.g., 7.3.5.17 and 7.3.5.18).
    - REMEDY: See PC-21-01.
    - REMEDY: PC must provide required information for each mitigation initiative in the appropriate WMP section, without exclusively referring to other sections, initiatives, or to outside documents.
- ISSUE: Requirement 9 (Section 7.3.4 of PC's 2021 WMP Update), PC exhibits similar issues to those stated in Requirement 8, above.
    - REMEDY: See PC-21-01.
    - REMEDY: PC must provide required information for each mitigation initiative in the appropriate WMP section, without exclusively referring to other sections, initiatives, or to outside documents.
- ISSUE: Requirement 11 (Section 4.3 of PC's 2021 WMP Update), a prioritized list of wildfire risks and drivers was not clearly evident in PC's 2021 WMP Update. It was provided in response to a data request (see Appendix 11.2).
    - REMEDY: PC must provide a table with a *prioritized* list of wildfire risks and drivers and the rationale for prioritization.
- ISSUE: Requirement 15 (Sections 5.4 and 7.3.8 of PC's 2021 WMP Update), PC does not sufficiently discuss the adequacy of its service restoration workforce in its 2021 WMP

Update. PC did provide additional details on service restoration personnel in response to a question asked in a phone call with WSD staff (see Appendix 11.2); however, these details should still be provided in the WMP.

- REMEDY: PC must discuss the type and number of personnel classifications it employs and the number of contractors in place for service restoration.

4.2. Actuals and planned spending for Mitigation Plan

The WMP Guidelines[33] require utilities to report a summary of WMP expenditures, planned and actual, for the current WMP cycle. This also includes an estimated annual increase in costs to the ratepayer due to utility-related wildfires and wildfire mitigation activities.[34] The WMP Guidelines require that ratepayer impact calculations are clearly shown to demonstrate how each value was derived. Nothing in the request for such information should be construed as approval of any such expenditure, which is left to the CPUC pursuant to Pub. Util. Code Section 8386.4(b).

- The WSD identified discrepancies between the numbers provided in the "Summary of WMP Expenditures" tables (Tables 3-1 and 3-2)[35] and those in Table 12 of PC's 2021 WMP Update. These discrepancies, due to calculation and copy-and-paste errors, were reconciled in response to a data request[36] (see Appendix 11.2 for more information). The numbers that follow are reflective of these corrections.
- PC shows a 26% decrease between its total 2020 planned spend and 2020 actual spend ($24,708,000 to $18,202,000).
- In five mitigation categories, PC shows an increase in spend in 2020 (between planned and actual):
  - Risk Assessment and Mapping ($25,000 to $186,000 [644% increase])
  - Situational Awareness and Forecasting ($278,000 to $1,209,000 [335% increase])
  - Vegetation Management and Inspections ($5,783,000 to $6,999,000 [21% increase])
  - Data Governance ($0 to $181,000 [100% increase])

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[33] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 22-24 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

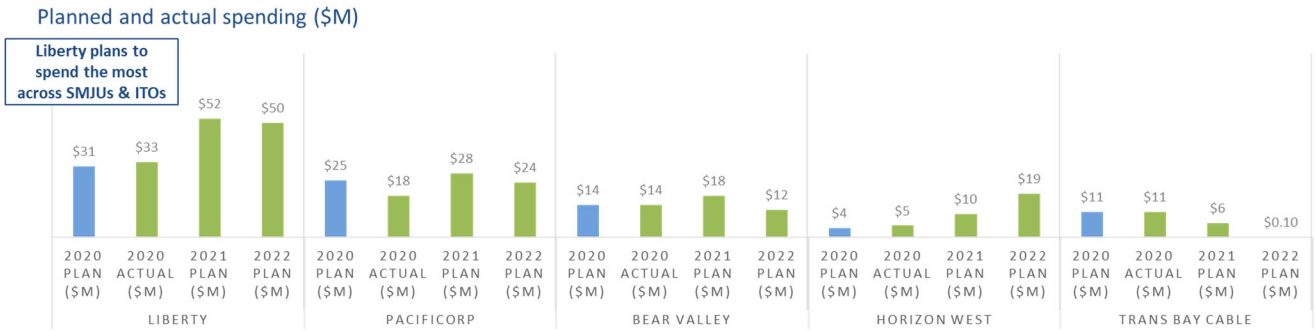
[34] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, Section 3.2 "Summary of ratepayer impact," p. 23 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

[35] PacifiCorp 2021 WMP Update, pp. 23-24.

[36] PacifiCorp DR 2apr2021 Questions 5-6, received April 6, 2021.

    - Stakeholder Cooperation and Community Engagement ($0 to $36,000 [100% increase])
- In three mitigation categories, PC shows a decrease in spend in 2020 (between planned and actual):
    - Grid Design and System Hardening ($15,403,000 to $8,788,000 [43% decrease])
    - Asset Management and Inspections ($1,219,000 to $803,000 [34% decrease])
    - Grid Operations and Protocols ($2,000,000 to $0 [100% decrease])
- PC reports $0 spend in three initiative categories across the 2020-2022 WMP cycle:
    - Grid Operations and Protocols
    - Resource Allocation Methodology
    - Emergency Planning and Preparedness
- PC's total planned spend for the 2020-2022 WMP cycle is the lowest of the three SMJUs.
- Per circuit mile and by category, PC's total WMP cycle planned spend is less than its peers in all mitigation categories except Risk Assessment and Mapping.
- Consistent with its SMJU peers, PC's top three spend categories are (1) Grid Design and System Hardening, (2) Vegetation Management and Inspections, and (3) Asset Management and Inspections.
- PC's top five initiatives account for approximately 91% of its total planned spend, roughly 44% of which is allocated for covered conductor installation.
- PC does not project a cumulative increase in cost to ratepayers due to utility-ignited wildfire mitigation activities.

Figures:



	2020 Plan ($M)	2020 Actual ($M)	2021 Plan ($M)	2022 Plan ($M)	Total WMP Cycle Planned Spend ($M)	Normalized WMP cycle spend per overhead circuit mile ($M)
Liberty	$31	$33	$52	$50	$136	$0.09
PacifiCorp	$25	$18	$28	$24	$70	$.02
Bear Valley	$14	$14	$18	$12	$43	$0.1
Horizon West	$4	$5	$10	$19	$33	$1,650
Trans Bay Cable	$11	$11	$6	$0.1	$17	$0[1]

Source: Tables 3-1 and 12 of 2021 utility WMP Updates
Note: In the 2021 WMP updates for Liberty, PacifiCorp, and Bear Valley, Table 3-1 did not match the totals from Table 12 exactly. The totals from Table 12 are used here for those utilities, in the 2020 Actual, 2021 Plan, 2022 Plan and Total WMP Cycle Planned Spend columns. The 2020 Plan columns are taken from Tables 3-1 in 2021 utility WMP Updates.
1. TransBay Cable does not have any overhead circuit miles

Horizon West only reported .02 OH circuit miles in their WMP

Figure 4.2a: Overview of total WMP spend, SMJUs.

4.3. Lessons learned and risk trends

This section of the WMP Guidelines[37] requires utilities to report how their plans have evolved since 2020 based on lessons learned, current risk trends, and research conducted. This section also requires utilities to report on potential future learnings through proposed and ongoing research.

Utilities must describe how the utility assesses wildfire risk in terms of ignition probability and estimated wildfire consequence using Commission adopted risk assessment requirements (for large electrical corporations) from the General Rate Case (GRC) Safety Model and Assessment Proceeding (S-MAP) and Risk Assessment Mitigation Phase (RAMP) Proceeding at a minimum. The utility may additionally include other assessments of wildfire risk. The utility must:

1. Describe how it monitors and accounts for the contribution of weather and fuel to ignition probability and wildfire consequence.
2. Identify any areas where the Commission's HFTD should be modified.
3. Explain any "high fire threat" areas the utility considers that differ from Commission-adopted HFTD, and why such areas are so classified.

[37] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 24-29 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

4. Rank trends anticipated to have the greatest impact on ignition probability and wildfire consequence.

PC provided all required information on lessons learned, current risk trends, and research conducted.

- To monitor and account for the contribution of weather and fuel to ignition probability and wildfire consequence, PC evaluates variables for fuel indicators, sustained wind, and other weather influencers (e.g., Fosberg Fire Weather Index) that serve a similar function as a Fire Potential Index. In 2020, PC also incorporated Vapor Pressure Deficit (VPD) into its forecasting to improve the reliability of the Keetch-Byram Drought Index (KBDI) and measure both short- and long-term drying. PC has also outfitted most of its weather stations with fuel moisture sensors as another method for measuring of fuel dryness.[38]

- PC used the Localized Risk Assessment Model (LRAM) to evaluate areas outside of the Commission-adopted HFTD and identify any aspects of HFTD that should be modified or adopted. Based on its LRAM fire/climate scores, PC determined two areas that may be candidates for consideration within the HFTD – Crescent City toward Klamath Glen and Montague.[39]

- PC analyzes its outage data, from both planned and fault events, to estimate ignition probability drivers and identify the frequency, duration, and cause of outages experienced on energized circuits. Although a ranked list of wildfire risks and drivers was not clearly evident in PC's 2021 WMP Update, it was provided in response to a data request (see Appendix 11.2).

- PC presents the lessons learned, results, and discussions on 11 pilot programs that are a part of its Research Strategy. A few are described below:

    - PC is further along than its peer utilities in incorporating climate change projections in its risk assessment. PC has piloted incorporating the CalAdapt climate data to analyze the projected climate forecasts and identify how its fire weather risk score will change by 2030. PC plans to continue to integrate this climate data projection into its model for long-term wildfire mitigation strategies.

    - In 2020, PC also implemented a new method for tracking vegetation management activities as a result of its "Pilot 5-Vegetation Management Database Pilot Program." This is an improvement from the utility's previous

[38] PacifiCorp 2021 WMP Update, Section 4.2.

[39] PacifiCorp 2021 WMP Update, pp. 37-39.

method which relied on paper forms, maps, and other documents. The new database system is centralized, and incorporates GPS locations from field work, providing more spatial granularity.

