

LETTERS

Edited by Jennifer Sills

Wildfires: Weigh policy effectiveness

IN THEIR POLICY Forum “Reform forest fire management” (18 September, p. 1280), M. P. North *et al.* commendably advocate a more rational strategy for managing fire in U.S. forests. However, their prediction that the extent and severity of wildfires can be substantially reduced by introducing managed fires is not well supported by the evidence.

Wildfires are rare events in many forested regions of the world, with annual area burned typically being less than 5% (1–3). An area treated to reduce fuels is unlikely to encounter wildfire before fuels recover to hazardous levels (3, 4). On average, each hectare reduction in wildfire area requires many hectares of treatment (2–4), which can be expressed as the ratio of the reduction in wildfire area to the area of treatment. Wide variations in this ratio exist, ranging from zero [e.g., Californian forests and chaparral and Australian grasslands, where treatment has led to no reduction in wildfire extent (3, 5)] to one [e.g., Australian savannas, where the reduction in wildfire area is equal to the area of treatment (3)]. In many cases (such as Australian forests), this ratio is less than 0.3 (2, 6), implying that high rates of treatment (i.e., more than 10% of the landscape per year) are required to produce major reductions in wildfire area. The rates of treatment required to be effective are often unaffordable across large areas (7).

Studies in Australia and the United States show that weather is a stronger determinant of fire severity than is fuel (8, 9). Fuel treatment, whether by managed fires or other means, may be most cost-effective when strategically targeted in close proximity to assets at risk (such as homes or vulnerable habitat locations), where any reduction in wildfire severity will have a greater likelihood of immediate protective effects compared with more broadly dispersed treatments (1, 10).

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Wildfires: Systemic changes required

IN THEIR POLICY Forum “Reform forest fire management” (18 September, p. 1280), M. P. North *et al.* highlight public support and improved spatial planning as key leverage points to deemphasize fire exclusion and expand beneficial fire. Although these steps are necessary, we caution that they are insufficient to overcome barriers to change.

There needs to be a deeper, systems-level understanding of the fire management system. The behavior of fire managers is a direct and logical result of the structure of the system in which they operate, influenced by factors such as incentives, culture, and capacity. If managers are judged by fire exclusion, that will become the dominant paradigm. Managers within this system may operate at cross-purposes, as shown by the widely divergent fire management policies and objectives across jurisdictional boundaries (1, 2). The joint influences of complexity, conflict, and uncertainty lead to a risk-averse decision structure constrained by perceptions and pressures, and susceptible to suboptimal decision biases and solutions to problems. The emphasis on aggressive suppression over less tangible ecological

benefits and hazard mitigation disconnects fire management objectives from underlying resource management objectives.

Infusing risk management principles into fire management decisions would directly address these systemic issues. We propose that efforts targeting transformation focus on four areas: (i) Engage in multiparty risk communication and prioritization of investments based on who can most efficiently mitigate risks. (ii) Track how, why, and with what information decisions are made, and ensure that decision processes are relevant and responsive to organizational and stakeholder needs. (iii) Invest in research to improve knowledge of fire management effectiveness, and consistently integrate new information. (iv) Cultivate a workforce well versed in risk management and the means to integrate this knowledge into decision-making.

Transforming fire management is not an inevitable consequence of enhanced support or planning alone; it requires meaningful organizational change in how and why fire response is determined. Adopting systems and risk analysis principles to better understand and improve fire management decisions is a critical step toward effecting comprehensive change.

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Response

WE AGREE WITH Boer *et al.* that vigorous fire suppression is needed near valued assets