

The Costs of Wildfire in California

An Independent Review of Scientific and Technical Information



CCST
CALIFORNIA COUNCIL ON
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This report, undertaken by the **California Council on Science and Technology** and made possible by the **Gordon and Betty Moore Foundation**, finds that a comprehensive statewide calculation of wildfire costs is not possible with currently available data. Moreover, the costs associated with unquantified categories of loss (e.g., health impacts, loss of ecosystem services) likely exceed the tens of billions of dollars in reported costs. The results of this study suggest opportunities for policymakers to improve the effectiveness of wildfire management in California by enabling regional approaches, increasing investments in mitigation and resilience strategies, and accounting for the cumulative public health impacts of exposure to multiple fire events.

Executive Summary

Overview

California's 2020 fire season has been a clarion call for the State. Although wildfires are a natural and integral part of California's landscape, the record-breaking losses of the past several years have illustrated the increasing destruction and complexity of fire disasters, and have highlighted tensions between short-term responses focused on firefighting and longer-term strategies required to strengthen mitigation and resilience. Absent a reorientation of California's approach to wildfire, these alarming trends are likely to worsen. However, there are important steps California can take as a state to minimize the destructiveness of wildfires and their attendant costs.

This report summarizes the state of knowledge regarding wildfire losses and their associated costs across key sectors. It highlights both known costs of wildfire and

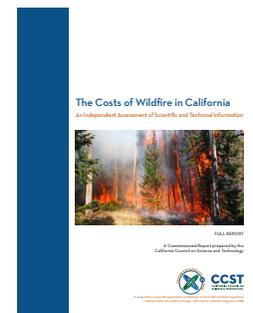
where research suggests the State should be concerned, but data are inadequate to fully estimate the costs of societal losses. Accurately quantifying societal losses will require substantial additional data collection and research in a number of disciplines. The costs of wildfires may be cumulative (e.g., accruing over time and multiple fire events), indirect (e.g., via impacts of smoke exposure on health or post-fire water quality), and difficult to quantify.

A key finding from this study is that a comprehensive statewide calculation of wildfire costs is not possible with currently available data. **Moreover, the costs associated with unquantified categories of loss (e.g., health impacts, loss of ecosystem services) likely exceed the reported costs.**

For example, federal and State firefighting expenditures exceed \$3 billion per year; utility wildfire prevention and mitigation costs are approximately \$5 billion per year; whereas the insured property losses in three out of the past four years have exceeded \$10 billion per year. Evidence suggests health impacts due to wildfire smoke represent a substantial portion of the total costs to the State, and that there are impacts from the interaction of wildfire smoke and COVID-19. Yet these additional billions of dollars in costs due to wildfire smoke impacts are not consistently tracked or factored into policy planning.

Given the magnitude of wildfire losses and of spending to prevent and suppress wildfires, more systematic assessment of wildfire costs is urgently warranted. We acknowledge that this additional proposed research will take time to complete, and that the State of California is likely to take policy actions in the interim.

Where possible, we have articulated recommendations that can be acted upon immediately.



[READ THE FULL REPORT AT CCST.US](https://www.ccst.us)

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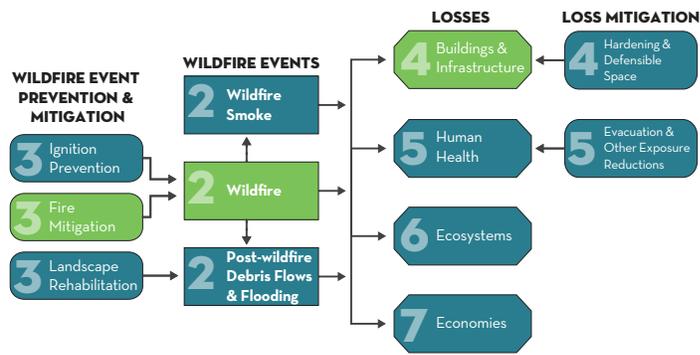
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Cost (\$) Data Available for California

- Empirical datasets from comprehensive, state-wide, systematic tracking.
- Empirical datasets from partial systematic tracking.
- Empirical data from individual studies or reports.
- Simulated data from individual studies or anecdotal accounts.