- One of PC's completed pilot projects is its "Pilot 2-LiDAR Pole Loading Assessment," which uses light detection and ranging (LiDAR) point data and 3D depictions of pole assets to identify pole loading concerns. Lines are identified based on fire risk, historic fault rates, and inspection results, and are then flown over with LiDAR. Data collected in the process is incorporated into strength modeling programs (PLS-Cadd) to calculate loading capacity and identify poles and pole lines in need of replacement and/or strengthening. PC incorporated the pilot results into its pole replacement initiative. PC is currently evaluating additional applications for integrating the technology into other asset strategies.

4.4. Inputs to the plan and directional vision for WMP

This section of the WMP Guidelines[40] requires the utility to rank and discuss trends anticipated to exhibit the greatest impact on ignition probability and wildfire consequence within the utility's service territory over the next 10 years. First, utilities must set forth objectives over the following timeframes: before the upcoming wildfire season, before the next annual update, within the next 3 years, and within the next 10 years. Second and more practically, utilities must report the current and planned qualifications of their workforce they expect in order to meet these objectives.

Goal, objectives, and program targets:

The goal of the WMP is shared across WSD and all utilities: documented reductions in the number of ignitions caused by utility actions or equipment and minimization of the societal consequences (with specific consideration of the impact on Access and Functional Needs populations and marginalized communities) of both wildfires and the mitigations employed to reduce them, including PSPS.

The WMP Guidelines[41] require utilities to provide their objectives which are unique to each utility and reflect its 1, 3, and 10-year projections of progress toward the WMP goal. The WMP Guidelines also require utilities to report their unique program targets, which are quantifiable measurements of activity identified in WMPs and subsequent updates used to show progress

[40] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-31(accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

[41] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 29-30 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

toward reaching the objectives, such as number of trees trimmed or miles of power lines hardened.

- PC's overarching WMP objective is to mitigate wildfire risk within its service territory by applying a broad range of solutions, "in the form of situational awareness, inspection and correction, focused and timely vegetation management, operational acuity and strategic system hardening."[42]
- PC presents its 1, 3, and 10-year wildfire mitigation goals in Section 7.1 of the 2021 WMP Update[43]. Although this information was not contained in the appropriate WMP section per the Guidelines, it was referenced and found in the Mitigation Initiatives section (7.1). Some of PC's 1 and 3-year goals include:
    - **By June 1, 2021:**
        - Situational awareness and forecasting: calibrating and integrating of existing 12 weather stations and installation of an additional nine stations
        - Grid design and system hardening: re-prioritizing programs based on risk modeling evolution
        - Asset management and inspections: completing 2021 planned inspections with the HFTD
        - Vegetation management and inspections: completing incremental Tier 3 visual vegetation inspections within the HFTD; piloting new electronic planning, mapping, and record keeping system regarding vegetation management within the HFTD
        - Grid operations and protocols: reviewing existing operating protocols and ensuring preparedness for 2021 fire season
        - Stakeholder cooperation and community engagement: improving the customer and community-facing forecast of the PSPS website status tool
    - **By September 1, 2021:**
        - Situational awareness and forecasting: completing installation of an additional 11 weather stations
        - Grid design and system hardening: planning corrective work identified through the pole loading infrastructure hardening program
        - Asset management and inspections: constructing and commissioning 11 additional transmission and distribution system automation devices to meet the program target of 27 in 2021
        - Vegetation management and inspections: reviewing 2021 fire season operating protocols and evaluating areas for improvement in 2022;

[42] PacifiCorp 2021 WMP Update, p. 96.

[43] PacifiCorp 2021 WMP Update, pp. 114-119.

leveraging data analytics to evaluate the impact of alarm-based high impedance fault detection observed through the 2021 fire season
    - Grid operations and protocols: leveraging data analytics to evaluate the impact of alarm-based high impedance fault detection observed through the 2021 fire season
    - Stakeholder cooperation and community engagement: Continuing to partner with public safety partners in communities throughout California regarding wildfire and PSPS preparedness
- **Before 2022 WMP Update:**
    - Situational awareness and forecasting: completing installation and integration of the weather stations included in the 2021 plan
    - Asset management and inspections: completing the 2021 planned inspections within entire California territory (not just HFTD)
    - Vegetation management and inspections: evaluating and preparing to implement a new tree density inventory system within the HFTD to inform risk assessment and prioritization of efforts; evaluating continued use of the newly piloted electronic planning, mapping, and record keeping system regarding vegetation management within the HFTD; and establishing a longer-term strategy for using LiDAR as it pertains to vegetation management and inspections applications
    - Grid operations and protocols: reviewing existing operating protocols and ensuring preparedness for 2022 fire season
- **Within the next three years:**
    - Situational awareness and forecasting: evaluating benefits and costs of distribution fault anticipation (DFA) technology in normal system operations
    - Grid design and system hardening: completing entire 2020-2022 WMP cycle system hardening program scope per Table 12 and additional work or scope developed in 2023
    - Asset management and inspections: evaluating potential incorporation of risk assessment software solutions to inform asset management and inspections programs and augment existing risk-based decision-making framework
    - Vegetation management and inspections: incorporating lessons learned though tree density inventory system analytics to inform risk assessment and prioritization of efforts (if implemented); evaluating overall workforce management strategies and structures to augment existing programs; and incorporating lessons learned from pilot projects and fully implementing new electronic planning, mapping, and record keeping system regarding vegetation management within the HFTD

    - Stakeholder cooperation and community engagement: incorporating three years of data, enhanced real time weather monitoring capability, and system hardening progress to evaluate PSPS methodology and protocols and reduce the potential scope or impact of PSPS events
- In Section 5.3, PC lists and describes its program targets and metrics from the last five years, highlighting 2019 and 2020 performance as well as 2021 and 2022 projections. Some of PC's projected program targets in Table 5.43-5-1 of its 2021 WMP Update were corrected in a data request (see Appendix 11.2 for more information).

Issues and Remedies:

- ISSUE: PC's 10-year plan is still lacking quantitative goal benchmarks, an explanation of how it intends to track progress of goals (in the absence of benchmarks), as well as a list of activities with metrics for tracking progress of benchmarks. This issue was previously determined and deemed Insufficient in the WSD's Draft Evaluation of PacifiCorp's Quarterly Report of January 21, 2021.[44] In its 2021 WMP Update, PC states, "At this time, it is challenging to set additional specific goals on a 10-year planning horizon, except to the extent that certain programs can be delivered within the WMP term."[45] This is inadequate as long-term goals and vision are an important part of wildfire mitigation planning.
    - REMEDY: In its 2022 WMP Update, PC must identify and detail quantitative goal benchmarks or provide an explanation of how it intends to track progress of goals in the absence of benchmarks *and* provide a list of activities with metrics for tracking progress of benchmarks.

Workforce planning:

This subsection of the WMP Guidelines[46] requires utilities to report their worker qualifications and training practices regarding utility-related wildfire and PSPS mitigation for workers in mitigation-related roles including:

1. Vegetation inspections
2. Vegetation management projects
3. Asset inspections
4. Grid hardening
5. Risk event inspection

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[44] Wildfire Safety Division Draft Evaluation of PacifiCorp's First Quarterly Report, Guidance-12.

[45] PacifiCorp 2021 WMP Update, pp. 118-119.

[46] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 30-31 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

PC provided all information required regarding worker qualifications within each of the required roles.

- PC provides the worker titles, minimum qualifications, and full-time employee (FTE) percentages by role for each of the mitigation-related roles listed above, with the exception of risk even inspection. PC states that it currently has not developed a dedicated risk event inspection workforce, but rather, "this role has been fulfilled by a combination of field inspectors, field engineers, foresters and journeymen linemen who pass the baton through the risk event inspection process."[47]
- The WSD gained further details and information on PC's Vegetation Management recruitment and training program via a data request[48] (see Appendix 11.2 for more information).
- PC has also added a meteorologist and emergency manager to its wildfire mitigation staff.

4.5. Metrics and underlying data

The WMP Guidelines[49] require utilities to report metrics and program targets as follows:

- *Progress metrics* that track how much utility wildfire mitigation activity has managed to change the conditions of a utility's wildfire risk exposure in terms of drivers of ignition probability.
- *Outcome metrics* that measure the performance of a utility and its service territory in terms of both leading and lagging indicators of wildfire risk, PSPS risk, and other direct and indirect consequences of wildfire and PSPS, including the potential unintended consequences of wildfire mitigation work.
- *Program targets* measure tracking of proposed wildfire mitigation activities used to show progress toward a utility's specific objectives.[50] Program targets track the utility's pace of completing activities as laid out in the WMPs but do not track the efficacy of those activities. The primary use of these program targets in 2021 will be to gauge utility follow-through on existing WMPs.

This section also requires utilities to provide several geographic information system (GIS) files detailing spatial information about their service territory and performance, including recent

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[47] PacifiCorp 2021 WMP Update, p. 103.

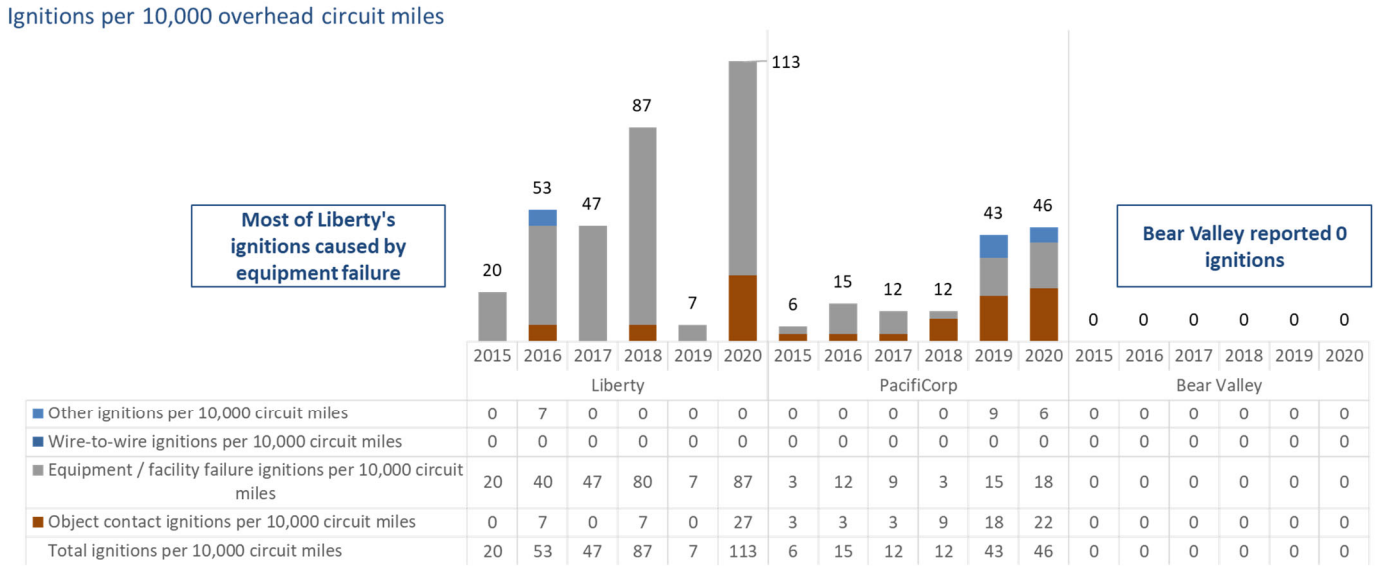
[48] PacifiCorp DR 20apr2021, Question 3, received April 23, 2021.

