Essential reading ...

Fire shields: protecting people, livestock and property.

How to Fireproof your Property Using the Principles of Firescaping

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Fending Off Fire

2008

Fires in South-Eastern Australia are the worst in the world. All too often lives are lost, pets and livestock killed, and homes destroyed. Fortunately, over the last twenty years or so, more information has become available on how to cope with bushfires (forest fires). Up to date information is available from local authorities, and there are many excellent recommendations in books such as "The Complete Bushfire Safety Book" by Joan Webster (Random House, 2000), ISBN 1 74051 034 8; "Landscape and Building Design for Bushfire Areas" by Dr. Caird Ramsay and Lisle Rudolph (CSIRO Publishing, 2003), ISBN 0 643 06904 6, and "Permaculture: A Designers' Manual" by Bill Mollison (Tagari Publications), ISBN 0 908228 01 5. The ideas and suggestions in this article are intended to build on these sources. There are no guarantees of course, but it is hoped that these suggestions might be of some help, at least in low to medium-intensity fires.

These ideas would also apply to other fire-prone areas in Western Australia, California, South Africa, Chile and countries around the Mediterranean Sea. The suggestions in this article are mainly aimed at Mediterranean climate regions, which have cool, wet winters, and hot, dry summers, as these generally have the worst fires, and have fire-prone as well as fire-promoting vegetation.

Fire Shields

In flood-prone areas, people build houses on stilts. The best building and landscape designs are built to suit the local environment. In Switzerland, where houses can be swept away by avalanches of snow and ice, they build earth walls, covered in rocks, uphill from the house. The earth wall is built in a "V" shape, pointing up the hill or mountain. This acts as a shield. If there is an avalanche, the snow is divided and deflected around and past the house. It is easier to fend off or deflect a blow, than to stop it head-on. This "deflecting shield" principle would apply to any phenomenon that comes as a wave or a front, for example mudslides, lava flows, tsunamis, and fire. It may not be easy to predict from which direction a fire may come, or how it may behave, but in most areas it can be predicted with a reasonably high level of probability.

The fire shield idea is based on having one or preferably more lines of protection, with each shield reducing the intensity of the fire, in a step-down process, to a point where the fire may become more manageable, as it approaches people, stock or property. Where possible, the shield should point towards the fire in a 'V" shape to divide and deflect it as well. If you have the space for multiple shields, this could include a frontline windbreak of low-flammability plants. This would intercept burning embers, divide, deflect and reduce the wind, and so reduce the speed and intensity of the fire.

The windbreak would be backed up by the next line of defence, a non-flammable wall or fence, pointing into the fire if possible, so that once again embers are stopped, and the wind and fire is deflected. Everything inside would also be protected from radiant heat. Alternatively, you could plant a hedge, but fences and walls provide instant protection whereas a hedge takes time to grow. Probably the best, but also relatively expensive, option would be a solid wall built of aerated, autoclaved concrete panels, such as the Hebel™ "Staggered Powerwall".

The next best choice would be fibre cement sheets, bolted onto hollow, square steel posts. The posts would be on the leeward side, and set in concrete. The wall or fence would probably need to be at least 1.8 metres high, but preferably 2.4 metres high. It could be painted an unobtrusive dark olive green or brown. If you are in the suburbs with an existing wooden fence, it could be painted with exterior fire-retardant paint, which can be surprisingly effective, see, for example, www.antiflame.com.au. A cheaper, but less effective option, would be whitewash. The fire-retardant qualities of whitewash could be improved by adding around one part borax to three parts hydrated lime (the borax could probably be less and still work well). Whitewash can also be improved by adding about 20% bondcrete/exterior PVA glue, or acrylic paint binder medium to the water, and a handful of white cement to 10 litres of whitewash, plus a couple of drops of dishwashing liquid. Whitewash can be applied easily to a fibre cement sheet or wooden fence with a long-handled broom, and a window cleaner's bucket. Two or more coats should be applied, perhaps annually or every second year, before the fire season (that is if you don't grow climbers on the fence).

