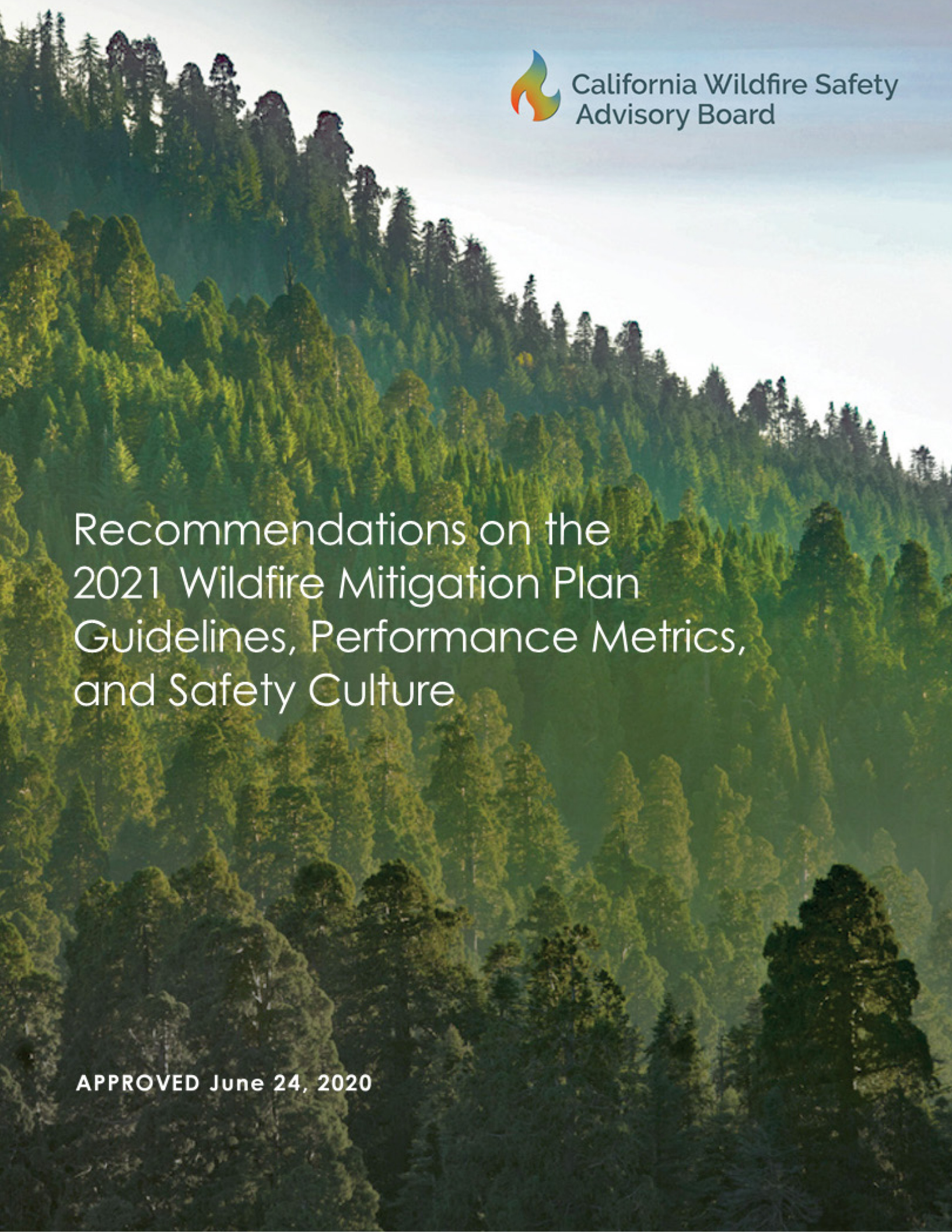


California Wildfire Safety Advisory Board

Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture

APPROVED June 24, 2020

California Wildfire Safety Advisory Board

California Wildfire Safety Advisory Board Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture

This document contains the recommendations of the California Wildfire Safety Advisory Board on the 2021 Wildfire Mitigation Plans Guidelines, Performance Metrics, and Safety Culture for investor-owned utilities that will be developed by the Wildfire Safety Division and considered by the California Public Utilities Commission in Rulemaking 18-10-007. These recommendations meet the June 30, 2020 statutory obligation pursuant to Assembly Bill 1054 (Holden, 2019). Future recommendations will address the broader implications for the utility sector in the next round of wildfire safety endeavors.

Members of the California Wildfire Safety Advisory Board:

- Marcie Edwards, Chair
- Diane Fellman, Vice Chair
- Ralph M. Armstrong Jr.
- Jessica Block
- John Mader
- Christopher Porter
- Alexandra Syphard

Each Board Members brings a unique perspective and expertise, enhancing the Board's ability to provide guidance to the Wildfire Safety Division. The Board approves these recommendations, but each recommendation may not reflect the views of individual board members. More information about Board Members can be found on the Board's website: www.cpuc.ca.gov/wsab.

Acknowledgements

These recommendations were adopted at the Board's June 24, 2020 meeting with the cognizance of the continual need to improve and inform the State of California's wildfire mitigation.

We acknowledge the ongoing efforts of Governor Newsom and his administration. California has always led the nation with our innovative renewable energy programs. Bankruptcy, wildfire mitigation, and an international pandemic were not likely the most anticipated job tasks. We are honored that Governor Newsom and the leadership of the California Legislature has called upon us to help advance a path forward.

We further acknowledge and commend Wildfire Safety Division Director Caroline Thomas Jacobs and her team for their efforts to develop a new division, meet legislative deadlines for Wildfire Mitigation Plan review, and develop a vision for a future.

We acknowledge and commend the utility efforts to mitigate wildfire. We recognize that the response to an international pandemic may have created unanticipated obstacles that slowed wildfire mitigation progress. Yet, utility actions to prepare for and mitigate wildfire mitigation remain essential and have continued.

Thank you to all participants in the utility wildfire mitigation process for the important efforts necessary to revolutionize the electric grid in a changing climate and keep Californians safe.

Last, but not at all least, the Board acknowledges our outstanding advisors, Jamie Ormond and Katherine Stockton, who have continued to wrangle our contributions into a meaningful statement of recommendations with aplomb and finesse. They have been ably supported by Jack Chang, Intern.

Introduction

Aged electric utility equipment and certain associated processes must be re-envisioned and rebuilt to avert utility ignited wildfires. The goal of utility wildfire mitigation planning is to implement programs that yield results. We commend the commitment that has been put towards reducing the risk of utility ignited wildfires to date. Through planning, action, data collection, and analysis, we will gain confidence in utility wildfire mitigation actions as we see results. We hope that the Board's 2021 recommendations will help regulators, utilities, and stakeholders appreciate the progress being made.

Pursuant to Public Utilities Code Sections 326.2 and 8389(a), this document constitutes the recommendations of the California Wildfire Safety Advisory Board (the Board or WSAB) to the California Public Utilities Commission's (CPUC) Wildfire Safety Division (WSD) on the development of the guidelines for the next round of wildfire mitigation plans as well as performance metrics and the utility safety culture. As the Board considers its recommendations on the 2021 Wildfire Mitigation Plans (WMP) Guidelines and other recommendations, we recognize that we are sharing the Board members' collective knowledge and experience to create a directional guidepost for future work efforts.

The 2021 Guideline Recommendations are broken into the following sections:

1. Structural Recommendations to the 2021 WMP Guidelines
2. Recommendations for 2021 WMP Guidelines that Generally Align with Guidance Resolution WSD-002
3. Recommendations that Go Further than Resolution WSD-002
4. Recommendations on Performance Metrics
5. Board Recommendations on Utility Safety Culture
6. Recommendations Likely Needing Legislative or Gubernatorial Action to Implement.

Overview of Board Recommendations

Structural Recommendations: The Board recommends minor changes to the organization of the guidelines centered around each mitigation area and with a focus on lessons learned. The Board suggests that it would be beneficial for readers of the 2021 Guidelines to highlight in the narrative sections of the WMPs the regulatory guidance being followed from laws and proceedings. We consider establishing an achievable submission schedule for the WMP that sets regulators, utilities, and stakeholders up for success. Finally, we suggest balancing data submission, quarterly reporting, and program implementation reporting to harmonize with the overall WMP schedule and maximize efficiencies.

Recommendations that Generally Align: The Board reviewed Guidance Resolution WSD-002 and noted that it reflected the Board's thinking when we reviewed the 2020 WMPs. Our recommendations for 2021 Guideline development are similarly aligned. We recommend a deeper Risk Spend Efficiency analysis on each mitigation measure. We support additional training and standards for qualified electrical workers. The Board considers updating the CPUC Fire-Threat maps and using risk assessment tools to guide utility implementation of mitigation measures. In this section we also suggest greater standardization of data collection across utilities for better comparability.

Recommendations that Go Further: Looking ahead, the Board provides recommendations for 2021 WMP Guidelines that raise the WMPs to the next level. We recommend additional scientific review of modeling inputs and assumptions before they are implemented in programs. The Board supports the need to develop a data access portal and a hierarchy of data permissions to allow interested parties access to some of the wildfire data and models used to make decisions. We expect that the scientific justifications used to make programmatic decisions be clarified in advance of implementation, especially in the area of vegetation management. The Board recommends additional training programs for all kinds of utility workers and an evaluation of workforce equity to mitigate a shrinking pool of employee resources. We urge utilities to align vegetation management practices with the best available science. To mitigate constraints on supply resources, we recommend the utilities collaborate with suppliers. And we see value in collaboration between WSD and CPUC General Rate Case experts as the reasonableness of wildfire mitigation implementation costs are considered.

Recommendations on Performance Metrics: There are two areas where additional performance metrics are in order in the 2021 WMP Guidelines. First, the Board recommends deliberating and implementing the concept of a new resiliency threshold that could significantly reduce the use of Public Safety Power Shutoff (PSPS) as the wildfire mitigation tool of choice. Utilizing wildfire risk reduction tools creates an electric grid that the utility can confidently run in higher wind events. The utility should know what threshold will permit the system to operate under windy conditions. Second, additional performance metrics and reporting are needed in the area of community outreach and emergency preparedness in order to evaluate the effectiveness of utility programs in this area.

Recommendations on Utility Safety Culture: The Board urges the utilities to use wildfire mitigation planning and implementation as a springboard to improve their safety culture. New groups must be directed to study black swan[1] events to help utilities prepare for future safety events outside of the standard areas of analysis. Safety assurance language must be inserted into utility Board of Director and manager-level job descriptions so that accountability can be enacted when necessary. High-level safety standards must be maintained over time. And post-accident follow-up briefings, and learning, must become a more standardized and integrated aspect of the electric utility landscape.

Recommendations Likely Needing Legislative or Gubernatorial Action: Finally, in the midst of an international pandemic that has slowed utility wildfire plan implementation, forced citizens to seek shelter across the state, and resulted in over 5,515 deaths[2] in California, it is inefficient to use time, energy, or budget resources to move WSD to another agency. While this move was a reasonable consideration for the 2019 legislation, the significant changes to our working environment since then requires that we direct all of our attention and effort to wildfire risk reduction and wildfire mitigation work.[3] The Board also suggests a couple of areas for further investigation.

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[1] A "black swan" is an event, often catastrophic, that was not predicted or predictable by existing statistical, engineering, or risk management models.

[2] As of June 21, 2020; reported on the State of California's "COVID-19 Statewide Update" webpage: https://update.covid19.ca.gov/.

[3] Public Utilities Code Sec. 326(b) requires that, by July 1, 2021, the WSD will transition to the California Natural Resources Agency and become the Office of Energy Infrastructure Safety (OEIS).

Themes

While utilities are responding to regulatory prompts, developing, and implementing their safety plans, the CPUC continues to promulgate regulatory policies and requirements consistent with the agency's mission: safe, reliable service at just and reasonable rates. As the Board put together the 2021 recommendations, the following themes surfaced throughout the process:

Analyze gaps by linking to CPUC Proceedings where decisions are being made. It is vital to guide interested parties to the regulatory proceeding where decisions are being made that affect their interests. The Board found that it may be useful to identify key areas where additional regulatory work may be needed. Just as a gap analysis was performed in the area of customer choice, and that gap analysis led to subsequent regulatory and legislative efforts, throughout this document, the Board will indicate where 2021 recommendations stem from 2020 recommendations, ongoing CPUC proceedings, WSD Resolution efforts, or require additional regulatory or legislative activity.

Prepare for compound catastrophes. Everyone needs to spend more time planning how to respond to inevitable catastrophic events. As utilities noted in their February 2020 workshops at the CPUC, the time to make plans is not at the same time that a lifesaving response is needed. Counties and local governments filed a Joint Motion[4] requesting additional guidance from the CPUC on how utilities should manage de-energization under shelter-in-place conditions. The questions raised in the motion are of utmost importance. As the state of Michigan responded to devastating flooding during COVID-19 shelter-in-place requirements, Californians, utilities, and fire fighters brace for a wildfire season with high winds occurring during a drought and a pandemic. We must proactively decide to protect human life and come up with plans now.

Acknowledging ongoing utility wildfire mitigation efforts. Utilities have implemented wildfire mitigation programs and have made progress. Review and improvement are ongoing, and we appreciate all of the efforts. We also recognize that advances can occur anywhere in the state, even outside of the regulatory gaze. We encourage interested stakeholders to surface all relevant information and lessons learned.

The Board appreciates the participation of the seventeen stakeholders and stakeholder groups who submitted comments, including: the Bioenergy Association of California, the Coalition of California Utility Employees, Georgia Goldfarb, the Green Power Institute, the Joint Local Governments, Kevin Collins, the Mussey Grade Road Alliance, Pacific Gas & Electric (PG&E), Patt Healy, Protect our Communities Foundation, the Public Advocates Office, Robert McCollum, San Diego Gas and Electric (SDG&E), San Lorenzo Valley Women's Club Environmental Committee, Southern California Edison (SCE), the Topanga Association for a Scenic Community, and The Utility Reform Network. We have incorporated these comments strategically throughout. The Board values this dialogue with stakeholders and the unique role the Board plays in the wildfire mitigation space. We look forward to opportunities to provide a forum to discuss these emerging issues.

[4] April 13, 2020 Joint Motion for Emergency Order Regarding De-Energization Protocols During the COVID-19 Pandemic filed in Rulemaking 18-12-005; available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M333/K014/333014736.PDF.