[49] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 32-41 (accessed July 19, 2021):
https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

[50] Objectives are unique to each utility and reflect the 1, 3, and 10-year projections of progress toward the WMP goal. See section 5.4 for review of the utility's objectives.

weather patterns, location of recent ignitions, area and duration of PSPS events, location of lines and assets, geographic and population characteristics, and location of planned initiatives.

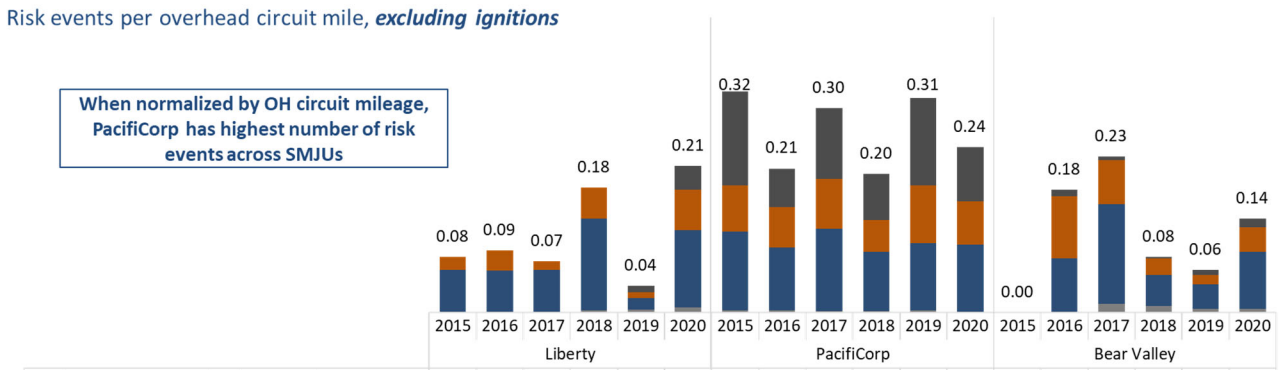
- See the Data Governance section for a detailed review of the utility's progress and shortcomings in its Quarterly Data Reports.



	Liberty						PacifiCorp						Bear Valley					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Other ignitions per 10,000 circuit miles	0	7	0	0	0	0	0	0	0	0	9	6	0	0	0	0	0	0
Wire-to-wire ignitions per 10,000 circuit miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment / facility failure ignitions per 10,000 circuit miles	20	40	47	80	7	87	3	12	9	3	15	18	0	0	0	0	0	0
Object contact ignitions per 10,000 circuit miles	0	7	0	7	0	27	3	3	3	9	18	22	0	0	0	0	0	0
Total ignitions per 10,000 circuit miles	20	53	47	87	7	113	6	15	12	12	43	46	0	0	0	0	0	0

Source: Tables 8 and 7.1 from utility 2021 WMP Updates
Note: The total number of ignitions for each year was normalized using the 2020 reported overhead circuit miles for each utility, in their 2021 WMPs.

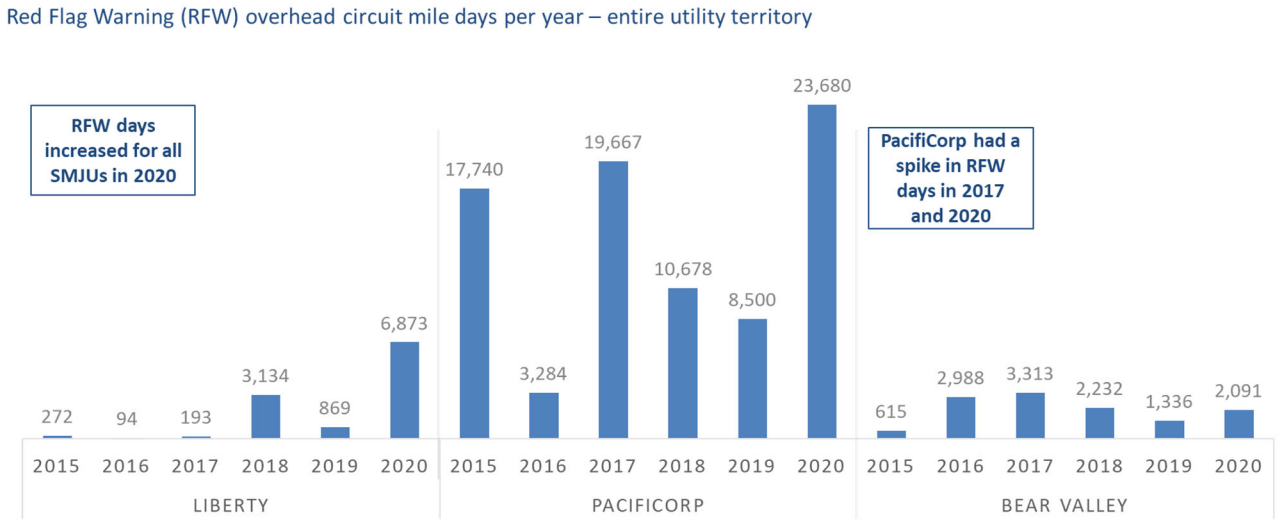
Figure 4.5.a: Number of ignitions per 10,000 overhead circuit miles.



	Liberty						PacifiCorp						Bear Valley					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Other events per overhead circuit mile	0.00	0.00	0.00	0.00	0.01	0.03	0.14	0.06	0.10	0.07	0.13	0.08	0.00	0.01	0.00	0.00	0.01	0.01
Contact from object risk events per overhead circuit mile	0.02	0.03	0.01	0.05	0.01	0.06	0.07	0.06	0.07	0.05	0.08	0.06	0.00	0.09	0.06	0.02	0.01	0.04
Equipment/facility failure risk events per overhead circuit mile	0.06	0.06	0.06	0.13	0.02	0.11	0.11	0.09	0.12	0.08	0.10	0.10	0.00	0.08	0.14	0.05	0.04	0.08
Wire to wire risk events per overhead circuit mile	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total risk events per overhead circuit mile	0.08	0.09	0.07	0.18	0.04	0.21	0.32	0.21	0.30	0.20	0.31	0.24	0.00	0.18	0.23	0.08	0.06	0.14

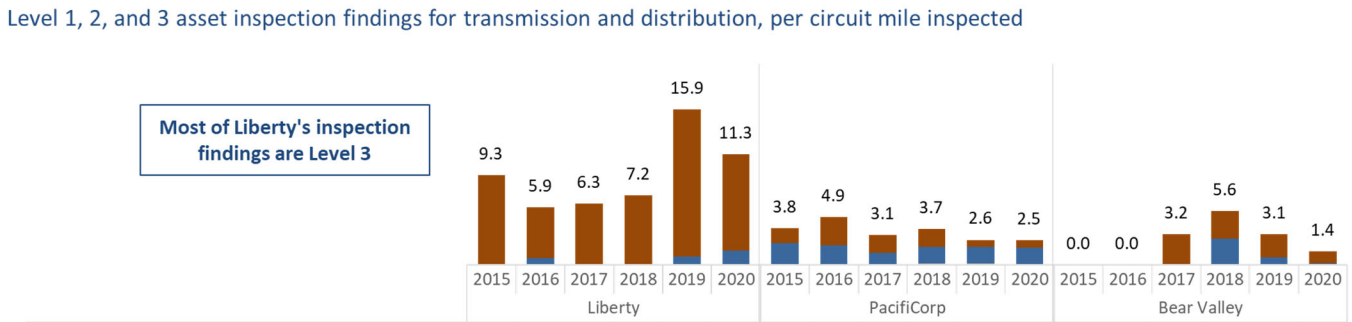
Source: Risk events from Table 7.1 of utility 2021 WMP Updates, overhead circuit miles from Table 8 of utility 2021 WMP Updates
Note: A risk event is defined as an event with probability of ignition, including wires down, contacts with objects, line slap, events with evidence of heat generation, and other events that cause sparking or have the potential to cause ignition.

Figure 4.5.b: Risk events per overhead circuit mile.



Source: Table 6 of 2021 utility WMP Updates.
Sum of overhead circuit miles of utility grid subject to Red Flag Warning each day within a given time period, calculated as the number of overhead circuit miles that were under an RFW multiplied by the number of days those circuit miles were under said RFW.

Figure 4.5.c: Red Flag Warning (RFW) overhead circuit mile days per year.



	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
	Liberty						PacifiCorp						Bear Valley					
Level 3 asset inspection findings, transmission and distribution per circuit mile inspected	9.3	5.2	6.3	7.1	15.1	9.9	1.6	2.9	1.8	1.9	0.7	0.8	0.0	0.0	3.2	2.9	2.3	1.2
Level 2 asset inspection findings, transmission and distribution per circuit mile inspected	0.0	0.7	0.0	0.1	0.8	1.4	2.2	1.9	1.2	1.6	1.8	1.7	0.0	0.0	0.0	2.7	0.8	0.2
Level 1 asset inspection findings, transmission and distribution per circuit mile inspected	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total inspection findings, transmission and distribution per circuit mile inspected	9.3	5.9	6.3	7.2	15.9	11.3	3.8	4.9	3.1	3.7	2.6	2.5	0.0	0.0	3.2	5.6	3.1	1.4

Source: Inspection findings from Table 1 of utility 2021 WMP Updates
Note: A Level 1 finding is an immediate safety and/or reliability risk with high probability for significant impact. A Level 2 finding is a variable (non-immediate high to low safety and/or reliability risk. A Level 3 finding is an acceptable safety and/or reliability risk.

