PEOPLE LED PREVENTION | TRAINING PACK

Landcare
New South Wales

Fire Preparedness - Landscaping for bush fire: Defendable spaces and fire wise species selection

In this training pack, we aim to enhance fire resilience by focusing on the selection of fire-resistant characteristics of plants and the implementation of firewise landscaping principles. This approach helps establish a defendable space around your home or asset, minimising the risk of fire damage.

What is Landscaping for Bush Fire?

Landscaping for bush fire involves the planning, design, planting, and management of the space surrounding a house.

The goal is to maintain an area around a house and other structures, free from highly flammable vegetation which could ignite the buildings.

Landscaping for bush fire can be applied to develop new or modify existing gardens.

This process considers several factors, including:

- Understanding fire behaviour
- Creating defendable space
- Strategically positioning plants within the garden
- Assessing the flammability of specific plants
- Recognising the importance of regular maintenance

How Can Landscaping for Bush Fire Reduce Your Property's Risks

Using well-considered design principles and choosing the right plants can enhance a home's chances of withstanding a bushfire, even for those planning to evacuate early.

Inappropriately placed, highly combustible plants can increase a home's exposure to radiant heat and direct flames.

Conversely, strategically positioned plants with low flammability can serve as protective barriers by:

- Reducing the radiant heat affecting the home
- Lowering the likelihood of direct flame contact with the structure
- Decreasing wind velocity near the home
- Deflecting and filtering flying embers
- Minimising flammable materials within the defendable area

Whilst fire-wise landscaping can increase the resilience of your structures, these principles must form part of a holistic approach combined with:

- Building and maintaining fire-resistant structures

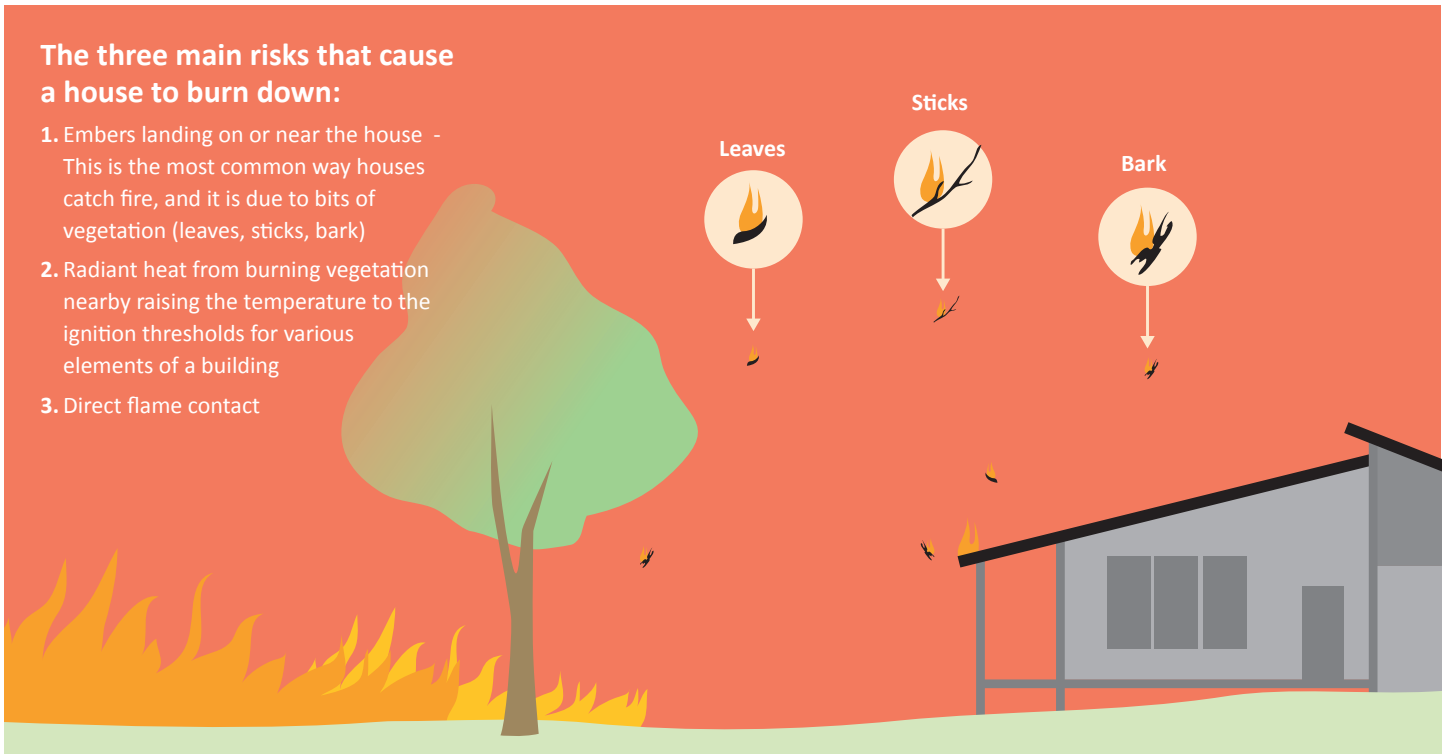
IMPORTANT

While a well-planned garden is important, it is only one aspect of preparing for bushfire. It should not be relied upon in isolation. In bushfire risk areas on **Extreme** and **Catastrophic** days, leaving early is always the safest option.

- Developing a Bushfire Survival Plan
- Ensuring sufficient water supply and accessible escape routes
- Thoughtful garden design and careful plant selection.

The three main risks that cause a house to burn down:

1. Embers landing on or near the house - This is the most common way houses catch fire, and it is due to bits of vegetation (leaves, sticks, bark)
2. Radiant heat from burning vegetation nearby raising the temperature to the ignition thresholds for various elements of a building
3. Direct flame contact



How Bush Fires Impact Houses

There are a number of things which can affect the way a fire burns, including:

Slope – a fire travelling uphill will travel faster. In fact, for every 10 degrees of slope, a fire can double its speed. As a fire speeds up, it becomes more intense and more dangerous.

Vegetation – smaller items such as twigs, branches and leaves are known as 'fine fuels'. These can burn very easily. Burning bark, twigs and leaves can also be blown in the wind.

Weather – when it's hot, dry and windy, fires can be more intense and unpredictable. Strong winds can send a fire in different directions and cause burning embers to be blown through the air.

Landscaping for Bush Fire Protection

There are different things that you can do and considerations to take into account when landscaping to create a property that is more resilient to the risks of bush fires. Some important measures that you can take include:

1. Creating defendable space and reduce fire spread with plant placement and management
2. Choosing fire wise plant species with fire resilience characteristics
3. Utilising shelterbelts to reduce wind speed
4. Ongoing maintenance and preparedness of the garden

Creating Defendable Spaces

One of the best ways to reduce the risk of bush fires is to carefully manage the location and arrangement of fuel on your property ie. In your gardens to create defendable space.

A home's defendable space is a managed area around a building where vegetation is modified to reduce flame contact and radiant heat from bushfires. By breaking up fuel continuity and reducing available fuel, it lowers the risk to the property. This separation is crucial in preparing for bushfires, as the greater distance from the bushfire hazard significantly decreases the risk.

Potential bush fire fuels should be minimised in this defendable space. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

The defendable space around your home commonly consists of 2 zones that allow for varying levels of vegetation management. For example an Inner and outer protection area

The Inner protection area: Commonly up to 10 metres from the home is the area immediately around the house. It provides separation from fuel sources, reduces radiant heat, eliminates direct flame contact and reduces ember attack. Vegetation needs significant and intensive management. Fuel is managed to a minimum level in this zone.

An example of a defendable space inner zone would be to manage fuel to the following conditions:

- Within 10 metres of a building, flammable objects such as plants, mulches and fences should not be located close to vulnerable parts of the building such as windows, decks and eaves.
- Trees should not overhang the roofline of the building, or touch walls or other elements of a building.
- Lower tree limbs should be removed to a height of 2m above the ground
- Grass should be no more than 10 centimetres in height.
- All leaves and vegetation debris are to be removed at regular intervals.
- Shrubs should not be planted under trees.
- Plants greater than 10 centimetres in height at maturity must not be placed directly in front of a window or other glass feature.
- Tree canopy coverage should be no more than 15 per cent.
- Vegetation should have smooth bark where possible and produce low amounts of leaf litter
- Features with high flammability, such as doormats and firewood stacks, should not be located near the structure.

Bushfire building standards for new builds in NSW and RFS materials refer to the required defendable space that a home needs as a home's Asset Protection Zone.

