Designing gardens for bushfire-prone areas

Murrumbateman Landcare Group, June 2023

About this talk…

- There will be three presenters and a short video tonight, covering various aspects of bushfire landscaping.
- The original work was presented to a RFS “Get ready” day, 2020.
- We have accumulated a LOT of information preparing for this talk.
  - In the interests of brevity, most of it will not be presented...
  - …and questions will be taken at the end.
- Our website has a section on bushfire landscaping with all our material plus some of the more important references.
  - I will send a link out to MLG members and other attendees when the resources are all loaded.
- So…you don’t need to take notes!

A brief recap on basic bushfire safety

BOM tells us there is approximately a 50% chance of El Niño developing in 2023. So...does everyone have a bushfire survival plan?

- If not, you can get a hardcopy from your local bushfire brigade. Or you can do it online: https://www.myfireplan.com.au/.

One of the most important things to do before a bush fire is to decide what you'll do if one starts in your vicinity (they can travel fast!):

- Leave early. When? Where? How? What will we take? Who will we tell? What is our backup plan if it turns out not to be an option?
- Decide to stay. Are we prepared? Do we have the equipment we need? Does everyone know what to do? What is our backup plan?
- Be aware that some fires are so catastrophic that staying is not an option even if you are well prepared.

Bushfire survival plan

The bushfire survival plan outlines what you will need to have and know:

- equipment and action checklists if you decide to stay
- know how to make your home and property safer
- know the bushfire alert levels and what they mean – advice, watch and act, emergency
- know the fire danger ratings and what they mean – moderate, high, extreme, catastrophic
- have relevant information (phone numbers, emergency broadcaster channels, websites, the *Hazards Near Me NSW* app).
- Make a habit of checking your local weather forecast: temperature, wind strength and direction.

A well-designed garden is a wonderful place, providing:

- shade and cool areas to reduce summer temperatures
- shelter from the wind
- habitat for native animals
- spaces for growing food
- and just somewhere nice!

- Increasingly, we need to factor in the garden's role in protecting us and our properties from bushfires…
- … and ensure that its design and plantings do not actually *increase* the risks from bushfires.

There are three major factors that influence bushfire behaviour

- Weather: hot, dry and windy days provide ideal conditions for a bushfire.
- Fuel: plants are the primary source of fuel for a bushfire; understanding how vegetation influences fire behaviour is important when planning a garden.
- Topography: fire burns faster uphill; as the slope increases, so does the fire's speed and intensity.

Conclusion: houses should ideally be located away from unmanaged vegetation and steep slopes….

- and close to well-maintained public roads and accessways
- enabling access for fire tankers is very important.

The concept of asset protection zones and defendable space

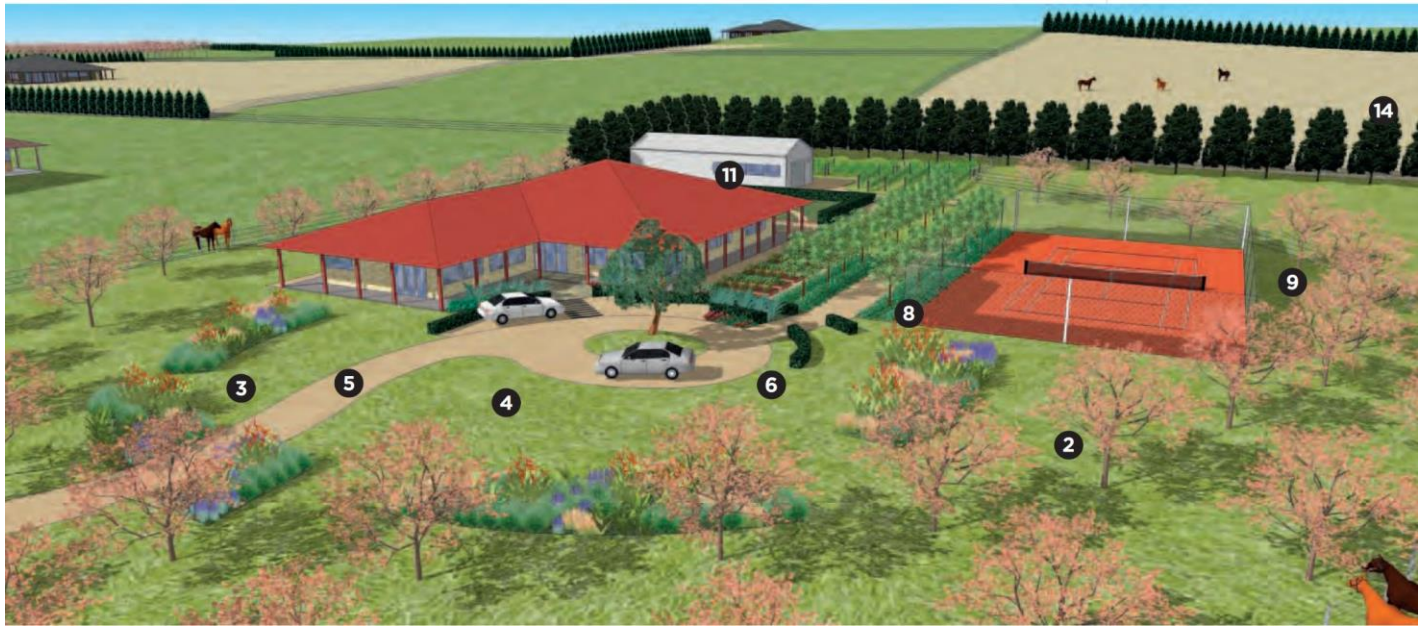
NSW RFS describes *asset protection zones* (APZ) in some detail.

