

The Expanding Burning Field: Advancing Land-Fire Stewardship in Landscape Architecture

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ABSTRACT

In recent years, the convergence of accelerating climate change, land use changes, and modified fire regimes has escalated the risk of catastrophic wildfires. In response, landscape stewardship tools such as the application of beneficial fire are being increasingly employed worldwide to mitigate fuel accumulation, improve habitat, and support eco-cultural practices. Beneficial fire encompasses various forms, including cultural burns, prescribed burns, or simply allowing naturally-occurring wildfires to safely burn out. Historically, those involved in planning and designing landscapes have resisted the transformative power of fire by embracing spatial techniques that suppress and push fire away. However, this article highlights co-creative strategies that embrace and utilize pyric forces. It discusses how landscape architects can broaden their wildfire adaptation toolbox to incorporate land-fire stewardship techniques. The article also acknowledges the agency of landscape architects to pursue (or not pursue) projects in fire-prone areas, promotes collaboration with existing fire stewards to gain insights and include them as key members of project teams, and explores how landscape architects could become active stewards themselves.

KEYWORDS

Climate Change Adaptation; Beneficial Fire; Cultural Burning; Prescribed Fire; Fire Suppression; Wildland Fire Use

HIGHLIGHTS

- The risks and negative impacts of wildfire are intensifying globally
- The design and application of beneficial fire is a key strategy for reducing wildfire risk, supporting eco-cultural practices, and bolstering desired ecological habitats and functions
- Landscape architecture practitioners are increasingly presented with opportunities and potential responsibilities to serve as allies, team builders, communicators, and cultural provocateurs in promoting and implementing land-fire stewardship

EDITED BY Ying WANG, Yuting GAO

1 The Land of Feral Flames

Over the past few decades, many parts of the world have experienced record-breaking wildfire events—a trend that is, unfortunately, expected to rise.^[1] These extreme events not only result in mass evacuations, but also release greenhouse gases like carbon dioxide, pose risks to life, devastate buildings and essential

infrastructure, and fundamentally disrupt and detrimentally transform native ecosystems.

California sits at the frontline of this crisis in the United States. Since 2015, the state has experienced 10 of its most destructive and costly wildfires.^[2] In the 2020 fire season alone, over 8,500 wildfires ravaged the state, prompting nearly 500,000 emergency responses.^[3] Residents endured severely degraded



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1. A view of the sky in Davis, California during the LNU Lightning Complex fires of 2020. These fires significantly reduced air quality in the region due to the large amount of particulate matter in the air.
2. A severely burned oak woodland showing minimal regrowth following the LNU Lightning Complex fires of 2020.

air quality characterized by toxic smog, frequent dustings of ash, and the pervasive odor of burnt debris, which infiltrated homes despite herculean efforts to block it (Fig. 1). The fires destroyed over 11,000 structures, which are increasingly challenging to reconstruct due to shifts in insurance coverages and soaring inflation rates.^[3] In total, the fires from that year were estimated to have emitted 140 million tons of carbon dioxide, significantly undermining years of climate mitigation work across the state.^[4] They also fundamentally altered many of California's ecosystems, even those designated as fire-prone and fire-adapted, by catalyzing large-scale shifts in vegetative communities, increasing erosion and flood risks, encouraging invasive species growth, and reducing critical habitat for native wildlife (Fig. 2).

The rise in extreme wildfire events in California is driven by multiple complex factors. First, a hotter and drier global climate contributes to more prolonged drought, lowered humidity, and increased plant mortality, leading to extended fire seasons and fire probability.^[5] Historian Stephen Pyne refers to this era as the Pyrocene, characterized by the burning of fossil fuels, the warming of the earth and the increasing severity and frequency of wildfire