Summary of Recommendations

The Wildfire Safety Advisory Board provides an overview of its recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics and Safety Culture.

1. STRUCTURAL RECOMMENDATIONS TO THE 2021 WMP GUIDELINES

1.1 Topical Organization by Wildfire Mitigation Program with a Focus on Lessons Learned

- The Board recommends the 2021 WMP Guidelines be organized around each of the 10 categories being used for the WMPs and the Maturity Model to give the reader a complete picture of each. The organization should highlight Public Safety Power Shutoffs, workforce training, and stakeholder cooperation and community engagement.
- The Board recommends each of the Wildfire Mitigation Program sections of the 2021 WMP Guidelines start with lessons learned.

1.2 State and Federal Rules and Requirements Should Be Included and Explained in the Narrative of the WMPs

- The Board recommends the 2021 WMP Guidelines require the utilities to briefly describe the state and federal rules and proceedings that are associated with each wildfire mitigation program area in the narrative of the WMPs.

1.3 Submission Schedules That Set All Parties Up for Success

- The Board recommends the WSD set a WMP submission schedule that promotes the success of all parties. The CPUC could set the deadline for 2021 WMP submissions at least four months after the approval of the final 2021 WMP Guidelines, for example.

1.4 Strike a Balance Between Data Submission Requirements, Quarterly Reporting, and Program Implementation

- The Board recommends the 2021 WMP Guidelines require simplified and streamlined reporting requirements to include the data that is critical for WSD staff to complete its evaluation.
- The Board recommends that, in the future, WSD consider the reporting ordered as part of its 2020 WMP review to be considered components of the next year's WMP Update.

2. RECOMMENDATIONS FOR 2021 WMP GUIDELINES THAT GENERALLY ALIGN WITH GUIDANCE RESOLUTION WSD-002

2.1 Risk Spend Efficiency Analysis Required for Each Mitigation Measure

- The Board recommends that the 2021 WMP Guidelines require utilities to complete a Risk Spend Efficiency (RSE) analysis for each mitigation measure, at a circuit level, so that each measure can be considered individually, in aggregate, and against each other, to determine the most appropriate wildfire mitigation effort for each circuit section.
- The Board recommends that the 2021 WMP Guidelines require PSPS to be treated as a risk for the purposes of the RSE calculations in order to encourage utilities to allocate resources in a way that prioritizes reducing the number, scope, duration, and reenergization timeline of PSPS events.

2.2 Training and Standards for Qualified Electrical Workers

- The Board recommends that the 2021 WMP Guidelines require the utilities to demonstrate that their training programs properly train wildfire mitigation workers. Because of the severe and often devastating consequences of arc flash incidents, wildfire mitigation worker safety must include training so that the qualified worker is knowledgeable in the construction and operation of equipment and work methods to identify and avoid the electrical hazards that might be present.
- The Board recommends that the CPUC and the 2021 WMP Guidelines require that the utilities hire Qualified Electrical Workers (QEW), meaning electrical asset inspectors with qualifications that go beyond a basic knowledge of General Order 95 requirements, to perform certain types of inspections. All wildfire mitigation related inspections and patrols of infrastructure and circuitry should be performed by QEWs.

2.3 Risk Assessment and Mapping to Determine Location of Wildfire Mitigation Measures and Update CPUC Fire-Threat Maps More Frequently

- The Board recommends that instead of relying solely on the High Fire Threat District (HFTD) maps to determine where to focus mitigation measures, the 2021 WMP Guidelines should require that utilities rely on both infrastructure risk assessment and mapping, and the relationship to the HFTD.
- The Board recommends that the CPUC, through WSD, consider developing a more streamlined process to update the CPUC Fire-Threat maps relative to how fast the input variables are changing. As vegetation conditions or construction development patterns change, so should the CPUC Fire-Threat maps.

2.4 Standardized Data to Allow Cross-Utility Comparisons

- The Board recommends the CPUC consider WSD's recommendation for a data taxonomy and data schema that will ensure consistent formatting and streamline the reporting of data in the WMPs, using the same measurements.
- The Board recommends WSD hold data working groups that are open to any interested parties to contribute to the generation of data standards for utility reporting as well as to assist in leveraging existing data standards from other fields.

3. RECOMMENDATIONS THAT GO FURTHER THAN RESOLUTION WSD-002

3.1 Scientific Review of Modeling Methods and Assumptions

- The Board recommends that the 2021 WMP Guidelines require the utilities to disclose detailed modeling methods and assumptions. An independent scientific advisory panel should be created to vet modeling methods. This scientific advisory panel would go through a nomination and confirmation process approved by the Board, the WSD, or the CPUC.
- The Board recommends that the CPUC require the utilities create a process to incorporate feedback from the scientific advisory panel.

3.2 Development of a Data Access Portal for Interconnected Data Repositories and a Hierarchy of Permission to Access Wildfire Data and Modeling Methods

- The Board recommends the CPUC, with oversight by the WSD, require the utilities to contribute to a data repository where data sources can be accessed by interested parties through a portal with varying levels of data access. To ensure data security, WSD would develop data policies defining a hierarchy so that different granularities of data can be accessed by interested parties with certain levels of permissions types (e.g. CPUC staff, scientists, those with Non-Disclosure Agreements (NDA), or the public).
- The Board recommends the WSD develop data policies through a transparent stakeholder process, taking into consideration the needs of regulators, the scientific community, and other stakeholders as well as the security of utility infrastructure.

3.3 Reporting Expert Qualifications and Scientific Justification for Decision-Making

- The Board recommends that the 2021 WMP Guidelines require the utilities to disclose the qualifications of scientific personnel relied upon to prepare the WMPs in order to increase transparency and demonstrate that each utility is relying upon accurate expert advice. Perhaps the minimum hiring qualifications for these roles ought to be developed.
- Wherever the best available science is relied upon within the WMPs, the Board recommends the 2021 WMP Guidelines direct the utilities to include a citation to the peer-reviewed scientific literature and associated scientific works. Citations ensure that the public can identify the scientific authorities relied upon by the utility as well as help socialize groundbreaking scientific efforts.

3.4 Robust Training Programs and Workforce Equity

- The Board recommends that the 2021 WMP Guidelines require the utilities to develop more robust outreach and onboarding training programs for new electric workers that (A) train workers to identify hazards that could ignite wildfires, and (B) increase the pool of Qualified Electrical Workers.
- The Board recommends the 2021 WMP Guidelines require the utilities to create pre-inspection vegetation management training programs to increase the pool of certified arborists.
- The Board recommends the 2021 WMP Guidelines require the utilities to assess whether they offer competitive pay to both unionized and non-unionized workers and whether that contributes to the limited pool of workers.
- The Board recommends the 2021 WMP Guidelines require the utilities to report and assess whether there are enough ecological and forest management scientists on staff to develop a coordinated vegetation management strategy.

3.5 Aligning Vegetation Management Practices with Best Available Science

- The Board recommends that all utilities coordinate and complete an ongoing study, that goes beyond what is ordered in WSD-005, that would ensure vegetation management practices align with best available science. The research should be reviewed by an independent scientific advisory panel or developed as part of a working group process overseen by WSD.
- The Board recommends the 2021 WMP Guidelines request additional details about the utility's vegetation management decision-making process and how the utility assesses the tradeoffs between vegetation fuel load versus flammability. Utilities should justify the removal of species, particularly shrubs, that will not reach a height to touch or contact electrical lines.
- The Board recommends the 2021 WMP Guidelines require the utilities to develop explicit vegetation management residue plans that ensure that vegetation management itself does not contribute to increased fuel load and increased risk of fire.

- The Board appreciates WSD-003 requiring SDG&E to list the species within a genus and recommends this requirement be extended to all utilities in the 2021 WMP Guidelines. The 2021 WMP Guidelines should also require reporting descriptions of the tree characteristics that justify any "at risk" designation since growth rates for trees vary depending on age and environmental conditions.

3.6 Resolving California Utilities Resource Constraints

- The Board recommends that California utilities collaborate and exercise their economic power to form partnerships with suppliers to advance store critical infrastructure equipment.
- The Board recommends that the 2021 WMP Guidelines require the utilities to report on procurement challenges such as equipment shortages, price increases in equipment, delays, and efforts to mitigate these challenges.

3.7 WMP Cost Reasonableness Review and Costs Recovery

- The Board recommends that WSD assist in the reasonableness review of utility wildfire mitigation expenditures because that evaluation occurs in CPUC-managed General Rate Case (GRC) proceedings. Subject matter experts must be available to collaborate.
- The Board recommends that WSD publish reports based on their utility wildfire mitigation status to assist with future expenditure review.

4. RECOMMENDATIONS ON PERFORMANCE METRICS

4.1 Develop an Electric Utility Resiliency and Risk Reduction Threshold

- The Board provides the following guidance that the WSD and stakeholders begin developing a new System Hardening for Electric Utility Resiliency (SHEUR) threshold, that sets an acceptable level of electric operation risk and establishes the risk reduction that a utility should assume so that it can design its systems accordingly. The future demonstration of compliance with the newly developed SHEUR threshold could become an achievable condition of approval of a utilities' WMP.

4.2 Community Outreach and Emergency Preparedness Performance Metrics and Data Reporting

- The Board recommends that the 2021 WMP Guidelines include progress metrics on community outreach and emergency preparedness.

5. RECOMMENDATIONS ON UTILITY SAFETY CULTURE

5.1 Develop a Unit Within or Outside of the Utility, to Study Black Swan Events and Predict Potential Future Events

- The Board recommends that the CPUC, with WSD oversight, require the utilities to create engineering and risk management teams to surface and flag black swan events for further consideration and remediation.

5.2 Insert Safety Language into Investor Owned Utility Board Member Job Descriptions

- The Board recommends that the WSD provide illustrative position descriptions for utility boards of directors that emphasize safety where the utility has not sufficiently addressed the issue.

5.3 Ensure Consistent Compliance with High-Level Safety Standard

- The Board recommends that WSD maintain its high bar when performing its safety culture assessments and set the bar so that that utilities maintain high standards as utilities hire, grow, and adapt their safety culture.

5.4 Post-Accident Debriefing and Learning

- The Board recommends that the WSD work with the CPUC's Safety Policy and Safety Enforcement Divisions to assess the effectiveness of the utilities' processes and post-accident evaluation, including whether the learnings from the evaluations are incorporated into future wildfire mitigation planning.

6. RECOMMENDATIONS LIKELY NEEDING LEGISLATIVE OR GUBERNATORIAL ACTION TO IMPLEMENT

6.1 The Wildfire Safety Division Remaining at the CPUC

- The Board recommends that the WSD continue performing the important wildfire safety work at the CPUC instead of spending time, energy, and money moving to a different agency in July 2021.

6.2 Future Issues for Consideration

- The Board recommends for the 2022 cycle that it conduct further study with associated due diligence on issues that are related to utility wildfire mitigation efforts that will aid implementation, enhance effectiveness, eliminate unnecessary barriers or eliminate inefficiencies following adoption of the 2021 recommendations.

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1 Structural Recommendations to the 2021 WMP Guidelines.

The Wildfire Mitigation Plan (WMP) Guidelines (together, the Guidelines) developed by the Wildfire Safety Division (WSD) are central to charting the investor-owned utilities' pathway to mitigating wildfire threat and the impacts on California citizens. These Guidelines are designed to gather and report a wide swathe of material including vegetation management, miles of covered conductor, the frequency of PSPS events, community engagement efforts, and workforce capacity building. This section lays out suggested structural changes to create greater accessibility to valuable information in the plans.

The 2020 WMP Guidelines, significantly improved the structure, comprehensiveness and data gathered, which increased the transparency of utility wildfire mitigation efforts. Based on the Guidance Resolution WSD-002, WSD will be requiring data updates for the tables and submission three months in advance of the 2021 Utility WMP Updates and may require staggered filings for the updated plans. The Board incorporated this guidance as part of its review.

One observation that stands out is that the 2021 WMP Guidelines should build on the organizational advances in the 2020 WMP Guidelines. It is critical to provide the utilities with clear guidance on the data reporting required in the plans. Additionally, an achievable timeline for WMP submissions and a simple organizational structure will help concerned members of the public who typically do not engage in the CPUC's processes to comprehend both the utilities' filings, and WSD's objectives.

1.1 Topical Organization by Wildfire Mitigation Program with a Focus on Lessons Learned

Procedural Linkage:

- The 2020 WMP Guidelines are organized by: (1) Persons responsible for executing the WMP, (2) Metrics and underlying data, (3) Baseline ignition probability and wildfire risk exposure, (4) Inputs to the plan and directional vision for wildfire risk exposure, (5) Wildfire mitigation strategy and programs for 2020 and each year of the 3-year WMP term, and (6) Utility GIS attachments.
- Section 5 of the 2020 WMP Guidelines describes the 10 wildfire mitigation Maturity Model categories: (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 protocols, (7) Data governance, (8) Resource allocation methodology, (9) Emergency planning and preparedness, and (10) Stakeholder cooperation and community engagement.
- The 2020 WMP Guidelines request information on lessons learned throughout, for example sections: 2.1, lessons learned on how tracking metrics on the 2019 plan has informed the 2020 plan; 4.4, lessons learned regarding PSPS events; and 5.1, lessons learned that inform the utility wildfire mitigation strategy.
- Guidance Resolution WSD-002 found deficiencies regarding PSPS impacts (Guidance-4) and planning to address personnel shortages (Guidance-11).

BOARD RECOMMENDATIONS

The Board recommends the 2021 WMP Guidelines be organized around each of the 10 categories being used for the WMPs and the Maturity Model to give the reader a complete picture of each. The organization should highlight Public Safety Power Shutoffs, workforce training, and stakeholder cooperation and community engagement.

The Board recommends each of the Wildfire Mitigation Program sections of the 2021 WMP Guidelines start with lessons learned.