The cheapest, but probably the least effective option, would be a steel post/star picket or concrete re-enforcing bar fence. This would have chicken wire or similar wire mesh attached and be covered with fire-retardant climbing plants. Climbing plants usually grow faster than hedges. This would be better than nothing, but the fire may possibly melt the whole lot. Walls, fibre cement and wooden fences can all have wire mesh attached, so that climbers can be grown over them. The plants may be destroyed, but they will absorb the initial blast of radiant heat. This will partially protect the fence, which in turn protects what's behind it.

A line of screening fire-retardant or low-flammability tall shrubs or small trees could be planted inside the fence or wall. These should be taller than the fence, to catch embers, and to form a shield against radiant heat. They should also be one and a half or more times their height away from buildings, in case they do burn and perhaps fall over.

A final line of protection or shield against embers and radiant heat would be close to the house. This could be made up of walls, or fibre cement sheet, or hedges (eg. *Aloe*

arborescens), or fire-retardant climbing plants. Walls could be made of no-fines concrete or aerated concrete panels, preferably with a sprinkler system running along the top of them. Another possibility would be fibre cement lattice. This is a fibre cement sheet with around five centimetre diamond or square holes in it. Painted an unobtrusive colour with fire-retardant paint, and covered with fire-retardant climbers, this should still be reasonably effective. It would also be more aesthetic, compared to a solid wall. Built with hollow, square steel posts on the inside, in a raised garden bed, this could include succulents or other fire-retardant shrubs and ground-covers on the fireward side. A sprinkler system could be placed on top of a fence or wall, or above a hedge. Finally, the house itself should have screens, blinds or some protection for the windows, be sealed against embers, could have a sprinkler system etc.

Fire Refuges and Aerated Concrete

Aerated, autoclaved concrete is a versatile building material that is becoming better known. It is concrete with small air bubbles in it. This, and similar materials, have multiple names, including AAC, aircrete, cellular concrete, foamed concrete, etc. Also, trade names such as Hyssil™ and Hebel™. You may find it interesting to look at www.hyssil.com.au, a CSIRO invention which does not need autoclaving, and www.hebelaustralia.com.au. This material obviously provides outstanding insulation against heat and cold, but also protection from fire. The material is still strong, but usually weighs less than half the weight of solid concrete. Hebel™ panels may be available for purchase at local hardware stores for about $40 each. The panels are 750mm thick, 1200mm long, and 600mm wide. They can be cut with a handsaw, or even carved and sculpted. Fire rating: 125mm thick or more, delivering 240/240/240 FRL. Fire ratings up to four hours (presumably around one and a half hours for 750mm thick, which is easily more than enough gun). The Australian house of the future might be made of aerated or no-fines concrete walls and roofs, providing protection from heat, cold and fire. All that would be needed would be to add screens or shutters to toughened glass windows.

These panels should prove to be an excellent material for building fire refuges. The experts recommend that if you choose to stay at home to fight the fire, you should retreat to an indoor fire refuge for the ten minutes or so that it takes for the fire front to pass. Refuges should therefore be built inside. Outdoor refuges, such as sheds, garages or underground refuges could be built, as long as access to the shelter is shielded from radiant heat. An outdoor refuge might also be used to protect pets (a deluxe, insulated kennel), and to keep precious items in an earth-covered metal box, in case the house burns down.

It may also be of interest that fire fighters in the United States Department of Agriculture Forest Service use a "Fireshelter", which is basically a swag (covered sleeping bag) made of reflective, fire-retardant materials. People have survived (sometimes burnt, but nevertheless, survived), intense forest fires in these. It should be possible to import them, though probably expensive, or perhaps a similar product could be made in Australia. Other potentially useful products that could be made from this material include roll-down house blinds, car covers; and wrap-around blankets and hooded ponchos, which could be lined on the inside with insulating wool.