- An APZ is located between an asset and a bush fire hazard and is intended to protect buildings from bush fires.
- Its size depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether that vegetation is managed.
- There is a methodology for calculating its size.
- An inner protection area within the APZ should be highly managed.

The CFA equivalent is *defendable space* (inner and outer).

Two main areas to focus on…

- Garden design
- Suitable plants



Garden design

Keep it spacious – don't crowd trees and shrubs.

- Break up any continuous vegetation, with well-watered short lawns, driveways, paths, paving or water features.

If possible, do not grow plants near windows, against walls or close to eaves or wooden decking.

Avoid creating "ladders" that can send fire into tree canopies.

- Shrubs, tall grasses and climbing plants should not be located under trees.
- Avoid trees that have loose bark hanging down, thus creating a pathway for fire to climb.
- Lower limbs of trees should be removed up to a height of 2m above the ground.

Garden design…

Avoid flammable mulches, using pebble or stone instead.

Non-plant landscaping elements that may contribute to bushfire risk include: wooden decks, wooden fences and screens such as brush fencing.

Other things around your house that can burn include plastic pots, hanging baskets, shadecloth sails, door mats, outdoor furniture and canvas awnings.

Combustible things like woodpiles, wooden sheds and mulch piles should be located away from the house.

Garden design…plants in general

Maintain plant health – an unhealthy plant may be more flammable than a healthy one.

All plants accumulate dead leaves and twigs. Regular removal is required.

- Prune low branches near base of shrubs to make it easier to remove litter.

Trees and shrubs in close proximity to the house should be short with low flammability.

- Choose trees and shrubs that do not accumulate litter underneath.
- Tree canopies should be separated by 2-5m and should not overhang buildings.
- Plant trees and large shrubs well away from buildings so that, if they fall, they will not hit them.

Garden design…plants in general

Grasses

- should be kept low and green
- debris should be removed.

Hedges can be problematic or beneficial

- can be helpful if strategically placed and with the right plants…
- but they may funnel fire towards buildings and
- may be flammable because of an accumulation of dead material.

Garden design...water

When designing or retrofitting a garden, include an emergency water supply:

- Ideally it will include a sprinkler system to wet the house, vegetation and flammable areas such as wood mulch and decks.
- Good placement of taps will allow you to run hoses to problem areas.
- You will need sufficient capacity in tanks or dams for your own needs and to potentially provide water for fire tankers.
- Power may go off during a fire so, unless you are on town water, emergency water supply should be gravity fed or run by a generator.

If possible:

- select drought tolerant plants
- keep plants near the house well watered
- if you use bore water, choose plants that will cope.

Two main areas to focus on…plants

All plants will burn if conditions are right (or wrong!).

Plants less likely to burn are:

- deciduous plants
- plants with high moisture content in their leaves
- plants with low volatile oil content
- plants with smooth bark
- plants with broad or fleshy leaves
- plants with salt in foliage (e.g. many silvery-grey leafed plants).

Determining low flammability plants for bushfire safe gardens

This is not straightforward!

Conditions and scientific methods differ, for example:

- lack of standardisation on experimental conditions such as ignition test temperatures
- testing an unwatered plant versus a watered one
- time of year – plants might be drier in autumn than spring
- part of the plant tested – green leaf versus dead leaf.

And terminology varies, of course!

- *Fire retardant, Fire resistant, Firewise* (term used by the CFA).
- *Flammability* is a composite of factors such as ignition time, flame height and peak heat output (cited by Corbett 2021). The more flammable a plant is, the more it will promote bushfire attack.