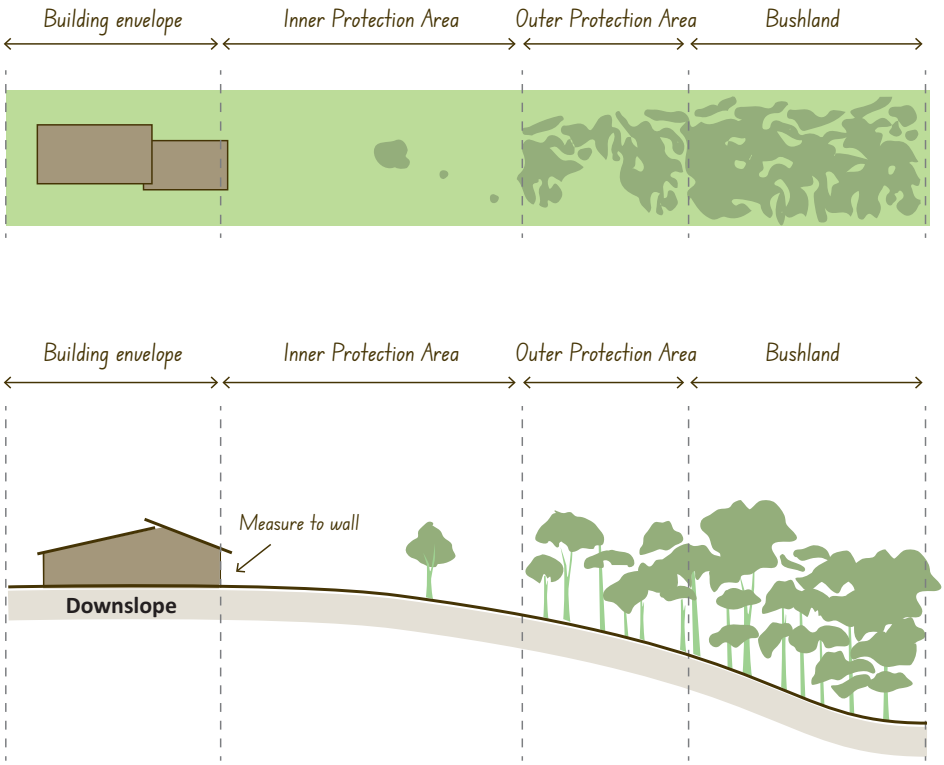
In order to calculate how large your asset protection zone must be, you will need to complete a site assessment. For more information, you can refer to NSW Rural Fire Service - Planning for Bush Fire Protection.

"One of the best ways to reduce the risk of bush fires is to carefully manage the location and arrangement of fuel on your property."

The Outer protection area: Commonly extends up to 40 metres from the home sits between the inner area and unmanaged vegetation (beyond the defendable space). Vegetation is managed to a more moderate level to substantially decrease the ground fuel and restrict the fuels available to an approaching bush fire.

- Tree canopy cover should be less than 30%.
- Canopies should be separated by 2 to 5m.
- Shrubs should not form a continuous canopy.
- Shrubs should form no more than 20% of ground cover.
- Grass should be no more than 10 centimetres in height and leaf and other debris, removed, mowed, slashed or mulched.
- Shrubs and trees should not form a continuous canopy.
- Non-flammable features such as tennis courts, swimming pools, dams, patios, driveways or paths should be incorporated into the proposal, especially on the northern and western sides of the proposed building.

Typical Inner and Outer Protection Areas



Break Up Fuel Continuity

One of the most effective ways to reduce the spread of fire within a garden is to create separation between plants, garden beds and tree canopies. Think about your garden design in terms of both horizontal and vertical separation of vegetation.

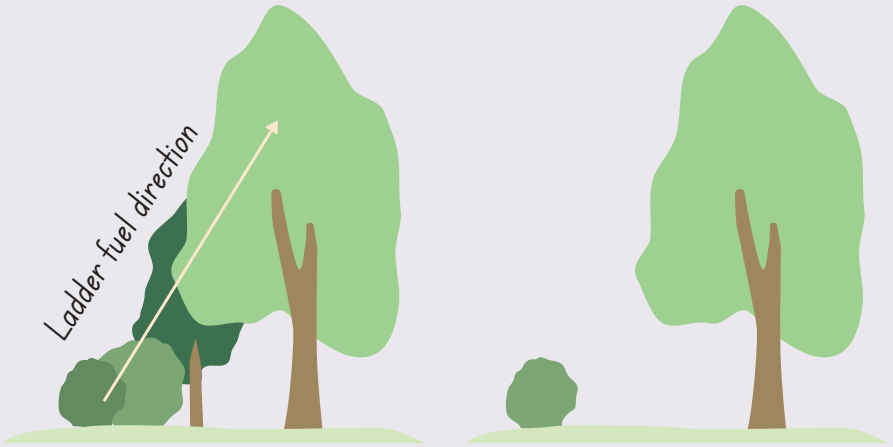
Fire spreads easily when plants are located close together.

