



RESEARCH BRIEF

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Preventing Wildfires Before They Start: New Biosafe Gel Retardant

Human activities near roads and utility infrastructure are known to spark 85% of wildfires in the United States. Solutions targeted to preventing ignitions in those areas – such as a new environmentally safe gel-like retardant – could have a significant impact in reducing wildfires.

Background

Although devastating wildfires occur across the U.S., California exhibits one of the most severe wildfire seasons worldwide. California also has the highest population of residents living in the wildland-urban interface (WUI), where wildfires pose the greatest threat to human life.

Approximately 84% of the 300,624 wildfires occurring in California over the past 10 years were initiated in high-risk areas such as adjacent to roadsides and surrounding utilities infrastructure. Wildfire events in the WUI are generally more severe and burn more acres per fire on average than those located in forests or open wildlands. WUI-based fires also present innumerable tactical challenges to firefighters as they have to use techniques and gear to fight a wildland and structural fire simultaneously.

POINTS FOR POLICY MAKERS

To date, policies and funding to address wildfires have emphasized response over prevention, but data on the causes of wildfire suggests that preventative measures could greatly reduce the incidence and severity of wildfires. Targeted pilot application of a new environmentally safe gel-like retardant developed at Stanford on high-risk areas, such as vegetation along roadways, medians, or utility infrastructure, has been demonstrated to provide season-long protection against ignitions, reducing the incidence of fires and avoiding toxic side-effects to the environment.

▶ **Adopting a proactive instead of reactive approach to wildfires before peak fire season begins could allow resources to be utilized more effectively.** Prevention offers a higher cost-benefit value in terms of dollars spent when compared to ‘live-fire’ fighting and disaster recovery from post-fire events.

▶ **Treating high-risk fire zones in advance of fire season could greatly reduce wildfire events and conserve fire-fighting resources.** Applying an environmentally safe retardant to high-risk landscapes identified by CalFire or local fire agencies could potentially prevent fires from starting and allow firefighters to focus their on-the-ground efforts more strategically.

▶ **Use of an environmentally safe retardant can also provide extra levels of assurance when conducting prescribed burns.** As fuel reduction solutions such as prescribed burns are implemented more widely across California and in other fire-prone regions, applying an environmentally safe fire retardant will allow forest managers to more precisely control burn areas while also helping to preserve valued vegetation, critical infrastructure or important cultural artifacts within these landscapes.

▶ **The gel-like retardant is available now in large scale quantities.** These materials have been applied and tested by both CalFire and Caltrans and are approved by CalEPA; it’s currently undergoing certification by the U.S. Forest Service.

Traditionally, existing fire retardant and suppressant products have been used only in emergency response efforts, primarily to slow the impact of active wildfires, and have ultimately failed to provide a season-long preventative treatment option. This is due to both the chemical composition of these products as well as environmental and health concerns resulting from the use of what are often highly toxic materials. The new gel-like retardants developed by Stanford researchers were created from biodegradable and nontoxic materials that can be produced at the scale required to be effective in areas that are at high-risk for ignitions. Unlike other fire retardant/suppressant products, this environmentally safe gel is not affected by exposure to weathering and will only lose its efficacy following significant rainfall events of 2-3 inches. This novel combination of materials allows advanced, seasonal fire-retardant application to occur in areas where it is most critically needed, potentially saving time and resources. Additionally, this environmentally safe gel-like retardant helps to enable the development of a prophylactic treatment strategy that can prevent wildfires in areas at high risk for fire starts, saving landscapes, structures and most importantly, lives.

The image on the left shows untreated grass roadside after a fire ignition and the image on the right shows the same area treated with the fire-retarding gel after a fire ignition.



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This brief is based upon: **Wildfire prevention through prophylactic treatment of high-risk landscapes using viscoelastic retardant fluids** published in the *Proceedings of the National Academy of Science* (2019).

FOR MORE INFORMATION

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