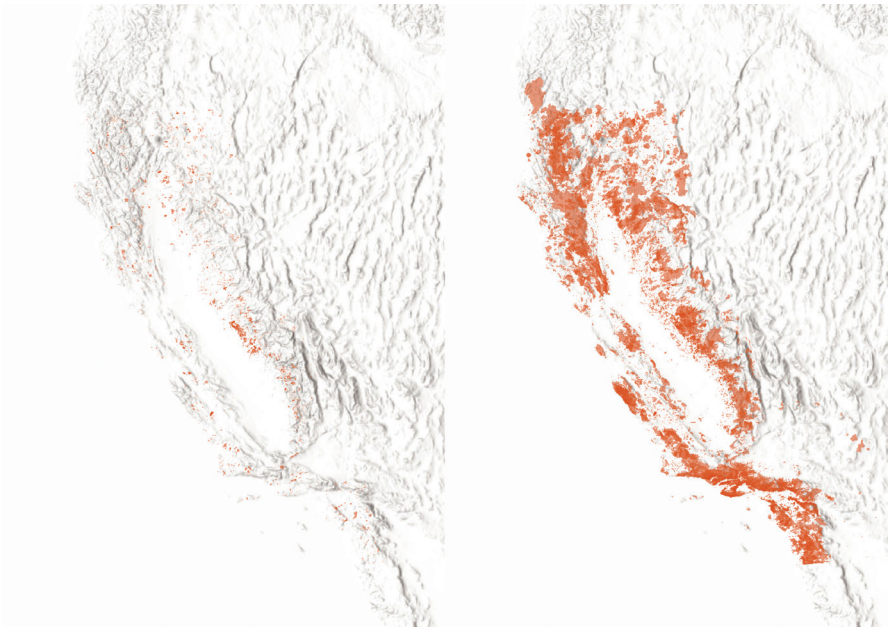
events; an era in which fire begets ever more fire.^[6] Second, land-use changes in the wildland-urban interface increase fire risks by adding more combustible materials and sparking human-caused ignitions.^[7] The third factor is the issue of human-modified fire regimes, shaped by historical colonial practices in California that have changed many ecosystems across the state.^[8] This predominantly consists of colonial-era fire suppression policies which have led to excessive biomass that would historically burn at regular intervals, creating abundant fuel for future wildfires (Fig. 3).

Prior to Euro-American settlement of the Western United States, fires burned large expanses of California, with an estimated 4.5 million acres (18,211 km²) affected each year^[9]—a figure surpassing even the catastrophic fire season of 2020^[3]. But those historic fires were generally far less intense and smokey, since before colonization, indigenous people utilized and applied fire frequently as a land tending and land shaping tool, and allowed naturally occurring fires to burn out.^[10] Beginning in the early 20th century, though, government agencies began prohibiting intentional burning of the landscape and sought to



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3. The same view of Yosemite Valley prior to colonization (left) and after a century of fire suppression (right).



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4. A map showing the spatial distribution of recorded beneficial fires (left) and large wildfire perimeters since 1878 (right).

suppress all wildfires. Notably, in 1935, the United States Forest Service enacted the “10 a.m. Policy,” aiming to extinguish all fires by the morning following their detection. The Smokey Bear campaign further entrenched the notion that fire was inherently detrimental to landscapes and communities.^[11] The effects of fire exclusion in California and the rest of the American West were profound, dramatically transforming fire-adapted landscapes and increasing their vulnerability to catastrophic wildfires.^[12]

Today, California remains largely in a fire deficit^[13], with many of its landscapes requiring fire to maintain ecological health, albeit not to the extent seen in recent decades (Fig. 4).

2 An Expanded Toolbox for Landscape Architects

In response to the increased risk of catastrophic wildfires, many planning and site design practices have sought to protect the trends and status quo of land development. These strategies aim to exclude fire through methods such as constructing earth-sheltered fire-resistant bunkers, wrapping structures in aluminized blankets, and indiscriminately clearing vegetation in certain perimeters around homes. These measures strive to resist and, ultimately, suppress fire, raising questions of how more innovative and diverse approaches could be employed in land-fire stewardship (i.e., the intentional act of working with fire to reduce risks, support eco-cultural practices,

and regenerate ecological processes and landscapes) by those involved in planning and designing landscapes.

This article shares a sample of fire tending techniques presented in *Design by Fire: Resistance, Co-Creation, and Retreat in the Pyrocene*—the first book of its kind to outline a range of design and planning strategies for fire-prone regions.^[14] The book curates 27 global design case studies (Fig. 5) situated within the dynamic and vulnerable wildland-urban interface and its adjacent wildlands, and catalogs them into three approaches: those that resist the forces of fire and landscape change, those that embrace and utilize such forces, and those that strategically retreat to minimize human intervention in fire-prone landscapes. In the following section, we highlight four creative and active ways designers can engage with fire.

