

# From the Ashes

**As the recent fires have demonstrated, bushfire can quickly destroy thousands of hectares of bushland. But no sooner has the ground stopped smouldering and we start to notice green shoots appearing from the blackened earth. This is because bushfires are a dramatic but natural part of the Australian landscape.**

Along with the flames, fire produces heat, smoke and ash. Each of these may be advantageous to plants re-establishing after fire. Heat may open woody cones or capsules, smoke may stimulate seeds to germinate, and ash may act as fertiliser.

Fire has been part of the Australian landscape long before humans inhabited the continent. Most fires would have started with lightning strikes and could have burnt large areas of vegetation. With the arrival of Aboriginal people approximately 50,000 years ago it is believed that fire use became more planned in most regions. Some areas were frequently burnt to aid hunting and movement. Other areas were thought to have been protected from fire or infrequently burnt, and these areas could have been managed to encourage food plants or animals that were sensitive to fire.

Since European occupation, the frequency and extent of fires has changed due to changing land uses, cessation of indigenous fire regimes in some regions, and government policies around fire suppression and planned burning. This has resulted in some areas being burnt too frequently while others are not burnt at all. Fire frequency is an important consideration as many species need a minimum fire-free period between burns to build up their seed reserves. *Banksia ericifolia* (Heath Banksia), for example, needs at least eight years to mature and begin to produce seeds. A fire frequency of less than this period will eliminate the species from the plant community. As such, in frequently burnt areas floristic composition becomes simplified as species are lost. The opposite is also true. Without fire the sclerophyllous species that have adaptations to survive and regenerate

Many gum trees respond to fire with epicormic growth.

Fire is an important part of the bushland cycle.



Post fire regeneration at Dunningham Reserve, Coogee.



after fire may be outgrown by species such as *Pittosporum undulatum* (Sweet Pittosporum) and by introduced weeds, such as Privet and Lantana, which establish in the absence of fire. Many small urban bushland reserves have dense *Pittosporum* canopies because of the absence of fire.

### Fire-adapted plants

In general, most plant species that occur in fire-adapted vegetation communities have developed mechanisms to aid their survival after fire. Some species either depend on, or benefit from, fire during some stage of their lifecycle. These plant species can also be referred to as fire-adapted.

Fire-adapted plants have two main ways that they respond to fire. The first is to resprout with new leaves after fire and the second is to produce seeds that germinate after fire. These plants are therefore called either resprouters or seeders, and some plant species can do both.

### Resprouters

Mature resprouter species tend to survive fire even when all their leaves have been burnt. They either resprout at ground level from lignotubers (large woody underground bases that store nutrients), or from epicormic buds (buds that are highly protected deep under the surface of the bark on most gum tree trunks or branches), or from rhizomes (modified underground stems that store nutrients). Heathlands, open forest and woodlands often contain plants with lignotubers. Plants with rhizomes include some grasses, sedges and rushes. Resprouters generally produce less seed than seeders and their seedlings tend to grow more slowly and may take some years to reach maturity.

### Seeders

These plants rely on building up a store of seeds in the soil by producing seeds with hard seed coats, or by holding seeds on the plant (inside seed pods or fruit capsules) until a fire triggers the capsules to open, releasing the seeds. Banksias and Hakeas hold their seeds in protective wood seed cases on their branches. After fire, these woody seed cases are triggered to open, releasing the seeds. In addition to the heat from fire, chemicals in smoke and ash can also trigger germination of some plants.



Banksia seed pods are opened through heat.

Many plant species have seeds with hard coats and attached 'food bodies' that are attractive to some types of ants. The seeds become buried in the ants' nest after they eat off the fruit body and when a fire passes above they are protected from being burned and their dormancy is broken by the heat or smoke. The seeds later germinate after rain, and seedlings grow in full sun in the bare post-fire soil, enriched by ash.

### Gum trees

Gum trees (Angophoras, Corymbias and Eucalypts) are one of the most widely recognised fire-adapted native plant groups. Gum trees accommodate fire in a variety of ways. The bark of most gumtrees is densest at the base and conducts heat poorly. Low-intensity fires char the exterior but not wound the

living cambium beneath it. Epicormic buds are a key mechanism used by fire-adapted gum trees and play an important role in helping some gum trees survive bushfires. Many eucalypt species also have lignotubers to help them survive droughts and bushfires.

A few eucalypt species, however, are killed by hot fires. These species tend to be generous seed producers and may hold their seeds in hard woody capsules in the canopy, which are released after fire. On the back of the first rains, the ash bed left behind is the perfect seedbed to enable germination.

### Succession

Vegetation usually responds to fire in a sequence, which is referred to as succession. Initially after fire, the vegetation structure has been reduced and is more open to sunlight. Native grasses and resprouting species respond quickly.

Once rain arrives, seedlings grow in the gaps between resprouting trees and shrubs. Pioneer species such as wattles (*Acacia*), herbs and short-lived annuals often dominate. Over time vegetation cover and structure increases and smaller plants may be shaded out by larger trees. Gradually the vegetation thickens up and, depending on the extent and intensity of the fire, the vegetation will eventually be similar to before the fire.

Every bushfire has different impacts and the recent fires are unprecedented in terms of the area burnt, houses destroyed, lives lost and wildlife populations decimated. Although the bushland will recover the impact upon the wider community will be longer lasting. Unfortunately our vulnerable wildlife are often the hardest hit in such circumstances and it may be a while before we fully understand the long term implications of this.



Bracken Fern and Blady Grass resprout rapidly after fire due to their extensive root systems.

Information for this article was sourced from *Sydney's Bushland - More than meets the eye* by Jocelyn Howel and Doug Benson and *Land for Wildlife South East Queensland* - [lfwseq.org.au](http://lfwseq.org.au)