

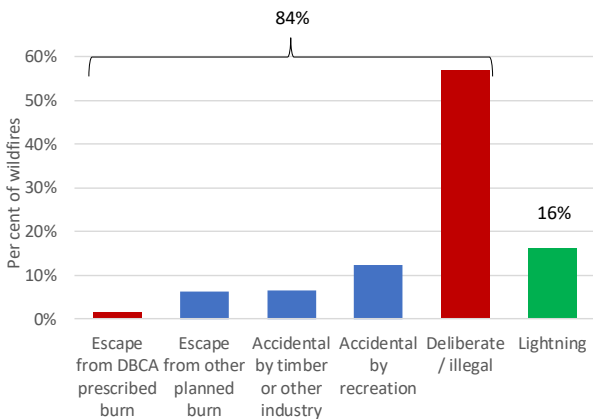
8 WILDFIRE CAUSES AND BEHAVIOUR



FACTS ABOUT PRESCRIBED BURNING AND WILDFIRE IN SOUTH-WEST FORESTS

Ignition

The main cause of wildfire is deliberate, illegal ignition. Using the fire history data, it is estimated that 57% of wildfires were started by arson. Lightning accounted for 16% of wildfires; the remaining 27% were escapes from industry, planned burns or recreation (campfires).



Causes of south-west wildfires from the DBCA_060 database¹ for January 1992 to December 2023. The 30% of wildfires with unknown cause were assigned a cause in the same ratio as wildfires with known cause.

Wildfires burn houses down, disrupt power supplies and kill people. Our drying climate in south-western Australia makes wildfires more likely to occur. The community should be educated about arson, which should be heavily penalised and not tolerated. Firefighters need to be adequately resourced to respond quickly, efficiently and effectively to wildfires.



85 firefighters and multiple fixed-winged water bombers fought an out-of-control wildfire started by arsonist(s) in the Walpole Wilderness area in April 2024.

Source: Department of Biodiversity, Conservation and Attractions.



Dwelling destroyed by out-of-control prescribed burn in Margaret River.

Source: Report on "Investigation of the house losses in the Margaret River Bushfire 23 November 2011", Department of Fire & Emergency Services, October 2012.

Fuel



Dense understorey regrowth in tingle forest of karri wattle and karri hazel following mass germination triggered by prescribed burning. Giants block, Tingleedale, Frankland District. Source: Icons to Ashes².

Forest left unburnt and allowed to mature is less flammable than frequently burnt forest.

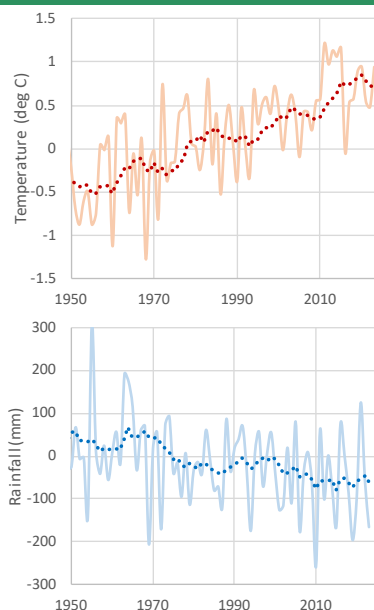
In the adjacent photo dense understorey is apparent³: As time-since-burn increases, understorey in red tingle and other forest self-thins and self-prunes. The litter on the ground decays and poses a lower fire risk than when still suspended. The canopy shelters the forest floor, greatly reducing wind and fire severity. In this way, long unburnt forest controls fire rather than fuelling it.

In contrast, prescribed burning creates dense regrowth, which burns severely during high-intensity fires. A study by Zylstra et al.³ showed that in dense regrowth, firefighters are often unable to extinguish the flames and need to resort to backburning - a risky fire suppression technique that can greatly increase the area burnt.

Climate and weather

The climate in south-west forests is hotter and drier than last century and this trend is predicted to continue. This is stressing forest ecosystems and threatening their biodiversity. Prescribed burning adds to these stresses.