When a plant catches fire it can preheat and ignite the vegetation around it through radiant heat or direct flame contact.

If there is continuous vegetation leading up to and surrounding a house, fire is likely to spread throughout the garden to the house. Grouping plants and garden beds with areas of low fuel between them can help avoid this by breaking up fuel continuity.

Ways to reduce fuel continuity include:

- Locating shrubs or other flammable objects away from trees. If planted under trees, vegetation can act as a ladder fuel and carry fire into canopies.
- Clumping shrubs and trees so they do not form a continuous canopy and are separated by areas of low fuel.
- Pruning branches to a minimum of 2 metres above the ground. This increases the vertical separation between fuel at ground level and the canopy.



Vertical fuel continuity:
UNDESIRABLE

Broken vertical continuity:
DESIRABLE

When you have grasses (ground cover) next to shrubs (Mid story) next to trees (canopy), it creates a ladder of fuel for the fire to climb, enabling fire to travel from the ground surface into shrubs and then into tree canopies where it can intensify and spread embers, potentially into the roof of a home.

Using Non-Flammable Materials in Your Garden to Create Buffers:

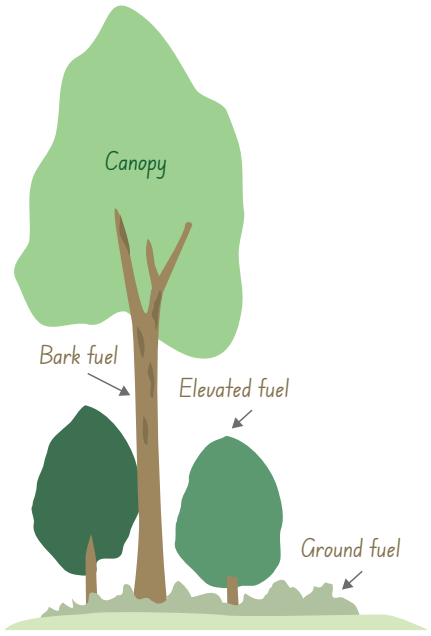
- Remove flammable objects from around the house that can transfer fire to the structure
- Using gravel paths, non-flammable mulch and mown grass to provide separation and areas of low fuel between plant groupings and garden beds.

It is important to note that all plant material will burn under intense hot, dry bush fire conditions

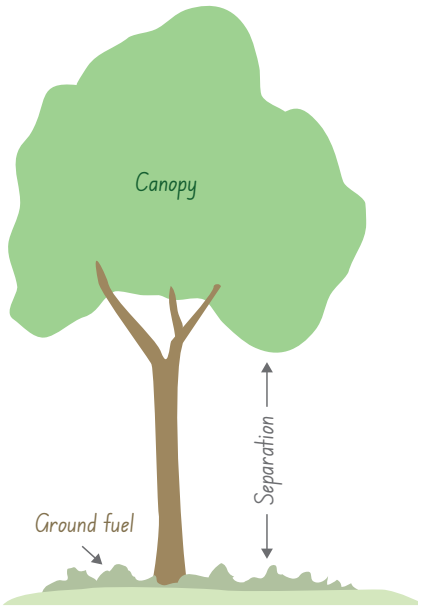
However, some native plant species are able to resist fire better than others. These fire-resistant plants may be able to slow the progress of a fire and are less likely to spread the fire to your home, thus helping with fire control.

Some ways that plants can be an effective method of slowing and reducing the intensity of an approaching fire front:

- Act as a radiant heat screen: Plants can block and absorb radiant heat, protecting structures from intense heat radiation.
- Reduce wind speeds near a house: Vegetation can act as windbreaks, reducing wind speeds and helping to prevent the rapid spread of fire.
- Trap embers without catching fire: Certain plants can trap airborne embers, reducing the risk of them igniting flammable materials.
- Act as fire buffers to slow the travel of a fire or stop its spread: Fire-resistant plants can create natural fire buffers, slowing down or halting the progress of a fire.