Stock Shelter

It is horrendous that so many animals die or are injured in bushfires. The stock shelter illustrated is intended as a multi-purpose shelter, to reduce the impact of fire, cold winter winds, and to provide shade. The principles are the same as for protecting the home, but this design relies more heavily on plants. Of course, if heat-shielding earth berms and trenches can be made, all the better. Water collecting swales would enhance tree growth, or enable you to grow plants that require more water. Rock walls would obviously be useful.

The first line of defence would be a relatively permeable windbreak of low-flammability plants to reduce the wind, catch embers and slow down the fire. It would also preferably be pointed into the wind/likely direction of the fire. After this, the fire has to burn across short grass or bare soil. It then has to get through a barrier of a row (or more) of *Atriplex nummularia*, *Myoporum insulare*, *Lagunaria patersonia* or *Aloe arborescens*, for example. This row should ideally point into the wind. The row or rows of larger plants (eg. *Myoporum insulare, Brachychiton populneus*, tree aloes) behind this should provide a canopy and some protection from falling embers, and overhead radiant heat. Even if the whole shelter does burn, it should take longer to ignite, burn with less intensity, and the fire should spread slower than if the stock were just left standing in long, dry grass, with burning embers falling on to them.

Fuel reduction browses

Livestock can be used to reduce flammable fuel loads and thereby reduce the intensity of fires, or even stop their spread. For example, they can be bunched together to heavily graze dry grass in a strip to produce a fire break. Livestock that browse (eat leaves of trees and shrubs), as well as graze (eat grass), such a Galloway cattle and goats, can also be concentrated in an area of trees, shrubs, and grass, where fire threatens people, stock or property, to reduce the fine fuel load of the vegetation, and so reduce the intensity of an approaching fire. This has been done before, see the book "Should meat

be on the menu" by David Mason-Jones, visit www.journalist.com.au. This could be done on the edge of bushland/forest to produce a protective strip or buffer zone, perhaps 20-100 metres into the forest. Repeated browsing could also be used to retard the growth of vegetation which promotes fire (common in Mediterranean climate regions with sclerophyll vegetation, e.g. eucalyptus and pine trees) and control the seedlings of fire-promoting plants such as eucalypts which germinate after a fire.

The stock could be fed beforehand with seeds of fire-retardant/low-flammability plants (see list below) which would be deposited and should germinate in their manure. With repeated browsing and seed deposition/dispersal, the vegetation would change from being dominated by highly flammable plants, to being dominated by low-flammability plants, or at least a higher percentage of low-flammability plants. Seed balls could be an additional technique to establish low-flammability vegetation (see the "AID plus seeds treatment" article, and the "Direct seeding *Faidherbia albida*" article, on the articles page).

Intensive browsing/grazing turns much of the plant material into manure, with faster recycling of organic matter and nutrients which improves soils (increasing water infiltration rates, water holding capacity and nutrient status), so that the vegetation could be shifted to a later successional stage (to a wetter type of forest, made up of less flammable plants). This vegetation would be less fire-prone, and less fire-promoting. This would have the additional ecological benefit of producing a patchy, more biodiverse forest. If a fire does burn the buffer strip, the fire should be reduced in intensity, and the process would need to be started again. By contrast, repeated, frequent fires reduce organic matter levels in soils, and some of the key nutrients such a phosphorus and nitrogen are partially lost (through volatilisation, erosion), turning the vegetation back to an earlier stage of succession, which tends to be more fire-promoting.

An oversimplification no doubt, but the practice of fuel reduction burns (prescribed burns) reduces the fuel load, and reduces the intensity of fires, but it also tends to favour the establishment and survival of plants that are adapted to cope with frequent fires, some of which tend to promote more fires, in a potentially vicious circle. Fuel reduction burns are likely to continue to be necessary to reduce fuel loads in large areas of forest, but the edges of forest, at least near houses, may be better managed through fuel reduction browses. Fuel reduction browsing is also safer near houses, compared to prescribed burns, and could be implemented before a prescribed burn.