Figure 4.5.d: Asset inspection findings per circuit mile inspected.

5. Mitigation initiatives and maturity evaluation

This section of the WMP Guidelines[51] is the heart of the plan and requires the utility to describe each mitigation initiative it will undertake to reduce the risk of catastrophic wildfire. The utility

[51] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 42-46 (accessed July 19, 2021):

Footnote continued on next page.

is also required to self-report its current and projected progress to mitigate wildfire risk effectively,[52] a capability referred to in this document as "maturity" and measured by the WSD Utility Wildfire Mitigation Maturity Model ("Maturity Model"). Utility maturity is measured across the same categories used to report mitigation initiatives listed below, allowing WSD to evaluate a utility's reported and projected maturity in wildfire mitigation in the context of its corresponding current and planned initiatives. The ten maturity and mitigation initiative categories are listed below, with further details in Appendix 11.3:

1) Risk assessment and mapping
2) Situational awareness and forecasting
3) Grid design and system hardening
4) Asset management and inspections
5) Vegetation management and inspections
6) Grid operations and operating protocols
7) Data governance
8) Resource allocation methodology
9) Emergency planning and preparedness
10) Stakeholder cooperation and community engagement

Key Areas for Improvement and Remedies

The WSD finds that PC must focus on the following areas as significant to reducing utility-related wildfire risk:

https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

[52] Utilities that submitted a WMP were required to complete a survey in which they answered specific questions which assessed their existing and future wildfire mitigation practices across 52 capabilities at the time of submission and at the end of the three-year plan horizon. The 52 capabilities are mapped to the same ten categories identified for mitigation initiatives. The results of the survey can be found in Attachment 12.1. The most recent survey for each utility can be found here: https://energysafety.ca.gov/what-we-do/wildfire-mitigation-and-safety/wildfire-mitigation-plans/2021-wmp/ (accessed July 19, 2021).

Utility-#	Issue title	Issue description	Remedies required
PC-21-01	Failure to follow format for Section 7.3.b, subparts 1-5, of 2021 WMP Guidelines	PC does not follow the format for Section 7.3.b of the 2021 WMP Guidelines for all of the mitigation initiatives provided in its 2021 WMP Update. Specifically, PC omits the subpart 1-5 headers, along with some the corresponding details, from many of its mitigation initiative discussions. This makes it difficult to identify key information, such as "Progress on initiative" or "Future improvements to initiative".	PC must include and address all components of the WMP Guidelines Section 7.3.b "Detailed information on mitigation initiatives by category and activity," including all subparts 1-5, for each of its initiatives. PC must follow and address all other WMP Guidelines components in its future submissions.

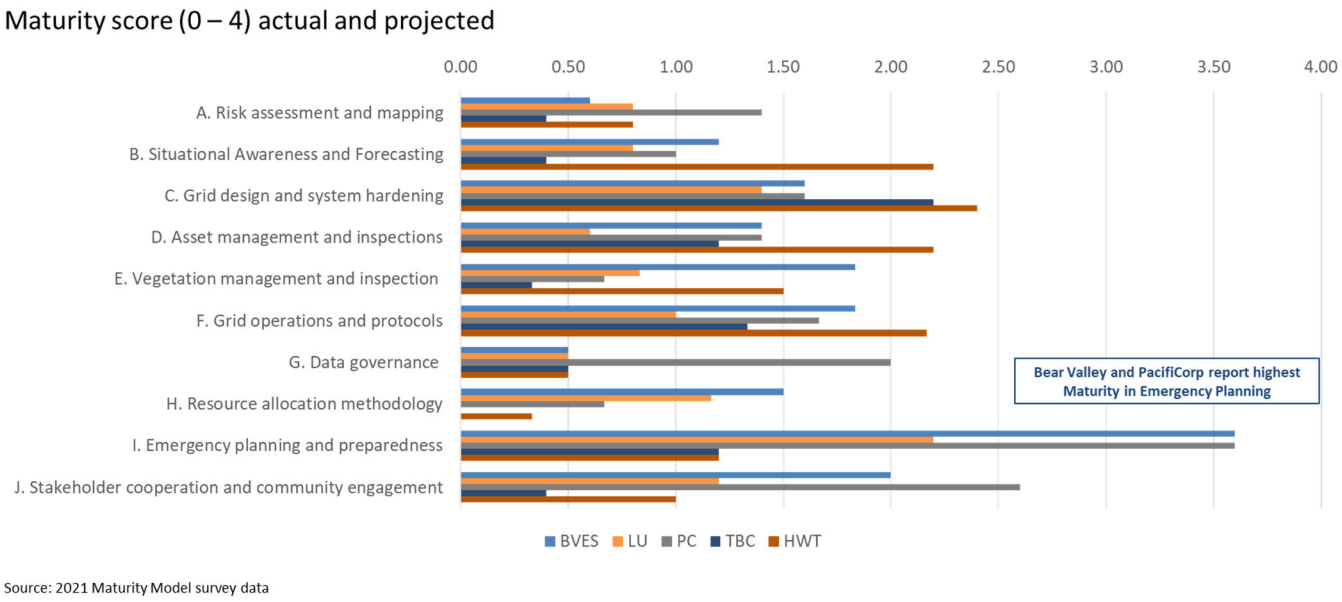
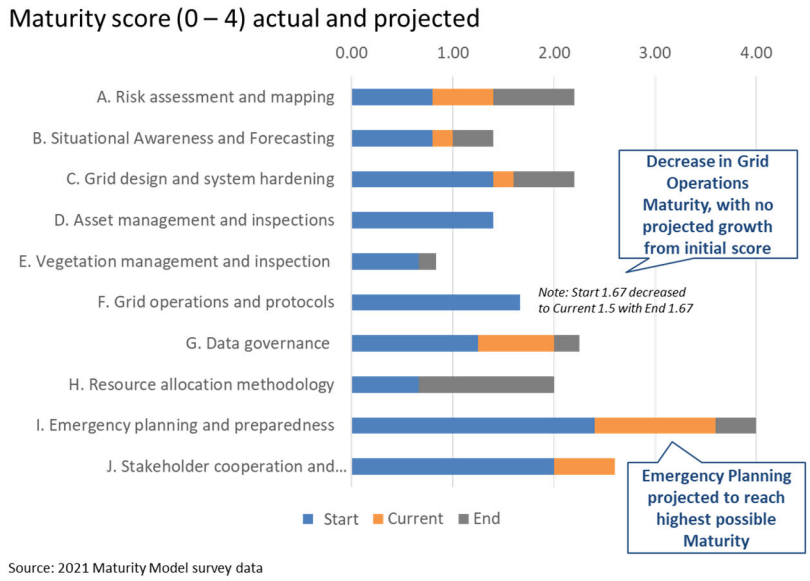


Figure 5.a: Self-reported maturity by category, SMJUs and ITOs.



Projected growth through WMP cycle in Maturity by Category: PacifiCorp

Category	Scores Start	Current	End
A. Risk assessment and mapping	0.80	1.40	2.20
B. Situational Awareness and Forecasting	0.80	1.00	1.40
C. Grid design and system hardening	1.40	1.60	2.20
D. Asset management and inspections	1.40	1.40	1.40
E. Vegetation management and inspection	0.67	0.67	0.83
F. Grid operations and protocols	1.67	1.50	1.67
G. Data governance	1.25	2.00	2.25
H. Resource allocation methodology	0.67	0.67	2.00
I. Emergency planning and preparedness	2.40	3.60	4.00
J. Stakeholder cooperation and community engagement	2.00	2.60	2.60

Figure 5.b: Projected growth through WMP cycle in maturity by category, PacifiCorp.

Below, WSD evaluates PC's initiatives across the ten categories in the context of its maturity model survey scores.

5.1. Risk Assessment and Mapping

Introduction

This section of the WMP Guidelines[53] requires the utility to discuss the risk assessment and mapping initiatives implemented to minimize the risk of its causing wildfires. Utilities must describe initiatives related to equipment maps and modelling of overall wildfire risk, ignition probability, wildfire consequence, risk-reduction impact, match-drop simulations,[54] and climate/weather-driven risks. This section also requires the utility to provide data on spending, miles of infrastructure treated, spend per treated line mile, ignition probability drivers targeted, projected risk reduction achieved from implementing the initiative, and other (i.e., non-ignition) risk drivers addressed by the initiative.

[53] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 43-44 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

[54] Simulations of the potential wildfire consequences of ignitions that occur along electric lines and equipment effectively showing the potential consequences if an ignition or "match was dropped" at a specific point in a utility's territory.

The parameters of risk assessment (discussed here) and resource allocation (discussed later in the "Resource Allocation Methodology" section) to reduce wildfire risk derive from the S-MAP and RAMP proceedings for the utility GRC (D.18-12-014).

The risk modelling conducted should ultimately inform the RSE analyses discussed in category 8, resource allocation methodology.

Overview

The WSD finds that PC has made progress in risk assessment and mapping and finds this section of PC's 2021 WMP Update to be sufficient subject to remedies.

Progress over the past year

The WSD finds that PC has made the following progress:

- PC improved its risk assessment and mapping capabilities from the last submission of its WMP in 2020 by developing its Localized Risk Assessment Model (LRAM) to inform a more risk-based decision-making process. Previously the utility was using the CPUC's HFTD Map tier designations to inform inspections, vegetation management, and prioritizing hardening efforts.
- PC is still using the Integrated Utility Threat Index (iUTI) data set from the CPUC's HFTD Map as a baseline for its relative risk score. However, the utility has broken down its circuits into segments by isolation devices, referencing them as Zones of Protection (ZOP). PC also integrated combined risk layers, mathematically weighing factors based on the risk of each ZOP. This should improve the granularity of PC's risk assessment to a circuit segment level.
- The risk data sets include tree canopy, vegetation-related outage, historic utility fault locations, damaged or failed equipment from short circuits, ignition data, and half-weighted arc energy data to gauge ignition risk.
- PC is further along than its peer utilities in incorporating climate change projections in its risk assessment. The utility extracted the averages for climate projections for temperature, precipitation, wind, and rainfall from four different CalAdapt models (HadGEM2-ES, CANESM2, CRNM-CM5, MIROC5) as inputs in to its Fosberg Index and KBDI. This analysis gives the utility the ability to forecast the KBDI, Fosberg Index, and combined fire risk score out until 2030. These indices are what PC also uses for PSPS and mitigation deployment decision-making.
- PC in comparison to its peer utilities was much more transparent in its Wildfire Mitigation Plan Update in the information it provided about its Risk Assessment and Mapping initiatives and was the only utility of the SMJUs to incorporate climate change projections in its risk assessment.