Observations:

- The 2020 WMP Guidelines are very comprehensive. The current structure is somewhat disjointed because in order to get a complete picture about any one mitigation program, the reader must find and read information in sections 2, 3, 4, and 5. If all the information about any particular mitigation measure is combined in one chapter, the Guidelines will be easier to read and digest. Therefore, section 2 on metrics, section 3 on baseline ignition probability, and section 4 on directional vision should be integrated into each topical suggestion.
- The organization of the Guidelines should highlight Public Safety Power Shutoffs (PSPS) because of the importance of the issue to the public. A chapter dedicated to PSPS will help the utilities demonstrate their PSPS strategy and help direct the utilities to use the entire toolbox of mitigation strategies to mitigate PSPS events.
- Workforce training and planning for limited resources should also be highlighted at the beginning of the document so that utilities emphasize these efforts more. Indeed, Guidance Resolution WSD-002 found that all utilities lacked detail on plans to address personnel shortages (Guidance-11).
- Stakeholder cooperation and community engagement should be the first mitigation program category discussed because of the importance of the issue to the public.
- The Board also recommends a new section towards the end of the Guidelines where the utilities can include any other noteworthy trends or challenges of which stakeholders and the CPUC should be made aware.
- As an example, the 2021 WMP Guidelines could be organized as follows:

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I. Introduction: Inputs to the Plan and Directional Vision for Wildfire Risk Exposure

a. Persons responsible for executing the WMP[5]
b. Objectives of the plan
c. Major trends impacting ignition probability and changes from previous WMP

[5] As described in section 3.3, this would cite to an appendix with the resumes of scientific experts.

II. Public Safety Power Shutoff Planning and Mitigation

a. Lessons Learned
b. State and Federal Rules and Open Proceedings
c. Directional vision for necessity of PSPS
d. Outline of decision-making before, during, and after PSPS events
e. How other initiatives mitigate need for PSPS

III. Workforce Training and Planning for Limited Resources

IV. Wildfire Mitigation Programs*

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

V. Other Trends and Challenges

VI. Updated Utility GIS Attachments

**Each Wildfire Mitigation Program section would include:*

a. Lessons Learned
b. State and Federal Rules and Open Proceedings
c. Updated Performance Metrics: Progress Metrics, Outcome Metrics, Program Targets
d. Updated underlying data [data tables currently in 5.3.1 through 5.3.10.]
e. Updated baseline ignition probability and wildfire risk exposure
f. Updated Wildfire Mitigation Plans for the 3-year period6
g. Updated expected outcomes of the 3-year plan
h. Updated data requested in the supplementary data request
i. Updated responses to the Wildfire Mitigation Maturity Utility Survey

[6] The bulk of the current section 5.3 per topic would go in this section.

1.2 State and Federal Rules and Requirements Should Be Included and Explained in the Narrative of the WMPs

Procedural Linkage:

- The 2020 WMP Guidelines require the utilities to cite the associated rule and state whether the utility is in or exceeding compliance with the regulation. These are tables 21 through 28 in sections 5.3.1 through 5.3.9.

BOARD RECOMMENDATION

The Board recommends the 2021 WMP Guidelines require the utilities to briefly describe the state and federal rules and proceedings that are associated with each wildfire mitigation program area in the narrative of the WMPs.

Observations:

- This recommendation is consistent with the Board's Recommendations on the Utility 2020 WMPs where we stated that "[w]e anticipate that as wildfire mitigation work progresses, the various forums for procedural developments will be brought together into the WMP documents."
- The guidelines and utility plans should clarify which rules are determined in which forums. The tables already require the utilities to report which proceeding has reviewed which program. This is useful, but this information should be brought into the narrative of the utility responses. Bringing this background into the narrative will help stakeholders understand which rules may be changed into the WMP rulemaking proceeding and allow stakeholders and the CPUC to assess whether the utilities are in compliance with rules set in other proceedings.
- As discussed in section 1.1, a description of the state and federal rules and their relevance to wildfire mitigation could be included as a sub-topic for each of the ten categories being used for the WMPs and the Maturity Model. This section could be titled, "State and Federal Rules and Open Proceedings." This narrative should *briefly* describe each state or federal rule, when and in what procedural forum the rule was set, and whether there is a relevant open proceeding. This is not intended as a duplication of effort. Rather, its objective is to note in the WMPs the extensive work being required and accomplished elsewhere.

1.3 Submission Schedules That Set All Parties Up for Success

Procedural Linkage:

- The urgency of establishing Guidelines to better understand, review and rule on the utilities' wildfire mitigation actions compressed the 2020 WMP schedule. Table 1 shows the schedule for the 2020 WMPs and predicts the schedule for the 2021 WMPs based on requirements from Assembly Bill (A.B.) 1054 (Holden, 2019) and the Guidance Resolution WSD-002.

Table 1. 2020 and 2021 WMP Deadlines, Based on A.B. 1054 and Resolution WSD-002

Activity	**Deadline/Date**
2020 WMP Guidelines issued via ALJ Ruling	December 16, 2019
PG&E, SCE, SDG&E, Liberty Utilities, PacifiCorp, Bear Valley, Horizon West, and Trans Bay Cable submitted 2020 WMPs	February 7, 2020
Draft Resolutions WSD-002 to 009 Published	May 7, 2020
Comments due on Draft Resolutions WSD-002 to 009	May 27, 2020
Earliest CPUC meeting date to vote on WSD Resolutions	June 11, 2020
WSAB deadline to publish recommendations on 2021 WMP Guidelines, performance metrics, and safety culture.	June 30, 2020
WSD recommendation on 2021 performance metrics, guidelines, compliance, and safety culture due to the CPUC	October 31, 2020
A.B. 1054 requires CPUC approval by December 1, 2020 of the 2021 WMP Guidelines, performance metrics, compliance matters, and safety culture parameters.	November 19, 2020 (last meeting) December 1, 2020 (statutory)

BOARD RECOMMENDATION

The Board recommends the WSD set a WMP submission schedule that promotes the success of all parties. The CPUC could set the deadline for 2021 WMP submissions at least four months after the approval of the final 2021 WMP Guidelines, for example.

Observations:

- The Board also supports easing the burden of the compressed timeline for the utilities. The utilities were given less than two months to prepare the 2020 WMPs under new guidelines. The utilities should be provided four months to prepare the 2021 WMP updates. Therefore, the WSD recommendation on performance metrics, guidelines, compliance matters, and safety culture should be due in August and the CPUC should target an October final decision.
- The Board recognizes the Herculean effort and coordination of CPUC and the California Department of Forestry and Fire Protection (CAL FIRE) staff during WSD's evaluation of the eight utility WMPs.

1.4 Strike a Balance Between Data Submission Requirements, Quarterly Reporting, and Program Implementation

Procedural Linkage:

- The utilities are required to gather and compile data to provide responses to the 2020 WMP Guidelines, Performance Metrics, Supplemental Data Requests, Utility Maturity Model and Survey, and additional data requests by WSD and other stakeholders. Table 2 below shows some of these reporting requirements. Note that this is not an exhaustive list.

Table 2. Overview of Data Reporting Requirements

Document or Report	Attachment[7] or Reference	Data Reporting Requirement
2020 WMP Guidelines	Attachment 1	31 tables
Maturity Model and Survey	Attachments 2 and 3	Reporting on the utilities' maturity in 52 categories
Performance Metrics: Progress and Outcome Metrics	Attachment 4 Overlap with Section 2 of the 2020 WMP Guidelines	10 Progress Metrics 20 Outcome Metrics
Supplemental Data Request	Attachment 5	13 tables
Quarterly Reports on Deficiencies	Resolutions WSD-002 through WSD-005	63 Class B deficiencies across the three large utilities
Quarterly Advice Letters	Required by A.B. 1054	(1) implementation of WMP and safety culture recommendations, and (2) summary of the board of directors' safety committee meetings
Weekly Updates	Ordered by Resolution WSD-001	Report responses to data requests and other information available on utility WMP websites

BOARD RECOMMENDATIONS

The Board recommends the 2021 WMP Guidelines require simplified and streamlined reporting requirements to include the data that is critical for WSD staff to complete its evaluation.

The Board recommends that, in the future, WSD consider the reporting ordered as part of its 2020 WMP review to be considered components of the next year's WMP Update.

[7] Attachments to the ALJ Ruling on WMP Templates and Related Materials and Allowing Comment, issued December 16, 2019 in Rulemaking 18-10-007.

Observations:

- The Board acknowledges the significant effort by utility staff to complete the reporting as required by the WMP Guidelines. The utilities demonstrated significant progress from the 2019 WMPs. The Board also agrees with WSD that the 2020 utility WMPs were deficient in some areas. However, in alignment with the Board's recommendations on the 2020 Utility WMPs,[8] the Board recommends that the additional elements for the quarterly reports directed in Resolutions WSD-002 through WSD-009 be considered components of the utilities' 2021 WMP Updates.
- There will likely be better outcomes and more collaboration between CPUC and utility staff if the CPUC could demonstrate that the data submitted by the utilities is in fact used in the decision-making process. Regulators often request large amounts of data to monitor utility programs and there should be a demonstration that data collected and submitted are used and analyzed.

[8] Board Recommendations on the 2020 Utility WMPs at 2, clarifying that its "recommendations do not request that the utilities resubmit documents related to their 2020 WMPs," and instead act as "additive guidance in consideration of the 2021 WMPs currently under development."

2 Recommendations for 2021 WMP Guidelines that Generally Align with Guidance Resolution WSD-002

On June 19, 2020, the CPUC's Wildfire Safety Division issued Guidance Resolution WSD-002 on 2020 Wildfire Mitigation Plans Pursuant to Public Utilities Code Section 8386. The text of the resolution correctly notes that the CPUC's, "most important responsibility is ensuring that its regulations keep Californians safe."[9] This section discusses where WSD's review aligned with the 2020 Board recommendations and the Board's current thinking.

2.1 Risk Spend Efficiency Analysis Required for Each Mitigation Measure

Procedural Linkage:

- Section 5.3.8. of the 2020 WMP Guidelines on resource allocation requires the utilities to describe their risk spend efficiency analysis. The 2020 WMP Guidelines state that, "Risk spend efficiency is an estimate of the cost-effectiveness of wildfire mitigation initiatives. This is calculated by dividing the mitigation risk reduction benefit by the mitigation cost estimate-based on the full set of risk reduction benefits estimated from the incurred cost."[10]
- Guidance Resolution WSD-002 (Guidance-1) found a deficiency in the lack of RSE information in the utilities' 2020 WMPs.
- The CPUC is actively considering how the utilities manage their wildfire mitigation tools in the deenergization (PSPS), undergrounding, microgrid, and other proceedings. Additionally, the CPUC approves RSE methodologies, Risk Assessment and Management Phases (RAMP) of utility General Rate Cases (GRC), and Safety Model Assessment Proceedings (S-MAP).[11]
- Senate Bill 901 as codified in Public Utilities Code section 8386(c)(11) and (12), requires the utilities to adhere to RAMP decisions in their respective WMPs.

BOARD RECOMMENDATIONS

The Board recommends that the 2021 WMP Guidelines require utilities to complete a Risk Spend Efficiency (RSE) analysis for each mitigation measure, at a circuit level, so that each measure can

[9] Guidance Resolution WSD-002 at 1: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M340/K859/340859823.docx.

[10] 2020 WMP Guidelines at 12.

[11] Some of these proceedings include Rulemaking 18-12-005 (deenergization/PSPS), Rulemaking 17-05-010 (undergrounding), Rulemaking 19-09-009 (microgrids), Investigation 18-11-006 (SCE RAMP), and Application 15-02-005 (SDG&E S-MAP).

be considered individually, in aggregate, and against each other, to determine the most appropriate wildfire mitigation effort for each circuit section.[12]

The Board recommends that the 2021 WMP Guidelines require PSPS to be treated as a risk for the purposes of the RSE calculations in order to encourage utilities to allocate resources in a way that prioritizes reducing the number, scope, duration, and reenergization timeline of PSPS events.

Observations:

- The Board agrees with WSD that the utilities must complete an RSE analysis for each mitigation measure.[13] The Board clarifies that this analysis must be completed at a circuit level. The Board also agrees with WSD that not all mitigation measures will require an RSE analysis, such as measures that do not directly reduce ignition risk.[14] Utilities should work with WSD to determine which mitigation measures do not need a complete RSE analysis.
- The RSE analysis should use the marginal risk reduction for each measure being considered in relation to the SHEUR threshold, as discussed in section 4.1 of these recommendations and section 8 of the Board's 2020 Utility WMP Recommendations.[15] The development of an RSE analysis for each mitigation measure, will enable the quantification of the most efficient asset allocation required to solve the risk reduction needed to both prevent wildfires and avoid some PSPS events.
- In their 2019 and 2020 filings, the utilities treated PSPS events as a solution to lower risk of ignition in their WMPs and in their RSE analyses. The utilities have naturally reached for the least expensive and most readily available tool to mitigate wildfire risk and the last two fire seasons have demonstrated the utilities' approach with the PSPS tool. PSPS may reduce the risk of wildfire but it also creates risk. The use of PSPS may increase the risk of other types of fires including fires caused by temporary generation or other fuel and light sources. Therefore, PSPS should be treated as a risk for the purposes of the RSE calculation.
- If PSPS is treated as a risk to avoid, then utilities will allocate resources in a way with the goal of reducing the scope, duration, and reenergization timeline for PSPS events. If mitigation measures,

[12] The Board initially brought forth this recommendation in its Recommendations on the 2020 Utility Wildfire Mitigation Plans, adopted April 15, 2020, in Recommendation 8, Criteria to Prioritize Reducing PSPS Events for Critical Infrastructure; and Recommendation 10, Risk Spend Efficiency and Costs of PSPS Events. The recommendations are available at: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/WSAB%20Recs%20on%202020%20Utility%20WMPs%20-%20Final%20Approved%20Executed%204.17.2020.pdf.

[13] Tools at the disposal of the utility include: grid hardening (undergrounding, installing covered conductors, sectionalizing circuits, or upgrading equipment most likely to cause fire ignition), installing microgrids to increase electricity resiliency in higher risk areas, vegetation management, improved inspection and maintenance, situational awareness (cameras, weather stations, and use of data to predict areas of highest fire threat), and improved community engagement and awareness.

[14] Guidance Resolution WSD-002, Issued on June 19, 2020 at 36.

[15] Adopted April 15, 2020 and available at: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/WSAB%20Recs%20on%202020%20Utility%20WMPs%20-%20Final%20Approved%20Executed%204.17.2020.pdf.

especially grid hardening measures, are not designed to reduce the impact of PSPS events, then there will be examples of utility lines that have received equipment upgrades, but are still required to be deenergized during high-wind events.