Some may be uncomfortable with the idea of changing the species composition and/or balance of species in a forest, however, much of the vegetation in Australia has been

modified by people, and is not in an idealised, pristine condition. Much of it has been subjected to a variety of fire regimes, during the thousands of years that people have been in Australia. Fuel reduction browsing would mean that a very small percentage of the vegetation would be managed in a way that perhaps more closely resembles the situation when the now extinct megafauna were dominant, before the arrival of people. Some weed species are likely to take advantage of this situation, but there are many fire-adapted weeds that are already thriving because of the existing fire regime.

A row of low-flammability trees could be planted between forests and houses, especially in the sector from which the fire is likely to come, perhaps *Lagunaria Patersonia, Brachychiton populneus* or *Acacia melanoxylon*.

Fire-retardant plant lists can be found in many books, and on the internet. Some low-flammability indigenous plants that could be established through livestock and/or seed balls to establish a low-flammability buffer zone:

In Southern Victoria:

Acacia melanoxylon, Myoporum insulare, Bursaria spinosa, Einadia nutans/Rhagodia baccata, Enchylaena tomentosa, Pittosporum undulatum, Solanum aviculare, S. laciniatum, Senecio odoratus, Dodonaea viscosa, Melaleuca lanceolata, Carpobrotus spp., Tetragonia tetragonoides, T. implexicoma, Kennedya prostrata, Hardenbergia spp., Acacia dealbata, A. implexa, A. mearnsii, A. pravissima, A. howitii, Correa lawrenciana, Olearia argophylla, Casuarina cunninghamiana, Grevillea victoriae, G. rosmarinifolia, Disphyma crassifolium, Lomatia fraseri.

New South Wales, Southern and Central coastal plain;

Most of the above spp., plus *Acmena smithi, Ficus macrophylla, F. rubiginosa, Brachychiton populneus, Acacia decurrens, Lophostemon confertus.*

For practical purposes the key species might be *Acacia melanoxylon, Myoporum insulare* and *Pittosporum undulatum.*

Fire-retardant Plants

The following plants are arguably some of the best fire-retardant or at least low-flammability plants available, that are also generally easy to grow and adaptable. It would be a good idea to seek local expert advice when selecting plant species.

You may be sceptical about the effectiveness of low-flammability or fire-retardant plants. You may come across the dogmatic statement that “all plants will ultimately burn”, or similar. I was confident that the water-filled leaves of succulent plants would

not ignite and support a flame, so I tried holding a cut *Aloe vera* leaf over a cigarette lighter for up to five minutes. The leaf blistered, bubbled, boiled and ultimately charred, but at no point did it ignite into flame. On one occasion that I tried to burn a cut *Aloe* leaf, a drop of sap put out the lighter.

Most of a succulent plant is water, so one can think of a succulent plant as storing water above ground. Granted, if you took an entire *Aloe arborescens* plant and threw it onto a bonfire, it might end up a mushy mess, but it would not contribute fuel to the fire. More to the point, if you lit a grass fire so that the wind made it burn towards a hedge made of two rows of *Aloe arborescens* plants (nearly two metres high, and about four metres across), it almost certainly would not get past the *Aloes*. In fact the Los Angeles Times, (November 8, 2007), reported and illustrated an incident where on a windy day, a couple's home appeared to be saved from a fire that burned uphill, by *Aloe arborescens* plants (see www.debraleebaldwin.com, and click on "Firewise landscaping" in the left hand column). Other homes around them burnt down. It may be that a fire trying to burn over the top of a succulent hedge, not only has no fuel to support it, but also the slightly viscous, watery sap may absorb some of the heat energy of the fire (it is a property of water that it takes a lot of heat to warm water). Even if the plant boils, it should give off steam, which should also dampen the fire.

Plants which have high concentrations of salt or other minerals also tend not to burn well, such as Old Man Saltbush, *Atriplex nummularia*, and other *Atriplex* species, and are more tolerant of cold and frost than most succulents. This is untested, but a solution of perhaps 5 grams borax to one litre of water sprayed onto *Atriplex* plants should be absorbed by the leaves, and make the plants more fire-retardant (borax is used as a fire retardant, and is cheaply available in supermarkets). The same borax solution could be sprayed onto the plants before a fire approaches.