PC has room for improvement in the following areas:

- While PC's Risk Assessment initiatives have improved, it does not incorporate asset health and condition into its modeling. It also omits consideration of different equipment types in its modeling.
- PC is unable to provide risk-spend efficiency (RSE) values for its initiatives. PC has confirmed that it expects to produce them by mid-2021 with the use of its LRAM[55] (see issue PC-21-09 in Section 5.8).
- PC's LRAM is currently only applicable to the utility's distribution circuits; it does not apply to transmission circuits.
- With the limited number of weather stations deployed in PC's territory and lack of installations in 2020 it is unclear whether the climate information from the weather stations is providing enough granularity when assessing the utility's weather risk.

Key Areas for Improvement and Remedies

The WSD finds that PC must focus on the following areas as significant to reducing utility-related wildfire risk:

[55] PacifiCorp 2021 WMP Update, p. 72.

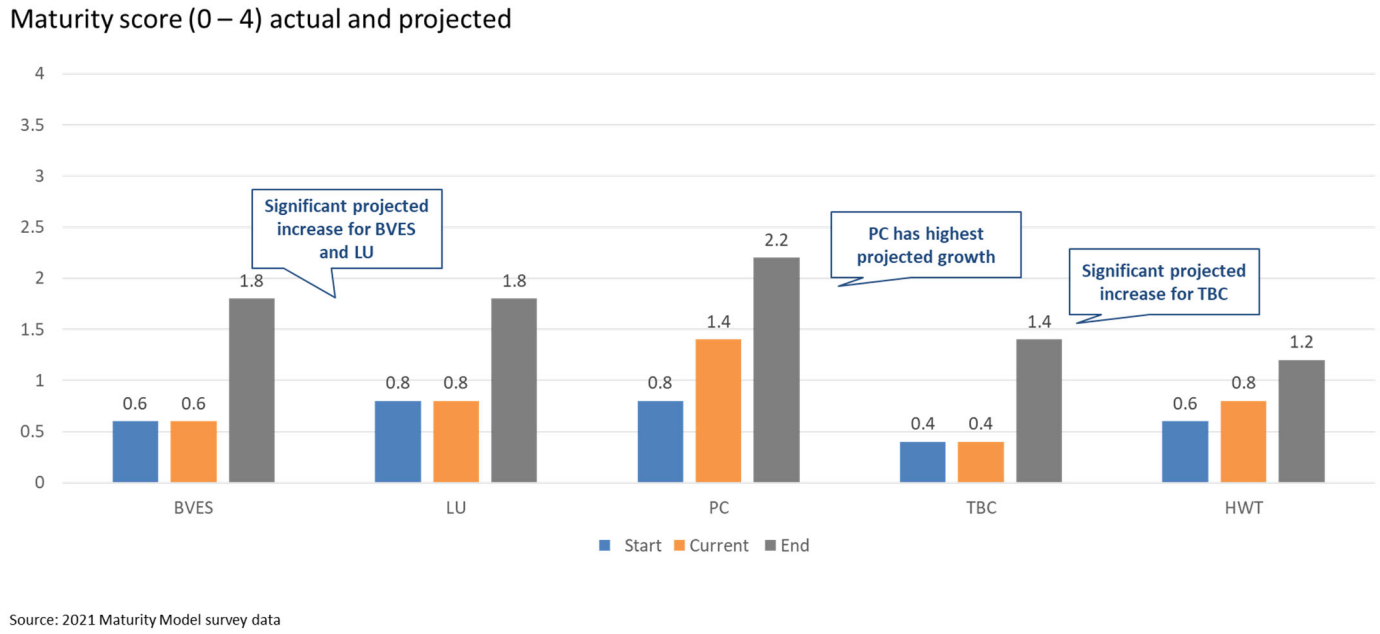
Utility-#	Issue title	Issue description	Remedies required
PC-21-02	Lack of consistency in approach to wildfire risk modeling across utilities	The utilities do not have a consistent approach to wildfire risk modeling. For example, in their wildfire risk models, utilities use different types of data, use their individual data sets in different ways, and use different third-party vendors. The WSD recognizes that the utilities have differing service territory characteristics, differing data availability, and are at different stages in developing their wildfire risk models. However, the utilities face similar enough circumstances that there should be some level of consistency in their approaches to wildfire risk modeling statewide.	The utilities[56] must collaborate through a working group facilitated by Energy Safety[57] to develop a more consistent statewide approach to wildfire risk modeling. After the WSD completes its evaluation of all the utilities' 2021 WMP Updates, it will provide additional detail on the specifics of this working group. A working group to address wildfire risk modeling will allow for: 1. Collaboration among the utilities; 2. Stakeholder and academic expert input; and 3. Increased transparency.

[56] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document.

[57] The WSD transitioned to the Office of Energy Infrastructure Safety (Energy Safety) on July 1, 2021.

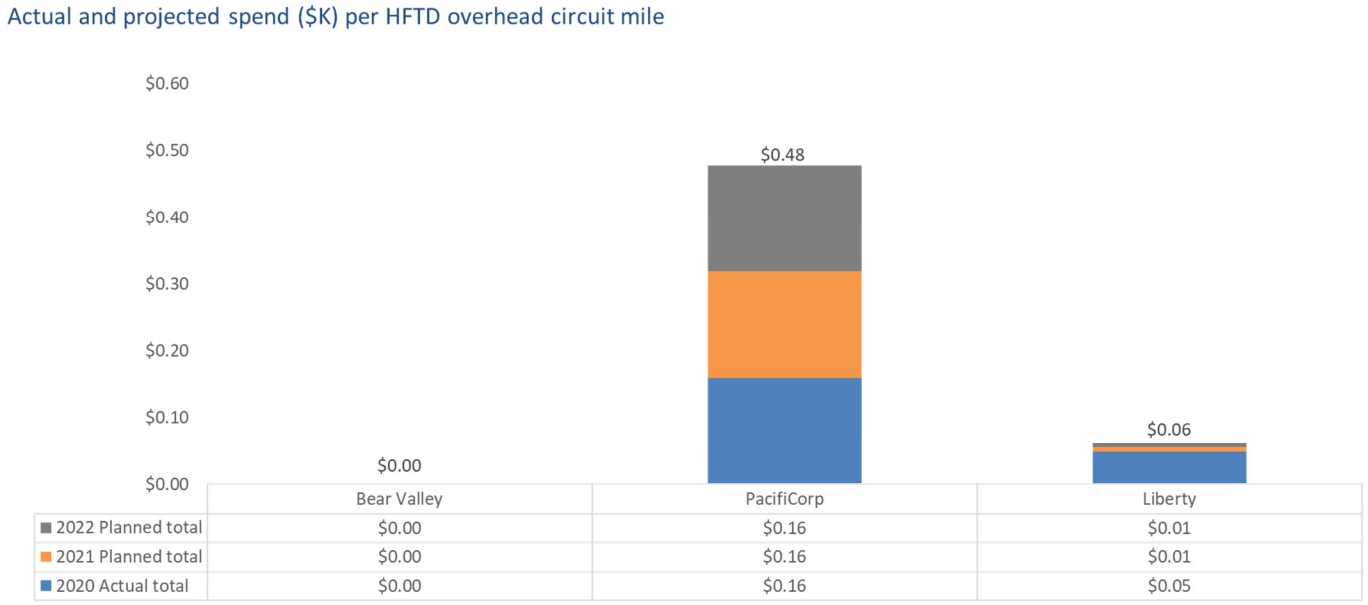
Figures

Below are charts used as part of the WSD's review of PC's risk assessment and mapping section:



Source: 2021 Maturity Model survey data

Figure 5.1.a: Risk assessment and mapping maturity score progress.



Source: Table 12 of utility 2021 WMPs and subsequent data requests

Figure 5.1.b: Risk assessment and mapping spend per overhead circuit mile, SMJUs 2020-2022.

5.2. Situational Awareness and Forecasting

Introduction

A strong weather monitoring and situational awareness system is an essential fire prevention/mitigation risk reduction strategy because it effectively alerts a utility's preparation and response to potentially dangerous fire weather conditions that can inform its decisions on PSPS implementation, grid design, and system hardening. It is also one of the most inexpensive strategies.

The situational awareness and forecasting section of the WMP Guidelines[58] requires the utility to discuss its use of cameras, weather stations, weather forecasting and modeling tools, grid monitoring sensors, fault indicators, and equipment monitoring. Situational awareness requires the utility to be aware of actual ignitions in real time and to understand the likelihood of utility ignitions based on grid and asset conditions, wind, fuel conditions, temperature, and other factors.

The WMP Guidelines refer to key situational awareness measures, including:

1. Installation of advanced weather monitoring and weather stations that collect data on weather conditions so as to develop weather forecasts and predict where ignition and wildfire spread are likely;
2. Installation of high-definition cameras throughout a utility's service territory, with the ability to control the camera's direction and magnification remotely;
3. Use of continuous monitoring sensors that can provide near-real-time information on grid conditions;
4. Use of a fire risk or fire potential index that takes numerous data points in given weather conditions and predicts the likelihood of wildfire; and,
5. Use of personnel to physically monitor areas of electric lines and equipment in elevated fire risk conditions.

Overview

The WSD finds that PC has made progress in situational awareness and forecasting and finds this section of PC's 2021 WMP Update to be sufficient subject to remedies.