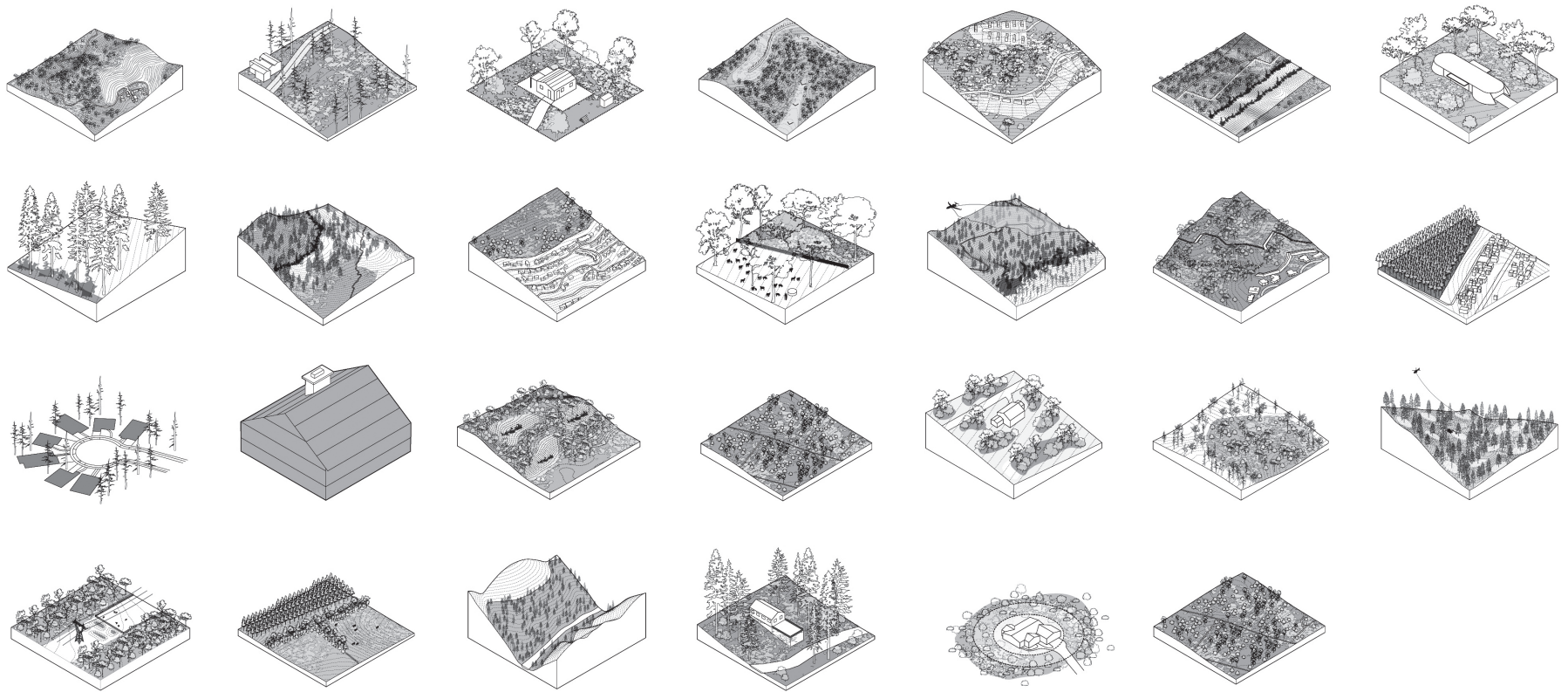
2.1 Fire Lighting, Rather than Fighting

“Beneficial fire,” also known as controlled, prescribed, and good fire, involves intentionally setting low-intensity fires during cooler months or allowing the landscape to safely burn during a wildfire. These techniques serve multiple purposes, including reducing hazardous forest overgrowth, enhancing ecological health, supporting indigenous traditions and sovereignty, or a combination of these goals. While the support for beneficial fire has grown over the last few decades^[15], it is still a relatively underutilized strategy in the fields of landscape architecture and planning. Internationally, there are numerous examples where fire is applied intentionally and beneficially.

In Cape Town, South Africa, the technique of “block burning” is used. Carefully monitored under controlled conditions to reduce fuel, the method typically involves dividing a site into management blocks that are similar in size, shape, and time since the last burn. These blocks are then burned rotationally in the late winter or early spring when weather conditions are favorable.^[16] The resulting checkerboard-like pattern helps slow future wildfires and prevent them from causing extensive damage across the entire site.^[17]

In Nowra, Australia, the practice of “firestick farming,” also known as cultural, traditional, or Aboriginal burning, is often executed on a small scale using single ignition point burns during cooler months.^[18] The highly localized approach relies on indigenous knowledge of the landscape. Once lit, these low-intensity fires move slowly across the ground, allowing practitioners to follow and guide them. Described as “little fires tending the earth affectionately,”^[19] these controlled burns create finely mosaicked landscapes, forming a patchwork of habitats shaped by the paths of fires.