It is probably good idea to define terms – I would suggest that a **fire-retardant plant** is one that does not support a flame, and its water content reduces the heat energy of a fire. This would include most succulents, and where suitable, these would be the best plants to use, and would be better than low-flammability plants. **Low-flammability plants** would be slow to ignite, and slow to burn, due to high concentrations of non-flammable minerals/salts. The next best would be plants that are simply lacking in volatile, flammable oils, resins, waxes or other flammable substances. **High-flammability plants** are often dry and twiggy, and usually contain volatile, flammable substances, such as many Eucalyptus species, pines, cypresses, and plants in the Rutaceae family. **Fire-resistant plants** are those that are generally not killed by a fire, but grow back – for example, many *Eucalyptus* species, *Banksias, Proteas, Laurus nobilis, Melaleauca lanceolata*, and cork oaks. Fire-resistant plants are not necessarily

fire-retardant, in fact many are highly flammable and even fire-promoting. An ideal plant for shielding against fires should first and foremost be fire-retardant, but could also be fire-resistant.

Weed Potential

Some plants could be invasive in your area, and take over in local natural vegetation or farmland, or even modify the type of vegetation. These should be avoided. At the same time, some may be a minor nuisance and naturalise to a limited extent. With responsible and careful management, this could be contained, and the benefits might outweigh the possible costs. Ecologically speaking, the best plants to use are indigenous, propagated from local seeds, cuttings, etc., but they are not always the best plants for the job. Before selecting plants, it is advisable to check with local authorities and nurseries about their weed potential in your area. Unfortunately, some plants that would otherwise be very useful, such as the succulent climber, *Senecio angulatus* (Syn. *S. tamoides*), *Hedera helix* and *Sansevieria trifasciata* cannot be whole-heartedly recommended because of their potential invasiveness in many areas. The main problem with these plants is that they spread when people dump prunings in the bush. If you decide to grow potentially weedy plants such as *Senecio tamoides/angulatus,* or *Prunus laurocerasus,* they should be trimmed of their flowers before they set seed, and prunings should be composted and used on site.

Hybrids

Hybrids are generally more vigorous and adaptable than the natural species. Some hybrids should be less weedy than some of the species, including *Fatshedera* x *Lizei*, *Coprosma* x *Kirkii*, and *Aloe* cv. *'Hercules'*.

Fodder Plants

Some low-flammability plants are also fodder plants, including *Casuarina cunninghamiana, Chamaecytisus palmensis, Atriplex spp., Brachychiton populneus, Portulacaria afra, Quercus ilex, Populus spp., Ceratonia siliqua, Rhagodia/Einadia spp,. Myoporum insulare*.

Fire-retardant plant list

Many extensive lists of fire retardant plants can be found in books and on the internet. If you are not familiar with the plants mentioned, an image search on Google, for example, may be helpful for you to visualise how they would work. The plants may or may not be available at your local nursery. Fortunately, many succulents can be purchased by mail order as cuttings, many of which can be direct-struck in the ground, and seeds can also be bought online.

Trees:

Aloes – fire-retardant

These succulent plants are generally not frost-tolerant, preferring a warm, sunny position, in well-drained sandy loam. Generally low maintenance, they can usually be grown from cuttings placed directly in improved soil, or started in a cold-frame and then planted out as bare-rooted cuttings. Many, especially *Aloe ferox*, and *A. arborescens*, contain bitter compounds in their sap, which may deter browsing by rabbits, and are considered deer-proof in California. They may not require the extra work and added expense of tree guards.

Aloe barberae. Previously *Aloe bainesii*. The largest of the tree Aloes, from sub-tropical and tropical Africa. It should grow well from just south of Sydney to the tip of Cape York, east of the Dividing Range. It is slow growing. *Aloe barberae* may be available from Paul Forster (see www.cssnsw.com; I have purchased cuttings of succulents from him before and received excellent service), www.glucinasnursery.com.au, and www.dragontrees.com.