Progress over the past year

The WSD finds that PC has made the following progress:

[58] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 44 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

- PC is beginning to build out its weather station network and is working with a fire engineering consultant to provide input regarding the placement of weather stations considering topography, climate trends and areas with low visibility.
- PC also uses the LRAM to identify areas where climate-driven fire risk and utility equipment exist and then calculate the distances to weather stations.
- PC began developing a Distribution Fault Anticipation (DFA) pilot program in 2019 and is on schedule to deploy the technology on four circuits in 2021. This technology is promising, with the capability of detecting issues on circuits prior to failure.
- PC incorporated Vapor Pressure Deficit (VPD) into its forecasting in 2020 to improve the reliability of the Keetch-Byram Drought Index (KBDI), which the utility uses as a measure of short and long-term drying. This, combined with additional weather influencers such as the Fosberg Fire Weather Index, serves as an input to identify its operational strategies and is used similarly to a fire potential index for PSPS decision-making and non-reclosing operations.

PC has room for improvement in the following areas:

- PC only completed two of its anticipated 11 weather station deployments in 2020, citing delays due to 2020 fires,[59] as well as the need to facilitate more robust siting.[60]
- No spend was reported in PC's mitigation initiative financials table (Table 12 of PC's 2021 WMP Update) for its "Continuous Monitoring Sensors (Distribution Fault Anticipation)" program for any of the years in the 2020-2022 WMP cycle. However, PC reports units (actual and projected) for each of the years.[61]
- No projected spend was reported in Table 12 for the "Personnel monitoring areas of electric lines and equipment in elevated fire risk conditions" initiative.[62] In a data request,[63] the WSD asked PC why there was 2020 spend for this initiative, but no projected 2021 or 2022 spend (see appendix 11.2 for more information and for PC's response).
- It is unclear whether PC does fuel sampling to determine and track fuel moisture content in vegetation, or if it is solely relying on remote sensing to determine fuel moisture. Peer utilities are using a combination of fuel sampling and remote sensing data to determine live and dead fuel moisture values. The validation using this combination of collection methods provides a more accurate representation of the current state of fuel moisture both living and dead and serves as a valuable input to better understand when large fires are possible.

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[59] PacifiCorp 2021 WMP Update, p. 124.

[60] PacifiCorp DR 2apr2021, Question 2, received April 6, 2021.

[61] PacifiCorp 2021 WMP Update, Table 12, Row 14, Columns T-AE.

[62] PacifiCorp 2021 WMP Update, Table 12, Row 17, Columns T-AC.

[63] PacifiCorp DR 27apr2021, Question 6, received May 3, 2021.

Key Areas for Improvement and Remedies

The WSD finds that PC must focus on the following area as significant to reducing utility-related wildfire risk:

Utility-#	Issue title	Issue description	Remedies required
PC-21-03	GIS and non-spatial data discrepancy	PC's weather station GIS data does not match the non-spatial data included in its 2021 WMP Update, nor does it match the numbers provided in response to a data request (see Appendix 11.2 for more information). PC reports that it completed installation of ten weather stations in 2019 and two in 2020, which brings its current total to twelve. However, PC's GIS weather station data, submitted as part of its 2021 WMP Update, only includes ten GIS data points.	PC must provide complete, accurate, and the most current information, including GIS data, pertaining to all of its program targets and performance.

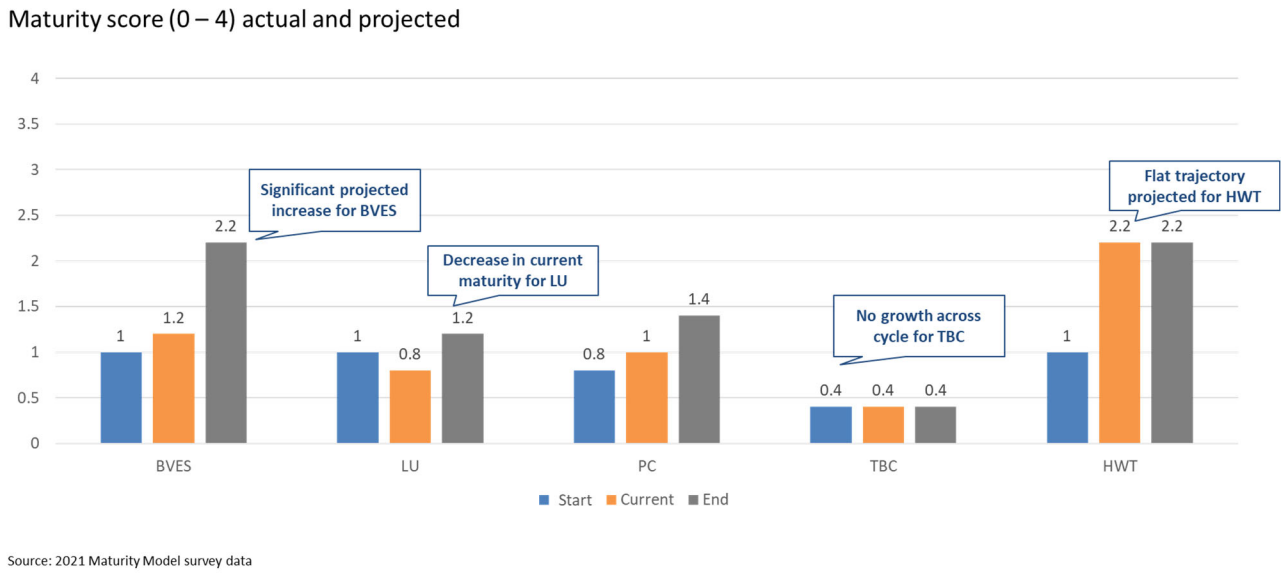
Additional Issues and Remedies

In addition to the key areas listed above, the WSD finds the following issues and associated remedies. The WSD expects PC to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: PC is trailing behind peer utilities in its situational awareness for ignition recognition with a lack of high-definition (HD) cameras and satellite fire detection technology in its California service territory.
    - REMEDY: PC must explain in its 2022 WMP how it plans to incorporate HD camera deployment and fire detection technology for ignition recognition in its California service territory.

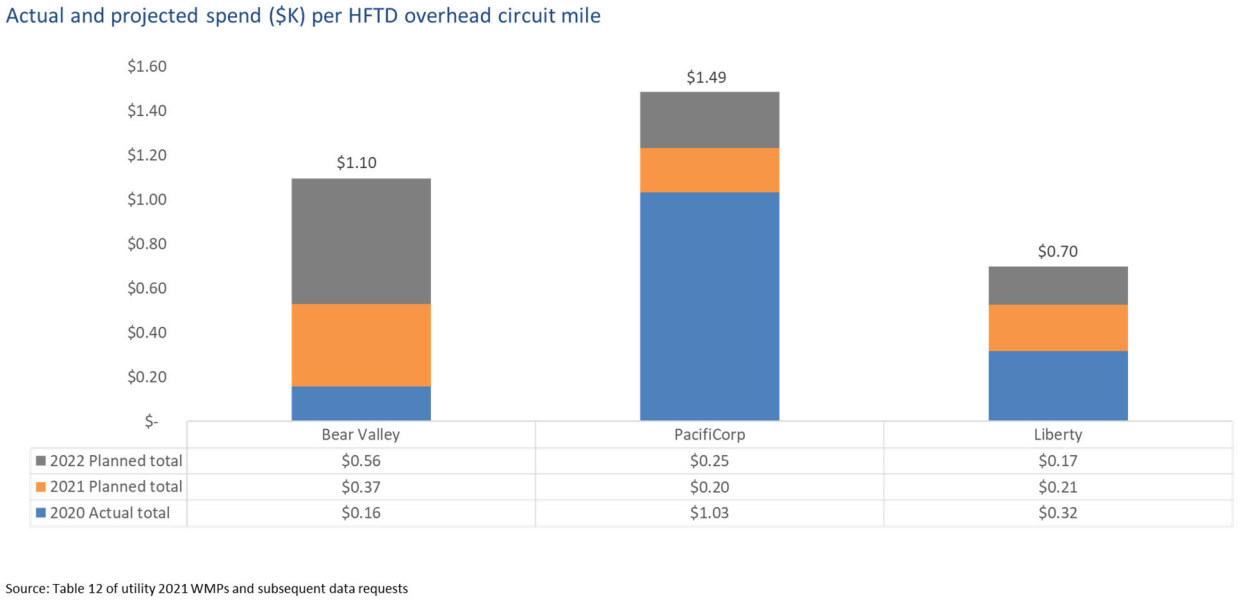
Figures

Below are charts used as part of the WSD's review of PC's situational awareness and forecasting section:



Source: 2021 Maturity Model survey data

Figure 5.2.a: Situational awareness and forecasting maturity score progress.



Source: Table 12 of utility 2021 WMPs and subsequent data requests

Figure 5.2.b: Situational awareness and forecasting spend per HFTD overhead circuit mile, SMJUs 2020-2022.

5.3. Grid Design and System Hardening

Introduction

The grid design and system hardening section of the WMP Guidelines[64] examines how the utility is designing its system to reduce ignition risk and what it is doing to strengthen its distribution, transmission, and substation infrastructure to prevent causing catastrophic wildfires. This section also requires discussion of routine and non-routine maintenance programs, including whether the utility replaces or upgrades infrastructure proactively rather than running facilities to failure. Programs in this category, which often cover the most expensive aspects of a WMP, include initiatives such as the installation of covered conductors to replace bare overhead wires, undergrounding of distribution or transmission lines, and pole replacement programs. The utility is required, at a minimum, to discuss grid design and system hardening in each of the following areas:

1. Capacitor maintenance and replacement,
2. Circuit breaker maintenance and installation to de-energize lines upon detecting a fault,
3. Covered conductor installation,
4. Covered conductor maintenance,
5. Crossarm maintenance, repair, and replacement,
6. Distribution pole replacement and reinforcement, including with composite poles,
7. Expulsion fuse replacement,
8. Grid topology improvements to mitigate or reduce PSPS events,
9. Installation of system automation equipment,
10. Maintenance, repair, and replacement of connectors, including hotline clamps,
11. Mitigation of impact on customers and other residents affected during PSPS event,
12. Other corrective action,
13. Pole loading infrastructure hardening and replacement program based on pole loading assessment program,
14. Transformer maintenance and replacement,
15. Transmission tower maintenance and replacement,
16. Undergrounding of electric lines and/or equipment,
17. Updates to grid topology to minimize risk of ignition in HFTDs, and,
18. Other/not listed items if an initiative cannot feasibly be classified within those listed above.