Across the state of California, the practice of “fire lighting”



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5. A visual summary of the 27 global case studies unpacked in *Design by Fire*.

is common; it is a distinctive land-fire stewardship approach that involves a broad spectrum of stakeholders—including tribal members, private landowners, federal and state agency representatives, and private fire professionals—collaborating on controlled burns. There are events such as workshops held for participants to exchange knowledge and collectively enhance their capacity to use fire on the landscape for a range of ecological, social, and economic purposes (Fig. 6). Participants are intentionally grouped into diverse squads, each representing various stakeholders and experience levels, to foster a comprehensive learning environment.^[20]

2.2 A Basin for Burns

Beyond the three examples outlined in the previous section (block burning, firestick farming, and fire lighting) there is another noteworthy form of beneficial fire—fire surrendering, also known as wildland fire use. This technique allows wildfires to safely burn.

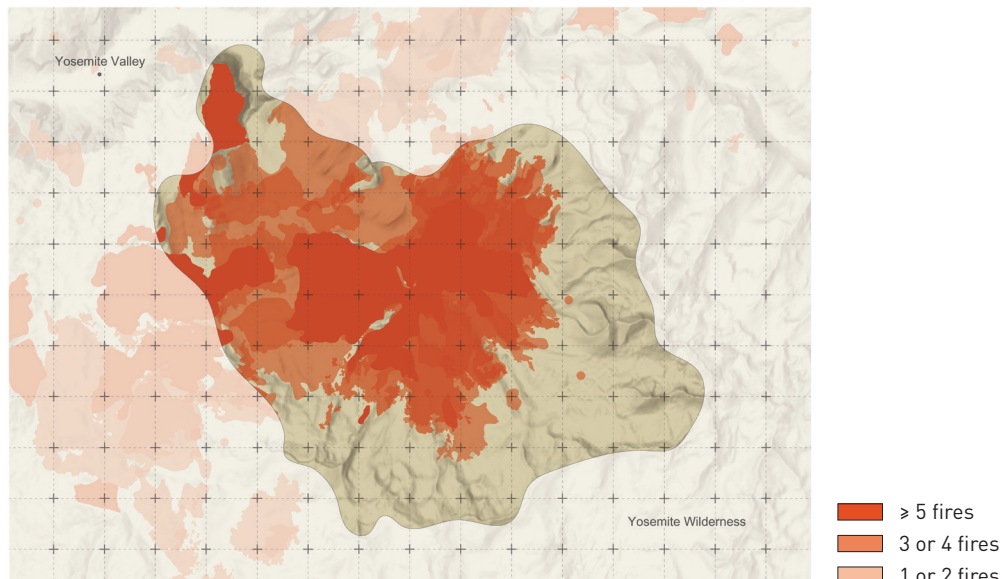
A prime example of where this technique has been implemented is in the Illilouette Basin, located just outside Yosemite Valley. For the past 50 years, wildfires in this basin have been allowed to burn, largely unchecked (helped in part by its granite edge that

acts as a bathtub-like natural firebreak at the top) (Fig. 7). Today, the 60 square miles (155 km²) of the basin present a stark contrast to other Sierra Nevada regions. Although the landscape might appear ravaged or unnatural to some, with patchy and messy areas devoid of any trees and fields of blackened stumps, it is among the

6. An example of “fire lighting” in Lake County, California with an indigenous-led fire crew.



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7. A map of Illilouette Basin showing documented fire perimeters.
8. A panoramic view of Illilouette Basin looking northeast, showing the patchiness of the landscape as a result of unchecked fires.

healthiest ecosystems in the entire range, offering a comparative glimpse into pre-colonial forest conditions (Fig. 8).^[21]

Since 1972, when Yosemite National Park adopted a fire policy to let places like the Illilouette Basin burn naturally, the area has experienced over 20 large wildfires. This surrendering approach has fostered a rich and complex mosaic of habitats, enhancing both plant and animal diversity, as well as the water table, thereby reducing the basin's vulnerability to severe wildfires.^[22]

3 Landscape Architects: Stewards of Fire in the Pyrocene?

For obvious reasons, the technique of fire surrendering cannot be applied everywhere, especially where human lives and properties

are at risk. Moreover, even well-established techniques like block burning, firestick farming, and fire lighting face challenges with wider-scale implementation, such as public resistance stemming from fears of uncontrolled fires and increased smoke. Other obstacles include resource bottlenecks like the lack of qualified personnel to manage the fires, regulatory and permitting hurdles, high costs, and associated liability concerns. Issues like these highlight pressing design challenges and needed adaptation.