Aloe cv. 'Hercules'. This is a hybrid between *A. barberae* and *A. dichotoma*, another tree aloe. It is reputed to grow faster, is unlikely to be a weed, and could be very useful if it were imported (tissue cultured plants available from www.ranchosoledad.com, California). These tree aloes should be excellent to protect a house or livestock from falling, burning embers.

***Brachychiton populneus* – low-flammability**

This stately, semi-deciduous tree, grows to about 4.5 metre wide, and about 9 metres high, and should be good for protecting livestock and houses from embers and radiant heat. This tree occurs mostly inland in summer rainfall areas of S. E. Australia. It also grows on the coastal plain of Southern N. S. W., and a few places in Eastern Victoria and these forms may perform better in the winter rainfall area of Southern Victoria.

***Lagunaria Patersonia* – low-flammability**

Norfolk Island Hibiscus is a columnar shaped, densely foliaged tree, ideal as a second row in a windbreak, or planted in a single row to form a fire shield in a garden. It grows to 4.5 metres wide, and 8 – 15 metres tall. One disadvantage is that the seeds are itchy and affect cows. Generally prefers mild to sub-tropical climates, but can grow in Mediterranean climates, and has survived the cold in Canberra.

Hedges/shrubs:

***Aloe arborescens* – fire-retardant**. This is probably one of the best plants, when grown in a continuous row as a hedge, to form a barrier or shield against radiant heat, and then prevent fire getting through. They grow 1-2.5 metres high and may be slightly wider. It has much the same medicinal properties as *Aloe vera*. In Africa, it is very adaptable, growing in different soils and rainfall seasons, from the S. W. Cape near Caledon (winter rainfall), the Southern Cape coast (year-round rainfall), North to inland, highland Malawi (summer rainfall). In Australia, this equates to Wollongong to the tip of Cape York. Thus, there are opportunities to import different forms to suit different parts of Australia. There are excellent hedges near the coast on the Bellarine Peninsula in Victoria. It has been recorded as naturalizing near Kempsey in Northern N.S.W., and along the Southern Californian coast, but does not appear to be an aggressive invader.

Aloe Striatula. Somewhat like *A. arborescens*, this Aloe is from highland areas, and is one of the most cold-tolerant of Aloes. It has been grown successfully outdoors in London, Dublin and Cornwall. It may be cold-tolerant, but it may not cope with heavy frosts, in inland locations. It may not grow as high as *Aloe arborescens*, and therefore may not be as effective. It may also be difficult to obtain.

***Atriplex* or saltbushes – low-flammability**

Many useful species, especially *A. nummularia*, variety 'De Koch'. Also potentially useful are *Atriplex halimus,* and *A. cinerea.* These are tough fodder plants, and generally tolerant of heat, frost, drought, temporary water-logging, salinity, alkalinity etc. For more information on these marvellous plants, visit www.growsaltbush.com, and www.inlandbotanics.com.au.

***Myoporum insulare* – low-flammability.** A fleshy-leaved large shrub or small tree. Dry leaves burn, but it is still a reasonably good low-flammability plant. Grows particularly well at the coast, and is generally adaptable, tolerant of drought, waterlogging, salinity and wind, but not heavy frost. Could be tip-pruned and grown as a low, dense hedge, or pruned underneath to form a protective, umbrella-shaped canopy for smaller livestock such as sheep and goats. Unfortunately it is a weed in many places where it is not native, with birds eating and spreading the seeds. There are also useful, low-flammability *Myoporum* groundcovers, such as *M. parvifolium* and *M. debile*.

Some other relatively low-flammability plants that could be grown as a hedge or windbreak to form a fire shield:

Hakea salicifolia (*saligna*), *Prunus laurocerasus*, *Grevillea victoriae* 'Murray Queen', *Dodonaea viscosa*, *Photinia glabra* and *Photinia* spp. and cv.'s, *Viburnum tinus*,

Pittosporum spp. and cv.'s, *Crassula arborescens, C. ovata*. Some of these are or could be weeds in some places.