Overview

[64] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, p. 44 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

The WSD finds that PC has made progress in grid design and system hardening and finds this section of PC's 2021 WMP Update to be sufficient subject to remedies.

Progress over the past year

The WSD finds that PC has made the following progress:

- PC is reinforcing high priority wooden poles within HFTDs with pole cladding, wrapping, and fireproof spray coating to reduce the threat of damage from wildfires. In 2020, PC identified 4,326 at-risk poles to be included in the program and is aiming to reinforce or wrap 2,262 poles in 2021.[65]
- In the next 4 years, PC has 68 projects planned specific to wildfire risk reduction within the HFTD relating to system automation equipment, which includes relays, breakers, reclosers, and communications equipment with the main focus around fault detection.
- PC is focusing on small diameter copper conductor replacements, due to the fact that such conductor is not compatible with fault detection protection schemes now being implemented,[66] with 6.43 miles planned for replacement in 2021 and 2022, and 100 miles planned to be evaluated for potential replacement starting in 2023.[67]
- During routine inspections, PC focuses on assets that could present wildfire risk in the event of failure and has shortened the required timelines to address any associated repairs and replacements (as discussed in Section 5.4 below).

PC has room for improvement in the following areas:

- PC installed only 1.4 miles of covered conductor in 2020, less than its initial target of 38 miles.[68] PC is using this limited amount of covered conductor as a basis for its reasoning behind expanding its covered conductor program to 85 miles in 2021,[69] despite only having six data points demonstrating the effectiveness of covered conductor.[70] Additionally, while PC is using risk analysis to determine the prioritization of installation for covered conductor, PC is still aiming to install covered conductor across the entirety of HFTD Tier 2 and Tier 3 areas, instead of using other initiatives and mitigations.
- PC performs covered conductor maintenance through General Order (GO) 165 inspections and does not have a separate maintenance program at this time. PC needs to demonstrate a full understanding of maintaining covered conductor given that it is

[65] PacifiCorp 2021 WMP Update, Table 7-1, p. 133.

[66] PacifiCorp 2021 WMP Update, p. 137.

[67] PacifiCorp 2021 WMP Update, Table 7-3, p. 137.

[68] PacifiCorp 2020 WMP, Table 23, p. 168.

[69] PacifiCorp 2021 WMP Update, Table 12

[70] PacifiCorp DR 27apr2021, Question 3, received May 3, 2021.

relatively new to PC's system and can present wildfire risk if failure to properly identify needs for repairs and improvements leads to premature failure of covered conductor.

- PC's pole replacement program is quite extensive, with the goal of 128 pole replacements in 2021, 272 poles in 2022, and 4,054 poles in 2023.[71] PC does not explain the major increase in the number of planned pole replacements in 2023, nor does it explain how it intends to secure resources to complete such extensive work.
- PC explains that it plans to prioritize wood poles over 40 years old for replacement,[72] but does not provide adequate explanation for why it finds that this particular age of pole requires replacement.
- PC does not currently account for strength needs when conducting pole replacements. Instead, the current driving factors are the material of the poles and the resulting wildfire spread risk.[73] PC does not currently account for poles that may need replacement due to strength needs to support covered conductor installation and consequently may need to replace newly installed poles if covered conductor is installed on a circuit segment where poles were recently replaced.
- PC does not have a separate program for replacing hotline clamps and connectors, instead relying on standard business practices and its covered conductor installations to include these repairs and replacements. PC has seen three ignition events since 2015 involving connection devices,[74] and needs to demonstrate that it is effectively accounting for ignitions seen on its system.
- PC does not currently have a planned wildfire-specific undergrounding program. PC should evaluate undergrounding as part of its wildfire risk reduction mitigations to ensure all alternatives are being considered for fire mitigation, given the high-risk reduction benefits of undergrounding.
- PC does not separate many of the specific asset inspection programs required by the WMP Guidelines, such as capacitors, circuit breakers, and crossarms, and instead inspects these assets as part of routine inspections.

Key Areas for Improvement and Remedies

The WSD finds that PC must focus on the following areas as significant to reducing utility-related wildfire risk:

[71] Table 7-2: PacifiCorp's 2021 WMP Pole Replacement/Reinforcement Revised Annual Scope, p. 134.

[72] PacifiCorp 2021 WMP Update, p. 133.

[73] PacifiCorp DR 27apr2021, Question 1, received May 3, 2021.

[74] PacifiCorp 2021 WMP Update, Table 12, Row 115.

Utility-#	Issue title	Issue description	Remedies required
PC-21-04	Limited evidence to support the effectiveness of covered conductor	The rationale to support the selection of covered conductor as a preferred initiative to mitigate wildfire risk lacks consistency among the utilities, leading some utilities to potentially expedite covered conductor deployment without first demonstrating a full understanding of its long-term risk reduction and cost-effectiveness. The utilities' current covered conductor pilot efforts are limited in scope[75] and therefore fail to provide a full basis for understanding how covered conductor will perform in the field. Additionally, utilities justify covered conductor installation by alluding to reduced PSPS risk but fail to provide adequate comparison to other initiatives' ability to reduce PSPS risk.	The utilities[76] must coordinate to develop a consistent approach to evaluating the long-term risk reduction and cost-effectiveness of covered conductor deployment, including: 1. The effectiveness of covered conductor in the field in comparison to alternative initiatives. 2. How covered conductor installation compares to other initiatives in its potential to reduce PSPS risk.
PC-21-05	Reconductoring projects not prioritized based on wildfire risk	PC states that it is replacing small diameter copper and iron conductors "throughout PacifiCorp's California service territory" instead of focusing on areas of highest risk.	PC must demonstrate that its copper and iron reconductoring projects prioritize locations with the highest wildfire risk, both in scope and timing.

[75] Limited in terms of mileage installed, time elapsed since initial installation, or both.

[76] Here "utilities" refers to SDG&E and Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), PacifiCorp, Bear Valley Electric Service, Inc. (BVES), and Liberty Utilities; although this may not be the case every time "utilities" is used through the document.

Additional Issues and Remedies

In addition to the key areas listed above, the WSD finds the following issues and associated remedies. The WSD expects PC to take action to address these issues and report on progress made over the year in its 2022 WMP Update.

- ISSUE: PC lacks a separate covered conductor maintenance program, and does not demonstrate that its GO 165 programs adequately cover maintenance specific to wildfire risk
    - REMEDY: PC shall provide all supporting material to demonstrate that its maintenance programs effectively maintain its covered conductor. If its existing maintenance programs do not provide maintenance specific to covered conductor, PC shall enhance its current operations to provide such maintenance and provide supporting material to detail the enhancements to its existing programs.
- ISSUE: PC is increasing its pole replacement program from 2021 to 2023 without demonstration of need, effectiveness, or proof of adequate resources to perform the full scope.
    - REMEDY: PC must demonstrate the need for the scope of its pole replacement program, as well as a plan to obtain resources needed for the program.
- ISSUE: There is no mechanism in place to prevent overlap between PC's pole replacement program and covered conductor installation.
    - REMEDY: PC must provide a plan to ensure that newly installed poles are not replaced soon after installation due to covered conductor installation.
- ISSUE: PC does not have a separate program to evaluate and track the need for repairs and replacements of hotline clamps and connectors.
    - REMEDY: PC must develop a wildfire-specific program to evaluate the health of its hotline clamps and connectors instead of relying on existing programs, or show how existing programs adequately evaluate and track the need for replacements and repairs of such assets.
- ISSUE: PC has no planned wildfire-specific undergrounding program at this time.
    - REMEDY: PC must evaluate undergrounding as a potential mitigation as part of its full wildfire risk reduction analysis.

Figures

Below are charts used as part of the WSD's review of PC's grid design and system hardening section:

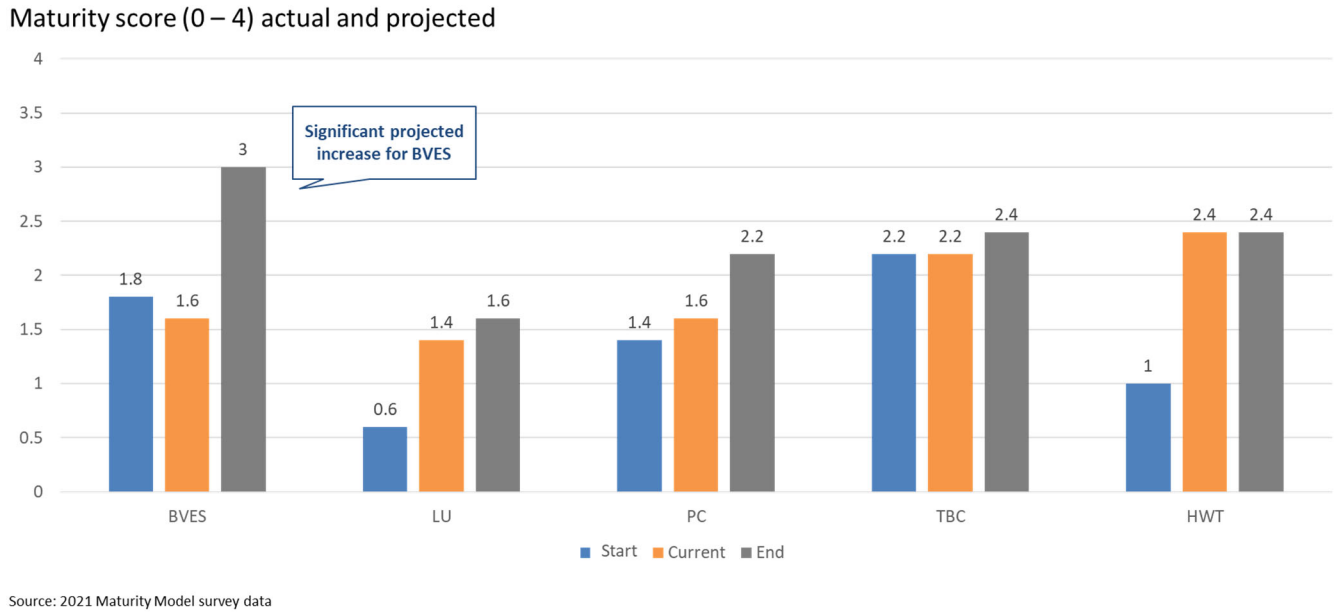


Figure 5.3.a: Grid design and system hardening maturity score progress.