- The Board appreciates and agrees with the WSD's new directive in Guidance Resolution WSD-002 prohibiting the use of RSE as a factor to determine whether to call a PSPS event:

  → "RSE is not an appropriate tool for justifying the use of PSPS. When calculating RSE for PSPS, electrical corporations generally assume 100 percent wildfire risk mitigation and very low implementation costs because societal costs and impact are not included. When calculated this way, PSPS will always rise to the top as a wildfire mitigation tool, but it will always fail to account for its true costs to customers. Therefore, electrical corporations shall not rely on RSE calculations as a tool to justify the use of PSPS."[16]

2.2 Training and Standards for Qualified Electrical Workers

Procedural Linkage:

- PG&E Resolution WSD-003, Deficiency PG&E-25, Class A deficiency, requires the utility to develop and furnish a plan that describes its recruitment and training for vegetation management, how to address personnel shortages.[17]
- Guidance Resolution WSD-002, Deficiency Guidance-11, Lack of detail on plans to address personnel shortages.

BOARD RECOMMENDATIONS

The Board recommends that the 2021 WMP Guidelines require the utilities to demonstrate that their training programs properly train wildfire mitigation workers.[18, 19] Because of the severe and often devastating consequences of arc flash incidents, wildfire mitigation worker safety must include training so that the qualified worker is knowledgeable in the construction and operation of equipment and work methods to identify and avoid the electrical hazards that might be present.[20]

The Board recommends that the CPUC and the 2021 WMP Guidelines require that the utilities hire Qualified Electrical Workers (QEW), meaning electrical asset inspectors with qualifications that go beyond a basic knowledge of General Order 95 requirements, to perform certain types of

[16] Guidance Resolution WSD-002, Issued on June 19, 2020 at 18.

[17] Resolution WSD-003 at 61.

[18] Qualified Electrical Worker or Qualified Person, see Department of Industrial Relations Section 2700 & 2940: https://www.dir.ca.gov/title8/2700.html; https://www.dir.ca.gov/title8/2940.html.

[19] Per the National Fire Protection Association 70E 2018 definition, a qualified person is: "One who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify the hazards and reduce the associated risk."

[20] Arc flash incidents are the number one cause of utility ignitions.

inspections. All wildfire mitigation related inspections and patrols of infrastructure and circuitry should be performed by QEWs.

Observations:

- The Board initially brought forth this recommendation in its Recommendations on the 2020 Utility Wildfire Mitigation Plans, adopted March 15, 2020, in Recommendation 7, Training Programs and Qualified Electrical Workers.
- Utilities currently administer robust training programs to qualified employees and qualified electrical workers within the field of line construction and substation maintenance. Additional trainings can be provided for workers that are not qualified electrical workers. International Brotherhood of Electrical Workers (IBEW) and accredited vocational institutions provide adequate training programs to produce more qualified workers. Utilities should expand partnership opportunities with these programs as well as upgrade the training of their compliance inspectors to ensure that qualified electrical workers[21] perform wildfire mitigation work.
- The utilities should assess the scope of work that non-qualified electrical workers can perform.

2.3 Risk Assessment and Mapping to Determine Location of Wildfire Mitigation Measures and Update CPUC Fire-Threat Maps More Frequently

Procedural Linkage:

- Section 5.3.1 of the 2020 WMP Guidelines requires the utilities to describe risk assessment and mapping programs including (1) a "summarized risk map showing the overall ignition probability and estimated wildfire consequence along electric lines and equipment," (2) a climate-driven risk map and modeling, (3) ignition probability mapping, (4) initiative mapping and PSPS risk-reduction impact, (5) match drop simulations, and (6) weather-driven risk map and modeling.
- Guidance Resolution WSD-002, Guidance-3 - A Lack of risk modeling to inform decision-making.

[21] Electrical workers who meet the definition of a "qualified electrical worker" will be able to: understand the construction and operation of the equipment or circuit associated with the planned work task. Qualified workers should also be trained to recognize, understand fully the operation of new equipment; identify and develop new and easily communicate procedures which will help mitigate ignition within the established engineering thresholds.

- The CPUC Fire-Threat maps that factor into whether an area is designated as a High Fire Threat District (HFTD) were developed through a nine-year[22] stakeholder process with the CPUC and CalFire.[23]
- September 18, 2018, SED-CAL FIRE Joint Assessment[24] and Recommendation Report, declining to recommend the development of a fire-wind map separate from the CPUC Fire-Threat map.
- As directed by Decision 19-05-038 in the WMP proceeding Rulemaking 18-10-007, SCE filed a petition for modification of Decision 17-12-024. SCE's petition requests a modest expansion of the CPUC Fire-Threat maps to include additional areas in SCE territory that it believes poses an unacceptable fire risk.[25]

BOARD RECOMMENDATIONS

The Board recommends that instead of relying solely on the HFTD maps to determine where to focus mitigation measures, the 2021 WMP Guidelines should require that utilities rely on both infrastructure risk assessment and mapping, and the relationship to the HFTD.[26]

The Board recommends that the CPUC, through WSD, consider developing a more streamlined process to update the CPUC Fire-Threat maps relative to how fast the input variables are changing. As vegetation conditions or construction development patterns change, so should the CPUC Fire-Threat maps.

Observations:

- Currently, large swathes of urban area fall within the same high fire threat Tier 2 and 3 zones as forested geographies. Meaning, many urban areas that are not part of the wildland urban interface are included in Tier 2 and 3 zones. These non-wildland urban interface areas may not require the

[22] This nine-year period begins with the opening of Rulemaking 08-11-005 in response to October 2007 fires in Southern California. The nine-year period ends with the development of the HFTD maps approved in Decision 17-12-024, December 21, 2017.

[23] The HFTD maps are composed of two sets of maps. First, the HFTD map includes Tier 1, High Hazard Zones that are developed by the US Forest Service and CAL FIRE based on tree mortality. Second, the HFTD maps include Tier 2 and Tier 3 fire threat areas created by the CPUC Fire-Threat Map, which will be updated on a 10-year cycle.

[24] The report was drafted jointly by the CPUC's Safety Enforcement Division (SED) and the California Department of Forestry and Fire Protection (CAL FIRE) and was ordered by CPUC Decision 17-12-024 in Rulemaking 15-05-006. Ordering Paragraph 11 required the Director of SED to report on among other things, "whether and how to proceed with ... the development and adoption of a statewide fire-wind map…" The report is available at: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/R.15-05-006%20SED-CAL%20FIRE%20Joint%20Assesment%20and%20Recommendation%20Report,%209-19-2018.pdf

[25] The SCE Petition for Modification is available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M311/K289/311289489.PDF.

[26] The Board initially brought forth this recommendation in its Recommendations on the 2020 Utility Wildfire Mitigation Plans, adopted March 15, 2020, in Recommendation 9, Analyzing Fire Maps to Exclude Lines from PSPS Events.

same wildfire mitigation strategies as Tier 2 and 3 zones or may require urban-specific mitigations for high wind events. Additionally, many areas with a potentially high fire threat are not considered HFTD areas.

- These zones serve a critical role in the design and implementation of the WMPs because mitigation actions are occurring, as they should be, either primarily or totally within the zones mapped as high fire threat. However, given that ignitions could occur in areas outside of those mapped priority zones, and result in catastrophic impacts, it is important to ensure these maps are as accurate and up to date as possible and are developed using defensible mapping methods.
- The inputs used to determine the high fire-threat areas are likely out of date. Maps used today should be representative of conditions today. Inputs should be nimble and representative of current conditions. The CPUC, through the WSD, must ensure that relevant environmental factors are considered, and that regional variation is accounted for. The CPUC should consider working on a process with a goal to updating maps depending upon how fast the input variables change.
  → As one way this could occur, a process could be developed in collaboration with WSD, utilities, and researchers to create a workflow with all of the utility data being collected and delivered to WSD such as Fire Potential Index data, vegetation maintenance, and fuel moistures, to add some automation to the process of re-drawing the CPUC Fire-Threat maps.
- The WSD could form an Independent Review Team or Fire Safety Technical Panel similar to what occurred in the development of the current CPUC Fire-Threat maps to review risk modeling methods, inputs, and assumptions.[27]

2.4 **Standardized Data to Allow Cross-Utility Comparisons**

Procedural Linkage:

- Guidance Resolution WSD-002 found that the inconsistencies and gaps in the data "rendered cross-utility comparisons impossible without substantive, resource and time-consuming manipulation of the data."[28] The resolution makes clear that this recommendation is both desired and necessary.

BOARD RECOMMENDATIONS

The Board recommends the CPUC consider WSD's recommendation for a data taxonomy and data schema that will ensure consistent formatting and streamline the reporting of data in the WMPs, using the same measurements.

The Board recommends WSD hold data working groups that are open to any interested parties to contribute to the generation of data standards for utility reporting as well as to assist in leveraging existing data standards from other fields.

[27] CPUC Fire Safety Rulemaking Background webpage, available at (accessed May 26, 2020): https://www.cpuc.ca.gov/FireThreatMaps/.

[28] Deficiency (Guidance-10, Class B): Data issues – general, Guidance Resolution WSD-002 at 33.

Observations:

- The Board recognizes and supports WSD's efforts to move utilities towards increased data standardization for the WMPs and urges utilities to continue down this path. In principle, the Board supports WSD's vision for consistent data reporting so that the CPUC and stakeholders can more easily understand the data the utilities report and compare data across the three utilities.
- The Board adds that comparable data must include regional relevance and specificity to increase our understanding of eco-regions. Some examples are to report data in specified resolutions in time and space, and defined metadata standards.
  - → The Board supports discussions and working groups that are open to all stakeholders to vet and determine the feasibility of WSD's data taxonomy and data schema.[29]
  - → For example, GIS data created and tagged similarly will enable WSD to analyze utility efforts across the state to compare and contrast, evaluate process, and describe successes. Additionally, some utilities reported in line miles and others reported in circuit miles. To compare the data, WSD staff created tables with normalized data. Standardized data schema and taxonomy will create efficiencies for WSD and stakeholders.
  - → It is understandable that utility leadership retains skepticism about providing volumes of data to the CPUC for analysis when past requests have not led to well-understood outcomes. Wildfire safety is different. This data will help WSD, CAL FIRE, Cal OES, CPUC, and interested parties participate in and improve wildfire mitigation efforts to keep Californians safe and move us towards a sustainable energy system for our future. This will result in a first of its kind utility data standard that will evolve and may inform utilities worldwide.

[29] Guidance Resolution WSD-002 at 26.

3 Recommendations that Go Further than Resolution WSD-002

The Board looks forward to the production of the 2021 Utility Wildfire Mitigation Plan Guideline development. The Board recommends the inclusion of a number of topics outside of the Guidance Resolution WSD-002 issued on June 19, 2020.

3.1 Scientific Review of Modeling Methods and Assumptions

Procedural Linkage:

- Guidance Resolution WSD-002 requires the utilities to file a Remedial Compliance Plan to describe how risk modeling informs decision-making. Guidance Resolution WSD-002 does not require granular disclosure of the model methods used and assumptions.

BOARD RECOMMENDATIONS

The Board recommends that the 2021 WMP Guidelines require the utilities to disclose detailed modeling methods and assumptions. An independent scientific advisory panel should be created to vet modeling methods. This scientific advisory panel would go through a nomination and confirmation process approved by the Board, the WSD, or the CPUC.

The Board recommends that the CPUC require the utilities create a process to incorporate feedback from the scientific advisory panel.

Observations:

- Utility engineers should not make decisions based on assumptions for wildfire mitigation program implementation in the absence of hard science proving the program reduces a known risk unless engineering assumptions are the only known alternative. Rather, utility wildfire mitigation programs must be implemented based on the risk reduction determined by scientific study and analysis.
- The process must review and ensure appropriateness of model assumptions. While all models must rely on assumptions, clear justification explaining methodological choices must be provided to show that modeling inputs are based on peer-reviewed scientific information. This will ensure that the models increase in usefulness over time. Peer reviewed research must also be cited.
- Current model method disclosures are general and do not describe detailed modifications to the open standard models the utilities use as foundations for the work. If the scientific community determines that methods used by the utilities are flawed, the utilities must have a way to receive and incorporate that feedback into their programs.
- Modeling method should not be proprietary because the safety of Californians depends upon the accuracy of these models. If modeling methods are proprietary, they must be vetted by the selected, independent scientific advisory panel. Any methodological approach must be explained in enough transparent detailed to permit proper review.

3.2 Development of a Data Access Portal for Federated[30] Data Repositories and a Hierarchy of Permission to Access Wildfire Data and Modeling Methods

Procedural Linkage:

- WSD has requested wildfire safety program implementation data from utilities in the 2020 Guidelines, in the Appendix 5 Supplemental data request, and are currently developing a data repository for use by experts to help assess the effectiveness of wildfire safety programs.
  - → In SDG&E's 2020 WMP it stated it will "invest in the development of a data sharing platform, which will enable researchers to access all of SDG&E's weather data."[31]
  - → Guidance Resolution WSD-002 notes that the data gathering exercise continues, and the WSD Roadmap Attachment 3 discloses a data schema and taxonomy.
  - → Resolutions WSD-004 (SCE) and WSD-005 (SDG&E) both found deficiencies in the information provided about the centralized data repositories being developed.
- Within reason, the CPUC has the authority to require data disclosure. For example, Resolution E-4868 required utilities to develop a two screen, click-through authorization process that allows customers to share meter data and other customer-specific energy-related data to third-party Distributed Energy Resource providers. Alternatively, in Rulemaking 14-08-013, Joint Parties filed a motion requesting that the CPUC issue a ruling directing the joint utilities make certain distribution system planning data accessible when they had not yet done so.[32] The Utility Pole Proceeding, Investigation 17-06-027, is another area with challenging data access issues.
- CPUC Data Privacy proceedings including: Rulemaking 05-06-040 to implement SB 1488 (2004) related to confidentiality of information; and Rulemaking 08-12-009 on Smart Grid development, which established the CPUC Privacy Rules.
- The Federal Critical Infrastructure Protection Protocols and numerous other state and federal rules on data privacy and security must be considered.

BOARD RECOMMENDATIONS

The Board recommends the CPUC, with oversight by the WSD, require the utilities to contribute to a federated data repository where data sources can be accessed by interested parties through a portal with varying levels of data access. To ensure data security, WSD would develop data policies defining a hierarchy so that different granularities of data can be accessed by interested

[30] A federated database system is a type of meta-database management system (DBMS) which transparently maps multiple autonomous database systems into a single federated one. The constituent databases are interconnected via a computer network and may be geographically decentralized.