Groundcovers:

***Carpobrotus* species and other succulent groundcovers/trailers – fire-retardant**

Luxuriantly succulent goundcover or trailing plants, the Australian species *C. modesta* is particularly useful because it is relatively frost-tolerant and suitable for inland or coastal planting. The South African species are mostly more robust, good for coastal plantings, and more likely to be a weed. *Sedum* species are also useful groundcovers, and for greenroofs and greenwalls, and are frost-tolerant. Some other possibilities include *Tetragonia* spp., *Disphyma* spp., *Delosperma* spp., *Cheiridopsis* spp., *Aptenia cordifolia,* and *Crassula multicava. Atriplex vesicaria, A.* semibaccata and *A. rhagodioides* can be used as low-flammability groundcovers and for greenroofs. A related plant, and also very tough, is *Einadia* (syn. *Rhagodia*) *nutans*.

Climbers:

Aloe ciliaris and ***A. tenuior* – fire-retardant.** Potentially useful climbing plants for wire mesh fences, or as groundcovers.

***Senecio tamoides* – fire-retardant.** A useful climber which grows quickly, and can be grown cheaply from cuttings struck directly in the ground, but may be a weed, and should be managed accordingly. It can also be used as a groundcover.

Ivy Pelargonium hybrids (climbing geraniums) – low-flammability. May succeed from cuttings grown directly in the ground. Also a goundcover.

***Trachelospermum* spp. – low-flammability**. Relatively frost-tolerant, but may be slow-growing initially.

Some tips for Growing plants

In gardens, a raised bed of good quality sandy loam, enriched with compost or well-rotted manure should give good results for most of the plants mentioned in this article. Mixing a handful per square metre of pelletised chicken manure and/or blood and bone into the soil (or on top of the soil) should also increase growth rates, but not for grevilleas and other plants in the Proteaceae. Planting should ideally be early in the wet season, after good rains. Plants could be mulched with pea straw or lucerne hay – most of the mulch should decompose over the first wet season, to be replaced with non-flammable gravel or pebbles before the fire season. If possible, water plants in dry periods to grow a plant shield as quickly as possible.

Community shelters/refuges should be “firescaped” with fire-retardant and low-flammability plants, and protected with walls, fences, fire-retardant paint etc.

On farms, direct seeding may be the cheapest option, and may result in plants that establish more quickly, with better root systems. If planting tubestock/pot plants of trees and shrubs for a fire shield/windbreak, roots should be spread out, and large holes prepared, with the soil broken up, especially if it is a heavy clay soil. Generally smaller plants, “tubestock”, will establish better than larger pot plants, and are cheaper. The plants should be watered in and mulched, for a minimum of one metre diameter. In my experience, a mulched plant will grow at least twice as fast as a plant competing with weeds, especially in the first year. Newspaper weighed down with spoiled hay, rocks, sticks or whatever is available, makes a cheap mulch. Thorny branches make a cheap tree guard, but plants usually grow faster inside a plastic tree guard, and the higher the plastic, the faster the growth. It is best to select tough, adaptable species, suited to the climate and soil, and preferably plants that are indigenous, but these may not be the best choice to form effective fire shields.

A final word

Although bushfires are so overwhelming, and their behaviour difficult to predict, this does not mean that there is nothing that can be done to help protect people, livestock and property. The fire shield approach can deflect fires, reduce winds and the intensity of fires, with multiple shields each reducing the fire to a level that ultimately may be more manageable as it approaches people, livestock and property.

In the most extreme fires, even if nothing works, there may be some comfort in knowing that you were prepared, and that you did all that you could. For example, some people suffer from unreasonable feelings of guilt if their house survives, while other houses burn down. This may be easier to deal with if you can point to things which you have done which may have made a difference. Your preparations may also help other people. Be prepared. Better to “have a go” than do nothing. Better to be prepared and to be proactive in trying to save lives, your property, and your neighbourhood. If you do nothing, you may be relying on fire fighters, who, heroic as they are, cannot be everywhere at once.

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