How might landscape architects better implement and advocate for land-fire stewardship? How can landscape architects expand their skill sets to encompass innovative tending techniques? And how can these efforts be scaled up to address broader regional concerns? These are the questions that prompted us to write *Design by Fire*, as we see both opportunities and responsibilities for the



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discipline in these domains.

Part of this responsibility lies in carefully deciding what design projects to pursue and not to pursue. Is it responsible practice to work on new construction in former wildlands susceptible to fires and increasing levels of risk? Should designers advocate for rebuilding following catastrophic wildfires in the expanding and unsustainable wildland-urban interface? Where and how should development be happening and where should it be retreating? These are tough questions and discussions that are only going to get tougher as the world continues to get hotter and more flammable.

We see increasing opportunities for landscape architects to work as collaborators, facilitators, and team builders. How might we serve as allies to cultural burners, promote indigenous land practices, and decolonize design? How might we assist existing prescribed fire stewards and work alongside them? These experts understand the specific needs and reasons for fire stewardship in their local landscapes. In many regions, we are seeing the emergence of community-based fire stewardship programs, empowering residents to manage their own lands. For example, Prescribed Burn Associations (PBAs) operate in a growing number of states including California, Illinois, Mississippi, Nebraska, Oklahoma, and Texas. While PBAs can take on many different forms, all of them function as self-organized, mutual-aid groups, where landowners and residents collaborate on controlled burns, sharing resources, expertise, equipment, and time (Fig. 9).

And perhaps some landscape architects can become fire stewards themselves, something we have been experimenting with in our own design practices. This may involve working or volunteering on prescribed and cultural burns or learning fire



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9. A rangeland burn outside of Capay of California, organized by the Yolo County PBA, to increase ecosystem health, support eco-cultural restoration, reduce the risk of future wildfire events, and provide training opportunities.
10. Burnie the Bobcat, a supporter of “good fire” challenges the notion that all fire is bad.
11. Potential public service campaigns that could broaden the message about the future of fire, and our role in making that future.

surrogate techniques like prescribed grazing—employing animals to forage overgrown vegetation. Such hands-on experiences ground truth theory and provide empirical and aesthetic insights into fire’s co-creative role in determining what landscapes are and will be.

Lastly, we see opportunities for designers to operate as communicators, activists, and creative provocateurs. We need makers of more nuanced and positive messages about fire that have relevance in these times. We need new mascots that might allow 80-year-old Smokey Bear to peacefully retire (Fig. 10). There are worlds possible beyond fire suppression, and as landscape architects know quite well, landscapes cannot be controlled; they can be tended to (Fig. 11). As we progress deeper into the Pyrocene, we can fundamentally rethink and remake our relationships with fire to foster the kinds of landscapes we wish to inhabit.

Competing interests | The authors declare that they have no competing interests.

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拓展燃烧范围： 通过景观设计途径推进土地—火烧管理

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摘要

近年来，气候变化加剧、土地利用变化及火灾机制改变等因素增加了灾难性野火的风险。为此，全球范围内开始越来越多地采用景观管理工具来应对此类问题，例如利用有益火烧来减少可燃物堆积、改善生物栖息地和支持生态文化活动。有益火烧包括多种形式，如文化火烧、计划火烧，以及允许自然野火在安全前提下燃尽。以往，从事景观规划与设计的专业人员往往通过空间设计来抑制和消除火烧，以防止火烧带来的负面影响。然而，本文强调了多方共同决策的必要性，认为应肯定并充分利用火烧的效用。文章探讨了景观设计师如何拓展他们的野火适应性工具箱，以整合土地—火烧管理技术。文章还指出，景观设计师应把握是否在易燃区域实施项目开发的决策主动权，与现有火烧管理者展开积极合作（获取相关经验或将其纳入项目团队），甚至亲身参与火烧管理工作。

关键词

气候变化适应；有益火烧；文化火烧；计划火烧；火灾抑制；野火利用

文章亮点

- 全球范围内的野火风险和负面影响正在不断加剧
- 设计和利用有益火烧是减少野火风险、支持生态文化实践及优化生态栖息地功能的关键策略
- 景观设计从业者正面临越来越多的机会和责任，可在推动实施土地—火烧管理中发挥盟友、团队建设者、传播者和文化破壁者角色

编辑 王颖，高雨婷