Selection of low flammability plants for bushfire safe gardens in our region

- Lesley Corbett in her 2021 book *Safer gardens: plant flammability & planning for fire* put scientific and anecdotal evidence together to rate the flammability of 500 native and exotic species.
- I have cross-classified her information and other references on low flammability plants against lists of native and exotic plants that can grow in our region.
- For a given plant, I have erred on the conservative side – If I couldn't find any or sufficient information about a plant's flammability I didn't include it.
- In the supplementary material on our website, I have listed plants that may be worth a try, in particular, if planted away from buildings. These are plants where evidence on their flammability is limited or there is a single adverse finding offset by positive ones.

So to the plants: some native trees and shrubs generally suitable for our region

The detailed list will be on our website and I will send you a link.

- Some acacias e.g. *A. acinacea, A. decurrens, A. falciformis* and *A. mearnsii*
- **Allocasuarina verticillata* (drooping she-oak)
- **Bursaria spinosa*
- *Melia azedarach* (white cedar)
- *Solanum aviculare* (kangaroo apple)
- Saltbushes (*Atriplex, Einadia* and *Rhagodia)*
- *Correa alba* and *C. reflexa*
- *Eremophila* species (emu bush)
- *Philotheca myoporoides* (wax flower)
- *Westringia fruiticosa.*

Some native ground layer species generally suitable for our region …

- *Ajuga australis* (Austral bugle)
- *Anigozanthos* species (kangaroo paw)
- **Bulbine bulbosa*
- native *Carpobrotus* species (pigface)
- *Dianella* species
- *Dichondra repens* (kidney weed)
- *Microlaena stipoides*
- *Myoporum* species
- *Pelargonium* species (native storksbill)
- *Viola hederacea.*

Avoid these natives in the garden – especially near the house…

- Some acacias e.g. *A. dealbata* and *A. implexa*
- *Allocasuarina littoralis*
- *Banksia marginata* but some banksias may be OK in the right situation
- *Callistemon citrinus,* lack of information on other *Callistemon* species
- *Daviesia mimosoides,* lack of information on other *Daviesia* species
- *Dodonaea viscosa*
- *Eucalyptus* and similar genera (*Angophora* and *Corymbia*)

Avoid these natives in the garden – especially near the house…

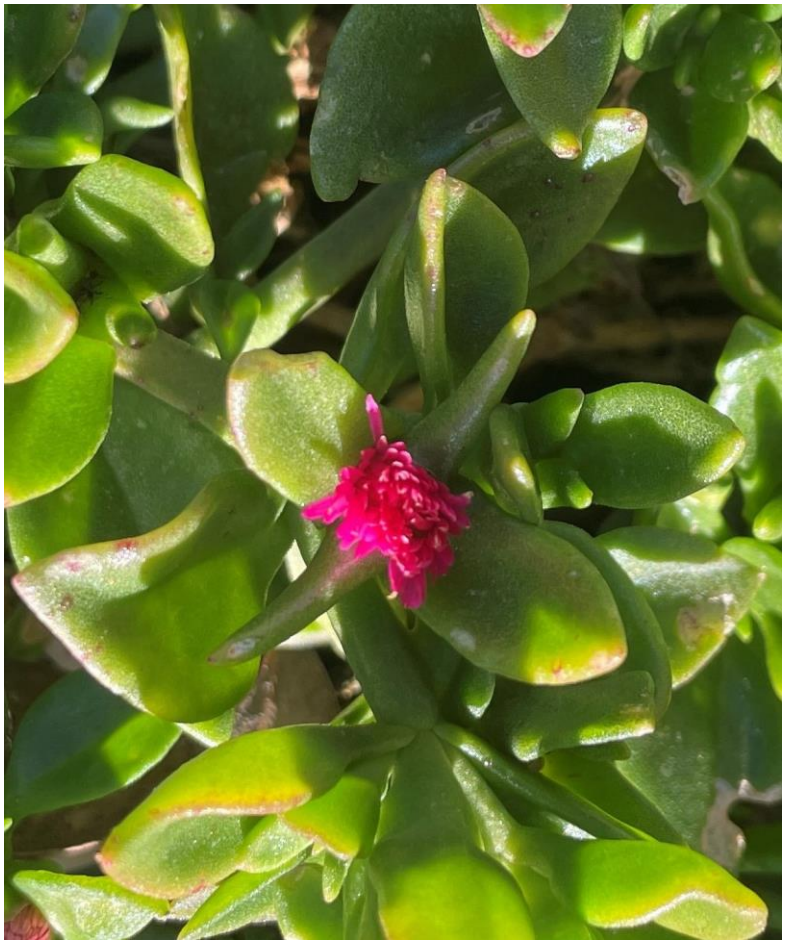
- *Grevillea shiressii,* lack of information on other *Grevillea* species
- *Hakea salicifolia*
- *Hardenbergia violacea*
- *Kunzea ericoides*
- *Leptospermum lanigerum,* lack of information on other *Leptospermums*
- *Poa labillardieri*
- *Xanthorrhoea*.

