



FINDINGS

Suppression firing is a prominent containment tool. It occurred on half of the **large fires** in **Victoria** and ranged from ~1 to ~20,000 hectares of burn area. One-fifth of the total fire perimeter length was **contained** by **backburning**.

Suppression Firing Prevalence & Practice

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Suppression firing (backburning and burning out) is widely used in practice but largely ignored in fire research. This prominent containment tool can account for hundreds to thousands of hectares of fire burn area. The practice occurs at such frequency and scale that it may confound other fire research and detection is difficult without operational data.

Introduction

Suppression firing, an encompassing term for backburns and burnouts, is used by firefighting agencies around the world. Yet we know little about the extent of its use and its impact on containment. We examine the prevalence and practice of suppression firing in Victoria, Australia.

Methods

Operational data from a five year period (2010-2015) was used to identify and map suppression firing on large fires (500+ ha). A keyword search of Situation Report comments was performed and the suppression firing was reconstructed from this data as well as visual inspections of available line scans, eMap extract data, and operational maps. ArcGIS 10.4.1 was used to map the suppression firing. Fires were grouped into 5 major fuel types (mallee, grassland, heath, woodland, and forest) based on the dominant fuel type by area of the final fire polygon. We performed a series of geoprocessing steps to generate: external perimeter, perimeter aligned road, suppression firing perimeter, and suppression firing aligned road.

Results

Half of the 74 large (500+ ha) fires had suppression firing. Twenty-six of which also had enough data to map the suppression firing location. Area burnt exclusively by suppression firing operations ranged from <1 ha to ~20,000 ha on different wildfires. Suppression firing was used to contain one-fifth of the external wildfire perimeter.

Suppression firing typically occurred during intervals of low fire spread and resulted in modest fire behaviour. Perimeter suppression firing was generally conducted by ground crews, while aerial ignition was usually reserved for internal burnout operations. Roads were often used for control lines. For the 26 wildfires we mapped, suppression firing occurred along 77% of the perimeter aligned road.

Discussion

As suppression firing forms such a large proportion of fire perimeter, it should be viewed as an important intervening variable in the degree to which landscape features impact fire cessation. Unidentified suppression firing can confound other types of fire research, especially research that is solely reliant on remote assessment techniques. One-sixth (13) of the 74 wildfires we studied had suppression firing operations that burnt 500+ ha which is well in excess of the reliable detection size for remote sensing. In such cases, access to operational data is important to delineate between natural and human-caused wildfire spread. However, there are quality issues with operational data as it is generated for fire management, not research purposes. Further research could establish production rates, ignition thresholds, and operational windows for conducting suppression firing, but better quality data is required.

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Tables and figures

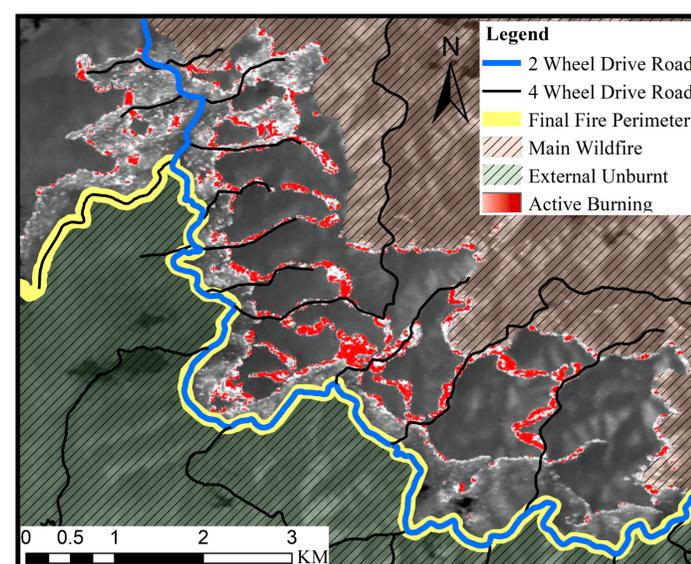


Figure 1 Linescan image of a burnout operation in progress. The ignition pattern of this ~1,000 ha burnout uses terrain features to promote a lower intensity 'backing' fire that will burn downhill from the roads/ridgeline. A backburn has been completed along the road to secure a containment line prior to the ignition of the burnout.

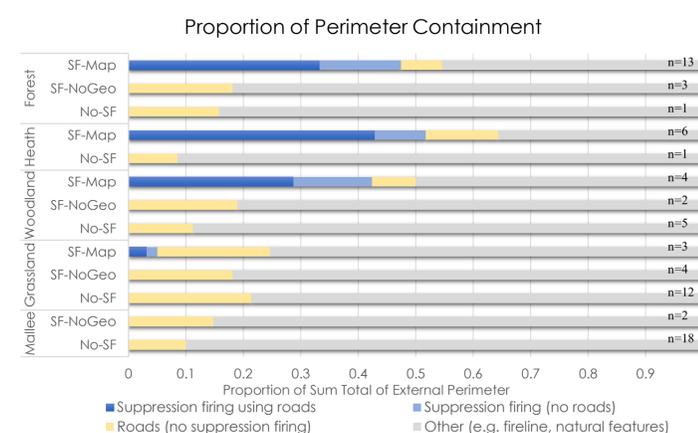


Figure 2 The proportion of external wildfire perimeter that was contained by roads, suppression firing, or other undetermined features. Fires are grouped by dominate fuel type. SF-Map fires had sufficient data to map the suppression firing, SF-NoGeo fires had descriptions of suppression firing but there was insufficient geographic data to map the extent, and there was no evidence of suppression firing on the No-SF fires.