[31] SDG&E 2020 MWP, Section 5.3.1.1 at 51.

[32] *See* Joint Parties, Rulemaking 14-08-013, May 4, 2018.

parties with certain levels of permissions types (e.g. CPUC staff, scientists, those with Non-Disclosure Agreements (NDA), or the public).

The Board recommends the WSD develop data policies through a transparent stakeholder process, taking into consideration the needs of regulators, the scientific community, and other stakeholders as well as the security of utility infrastructure.

Observations:

- In the Board's Recommendations on the 2020 Utility WMPs, Recommendation 3, the Board supported the development of a situational awareness center that that aggregates data from sources including High Definition cameras and weather stations, in addition to other data collected periodically like early warning data, Geographical Information Systems (GIS) data, fuel modeling data, risk assessment modeling data, historical burn patterns, and locations of past PSPS events. The Board continues to support a centralized access point for this and other types of data in order to allow stakeholders to share information, lessons learned, and data to increase the utilities' ability to identify and adopt best operating protocols quickly.
- Since federated data repositories are developing across the state, these data sources could connect with each other through a portal to allow access of data housed separately, in a variety of repositories. The portal could filter the types of data available to any particular user, depending on their level of permission. For example, WSD staff would have the highest level of granular access, while the public would be able to see a visualization of a subset of data. The permission structure for data access has not yet been created and should be developed, perhaps by WSD. The WSD should develop a process that is open and transparent and includes time for public input.
- The WSD should consider different use cases for this data when developing the data policies including, among others, the needs of:
  - → The scientific community to peer review modeling methods, assumptions, and outputs;
  - → The CPUC, WSD, and other state agencies (CAL FIRE, OES, etc.) to analyze the data and monitor compliance such as that requested in section 5.3.1;
  - → Local and tribal governments, and first responders during PSPS or other emergencies;
  - → Peer utilities to develop lessons learned;
  - → Developers and Community Choice Aggregators to start microgrid projects;
  - → The public, to understand how utility wildfire mitigation impacts their community; and
  - → The utilities to maintain secure data and physical infrastructure.

3.3 Reporting Expert Qualifications and Scientific Justification for Decision-Making

Procedural Linkage:

- Section 1 of the 2020 WMP Guidelines require disclosure of the executives with overall responsibility for the WMPs as well as of program owners, specific to each component of the plan. There is no requirement to disclose qualifications.

- Resolutions WSD-003, 004, and 005 express concern about the effectiveness of the large utilities' vegetation management practices and order completion of a study. The resolutions indicate an overall concern about the lack of scientific evidence regarding vegetation management.
- In testimony for formal proceedings, experts are required to disclose qualifications.

BOARD RECOMMENDATIONS

The Board recommends that the 2021 WMP Guidelines require the utilities to disclose the qualifications of scientific personnel relied upon to prepare the WMPs in order to increase transparency and demonstrate that each utility is relying upon accurate expert advice. Perhaps the minimum hiring qualifications for these roles ought to be developed.

Wherever the best available science is relied upon within the WMPs, the Board recommends the 2021 WMP Guidelines direct the utilities to include a citation to the peer-reviewed scientific literature and associated scientific works. Citations ensure that the public can identify the scientific authorities relied upon by the utility as well as help socialize groundbreaking scientific efforts.

Observations:

- In a number of sections, the WMPs state that the utilities develop their models or proposed actions in conjunction with "fire scientists" or "subject matter experts," without listing who these experts are, or their qualifications. This information should be transparent to ensure that the key developers of modelling decisions and assumptions have a demonstrated understanding of the complexity of fire behavior in different ecosystems. Model output created using erroneous assumptions or algorithms could result in unintentional consequences that could even be worse than the status quo. The WMPs should include a resume or short bio listing the qualifications of each of the key scientists. The CPUC may want to consider requiring minimum qualifications for these scientists.
- Because emerging technology used by utilities has not yet undergone significant peer review, adding citations of scientific works that support the use of the specific technology will help increase transparency. Written descriptions must provide explicit justification for approaches taken. Utilities must also submit updated WMPs that include the curriculum vitae or minimum qualifications of the scientific professionals that the utility consulted with in the development of the plans.
- The use of scientific peer-review, qualified professionals, and scientific community consultation is of concern in the areas of vegetation management, emerging technology, and fire modeling. In places within the plans where experts are referenced, the individual should be cited and linked to documentation of qualifications.

3.4 **Robust Training Programs and Workforce Equity**

Procedural Linkage:

- The 2020 WMP Guidelines require utilities to report their plans for the variety of required workgroups, workforce development, and trainings to increase the pool of qualified applicants in the various workgroups.

- Guidance Resolution WSD-002 found insufficient details on plans to address personnel shortages; Resolution WSD-003 found that some of PG&E's vegetation management workforce may lack proper certification, and Resolution WSD-004 found that SCE lacked International Society of Arboriculture-certified assessors.
- Resolutions WSD-002 through WSD-005 found a lack of detail on utility vegetation management plans and the utilities approaches for identifying at risk species.

BOARD RECOMMENDATIONS

The Board recommends that the 2021 WMP Guidelines require the utilities to develop more robust outreach and onboarding training programs for new electric workers that (A) train workers to identify hazards that could ignite wildfires, and (B) increase the pool of Qualified Electrical Workers.

The Board recommends the 2021 WMP Guidelines require the utilities to create pre-inspection vegetation management training programs to increase the pool of certified arborists.

The Board recommends the 2021 WMP Guidelines require the utilities to assess whether they offer competitive pay to both unionized and non-unionized workers and whether that contributes to the limited pool of workers.

The Board recommends the 2021 WMP Guidelines require the utilities to report and assess whether there are enough ecological and forest management scientists on staff to develop a coordinated vegetation management strategy.

Observations:

- Lineworkers have robust apprenticeship programs that can supply enough lineworkers to meet utility demands. Recently, apprentice numbers have doubled in the four-year program. New training centers are under construction, new apprentices are joining and graduating. The Board recommends further program development where workers are trained to identify hazards and increase the pool of Qualified Electric Workers. Utilities could target outreach to communities hardest hit by wildfire or affected by other environmental justice factors.
- While lineworker apprenticeship programs are well-established, pre-inspection arborists as well as vegetation removal workers in the vegetation management workforce do not have robust or standardized training programs or certifications. The utilities should work quickly to develop standardized training and certification programs to develop the local career workforce needed to accomplish each utility's vegetation management goals. [33]
- Wages may be a limiting factor in increasing the pool of utility workers. [34] Shrinking workforces slow down a utilities' ability to progress with its wildfire mitigation activities. The utilities should balance

[33] *See* requirements in SB 247 (Dodd 2019) wildland fire prevention: vegetation management, as well as the Department of Industrial Relations' Division of Occupational Safety and Health (Cal/OSHA) 2700 "Qualified Line Clearance Tree Trimmer."

[34] SB 247 (Dodd 2019) directed utilities to increase wages on January 1, 2020.

efficient use of ratepayer funds and determine whether low wages are impeding the utilities ability to accomplish more pre-inspection vegetation management activities.

→ If, for example, the pay of pre-inspection arborists is lower than the pay for vegetation removal workers who clear vegetation, then that is a contributing factor to the shrinking pool of certified arborists. This slows down the rate at which vegetation management activities can be completed.

- The utilities should assess whether they have enough scientific personnel on staff to develop a coordinated vegetation management strategy. Since the qualifications of scientists and other experts are not included in the utility WMPs, the Board does not have enough information to determine whether the utilities are hiring enough ecologists. The Board is concerned about the deficiencies in vegetation management cited by the WSD in Resolutions WSD-002 through WSD-005. If utilities do not have a coordinated, informed vegetation management strategy, they could be doing more harm than good. For example:

  → Removing too many trees could leave room for flashy fuel growth.

  → Incorrectly identifying trees as at-risk species when they in fact have a high moisture content and present a low ignition risk is problematic.

3.5 Aligning Vegetation Management Practices with Best Available Science

Procedural Linkage:

- Resolutions WSD-003 through WSD-005 require the utilities to provide WSD with more information on "at-risk" species:
  - → WSD-003, PG&E-18 - Requires PG&E to describe in more detail how its hazard tree analysis focuses on at-risk trees, but it does not require PG&E to name the species.
  - → WSD-004, SCE-14 - SCE relies only on growth rate to identify "at-risk" tree species.
  - → WSD-005, SDG&E-14 - Granularity of "at-risk species." WSD agrees w/Board recommendation, that not all species within a genus are considered "at risk."
- Resolutions WSD-002 through WSD-005 require the utilities to conduct a study:
  - → WSD-003, PGE-26 - Effectiveness of increased vegetation clearances.
  - → WSD-004, SCE-12 - SCE does not provide evidence of effectiveness of increased vegetation clearances.
  - → WSD-005, SDG&E-13 - SDG&E required to do a study. Lack of risk reduction or other supporting data for increased time-of-trim clearances.
  - → Resolutions WSD-003 and WSD-004 include other related deficiencies:
  - → WSD-003, PG&E-22 - Some of PG&E's vegetation management inspectors may lack proper certification.
  - → WSD-004, SCE-13 - Lack of advancement in vegetation management and inspections.
  - → WSD-004, SCE-15 - Lack of detail on how SCE addresses fast-growing species.
  - → WSD-004, SCE-16 - Lack of ISA-certified assessors for hazard tree assessment.

- The maturity model asks if vegetation management practices cultivate a native vegetation ecosystem across the territory that is consistent with lower fire risk.[35]

BOARD RECOMMENDATIONS

The Board recommends that all utilities coordinate and complete an ongoing study, that goes beyond what is ordered in Resolution WSD-005, that would ensure vegetation management practices align with best available science. The research should be reviewed by an independent scientific advisory panel or developed as part of a working group process overseen by WSD.

The Board recommends the 2021 WMP Guidelines request additional details about the utility's vegetation management decision-making process and how the utility assesses the tradeoffs between vegetation fuel load versus flammability. Utilities should justify the removal of species, particularly shrubs, that will not reach a height to touch or contact electrical lines.[36]

The Board recommends the 2021 WMP Guidelines require the utilities to develop explicit vegetation management residue plans that ensure that vegetation management itself does not contribute to increased fuel load and increased risk of fire.

The Board appreciates Resolution WSD-003 requiring SDG&E to list the species within a genus and recommends this requirement be extended to all utilities in the 2021 WMP Guidelines. The 2021 WMP Guidelines should also require reporting descriptions of the tree characteristics that justify any "at risk" designation since growth rates for trees vary depending on age and environmental conditions.

Observations:

- Vegetation management practices should help the utilities develop and better understand eco-regions within the state. Treating eco-regions similarly or differently must be justified by the data developed that can justify the similar or different treatment.
- Certain traits make a plant more flammable than others, one of those is surface area to volume ratio. Utilities should develop a justification for their vegetation management practices that explain which flammability characteristics they are utilizing to develop the vegetation management practices. Scientists should review these plans and provide input.
- The Board agrees that biomass residues create increased fuel loads and as such, these practices must be examined and reported on in the utility WMPs. The utilities must develop explicit plans to ensure that vegetation management itself does not contribute to increased fuel load and increased risk of fire.
- In Comments to the Board's Recommendations on the 2020 Utility WMPs,[37] SCE noted that, "it's not practical for SCE to tailor vegetation management at a higher granularity than the genus level.

[35] 2020 WMP Guidelines, Attachment 3, Table J.V.c.

[36] Typically, shrubs or dry grass catch on fire in an arc event. Understandably, certain species of shrubs may increase risk in certain high fire areas.

[37] Recommendation 5 on Fuel Management, Removal of At-Risk Species, and Scientific Review at 15-18.

SCE inspects all vegetation in its inventory annually, and moving from identifying vegetation at the genus level to species or sub-species level would require SCE's contract inspectors to be replaced with much higher skill-level inspectors, typically with the technical qualifications of ISA-certified Arborists. California is already experiencing a shortage of ISA-certified Arborists and the Board's recommendation would exacerbate the resource constraints. The benefits of identifying species and sub levels be minimal."[38, 39]

→ California's ecoregions host pine (*Pinus*) and oak (*Quercus*). Thus, the vast majority of native trees across the state fall into the "at risk" category. Yet, species within a genus may be even more different from one another from a fire behavior perspective than species in different genera. For example, the difference between Black Oak and Scrub Oak should be understood and accounted for when performing vegetation management projects. This is just an example to illustrate how two species in the same genus can be very different.

→ To scientists, the distinctions among species are obvious. Utilities must also learn the difference as they pursue vegetation management projects in California.

→ The Board also notes that WSD-003 and WSD-004 found deficiencies in the certifications of SCE and PG&E vegetation management inspectors.

- Vegetation management practices may be based on assumptions. These assumptions should be reviewed by the scientific community to ensure that the utilities are using the best available science to make decisions.
- Study of vegetation management effectiveness should be reviewed by the independent scientific advisory panel before the study is undertaken to ensure that any costs associated with doing the research are justified. Alternatively, WSD staff could conduct public workshops and oversee the study plan. The utilities should publish the study, the methodologies used in the study, and the results of the study in the 2021 WMPs.

Potential Data Reporting Requirements:

- The CPUC and the Board must be able to determine whether each utility is using best practices in vegetation management to create less-flammable environments and reduce the probability of utility infrastructure-caused ignition.
- There must be a more detailed description of utility understanding about the tradeoffs between vegetation fuel load (related to fire intensity) versus flammability, the two most important components relative to fire behavior.
- The species within a genus will be disclosed, in addition to descriptions of the tree characteristics that justify its "at risk" selection since growth rates for trees vary depending on age and environmental conditions.

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[38] SCE Comments on the Board's 2020 Recommendations Document, April 14, 2020 at 7: ftp://ftp.cpuc.ca.gov/WSAB/PublicComments/SCE%20-%20Comments%20on%20WSAB%20Recs%20on%202020%20Utility%20WMPs%2004.13.2020.pdf.

[39] See also SCE Comments on the Board's 2021 Recommendations, June 15, 2020 at 11-12.

