UC SANTA BARBARA | Research Brief

We Need More Prescribed Burning in California's Coastal Foothills

The Policy Problem

Over 27 million Californians live in coastal shrublands, grasslands, and oak woodlands that are threatened by increasingly frequent and destructive wildfires. But compared to more remote, forested areas like the Sierras, these areas receive little attention and funding. As a result, scientists, policymakers, fire specialists, and residents know less about predicting wildfires and protecting communities in these ecosystems.

The Building Resiliency to Wildfire Project (BRW), funded by the Gordon and Betty Moore Foundation, bridges this knowledge gap through a series of prescribed burns. Prescribed burns – sometimes called controlled burns, intentional fires, or even good fires – are set by land managers deliberately to achieve a management goal. By conducting prescribed burns in the coastal foothills, researchers learned more about how intentional fire can reduce wildfire risk, improve habitat, improve rangelands, or achieve a cultural purpose.



However, with over 7,000 fires across California in 2023 alone, it is clear that we must scale up our efforts. Part of the solution is to fight fire with fire. This may sound counterintuitive, but fire has always been part of California's environment.

So, how can we use intentional, prescribed burns to better protect our communities from wildfires? Expanding the scope of prescribed burning requires more than research —it also requires targeted funding. To protect the 27 million Californians living in these high-risk areas, we need policies that prioritize and finance prescribed burning and related research, ensuring wildfire resiliency in our backyards.

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Local Data & Targeted Research Improves Fire Resilience

- **Local data can strengthen fire prediction models, enabling tailored approaches to prescribed burning.** Through the integration of local groundwater, plant health, and fire data, decision-makers can test potential prescribed burn treatments to see how they will affect future fires. This can improve wildfire management, in turn benefiting communities with high fire risk.
- **Oaks are surprisingly resilient to drought and fire, so focus on other species and/or cultural resources during prescribed burns.** During dry years, oak trees on ridges had higher water availability, surprising researchers who expected trees near water sources to fare better. This finding invites further research but also highlights the strength of California oaks.
- **Local weather stations can provide critical information about fire weather.** The BRW project's local weather station gathers climate data continuously. It is so sensitive that it detected recent solar eclipses and the July Lake Fire. Researchers can compare data between wildfires and controlled burns via the tower, offering insights into how weather influences fire and how different kinds of fires impact the environment.

Why Prescribed Burning in the Coastal Foothills Matters

When it comes to living with wildfire, a one-size-fits-all approach will not work because every corner of California is unique. Tailored prescriptions that fit perfectly for a local area are most effective. That requires understanding each component of a system, from plants and animals to daily weather forecasts and local water resources. California has invested roughly $2.8 billion to promote wildfire resilience, with a majority of that funding ($1.3 billion) dedicated to the Wildfire and Forest Resilience Expenditure Plan through Fiscal Year 2023-2024. A significant amount of funding, resources, and research has uncovered information about prescribed burning in conifer and high-alpine environments, like the Sierras. However, we need to learn more about how to apply fire in coastal foothill landscapes, where most Californians live, at a similar scale.

The BRW Project gathered information about landscape conditions before, during, and after prescribed burns, allowing for comparisons between the datasets. It led to new insights into fire recovery and behavior. For example, researchers expected a consistent relationship between fire intensity and vegetation regeneration, but the varied regrowth rates observed between the 2022 and 2023 burns open promising paths for future research. Additionally, fog and lichen, the organism hanging from oak canopies like an old man's beard, proved more influential in fire behavior than previously thought as observers at the 2023 prescribed burn watched lichen erupt in flames, redirecting the fire ever so slightly. The next day, the team hosed down the lichen before igniting the controlled fire, which prevented the fire from reaching the oaks' canopies. Researchers suspect this relates to fog. Fog buffers vegetation from fire, while lichen can either accelerate or slow down fires depending on whether it has absorbed fog recently.

The BRW Project included fire ecologists, landscape ecologists, biologists, geomorphologists, atmospheric scientists, eco-hydrologists, herpetologists, and computer scientists. It also united the work of several pre-existing research efforts to answer new questions about fire. These research efforts focus on California's freshwater supply, predictive fire modeling, prescribed burning programs, moisture in plants, and localized wind and weather. By collaborating, the diverse array of experts asked and answered questions more comprehensively, applying each expert's field – fire, water, plants, fog, local weather, and more – to better understand fire in California's coastal foothills.

Smarting Prescribed Burning Needs Technology & Collaboration

- **Research that utilizes novel technology and a combined approach provides a better understanding of fire.** Combining on-the-ground measurements, remote sensing, and predictive computer modeling to answer questions about prescribed burns, as the BRW did, creates the opportunity for real-time data to ground truth predictive computer models. In turn, this improves the accuracy of models.
- **Collaboration amongst experts and diverse fields can lead to safer and more effective prescribed burns.** This approach allows prescribed burns to achieve goals that go beyond wildfire prevention, such as enhancing wildlife habitat, regenerating native species, and boosting the fire resilience of native plants.

A Call for More Research Funding

The success of the BRW Project highlights the urgent need for more research initiatives like it. As climate change continues to exacerbate wildfire risks, we need expanded funding and support for projects that integrate local data, expert collaboration, and innovative technologies. Investing in such research is not just about protecting our communities today; it's about building a resilient future where we can live safely with wildfire. If we want to understand how fire interacts with the coastal foothills and help wildfire managers better prepare communities, then we need more funding for prescribed burning and related research.



How to Scale Prescribed Burning and Associated Research

In order to scale up prescribed burning efforts and research in the coastal foothills, we need to invest in the following:

- **Long-term Research Commitments:** Long-term studies and sustained funding are more valuable than short-term, piecemeal projects. Such commitments lead to more comprehensive data and foster better working relationships among researchers, resulting in more robust and meaningful findings. The University of California's Natural Reserve System provides an ideal setting for long-term research initiatives due to its network of reserves and connections to researchers and students.
- **Innovative Technologies:** Exploring new technologies, such as UCSB's self-containing burn boxes and predictive fire modeling, can significantly advance our understanding of fire's impact on specific plants and ecosystem types within the coastal California foothills.
- **Climatic and Weather Influences:** The findings from the BRW project are fundamentally applicable to California's coastal foothills. However, to fully understand the impact of climatic and weather conditions--particularly the Santa Ana winds that significantly influence wildfires across this landscape, further funding and research are essential.
- **Community Collaboration:** Collaborations with local Fire Safe Councils help educate communities about wildfires. These connections bridge the gap between scientists, experts, and residents, fostering a shared understanding of fire science and trust. Similarly, strengthening relationships between researchers and fire professionals enhances the dissemination of relevant research findings to individuals and agencies working on the ground.
- **Multi-objective Prescribed Burns:** In order to understand fire's impacts on this landscape, researchers and fire practitioners must focus on learning in addition to achieving wildfire risk reduction goals. Developing a set of questions that can be answered in tandem with wildfire risk reduction work during prescribed burns will help scale this work. The BRW project provides a template of questions and objectives.





All photos were taken by Ethan Turpin. Please explore his work with the Burn Cycle Project here.