

Fire fuel, behaviour and bushfire risk

When people talk about the risk of bushfire they often mention fuel, but what is it? Which fuels are the most hazardous, how do they contribute to fire behaviour and what does that mean in terms of bushfire risk?

What is bushfire fuel?

Bushfire fuels are living and dead vegetation that influence the speed and intensity of a bushfire. But there is more to fuels than you think.

All bushfire fuel is characterised by:

- vegetation type and moisture content which influences the flammability the fuel
- size of the fuel (fine or coarse)
- quantity (the amount of fuel available for a fire to consume)
- arrangement (horizontal or vertical orientation of the fuel).

The fuel arrangement can be divided into four layers:

1. surface fuel [ground leaf litter and loose bark]
2. near-surface fuel [herbs and grasses]
3. elevated fuel [shrubs and young trees]
4. bark fuel [rough or loose bark on tree trunks and branches].

Fuel type

Fine

Fine fuels are less than 6 mm wide, or smaller than your little finger. The finer (and drier) the fuel, the more easily it will burn. This type of fuel is made up of dead grass, leaf litter, twigs, bark or some live vegetation, similar to what you would use to light a campfire or a wood fire in your lounge room.

Fine fuels dry out fast and heat up quickly as a fire approaches, which means they catch alight and burn easily. Fine fuel carries the fire front, making it the most

dangerous of all fuel types, which is why it is the main one targeted for fuel reduction activities such as prescribed burning.

Coarse

Larger fuels such as tree branches and fallen logs typically don't burn in the fire front or carry the fire, however, they will generally burn for some time after a fire front has passed.

This visible coarse fuel is far less combustible than fine fuels. It also doesn't contribute to the rate of fire spread or flame size, but does add substantially to the amount of heat released which makes fire suppression more difficult.

Bark

Strong winds can carry burning bark fragments long distances and create spot fires ahead of the main fire.

Burning the bark of rough-barked trees during a prescribed burn can reduce the risk of spotting and intense bushfires for a longer period of time than just burning fine fuels.

Impact of fuel on fire behaviour

The way fire behaves is determined by a combination of weather, topography and fuel. The only element of the bushfire triangle that we can influence is fuel.

The arrangement of fine fuel significantly affects how a fire behaves. The horizontal and vertical arrangement largely determines the rate of spread and intensity of bushfires.



Bark fuels – rough or loose bark on tree trunks and branches

Elevated fuels – shrubs or young trees

Surface fuels – loose bark and leaf litter on or near the ground





Fine fuel that is tightly packed together is less likely to burn and will smoulder due to lack of oxygen, whereas loosely arranged fuel will burn with more ferocity. Fine fuel that is separated is less likely to carry fire than fine fuel that is continuously connected. And more fine fuel means larger flames and greater fire intensity.

That's why continuous fine fuels close to the ground are often the main target of a prescribed burn. When shrubs and bark provide a continuous ladder of fuel into the tree canopy, a bushfire can burn high in the trees and produce a lot of heat.

Fire risk

National Parks and Wildlife Service SA (NPWSSA) staff regularly monitor fine fuel levels in parks to ensure any risk to neighbouring properties is managed in line with zone standards set by the Country Fire Service. Where the build-up of fine fuels becomes too great, fuel reduction work such as slashing or rolling vegetation, weeding, or prescribed burning are put in place to reduce this risk.

Fires which are generally easy to suppress and are less likely to impact on assets have low fuels (**Photo A**). These fires will still ignite but their rate of spread will be slower and their intensity (measured in kilowatts per metre) will be lower. They have smaller flames, short-lived embers and are unlikely to develop into crown fires

due to the absence of a fuel ladder. When fuels are extreme (**Photo B**) fires will burn at a greater intensity with larger flames and long-distance spotting. They are harder to suppress and have greater potential to cause significant damage.

Reducing the amount of bushfire fuel in an area could be the difference between 2m and 50m flames on a day of heightened fire danger. In other words, a fire we can work on or one where the only option is to retreat to a safe distance and to protect assets where we can.

What are prescribed burns?

Prescribed burns are planned fires on public or private land, to reduce fuel loads and regenerate plants and animal habitats. To know when and where NPWSSA prescribed burns are subscribe at: environment.sa.gov.au

A shared responsibility

Planning and being prepared for a bushfire is a shared responsibility. It's important to have a Bushfire Survival Plan, prepare your property well prior to fire danger season, and have a plan for total fire ban days. Visit the CFS website for resources and information: cfs.sa.gov.au

More information

environment.sa.gov.au/topics/fire-management