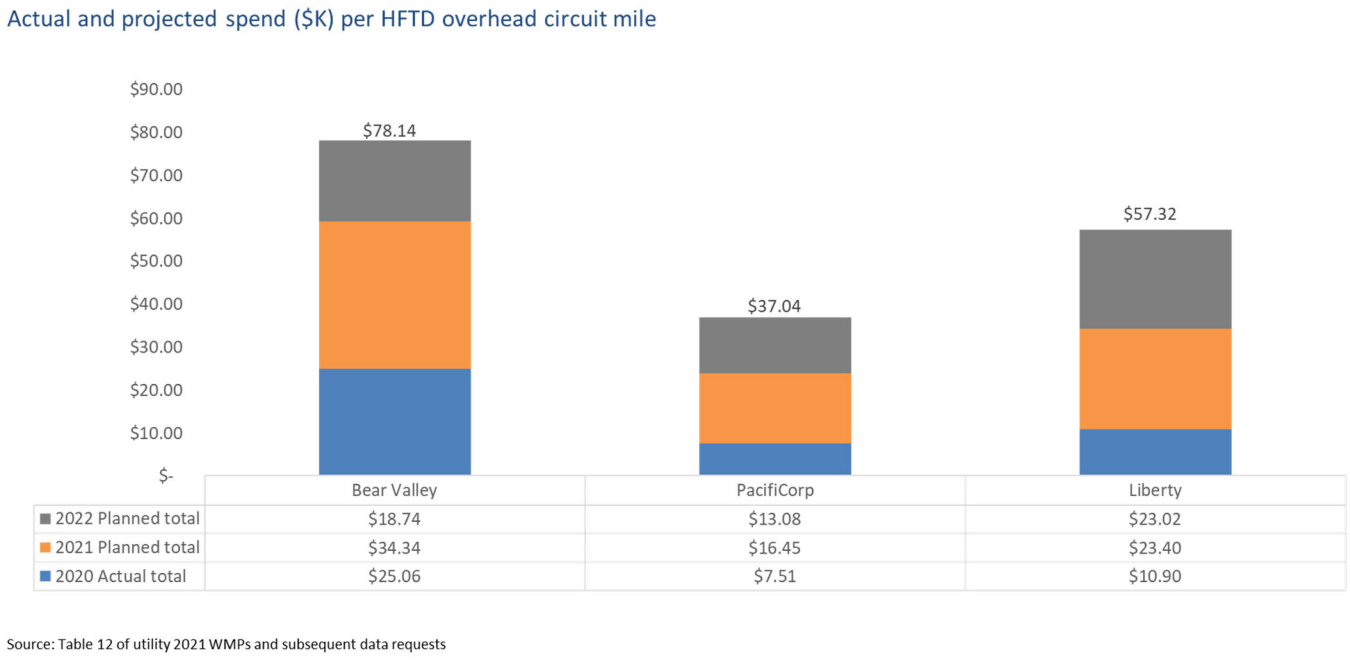
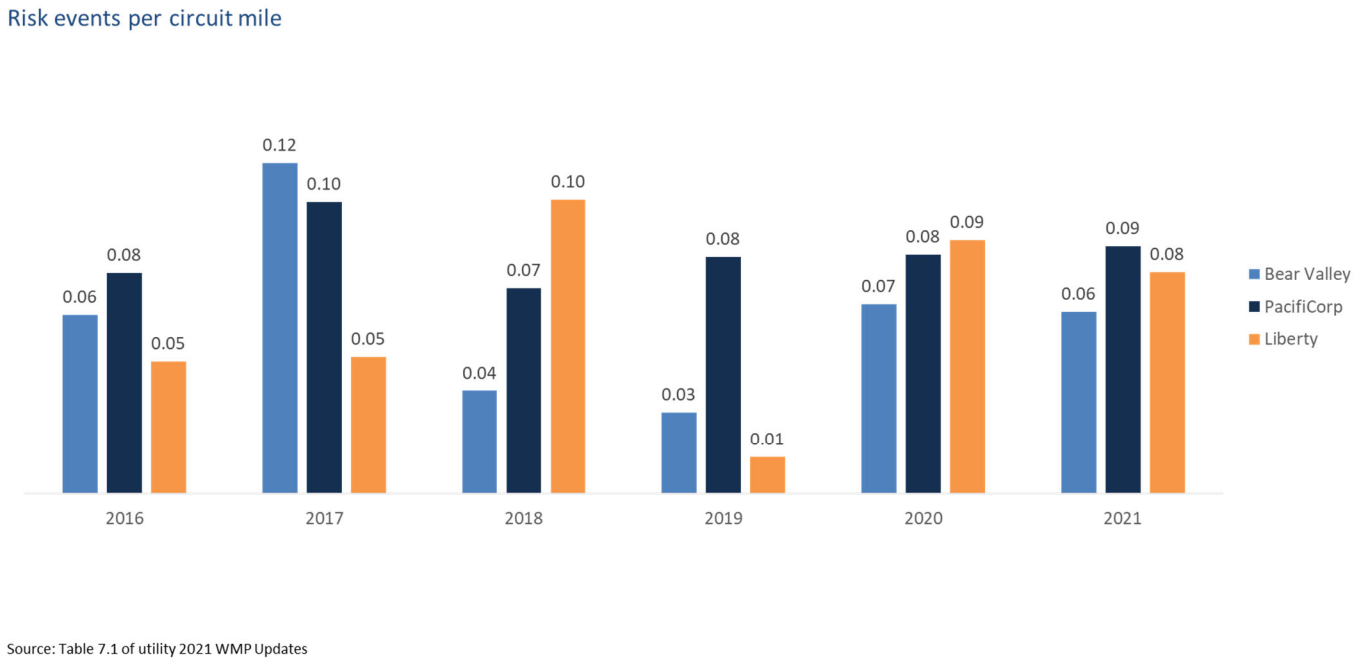


Figure 5.3.b: Grid design and system hardening spend per HFTD overhead circuit mile, SMJUs 2020-2022.



Source: Table 7.1 of utility 2021 WMP Updates

Figure 5.3.c: SMJU risk events due to equipment/facility failure per overhead circuit mile.

5.4. Asset Management and Inspections

Introduction

The asset management and inspections section of the WMP Guidelines[77] requires the utility to discuss power line/infrastructure inspections for distribution and transmission assets within the HFTD, including infrared, light detection and ranging (LiDAR), substation, patrol, and detailed inspections, designed to minimize the risk of its facilities or equipment causing wildfires. The utility must describe its protocols relating to maintenance of any electric lines or equipment that could, directly or indirectly, relate to wildfire ignition. The utility must also describe how it ensures inspections are done properly through a program of quality control.

Overview

The WSD finds that PC has made progress in asset management and inspections and finds this section of PC's 2021 WMP Update to be sufficient subject to remedies.

[77] WSD-011 Attachment 2.2, 2021 Wildfire Mitigation Plan Guidelines Template, pp. 44-45 (accessed July 19, 2021): https://energysafety.ca.gov/wp-content/uploads/docs/wmp-2021/attachment-2.2-to-wsd-011-2021-wmp-guidelines-template.pdf.

Progress over the past year

The WSD finds that PC has made the following progress:

- PC has made progress on its asset inspection program, including:
  - Increasing the frequency of inspections in high fire consequence areas
  - Narrowing the fire risk condition timeframes for correction
  - Piloting new technology to enhance visual inspections
- In 2020, PC performed approximately 13,000 detailed inspections of overhead distribution facilities, with approximately 7,000 conditions identified. The top five conditions consisted of 65% of the findings, with only 7% qualifying as a potential fire risk condition involving insufficient conductor clearance to the pole or crossarm, with 546 total instances found.[78]
- In 2020, PC performed approximately 3,000 detailed inspections of transmission facilities, with approximately 500 conditions identified. The top five conditions consisted of 57% of the findings, with only 2% qualifying as a potential fire risk condition involving damaged poles requiring replacement, with 15 total instances found.[79]
- PC continued its infrared (IR) inspections pilot program for transmission facilities after starting the pilot in 2019, although PC does not currently have an IR program for distribution facilities. PC found seven findings using IR in 2020 and plans to inspect 700 line-miles in 2021. PC is improving this program by examining data collected for better insight into the cause of identified hot spots.
- In 2019, PC piloted use of LiDAR for augmenting its asset inspections. PC found the information collected to be less accurate than expected based on field verification and is still in the process of determining the extent to which it intends to implement LiDAR into its asset inspection process.
- While PC does not have a wildfire-program specific quality assurance/quality control (QA/QC) process, PC has an overarching asset inspection QA/QC program that checks the accuracy of inspections being performed, including physical audits conducted at random for at least 5% of inspections. PC continues to improve its QA/QC process through iterations of correcting the root cause of any findings during audits and intends to expedite QA/QC audits in HFTDs after 2021.
- In 2020, PC implemented a mobile application for inspections.

PC has room for improvement in the following areas:

- While other utilities have demonstrated high risk-spend efficiency for expulsion fuse replacements,[80] and despite expulsion fuses having been shown to have a high

[78] PacifiCorp 2021 WMP Update, Table 7-6, p. 145.

[79] PacifiCorp 2021 WMP Update, Table 7-7, p. 146.

[80] For example, SDG&E provides estimated RSE values in line 29 of Table 12 in its 2021 WMP Update.

incidence rate for ignitions,[81] PC does not currently track expulsion fuse replacements separately, nor does it have a separate program to specifically target expulsion fuse replacements. PC instead relies on replacements occurring during covered conductor installation and through regular repairs related to its inspection program.[82] PC states that it "will continue to evaluate the need for an additional, stand-alone overhead expulsion fuse program should necessary fuse replacements not be sufficiently addressed through other programs"[83] but does not provide any details on how it is performing these evaluations, nor does it provide a timeline for possible implementation.

- PC does not provide a specific timeline for when it intends to start inspecting all transmission lines within its California service territory annually using helicopters, nor does PC provide adequate justification to support the effectiveness of the scope of this