

Testimony of Dr. Michael J. Gollner
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Hearing on “Fighting Fire with Fire: Evaluating the Role of Forest Management in Reducing Catastrophic Wildfires”

Chairman Khanna (D-CA), Ranking Member Norman (R-SC), and distinguished members of the Committee, thank you for the opportunity to appear today to discuss opportunities to prevent future wildfire disasters in our communities. My name is Dr. Michael J. Gollner, and I am an Associate Professor of Mechanical Engineering at the University of California, Berkeley and run the Berkeley Fire Research Laboratory. I have over a decade of experience carefully studying the physics of spreading wildfires, with a particular interest in those fires that move beyond our forests and rangelands into the Wildland-Urban Interface (WUI), where fires spread from vegetation into our communities¹. During my testimony, I will discuss the causes of our current crises as well as solutions we have available to safeguard our communities and preserve our natural lands. The opinions expressed in my testimony today are that of my own and do not represent the views of the University of California.

Over the past few decades, we have seen a dramatic increase in the frequency and severity of destructive wildfires². The effect large wildfires have on people: lives lost, communities destroyed, critical natural resources wiped out is a large part of what transforms a natural process into a human disaster³. Increasingly, large populations are affected by wildfires, even indirectly by health effects from smoke exposure, large-scale preventative power shutoffs, and post-fire landslides. However, wildfires are a natural process that have occurred across our landscapes for millennia. Indigenous peoples utilized fire as an important cultural practice and resource management tool⁴. Starting in the early 1900s a series of large wildfires pressed the federal government to eradicate fires from our forests. By suppressing every small fire, we left a massive buildup of fuels that is less resilient to change and has therefore led to more severe wildfires in the long term^{5,6}. Climate change has further exacerbated this crisis, leading to prolonged droughts and severe fire weather conditions,

¹ Radeloff, Volker C., et al. "Rapid growth of the US wildland-urban interface raises wildfire risk." *Proceedings of the National Academy of Sciences* 115.13 (2018): 3314-3319.

² Westerling, A. L. (2016). Increasing western US forest wildfire activity: sensitivity to changes in the timing of spring. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 371(1696), 20150178

³ Gollner, M.J., “[Defensible Space: Combating the Challenges of Wildfire Mitigation.](#)” *Fire Protection Engineering Magazine*, Quarter 2, Issue 86, May 2020.

⁴ J.E. Keeley, Native American impacts on fire regimes of the California coastal ranges, *J. Biogeogr.* 29 (2002) 303–320. doi:10.1046/j.1365-2699.2002.00676.x.

⁵ [Federal wildfire policy and the legacy of suppression](#), Headwaters Economics (Last Accessed 3/22)

⁶ Calkin, D. E., Cohen, J. D., Finney, M. A., & Thompson, M. P. (2014). How risk management can prevent future wildfire disasters in the wildland-urban interface. *Proceedings of the National Academy of Sciences*, 111(2), 746-751.

and is projected only to get worse⁷. Increasing development out of cities into the WUI has also meant areas accustomed to fire now supports tens of thousands of residents who are threatened during these events.

While wildfires will always occur, wildfire *disasters* are preventable when the right strategies are applied *before* a fire begins. Focusing on better management of our landscape, including adding prescribed fire, reducing hazardous fuels near communities, and allowing some fires to burn under mild conditions, will lower the intensity of fires our communities are exposed to. There are many challenges here, as there is always some risk from a fire, even under controlled conditions. There is also often public backlash from reducing fuels on landscapes, significant regulatory hurdles, local smoke exposure, and the above-mentioned risk from any fire. But without this, we will be forced to contend only with the most extreme fire events.

While fuels management is a critical practice necessary to preserve our forests, this alone will do little to prevent disasters within our communities⁸. We must work to make it harder for these fires to spread into and within urban areas. The recent Marshall fire outside of Boulder, Colorado burned through grass in the middle of winter but still destroyed over 1000 homes⁹, highlighting this is not solely a forest management problem. Mitigation must focus on both structures and critical infrastructure such as hospitals, power, water, evacuation routes, and communications. “Hardening” communities from fire is possible with moderate changes. Modifications can be made to homes to prevent ignition from embers, such as screens on vents, non-combustible building materials, and constant maintenance removing flammable litter¹⁰. Defensible space is also used to keep fires from getting close enough to ignite structures and give firefighters a safe place to protect those structures as the fire approaches.

Our understanding of wildfires and how they ignite and spread within our communities is improving, but there are still many unanswered questions¹¹. Small flying embers have been recognized by NIST and US Forest Service investigations as the key mechanisms of spread from wildfires into communities, but much of this understanding is still in its infancy¹². From sprinklers to home spacing, we know there could be improvements here but struggle to quantify the best designs possible¹³. Most deaths occur while people are evacuating fires, however little attention has been paid to evacuation and notification. Despite the incredible importance and potential lifesaving outcomes of this research, the United States lacks the necessary dedicated infrastructure to test buildings against wildfire exposure. Dedicated research facilities, multidisciplinary centers of excellence, sustained support, and interagency coordination are desperately needed. If we could

⁷ Abatzoglou, John T., and A. Park Williams. Impact of anthropogenic climate change on wildfire across western US forests. *Proceedings of the National Academy of Sciences* 113.42 (2016): 11770-11775.

⁸ Cohen, Jack. 2008. The wildland-urban interface fire problem: A consequence of the fire exclusion paradigm. *Forest History Today*. Fall: 20-26.

⁹ Brulliard, K., Can they go home again?, Washington Post, January 25, 2022.

¹⁰ [Suburban Wildfire Adaptation Roadmaps](#), Insurance Institute for Business & Home Safety, November, 2021

¹¹ S.E. Caton, R.S.P. Hakes, D.J. Gorham, A. Zhou, M.J. Gollner, Review of Pathways for Building Fire Spread in the Wildland Urban Interface Part I: Exposure Conditions, *Fire Technol.* 53 (2017) 429–473.

¹² S.L. Manzello, S. Suzuki, M.J. Gollner, A.C. Fernandez-Pello, Role of firebrand combustion in large outdoor fire spread, *Prog. Energy Combust. Sci.* 76 (2020) 100801.

¹³ R.S. Hakes, S. Caton, D.J. Gorham, M.J. Gollner, A Review of Pathways to Building Fire Spread in the Wildland Urban Interface Part II: Response of Components and Systems and Mitigation Strategies in the United States, *Fire Technol.* 53 (2016) 475–515.

develop minimally invasive ways to retrofit existing structures and communities, and incentivize these changes to happen, we could potentially make a widespread change saving lives while minimizing costs.

Implementing these recommendations on a broad scale is a challenge that takes extensive cooperation between residents, first responders, private industry, and public policy makers¹⁴. We are making progress through community-based programs such as Firewise and Fire Adapted Communities the implementation of Community Wildfire Protection Plans (CWPPs), as well as the US Forest Service's Wildfire Risk to Communities map, which provides valuable insight on community-based fire risk. Federal grants and support could play a large role in increasing the capacity of these local programs to implement changes that ultimately will prevent disaster.

Acknowledgements

Short excerpts from this testimony were adapted from:

Gollner, M.J., "Defensible Space: Combating the Challenges of Wildfire Mitigation." *Fire Protection Engineering Magazine*, Quarter 2, Issue 86, May 2020.

¹⁴ Gollner, M. et al., [Preparing for Disaster: Workshop on Advancing WUI Resilience](#), Fire Protection research Foundation Report, March 2021.