3.6 **Resolving California Utilities' Resource Constraints**

Procedural Linkage:

- Section 5.3.1 to 5.5 of the 2020 WMP Guidelines require the utilities to report on initiatives to increase workforce training to address the scarcity of contractor or employee resources.
- Resolutions WSD-002 through 009 require the utilities to provide additional information regarding utility recruitment and training programs to address personnel shortages.

BOARD RECOMMENDATIONS

The Board recommends that California utilities collaborate and exercise their economic power to form partnerships with suppliers to advance store critical infrastructure equipment.

The Board recommends that the 2021 WMP Guidelines require the utilities to report on procurement challenges such as equipment shortages, price increases in equipment, delays, and efforts to mitigate these challenges.

Observations:

- California electric utilities are navigating our state's unique wildfire risks including high winds, drought, and continued construction into the urban-rural interface. California electric utilities are responding to this risk by placing large orders for new and upgraded electric utility equipment while utilities across the country are putting similar orders together for other catastrophic events. These orders are straining supply chains for raw materials and equipment.
- The reduced supply and increased demand raise prices, makes obtaining the necessary equipment more expensive and more difficult. California utilities are put in a position to compete against each other or against utilities in other states. COVID-19 conditions further exacerbate these challenges. All of this slows down the capacity for utilities to implement wildfire mitigation measures.
- California investor-owned and publicly owned utilities should review and possibly expand existing mutual aid agreements in order to increase options to address these supply chain issues. This could reduce costs for ratepayers and increase the pace of wildfire mitigation efforts, which is for the benefit of all Californians.
  - → One example of a symbiotic partnership is Arizona Public Service (APS) and a private supplier of critical infrastructure that stores inventory, both purchased and projected, in APS's laydown yards to facilitate rapid access to critical equipment for the utility.
- The utilities already report on initiatives to mitigate workforce resource constraints and reporting on equipment resource constraints would provide useful information for the WSD and stakeholders.

3.7 **Wildfire Mitigation Plan Cost Reasonableness Review and Costs Recovery**

Procedural Linkage:

- Public Utilities Code Section 8386.4(b)(1) states, in part, "The [CPUC] shall consider whether the cost of implementing each electrical corporations' [wildfire mitigation] plan is just and reasonable in its general rate case application. Each electrical corporation shall establish a memorandum account to track costs incurred for fire risk mitigation that are not otherwise covered in the electrical corporation's revenue requirements..."
- SCE 2021 GRC Application 19-08-013, SCE 04 Vol. 5; Figure II-9 Modelled Wildfire Risk per Mile in High Fire Threat Areas, at 26, describes a new way to consider risk mitigation and wildfire mitigation spending for GRC purposes.
- On January 16, 2020, the CPUC adopted Decision 20-01-002 moved from a three-year rate case cycle to a four-year cycle, changing the frequency of the need for this future collaboration.[40]

BOARD RECOMMENDATIONS

The Board recommends that WSD assist in the reasonableness review of utility wildfire mitigation expenditures because that evaluation occurs in CPUC-managed General Rate Case (GRC) proceedings. Subject matter experts must be available to collaborate.

The Board recommends that WSD publish reports based on their utility wildfire mitigation status to assist with future expenditure review.

Observations:

- Utility ratemaking is a complex regulatory process that takes years of training to master and is extremely complex. GRCs are the foundation of the regulatory compact between investor-owned utilities and the regulatory body. In the GRC, the costs of operating and maintaining an electric system are determined and the recovery of those expenses are allocated among customer classes.
- The CPUC's GRC evaluation will take on the task of determining the reasonableness of wildfire safety expenditures. For that evaluation to occur, the expertise of WSD must be integrated early on to help the agency properly assess the reasonableness of expenditures on behalf of ratepayers.
- The WSD is charged with evaluating WMPs for (1) compliance with statutory requirements, (2) the technical feasibility and effectiveness of proposed initiatives, (3) resource use efficiency, and (4) forward looking growth.[41] Given that these factors are related to the review in the GRC, and to ensure efficiency, WSD should assist in this evaluation process to determine whether actual wildfire related expenditures are "reasonable." This also prevents sending mixed signals to the utilities as they manage expenses based on regulatory approval of wildfire mitigation measures.

[40] Decision available at: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M329/K824/329824881.PDF.

[41] Guidance Resolution WSD-002 at 17.

4 Recommendations on Performance Metrics

The 2020 WMP Guidelines required that the utilities file performance metrics and targets in three areas to help WSD evaluate their wildfire mitigation performance: progress metrics, outcome metrics, and program targets. A.B. 1054 requires the Wildfire Safety Division to:

> "develop and recommend to the [CPUC] performance metrics to achieve maximum feasible risk reduction to be used to develop the wildfire mitigation plan and evaluate an electrical corporation's compliance with that plan. For this purpose, 'maximum feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

In this section, the Board evaluates a threshold, which could be a new approach that sets the acceptable level of risk, in addition to the existing performance metrics. The Board also evaluates Performance Metrics and reporting requirements for Community Outreach and Emergency Preparedness.

4.1 Develop an Electric Utility Resiliency and Risk Reduction Threshold

Procedural Linkage:

- The 2020 WMP Guidelines require reporting on performance metrics that will allow the utility to "achieve maximum feasible risk reduction," as required by A.B. 1054.

BOARD RECOMMENDATION

The Board provides the following guidance that the WSD and stakeholders begin developing a new System Hardening for Electric Utility Resiliency (SHEUR) threshold, that sets an acceptable level of electric operation risk and establishes the risk reduction that a utility should assume so that it can design its systems accordingly. The future demonstration of compliance with the newly developed SHEUR threshold could become an achievable condition of approval of a utilities' WMP.

Observations:

- The need for the System Hardening for Electric Utility Resiliency (SHEUR)[42] threshold would be examined and developed with robust stakeholder input and approved as part of a CPUC proceeding. Alternatively, the utilities could set their own threshold as part of their WMP process. The intent this new SHEUR threshold aims at creating a different approach rather than duplicating efforts. The purpose of the threshold would be to assist the utilities in holistically evaluating system design and risk mitigation measure application to increase efficiencies and achieve a more resilient electrical grid.

[42] The SHEUR threshold does not refer to the brand name "Shure," that, among other things, manufactures microphones.

The new SHEUR threshold could allow utilities to streamline resource allocation and increase value from investments. Stakeholder input will ensure the technical feasibility and common understanding.

- The SHEUR threshold would set an acceptable level of risk, and the utilities would be required to establish a risk reduction plan to meet the threshold using the suite of available wildfire mitigation tools in combination. Once that threshold is understood, utilities can reduce the risk of wildfire by designing their systems to provide electricity at higher wind speeds with the goal of avoiding the use of de-energization during high wind events. Utilities should better understand the cross-functional, circuit-specific, wildfire risk reduction technique that are current best practices.
  - → As an example, SDG&E reports that it looks at every circuit section with a cross functional team of arborists, a GIS mapper, engineers, vegetation managers, and fire scientists to strategically reduce the unique risks for each line section. This multi-factor risk reduction process allows SDG&E to operate their electric system at higher sustained wind speeds of 85 miles per hour (MPH) and in some cases, up to 111 MPH.[43]
  - → With a combination of wildfire mitigation tactics deployed on the system, all utilities could reduce the use of deenergization (PSPS) to prevent a line section from sparking a wildfire.
- Performance metrics are supposed to help "achieve maximum feasible risk reduction to be used to develop the wildfire mitigation plan and evaluate an electrical corporation's compliance with that plan." The SHEUR threshold would define the acceptable level of risk and could therefore be used as an alternative to or in addition to performance metrics. Developing and using a threshold could be a way of allocating the same amount of resources and getting a dramatically better result.
- To create an enforcement mechanism, a demonstration of compliance with the new SHEUR threshold could be a condition of approval of a utility's WMP. WMP approval is required for a utility to receive its safety certificate from WSD. Alternatively, if the utilities develop a threshold on their own initiative as part of the WMP process, compliance would be required.
- Using the COVID-19 pandemic response as analogy: each mitigation tool deployed adds up to an amount of risk reduced. Various strategies include social distancing, hand washing, wearing masks, and sheltering–in place. Some combination of risk reduction techniques will theoretically be sufficient to achieve policy goals of suppression or flattening the curve. Utility wildfire safety, similarly, should be measured by layering mitigation strategies to reduce utility wildfire risk to meet a target threshold, the SHEUR threshold.
- In the future, the utility should have a higher confidence that the system will perform in more adverse weather conditions without igniting a wildfire after the utility has deployed various wildfire mitigation measures.[44] The utility would be confident it is meeting the SHEUR threshold, and fewer PSPS events would result.

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[43] SDG&E 2020 WMP, Revision 1, March 2, 2020, Section 5.3.3.17.1 at 87.

[44] These mitigation measures include: enhanced inspection, enhanced vegetation management, surveys showing that the surrounding topography has lower contributory fuels, consequence mapping, weather forecasting, sectionalizing, microgrid implementation, spacing lines farther apart, upgrading equipment including upgrading lines with covered conductors, and decreasing the distance between generation and load.

→ For example: If a utility begins considering using deenergization to prevent wildfires (triggering PSPS) at sustained 25 MPH winds, and initiates PSPS if sustained winds rise above 35 MPH, the outcome will be continued reliance on the PSPS tool, causing immense disruption to the public.

→ The question is: What portfolio of wildfire mitigation techniques can reduce the risk of ignition so that the utility is confident to continue serving customers at high wind events of 30, 40, 50, or 60 MPH, or whatever the appropriate threshold is, without having to deenergize. Each circuit requires risk reduction based on an analysis of the risks presented at each location.

- The Board supports expediting the use of Grid Hardening Operating Criteria, as discussed in section 8 of the Board's 2020 Utility WMP Recommendations.[45] The Grid Hardening Operating Criteria provides the utilities with a roadmap to evaluate each circuit within a distribution or transmission line with the goal of reducing PSPS events for certain circuits. The SHEUR threshold incorporates the Grid Hardening Operating Criteria.

  → The SHEUR threshold that incorporates the Grid Hardening Operating Criteria should be used in conjunction with an RSE analysis that treats PSPS as a risk in and of itself in order to encourage utilities to allocate resources in a way that prioritizes reducing the number, scope, duration, and reenergization timeline of PSPS events.

- Even in advance of the creation of the SHEUR threshold, the 2021 WMP guidelines should require that operators assume that such criteria will be established in the near future and allocate their resources accordingly, which will allow for:

  → Retroactive application to wildfire mitigation projects already under development;
  → Risk reduction in targeted circuit sections and the exclusion of these targeted circuit sections from some PSPS events in the future; and
  → Coordinated allocation of resources to mitigate wildfires risk, with respect to PSPS avoidance.

- The utilities should strive to reduce the need for PSPS events on already hardened lines and effectively gauge how PSPS events can be avoided. One additional method to achieve PSPS reduction would be for all utilities to assess the feasibility of rerouting power supplies from High Fire Threat District (HFTD) to non-HFTD areas, at the distribution level, to allow operation in conditions that would otherwise require a PSPS.

- The Board would be happy to lend its expertise and work with the WSD in the development of the 2021 WMP Guidelines or work with the CPUC and stakeholders as part of a formal proceeding to further develop this standard.

[45] Adopted April 15, 2020, available at: https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/WSD/WSAB%20Recs%20on%202020%20Utility%20WMPs%20-%20Final%20Approved%20Executed%204.17.2020.pdf.

4.2 Community Outreach and Emergency Preparedness Performance Metrics and Data Reporting

Procedural Linkage:

- The 2020 WMP Guidelines Section 2 did not include any example tables for the utilities to report contacts with community stakeholders.
- The 2020 WMP Guidelines WMP Metrics, Attachment 4, progress metrics for community engagement activity and effectiveness include:
  - → Percent of residents made aware of PSPS and emergency response procedures in advance of events, according to post-event surveys.
  - → Percent of residents agreeing to participate in utility wildfire risk-reduction activities (e.g., allowing access to property for utility hazard tree remediation).
  - → Number of emergency response deficiencies reported by Cal OES, suppression agencies, and other emergency response personnel when plans were tested or activated.
- Decision 20-05-051 in the PSPS proceeding Rulemaking 18-12-005 requires the utilities to develop communication protocols to improve communication with local governments.
- Decision 20-03-004 in Rulemaking 18-10-007 requires utilities conduct outreach before, during and after a wildfire in all languages spoken by more than 1,000 people in their service territories.

BOARD RECOMMENDATION

The Board recommends that the 2021 WMP Guidelines include progress metrics on community outreach and emergency preparedness.

Observations:

- The PSPS Proposed Decision requires utilities to develop communication protocols. These communications protocols and tactics are not immediately apparent in the WMPs and information about the processes in place must be made available to measure and track whether the utility communications protocols are working.
- There is no roadmap to demonstrate the breadth of CPUC proceedings and utility compliance with the requirements for community engagement created in each proceeding. The WMP's intersection point with the public, local governments, the Access and Functional Needs community, and utilities provides a platform to consolidate the information at a high level without duplication.

Potential Performance Metric:

- Progress metrics for community engagement activity and effectiveness could include:
  - → Percent of local government representatives, including local/city fire departments, satisfied with pre-PSPS event communication and planning based on a survey.
  - → Percent of local government representatives satisfied with communication during the PSPS event based on a survey.

5 Recommendations on Utility Safety Culture

A utility's performance record related to safety ties to its safety culture, of the collective set of values, principles, norms, and beliefs manifested in an organization's planning, behaviors, and individual actions. For the past decade, the CPUC has emphasized safety culture.[46] To assist WSD in performing its safety culture assessments, the Board provides recommendations that should impact electric utility safety culture with respect to wildfire mitigation.

5.1 Develop a Unit Within or Outside of the Utility, to Study Black Swan Events and Predict Potential Future Events

BOARD RECOMMENDATION

The Board recommends that the CPUC, with WSD oversight, require the utilities to create engineering and risk management teams to surface and flag black swan events for further consideration and remediation.