Overview of Wildfire Costs Considered. Each color identifies the types of databases and studies available to assess the cost (dollar value) estimates of topics addressed in the report. Lines indicate the interactions across multiple topics, illustrating the complexity of interrelated wildfire-relevant issues. Note that no shapes are colored yellow, indicating very few or no topics are tracked in a comprehensive, systematic way for the State as a whole. Numbers indicate the chapter in which each item is discussed in the report.

Executive Summary

Conclusions

Conclusion ES.1. Wildfire in California presents a complex management challenge, as natural fire regimes—long-term spatial and temporal characteristics of wildfires—are increasingly altered by population growth and the growth of the developed footprint.

Wildfire in California can be both beneficial and damaging. It results from a complex mixture of environmental and biological variability, forest and land management, land use development policy, building codes, electric utility policy, and fire suppression. Climate change is an increasingly important factor that amplifies and intensifies wildfire impacts.

The overall growth and expanded spatial footprint of California’s population has increased fire frequency while also increasing the economic value at risk, thus raising the total losses from wildfire. The history of fire management in the U.S. teaches that California will be more successful as a state if it addresses wildfire policy with this ecological and regional context in mind rather than a one-size-fits-all, state-wide approach.

Conclusion ES.2. While wildfire suppression, utility investments, and structure losses are well quantified, understanding the scale of other losses and the cost—and cost effectiveness—of other mitigation and prevention activities will require the measurement of impacts that

may range well beyond the geographic boundaries of fire events.

In general, the scale, cost, and cost-effectiveness of wildfire mitigation measures such as home hardening, defensible space, public safety power shutoffs and community- and landscape-scale vegetation management are not systematically tracked.

Conclusion ES.3. The location and pattern of housing development is one of the most important factors explaining structure loss in wildfires.

Conclusion ES.4. Public health impacts from wildfire are substantial and likely to be significantly underestimated. Aside from injuries or deaths due to heat exposure from fires, these impacts are not systematically tracked in the State. Available evidence suggests that pulmonary and cardiovascular outcomes from wildfire smoke are the most significant cause of morbidity and mortality and may have both acute and long-term consequences.

Today, policymakers attempt to strike the balance of investment between prevention and suppression without complete information about the overall costs to society or of how alterations to California’s fire management approach might impact total societal costs. It is in the State’s and federal government’s interest to conduct the necessary data collection and research to understand these costs if California is to move toward sound fire management policy. Additional findings, conclusions, and recommendations can be found in the **full report**. ■

Executive Summary RECOMMENDATIONS

Using the findings, conclusions, and recommendations from the full report, the Steering Committee developed the following Executive Summary (ES) recommendations:

ES.1.

To design contextually appropriate wildfire policy, policymakers must remain attuned to how climate change, land use change, and other human impacts may impact wildfire differently across the diverse regions of the State.

ES.2.

The State should create a comprehensive public accounting of relevant programs in order to better understand the costs of wildfire mitigation activities.

Es.3.

The State should consider supporting necessary research to fully assess the cost effectiveness of prevention and mitigation activities. The research will provide an opportunity to compare these investments to costs of suppression and the losses incurred as a result of wildfire. This accounting should explicitly consider ecosystem and natural resource values as well as structure values.

Es.4.

The State should evaluate land use planning and urban development as an alternative strategy for preventing structure loss and increased ignitions in wildland areas.

ES.5.

In order to understand the full costs of wildfire and the potential public health benefits of mitigation activities, as well as the tradeoffs associated with prescribed fire, the State should create a program to systematically track public health impacts from wildfire smoke, especially for vulnerable populations.

ES.6.

California should create and manage a systematic, comprehensive data clearinghouse for wildfire events including wildfire smoke, prevention and mitigation, losses including health, societal and ecological impacts, and associated costs. Models exist for this type of clearinghouse in the CalEnviroScreen and the California Open and Transparent Water Data Platform. Such a clearinghouse could be established via an extension and expansion of the recently established Wildfire Forecast and Threat Integration Center.