Plants in particular: some exotics

While our focus is on natives, a number of exotic plants are generally suitable for our gardens due to low flammability. They include:

- Most deciduous trees and shrubs have low flammability.
- Evergreen trees and shrubs include: *Artemisia absinthium* (wormwood*), Camellia* cultivars*, Escallonia* species and *Nerium oleander.*
- Smaller plants include: *Agapanthus praecox*, *Canna indica*, *Fuchsia* species, *Hydrangea macrophylla*, *H. quercifolia*, *Lavendula angustifolia* (English lavender), *Pelargonium* species and succulents.
- Ground layer species include: *Ajuga* species, *Aptenia cordifolia* (baby sun rose) and exotic *Carpobrutus* species (pigface).
- Vegetables in beds made from non-flammable material and without flammable mulch.
- Short, green lawns.

Baby sun rose (heartleaf ice plant)



The baby sun rose, *Aptenia cordifolia*, is a vigorous low-growing succulent groundcover from South Africa.

- evergreen
- grows happily in full sun or light shade
- drought and frost tolerant
- smothers weeds effectively
- grows very quickly
- potentially invasive but I have found it easy to control
- bees love the small pink flowers.

I have brought some rootlings – just keep them moist and lay them on prepared soil in spring. They should take root and spread.

Some popular exotics to avoid – especially near the house…

- Pines, cypresses and junipers
  - *Cupressus* × *leylandii* (Leyland cypress, interior of the tree can be filled with dry twigs creating a fire hazard)
- *Acer palmatum* (Japanese maple)
- *Betula pendula* (silver birch)
- *Coleonema pulchellum* ‘Aurea’ (golden diosma)
  - dead material in the centre of the plant is very flammable.
- *Laurus nobilis* (bay tree)
- *Lavandula* species (French & Italian lavender) (English lavender OK!)
- *Olea europaea* (Olive tree)
- *Photinia x fraseri* (red leaf photinia)

CFA's plant selection key, examples of use

Following the 2009 Victorian bushfires, CFA promotes a characteristic-based rather than a list-based approach to plant selection.

Given how little information on flammability is available for many species, this approach is worth a try if you are selecting plants.

Example 1. *Eucalyptus macrorhyncha* (red stringybark), common in our region.

- What type of plant (e.g. tree, vine, groundcover)? Select TREE
- What type of tree (Eucalypt, conifer, other)? Select EUCALYPT.
- What type of bark (stringy bark, sheds ribbons, neither). Select STRINGY BARK.
- Rating: NOT FIREWISE. Trees with this type of bark are extremely flammable. This type of bark acts as a ladder carrying fire into the canopy of the tree and produces masses of embers.

Example 2. *Myoporum parvifolium* (creeping boobiala)

A low growing native ground cover; a single plant will cover a large area; easily propagated from rootlings or cuttings.

- What type of plant (e.g. tree, vine, groundcover)? GROUNDCOVER
- Is it a grass greater than 30 centimetres tall? NO
- Does the plant retain dead leaves or twigs? NO
- Are the leaves waxy or oily? NO
- Is the species seriously susceptible to disease, insects or pests? NO
- Is the plant deciduous or evergreen? EVERGREEN
- Are the leaves soft, thick or fleshy? YES
- Rating: FIREWISE. Flammability = Low. These plants can be used in a garden as they are not known to be particularly flammable.

Now for something a bit more entertaining – let's look at a short Gardening Australia video on a fire resistant garden

Fire resistant garden | Bushfire recovery | Gardening Australia - YouTube

And then Gill will tell us about her work on retrofitting her garden to make it more resilient to bushfires.

Retrofitting my garden

Of course most of us already have a garden!

Where do I start if I want to make it bushfire ready?

- Write down a plan.
- Prioritise jobs starting with the easiest/most important.

Much of the advice in this presentation – and the associated documents on our website – applies to retrofitting existing gardens.

Example: my garden retrofit, 3 YEARS, 2021-23

	Jobs to do	Fire risk importance	Difficulty of job	Priority (year)
WATERING	New tank New sprinklers New drippers	High	Difficult	2
MULCH	Away from house Gravel paths Green mulch	High	Easy	1
LAWN	Keep green and short	Low	Easy	1

Example: my garden retrofit, 3 YEARS, 2021-23

	Jobs to do	Fire risk importance	Difficulty of job	Priority (year)
SHRUBS	Thin/remove: some replaced	High	Moderate	2
TREES	Prune and some removed	Moderate	Difficult	3
ONGOING MAINTENANCE	Reduce size of garden Year round clearing	Moderate	Moderate	2
OTHER	Access for firefighters: track around water tanks and dam access	High	Difficult	2