Observations:

- The electric lines that caused the Camp Fire were susceptible to stress that they were not designed for when towers shifted after seismic activity. The utility likely did not consider that type of tower movement might contribute to equipment failure. The assumption likely was not questioned in advance. Tower location were static, lateral stress consequences were not likely anticipated and analyzed. Utility decision-makers likely did not consider the need to recheck connection points based on how lateral stress consequences might impact connection points.
- Utility engineers need to be encouraged to develop a questioning state of mind to identify new risks that are not initially quantified. Then, these newly identified risks must be shared with colleagues, supervisors, and managers, without fear of negative consequences.
- Engineering disciplines have different safety cultures:
  - → Electric utilities have a safety culture of standards and compliance. Standards are developed, engineers set out to meet them.
  - → Nuclear engineers work two teams on the same project. The first team designs a project and develops project assumptions. The second team challenges the project design and all of its assumptions to mitigate safety issues before they are issues. This system may seem

[46] The CPUC originally began investigating PG&E's safety culture after the San Bruno incident killed eight people in San Carlos, California.[46] In Investigation 15-08-019, the CPUC set out to determine whether the utility's organizational culture and governance prioritized safety. A consultant was hired to help the CPUC investigate and the North Start Report was published in the proceeding on May 8, 2017.

The SDG&E/Sempra Safety Culture Investigation began in June of 2019 but has not yet published a consultant investigation report.

confrontational but testing someone else's work as it is being built does tend to surface potential black swan events, or previously unidentified risks.

- Utility engineers and risk managers should embrace the idea of incorporating a process to help surface and flag black swan events for consideration and remediation. The second team could review existing infrastructure as well as new projects. These activities may fall within the scope of a CPUC S-MAP proceeding.[47]

5.2 Insert Safety Language into Investor Owned Utility Board Member Job Descriptions

Procedural Linkage:

- Executive Compensation program that WSD must review in order to approve safety certificates.
- Generally, the CPUC has the authority to regulate utility matters as long as there is a nexus between the issue and ensuring "safe and reliable electricity service."
  - → Public Utility (P.U.) Code 851 gives the CPUC the authority to create regulations to protect the public interest.
  - → P.U. Codes 761, 768, and 770 give the CPUC the authority to create regulations to ensure "safe and reliable electric service" for retail customers.
  - → P.U. Codes 451 & 701 give the CPUC the authority to create regulations for consumer protection.
- CPUC Safety Culture proceedings, Investigation 15-08-019 (PG&E) and Investigation 19-06-014 (Sempra).
- A.B. 1054 directs the CPUC to approve PG&E's plan and governance structure, "in light of the electrical corporation's safety history…"[48] Public Utilities Code Sections 8389(e)(3), (4) and (5) require these findings as part of documentation required for the Safety Certification.
- The June 1, 2020 Decision 20-05-053 in Investigation 19-09-016 approves with modifications PG&E's Plan of Reorganization including (1) the development of a matrix of qualifications for members of the board of directors,[49] (2) requiring the Safety and Nuclear Oversight Committee to approve Senior Management,[50] and (3) board oversight of the development and implementation of the WMPs, compliance with PSPS protocols, and compliance with safety and operational metrics.[51]

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[47] Such as Application 15-02-005 for SDG&E.

[48] June1, 2020 Decision 20-05-053 in Investigation 19-09-016 at 3.

[49] *Id.* at 15.

[50] *Id.* at 37.

[51] *Id.* at 23.

BOARD RECOMMENDATION

The Board recommends that the WSD provide illustrative position descriptions for utility boards of directors that emphasize safety where the utility has not sufficiently addressed the issue.[52]

Observations:

- The Board concurs with the CPUC's implementation of a matrix of board qualifications set in Investigation 19-09-016 in instances where the utility has failed to address appropriate safety considerations. The job description for utility boards of directors should align with this matrix of qualifications.
- The job description should also align with the board's duty of care to the utility. Utility Board Members are obligated under the law to provide the duty of care and the duty of loyalty to the investor shareholders of an investor-owned utility. California Corporations Code Section 309 defines this duty:
  - → "A director shall perform the duties of a director … in good faith, in a manner such director believes to be in the best interests of the corporation and its shareholders and with such care, including reasonable inquiry, as an ordinarily prudent person in a like position would use under similar circumstances."
- To tie the board members duty of care and loyalty to the responsibility of carrying out the utility's safety mission, language to that effect must be embedded in the job description language of the board member seat. Additionally, the responsibility of carrying out the utility's safety mission must be embedded in the job descriptions of utility managers and supervisors. The focus of recruiting efforts should also reflect the importance of the Board's role in supervising safety efforts.

5.3 **Ensure Consistent Compliance with High-Level Safety Standard**

Procedural Linkage:

- A.B. 1054 requires WSD to perform safety culture assessments for the first time.
- Decision 19-05-042 required that the CPUC's Safety Enforcement Division create, and the CPUC adopt, a Lessons Learned template to assist the utilities in filing high-level, postmortem reviews of PSPS event impacts.[53]

[52] This builds on Recommendation 7 from the Board's 2020 Utility WMP Recommendations.

[53] *See,* Public Advocates Office comments filed in Rulemaking 18-12-015, on Feb. 19, 2020 at 7.

BOARD RECOMMENDATION

The Board recommends that WSD maintain its high bar when performing its safety culture assessments and set the bar so that that utilities maintain high standards as utilities hire, grow, and adapt their safety culture.

Observations:

- Competition to deploy electrical workers for wildfire mitigation program implementation has set a high bar for hiring qualified professionals. This high-level hiring standard should not waiver as additional workers are hired to implement programs across utility business across the state. Just as hiring standards must remain high when adding additional members to the work force, high-level safety standards must be maintained over time as circumstances change.
- Utility executives, middle managers, and direct supervisors must work together to ensure compliance with high-level safety standards that remain high over time. Standards should not be permitted to deteriorate over time or as a result of success.
- Utilities must not permit the lowering of safety standards to help employees reach production or inspection targets. Either inspection targets must be adjusted downwards, or additional hiring and training must occur. In either instance, adjusting the safety standards themselves shall not occur.

5.4 **Post-Accident Debriefing and Learning**

Procedural Linkage:

- PG&E Safety Culture Proceeding Investigation 15-08-019: After a thorough evaluation, a May 8, 2017 Report by NorthStar made recommendations to improve the safety culture at PG&E. Decision 18-11-050 ordered PG&E to implement the report's recommendations. NorthStar completed an additional evaluation and provided a First Update to the NorthStar Report on March 29, 2019.

BOARD RECOMMENDATION

The Board recommends that the WSD work with the CPUC's Safety Policy and Safety Enforcement Divisions to assess the effectiveness of the utilities' processes and post-accident evaluation, including whether the learnings from the evaluations are incorporated into future wildfire mitigation planning.

Observations:

- Utilities ought to evolve from reactive culture and discipline, with potential for worker-level termination, to a culture of learning from incidents, near-miss reporting, and disseminating that information widely. After an accident, utility managers must talk to and learn from the utility work force to learn from the experience and share those learnings with others in the industry.
- The Federal Aviation Administration and the International Atomic Energy Agency have incident reporting systems "designed to stimulate the free and unrestricted flow of information." The

CPUC's Office of Safety Advocates pushed for robust safety management and risk evaluation systems in line with this type of federally led incident reporting and evaluation systems.[54]

- Utilities should provide access to accident data for third party review, looking back ten, five, one year ago, and current practices. This open access to information will help to diagnose and develop a utility safety culture. The CPUC should assess whether the utilities have adequate incident reporting systems that disseminate reports about accidents and near misses. The utilities must promote compliance among the entire workforce and evaluate and measure compliance across utilities to reduce accidents.

Potential Data Reporting Requirement:

- Create checklists to determine if the utility took required actions. Post-incident reports should be uploaded into a database and shared among utility safety professionals.

[54] More information on the former Office of Safety Advocates may be found here: https://www.cpuc.ca.gov/safetyadvocates/.

6 Recommendation Likely Needing Legislative or Gubernatorial Action to Implement

The California Wildfire Safety Advisory Board brings together vast utility, financial, and regulatory management experience. With due respect to the years of active service in the electric utility environment, having overseen transition after transition, the Board takes this opportunity to articulate several recommendations for 2021 that go beyond the scope of the WSD Wildfire Mitigation Plan Guideline development.

6.1 The Wildfire Safety Division Remaining at the CPUC

Procedural Linkage:

- Guidance Resolution WSD-002 notes that, "…WSD will issue guidance as necessary to ensure electrical corporations and stakeholders are aware of any changes to the WMP submission, evaluation, reporting and compliance processes as a result of transition to [the California Natural Resources Agency] [CNRA] and conversion to [the Office of Energy Infrastructure Safety] [OEIS]."
- Guidance Resolution WSD-002 notes that WSD is working to develop an enterprise data strategy to support WMP review and risk reduction by standardizing file formats, fields, and software compatibility. These actions require comprehensive and sustained attention from agency leadership.
- Currently wildfire matters are reviewed by at least four divisions in the CPUC – Safety Policy Division, Wildfire Safety Division, Safety Enforcement Division and Energy Division. WSD evaluates WMPs, monitors compliance, and audits the utilities. Safety Enforcement Division, as the enforcement arm of the CPUC, performs investigations based on the audits performed by WSD. Access to expert staff, audit materials, and wildfire related data to complete investigations is required. Safety Policy Division provides policy development support to decision-makers in wildfire and safety-related proceedings. Energy Division staff provides technical and policy support for the microgrid Rulemaking 18-12-005 and General Rate Case proceedings, among other wildfire and rate regulation-related proceedings.

BOARD RECOMMENDATION

The Board recommends that the WSD continue performing the important wildfire safety work at the CPUC instead of spending time, energy, and money moving to a different agency in July 2021.[55]

Observations:

- The realities of the state budget have changed dramatically since the beginning of California's response to COVID-19. Moving a division from one agency to another takes time, energy, and money that would be better spent singularly focused on implementing wildfire safety mitigation.

[55] Section 15475 of the California Government Code, added by A.B. 111 (Committee on Budget, 2019).

- The WSD should remain at the CPUC in order to ensure coordination between CPUC proceedings and transparency in public participation. Developing Memorandum of Understanding and Non-Disclosure Agreement between agencies will likely be required since WSD may rely on expertise in a variety of CPUC divisions. WSD should remain at the CPUC to ensure operational efficiency and consistency in safety policymaking and ratemaking.[56] Participation by stakeholders and customer advocates should also be supported by maintaining stakeholder due process rights, which may not be available at CNRA agencies. Further, bifurcating regulatory requirements could increase regulatory costs for utilities and stakeholders.
- WSD has excelled in conducting a thorough review of the utility WMPs and developing new processes and procedures to accomplish this Herculean task. Moving the WSD to another agency could slow WSD's progress. Throughout the past eight months, WSD has been "building the airplane as it flies." Remaining at the CPUC would allow WSD to continue to focus on flying, instead of having to dismantle and then reconstruct the plane at another agency.
- The safety of the residents of the state of California rely on WSDs' success. The state cannot afford to waste time or expense moving experts from one agency to another with fire season near and during a global pandemic.

6.2 **Future Issues for Consideration**

Procedural Linkage:

- A.B. 1054 created responsibilities for the Board. In addition to its specific duties, Public Utilities Code Section 8939(b) states that the Board shall make recommendations on "appropriate requirements in addition to the requirements set for in Section 8386 for the wildfire mitigation plans."

BOARD RECOMMENDATION

The Board recommends for the 2022 cycle that it conduct further study with associated due diligence on issues that are related to utility wildfire mitigation efforts that will aid implementation, enhance effectiveness, eliminate unnecessary barriers or eliminate inefficiencies following adoption of the 2021 recommendations.

Observations:

- A concern raised by two investor-owned utilities is that A.B. 1054 defines "Eligible Claims" as those paid from the Wildfire Fund resulting from wildfires incurred by a utility aggregated over a "calendar year" that exceed $1 billion or the amount of insurance required by the Fund Administer to be held

[56] See also, Recommendation 3.7, recommending the expertise of WSD staff be leveraged to review WMP cost reasonableness in the CPUC GRCs.

by the utility.[57] Additional study is need to understand the impact of changing "calendar year" to "policy year."

- There are other state advisory boards that receive nominal compensation for their work, in addition to attendance at meetings, where there is a high level of expertise involved along with deep commitment to perform their functions. Some of these Boards are funded through the state budget and others through funds established by the regulated entities. A survey of these boards' functions and funding mechanisms can inform the appropriate approach to the California Wildfire Safety Advisory Board.

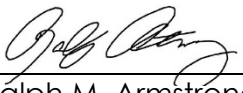
The California Wildfire Safety Advisory Board's Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture were adopted on June 24, 2020 and are hereby executed on June 26, 2020.



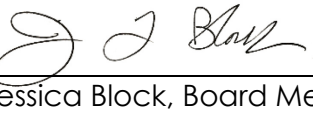
Marcie Edwards, Chair



Diane Fellman, Vice Chair



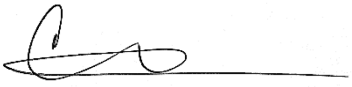
Ralph M. Armstrong Jr., Board Member



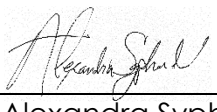
Jessica Block, Board Member



John Mader, Board Member



Christopher Porter, Board Member



Alexandra Syphard, Board Member

[57] Public Utilities Code Section 3280(f).

California Wildfire Safety Advisory Board

Concurrence of Board Member Jessica Block on the Wildfire Safety Advisory Board's Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture

Systemic Racism in the United States and a Commitment to Focus on Communities Disproportionately Impacted by Wildfire

The members of the California Wildfire Safety Advisory Board acknowledged the persistence of systemic racism in the United States at the June 24, 2020 Board meeting. I submit this concurrence to the Board's Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture in order to memorialize my commitment to focus on Communities Disproportionally Impacted by Wildfires. I support the Board's recommendations, and I think the Board can do more.

American institutions have been central in cementing segregation and discrimination. For example, Redlining was an official policy that has resulted in black Americans nationwide living in more polluted and resource-poor regions. Redlining was a process in which the Home Owners' Loan Corporation, a federal agency, gave neighborhoods ratings to guide investments. Black neighborhoods, drawn in Red, were considered hazardous, and not desirable for providing home loans.

Now, communities of color are disproportionally affected by wildfires, wildfire risks, and its pollution. Any institution that does not acknowledge – and act to reverse – the effects of these historical policies acts as an accomplice to them. As members of the Wildfire Safety Advisory Board, we must commit to do our part in creating anti-racist institutional policies.