- Forests are becoming drier.
- Fire seasons are becoming longer.
- Weather-driven fires will become more prevalent and fuel load on the forest floor less important.
- It is becoming more dangerous to undertake prescribed burning and there is a greater likelihood of escape.
- Periods of extreme weather conditions are increasing.



Bureau of Meteorology annual temperature and rainfall anomalies for south-western Australia relative to the 1961–1990 baseline with 10-year moving average.

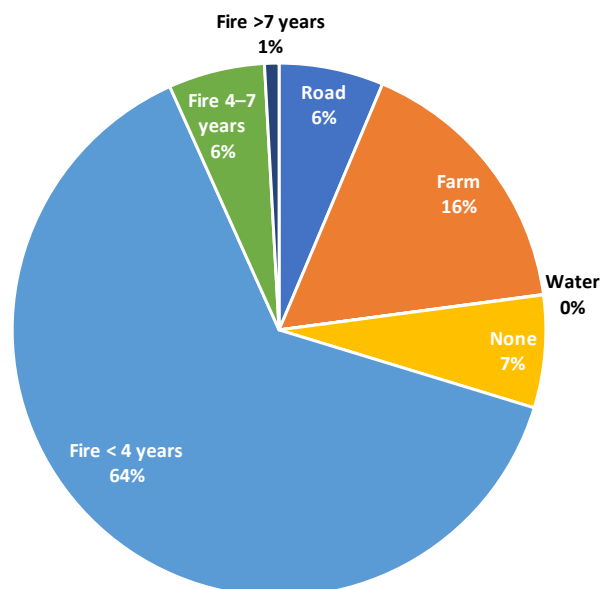
Source: <http://www.bom.gov.au/cgi-bin/climate/change/timeseries.cgi>

What stops wildfires?

Small wildfires may be stopped by weather changes, firefighting or reaching a low flammability barrier such as a river, road or fire-break. Very intense, large wildfires are generally only stopped by wind or weather changes, even if low flammability barriers may aid firefighting at the margins.

An analysis⁴ of 312 south-west wildfires that occurred in the dry periods of 2010/11 to 2021/22 considered the characteristics of the area in which the fire died out or was extinguished. By number, most wildfires were extinguished when they reached a road. These were most likely smaller fires, easily controlled. By area, most fires (64%) were extinguished in an area which had been burnt within the previous 3 years; only a small portion of wildfires stopped at a road (6%). Large intense fires readily jump roads and rivers.

This analysis⁴ shows that forest burnt within the last 3 years poses a low fire risk. Frequent burning may be an appropriate strategy close to critical infrastructure, but would lead to major changes to the forest ecosystem. The environmental, human health and economic costs of burning at that frequency could not be tolerated. **This analysis does not highlight the low flammability of long unburnt forest since it was not represented sufficiently in the data.**



Percentage of total area of bushfires studied that stopped (were extinguished) at roads, farms, areas burnt in preceding 3 years, areas burnt 4–7 years previously and areas not burnt for more than 7 years. 'None' indicates a border type was not identified.

Source: Tristan Campbell personal communication⁴.

Fire-fighting resources and effort

Immediate detection and rapid suppression of ignitions is the safest and most effective way to protect life, property and biodiversity from wildfires.

References:

- 1 Department of Biodiversity, Conservation and Attractions database of wildfires and prescribed burns (DBCA_060). Data extracted on 11 March 2024.
- 2 Fire and Biodiversity Western Australia (FaBWA) & the Denmark Environment Centre Inc. (2023) *Icons to Ashes*. <https://www.fabwa.org.au/icons-to-ashes>
- 3 Zylstra, P, Wardell-Johnson, G, Falster, D, Howe, M, McQuoid, N, & Neville, S (2023) Mechanisms by which growth and succession limit the impact of fire in a south-western Australian forested ecosystem. *Functional Ecology*, **37**, 1350–1365. <https://doi.org/10.1111/1365-2435.14305>
- 4 Campbell, T (2024) *Analysis of wildfire area characteristics and borders where wildfires were extinguished*, personal communication.