I would like to begin enacting this commitment to create anti-racist polices by proposing to expand the "Stakeholder Cooperation and Community Engagement" section of the Utility Wildfire Mitigation Maturity Assessment section of the Wildfire Mitigation Plans. In the 2020 Guidelines, this section focused on communication with Limited English Proficiency and Access and Functional Needs populations. I recommend redefining the section to better engage and address "Communities Disproportionately Impacted by Wildfire." These communities should include an even broader coalition of impacted communities including: Limited English Proficiency populations, Access and Functional Needs populations, Communities of Color, First Nations, and Resource-Poor Communities.

I commit, as a Wildfire Safety Advisory Board Member, to pursue the wildfire safety needs of communities of color, and resource-poor communities. I plan to engage with community leadership within each of the noted communities and provide additional focus on Communities Disproportionately Impacted by Wildfire. My aim is not a unilateral commitment to increase our work efforts, but an investment to learn from these communities and benefit from their experience and leadership. To better engage and understand the needs of our underserved California communities, we must give those communities a seat at the table.

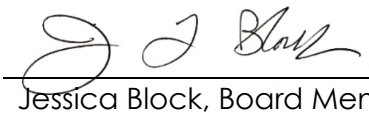
To this end, I would like to pursue the following paths:

- Request Community Needs Assessments, or engage leaders to complete community needs assessments of underserved communities in California
- Actively incorporate leaders from Communities Disproportionately Impacted by Wildfire into roles directly impacting fire policy and response
- In the future, ensure the Wildfire Safety Advisory Board prioritizes recruiting leaders from Communities Disproportionately Impacted by Wildfire to the Board.

Finally, we cannot change what we can't name. Many Americans today are unaware that red lining existed even recently. I commit to collaborating with existing research and community organizations in the field toward the common goal of sharing historical information on this topic.

I will be working with our staff to add information to our advisory board website on our efforts here. If you are interested in helping with this topic, please contact me. You can find my information on our website. My email address is Jessica.Block@cpuc.ca.gov. Thank you.

The Concurrence to the California Wildfire Safety Advisory Board's 2021 Recommendations is hereby executed on June 26, 2020.



Jessica Block, Board Member

California Wildfire Safety Advisory Board

Concurrence of Board Member John Mader on the California Wildfire Safety Advisory Board's Recommendations on the 2021 Wildfire Mitigation Plan Guidelines, Performance Metrics, and Safety Culture

Risk Spend Efficiency and the System Hardening Electric Utility Resiliency and Risk Reduction (SHEUR) Threshold

Recommendations 2.1 Risk Spend Efficiency and 4.1 Electric Utility Resiliency and Risk Reduction Threshold are meant to complement each other and are interdependent.

The goal of recommendation 2.1 and 4.1 is to embed in the Wildfire Mitigation Plan (WMP) Guidelines a new common methodologies or enable IOU specific methodologies that can be used determine how to more cost effectively reduce wild fire risk AND ALSO reduce the use of Public Safety Power Shutdown (PSPS) with the same or similar amount of resource expenditure of than to just mitigate the risk of wildfire.

This concurrence will seek to demonstrate how recommendation 2.1 and 4.1 could be developed by the Wildfire Safety Division (WSD) in the 2021 WMP Guidelines and used by the IOU's to achieve the goals of 2.1 and 4.1.

This example is meant to be largely hypothetical, both in the utilities to be discussed, but many analytical tools are also hypothetical and are meant to be analogues for those tools that may be developed in the future. In addition, several considerations will be simplified and analytical tools and information with be introduced to demonstrate the process of analysis of the example.

- These tools and information do not currently exist in these forms.
- Those tools and information are in purview of other sections of the WMPs and may develop differently than discussed here.
- Examples of tools and analysis that this example takes illustrative license with; Historical and projected profiles for the line sections, overhead line wildfire rate per operating hours and construction type – height – wind profile per operation hour
- This example will consider sustained wind threshold for operating circuits, assessing risk and consideration of PSPS.
- The Circuits will be studied and operated in discrete and contiguous sections.
- Only the risk profiles from the types of overhead construction will be used to demonstrate 2.1 and 4.1, risk from other items will be excluded (e.g cutouts, lightening arrestor, capacitors, etc)
- Probability statics are not used, only risk modifiers
- All spans are 528'
- Age of asset is not considered
- Assumes that the circuits studied have been patrolled and maintained and are complaint with existing standards, such as GO 95
- The circuits are considered safe to operate at winds less 35 MPH, absent other considerations.
- As well as other simplifications and assumptions.

Concept Considerations

Wildfire Risk Reduction

Hardening such as covered conductor, spaced out conductor, enhanced maintenance to find and address non complaint plant and vegetation management all reduce risk of utility-initiated wildfires. Acknowledging this risk reduction, it is conceivable that the applications of such mitigations could make it possible to operate a circuit at a higher wind speed at a lower risk than that of the unmitigated circuit. If such risk reduction and their corresponding operating criteria could be quantified to minimum accepted threshold it would be more possible to operate and plan the system with that risk reduced informed SHEUR threshold. I note: This recommendation is not a one size fits all, IOU's would still be able to develop or continue their own standards in their WMP, rather if the WSD does develop such resiliency threshold it is most likely to a floor, not a ceiling. For the purposed of this example

Goals of Spending Efficiency Calculations

Currently the WMP Guidelines seem to direct the IOU to consider the reduction of wildfire as the object to the Risk Spend Efficiency (RSE) calculation. The WMP also set a goal to reduce the reliance on PSPS to address wildfire risk. Our recommendation to the combine those two goals as the objective of the WMP RSE calculation. With the development of both the consideration of the consequences of PSPS relative to RSE calculations and SHEUR threshold it possible to analysis the application of wildfire risk reduction mitigation project for their projected value with respect to both goals of WFRD and PSPS reliance reduction.

Example: Assumptions

This example assumes an analytical tool for both existing types of construction and hardened Equipment. In this example the SHEUR threshold uses these criteria:

Criteria: Asset Wind Risk Profile

Is the projected utility-initiated wildfire rate at less than 35 MPH per 100,000 operating hours per 100 miles and differentiated by type of construction (in this example normal, spaced and covered) and height of construction (in this example low and high).

Construction	High	Low
Normal	.75	1
Spaced (more than 3' between conductor)	.375	.5
Covered	.2	.2

Criteria: Circuit Section Wind Profile

It is assumed that based on weather modeling and history each line section has a projected expected high probability maximum future wind speed. Which is:

- Circuit 1: Sec 1 & 2: 2 separate incidents per season above 35, less than 55.

Circuit Section Topography Risk Profile Modifier Above 35 MPH Wind

This example will use 3 types of topography risk modifiers:

(1) Semi urban; risk increases by:
- Up to 35 MPH to 55 MPH, 20%
- 35 MPH to 55 MPH, 50%

(2) Cleared
- Up to 35 MPH, 0%
- Between 35 and 55, 10%

(3) Wooded
- Up to 35 MPH to 55 MPH 40%
- 35 to 55 mph 80%

Mitigations Considered

Mitigation	Cost*
Spaced**	9
Covered conductor	20

* Cost in units of expenditure per span
** Spaced assumes high construction as well

The Example: Transmission line 1

Transmission line 1 and is rated to operate at winds of 55 mph with acceptable risk and feeds two substations in a mountainous valley. The transmission line and substation are all in High Fire Threat Districts (HFTD).

The substation feeds one circuit, which will be Circuit 1 (C1) for Substation 1. Circuit 1 has 2 sections separated by a switching device and for purposes of this example are considered discrete and contiguous. We will analyze a RSE calculation for mitigation projects on C1.

Circuit 1 Section 1 (C1S1) has 10 spans:
- 5 of which are semi urban, normal low construction,
- 5 spans are Normal High, semi urban
- C1S1 serves 5000 customers.

Circuit 1 Section 2 (C1S2) is
- 90 spans long, wooded, normal high construction
- C1S2 serves 1000 customers

Analysis Circuit 1 Current Risk Status

Circuit 1:

- Operational hours are assumed to be 365 days -14 days (projected 2 events above 45 MPH) X 24 hours = 8,424 hours operational hours, due to circuit wind profile.
- Projected Wildfire Fire incidences (PWFI) = Asset Risk Profile * Asset amount * Operation Hours * Topography wind risk modifier/ (100K hours* 100 miles)
- PSPS Customers outage minutes = Projected number of wind events above circuits rated risk, * customers affected * hours (assumed to be 1 week)

Section 1:

- (1 X 5 (spans normal Low) X .1 miles X 1.2 + .75 X 5 (Spans normal high)X .1 miles X 1.2) * 8,462 / 100000 *100 = .000089 circuit section current incident rate projection.
- It is assumed that the Circuit will experience 2 PSPS due to it's current risk profile and projected wind profile, since no action has been taken to reduce risk. Hence the circuit operates for 8,462 hours instead of 8,760 hours.
- 7 days per PSPS = 2 * 6000 (since section 1 is the source for section 2) * 24 * 60 *7 = 120,960,000 customer outage minutes projected.

Section 2:

- (.75X 90 (spans normal high/wooded) X .1 miles X 1.4) X 8,462 / 100000*100 = .008 projected circuit incident rate.
- The total WFIR is projected to be 0.123 and 120,960,00 customer outage minutes
- 7 days per PSPS = 2 * 1000 (customers) * 24 * 60 *7 = 20,160,000 customer outage minutes projected. Note: no remediation of section 2 will alter this as the source is section 1.

C1 Risk Profile is:

- S1 & S2 PWFI = .0089
- S1 & S2 PSPS COM = 120,960,00

Analyzing 2 Potential Projects

- Replace 10 line sections with Spaced Conductor. Concentrate on section 1
- Replace 4.5 line sections with Covered conductor in Section 2.
- Project 1 Unit of expenditure: 10 spans X 9 units = 90 Units
- Project 2 Units of expenditure: 4.5 spans x 20 units = 90 units

Project 1 New C1 Risk Profile

Projected Wildfire Fire incidences (PWFI) = Asset Risk Profile * Asset amount * Operation Hours * Topography wind risk modifier/ (100K hours* 100 miles)

PSPS Customers Outage Minutes (COM) = Projected number of wind events above circuits rated risk, * customers affected * hours (assumed to be 1 week)

Section 1

- (.375 X 10 (spans spread out high) X .1 miles X 1.2) * 8462/ 100000 *100) + (.375 X 10 (spans spread out high) X .1 miles X 1.5) * 298/ 100000 *100) = .0004 circuit section WF projection.
- Since the PWFI has decreases from .00089 to .000548 C1S1 is now not projected to have a PSPS event due to it's wind profile is less than 45 MPH.
- PSPS COM = 0

Section 2

- (.75X 90 (spans normal high/wooded) X .1 miles X 1.4) X 8,462 / 100000*100 = .008 projected circuit incident rate.
- PSPS COM = 2 * 1000 (customers) * 24 * 60 *7 = 20,160,000 customer outage minutes projected.

New Circuit 1 Risk Profile

- WFIR : .0084
- PSPS Customer Outage minutes: 20,160,000

RSE = (.0005 WF + 100M PSPS COM) /90 units, project 1

- Projected Wildfires avoided = .0089 - .0084 = .0005 wildfires
- Projected PSPS Customer Outage Minutes avoided = 120,960,000 - 20,160,000 = 99,936,00
- (.0006 wildfire and 100 million PSPS Customer Outage Minutes) /90 units

Project 2 New C1 Risk Profile

Section 1:

- (1 X 5 (spans normal Low) X .1 miles X 1.2 + .75 X 5 (Spans normal high)X .1 miles X 1.2) * 8,462 / 100000 *100 = .000089 circuit section current incident projection.
- It is assumed that the Circuit will still experience 2 PSPS due to it's current risk profile and projected wind profile, since no action has been taken to reduce risk. Hence the circuit operates for 8,462 hours instead of 8,760 hours.
- 7 days per PSPS = 2 * 6000 (since section 1 is the source for section 2) * 24 * 60 *7 = 120,960,000 customer outage minutes projected.

Section 2

- (.75 * 85.5 (spans normal high/wooded) X .1 miles X 1.4) X 8,462 + .2 * 4.5 (spans covered high/wooded) X .1 miles X 1.4) / (100000*100) = .0077 projected circuit incident rate.
- 7 days per PSPS = 2 * 1000 (customers) * 24 * 60 *7 = 20,160,000 customer outage minutes projected. Note: no remediation of section 2 will alter this as the source is Section 1.

Circuit Risk Profile

- WFIR : .0086
- PSPS Customer Outage Minutes: 120,960,000

RSE =

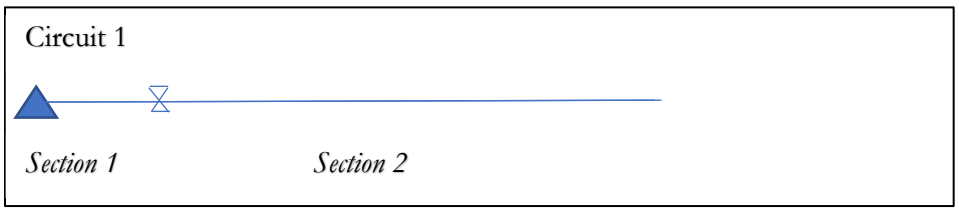
- Projected Wildfire avoided = .00089 - .0086 = .0003 wildfires
- Projected PSPS Customer Outage Minutes avoided = 120,960,000
- **(.0003 wildfires) /90 units**

Conclusion

Project 1 is clearly the most efficient project. Project 1 achieved more projected wildfire avoidance and also achieved Projected PSPS avoidance, for the same asset allocation and probably less maintenance costs. Forty percent of PSPS minutes for Transmission line 1 are avoided.

This has been an illustrative example of how a risk reduced informed cost analysis can identify resource allocation that is most impactful in terms of customers benefit in the shortest amount of time (if their are limit resources). I also recommend that the WSD direct the IOU to anticipate a SHEUR threshold and allocate resources accordingly so that additional benefits maybe enjoyed (in terms of WFRR and PSPS COM avoidance) in the future from investments today.

Additional benefits also include Customer serves by Transmission line 1 have access to services likely closer to them at C1S1 (rather than travelling out of the area) even if they still experience a PSPS event.



There are additional benefits to this approach that I would be happy to help develop further.

The Concurrence to the California Wildfire Safety Advisory Board's 2021 Recommendations is hereby executed on June 26, 2020.

John Mader, Board Member