HEAVY



LIGHT

Carefully Select, Locate and Maintain Trees

Trees can be useful during a bushfire, provided they are:

- Selected carefully
- Properly maintained
- Located at a safe distance from the house.

Bushfires are often accompanied by strong winds, which may cause branches to break or whole trees to blow over. Trees can also catch fire, burn through and fall over.

Correctly selected and located trees can:

- Reduce wind speed
- Absorb radiant heat
- Filter embers.

Fire is rarely sustained in the tree canopy unless there is a fire burning in the plants or leaf litter under the tree.

When implementing this design principle:

- Avoid trees with loose, stringy or ribbon bark.
- Separate tree canopies by at least 2 metres.
- Canopies should cover less than 15 per cent of the inner zone and 30 per cent of the outer zone.
- Prune branches to a minimum of 2 metres above the ground increasing the vertical separation between fuel at ground level and the canopy.
- Locate trees at a safe distance from all other buildings, driveways, water supplies and powerlines. They should be at least 1.5 times their mature height away.
- Do not plant trees near shrubs, as shrubs can carry fire into tree canopies.
- Periodically remove dead leaves, bark and branches as well as leaf litter from underneath trees around the house.

Species Characteristics: (Fire Resistant Species)

Selecting fire-resistant, or low-flammability plant species for your property helps mitigate the risk of bush fire by reducing the likelihood of ignition and slowing the spread of fire, thereby enhancing the overall safety and resilience of your landscape. There are native plant species that can be used for this purpose.

Characteristics of Plants:

Low Flammability: Choose plants with high moisture content, low oil/resin content, and those with smooth bark that sheds bark and leaves infrequently.

*Important- The examples of plants below are only to illustrate the characteristics of fire resistant species and are not exhaustive. When selecting suitable plants, consider which native species in your local area has some of the features of fire resistance and also what species are suitable for your site in regards to annual rainfall, aspect (south and east-facing positions and slopes are cooler than north and west-facing), drainage, and soil type. Understanding these elements is crucial and can determine the success or failure of your planting efforts.

CHARACTERISTICS/FEATURES OF PLANTS

Characteristic	Description	Examples of plants
Plants with high moisture content *Please see additional information below	Plants with thick, fleshy leaves that retain more water in their leaves are less likely to catch fire. The high moisture content acts as a natural fire retardant, making it difficult for the leaves to ignite.	Ground covers: • Pigface *Carpobratus glaucescens* • Austral Bugle *Ajuga australis* • Blue Fan-flower *Scaevola aemula* • Kidney weed *Dichondra Repens* Shrubs: • Swamp Lily *Crinum pedunculatum* • Scentless Rosewood *Synoum glandulosum* Trees: • Port Jackson Fig *Ficus rubiginosa* • Water Gum *Tristaniopsis laurina*
Plants with low volatile oil content	Plants that do not produce or contain significant amounts of volatile oils, or flammable resins are less flammable. Volatile oils like those found is Eucalyptus species can easily ignite and contribute to the spread of fire, so plants without these oils are safer.	Ground covers: • Blue Flax-lily *Dianella caerulea* Vines: • False Sarsparilla *Hardenbergia violacea* • Golden Guinea Flower *Hibbertia scandens* Shrubs: • Boobialla *Myoporum montanum* • White Correa *Correa alba* • Silver Banksia *Banksia marginata* Trees: • Kurrajong *Brachychiton populneus* • Coach wood *Ceratopetalum apetalum* • Cheese Tree *Glochidion ferdinandi*
Deciduous Plants	These plants shed their leaves seasonally, typically in autumn. The absence of leaves reduces the amount of available fuel during these times	Trees • White Cedar *Melia azedarach* • Red Cedar *Toona ciliata* • Illawarra Flame *Brachychiton acerifolius*
Plants with smooth bark	Smooth bark can prevent the accumulation of fibrous bark, dead leaves and other flammable materials on the plant. It also makes it more difficult for fire to climb from the ground up into the canopy. Some species of Eucalyptus have smooth bark and can be helpful however they also have a higher oil content in their leaves.	Trees • Blueberry Ash *Elaeocarpus reticulatus* • Lilly Pilly *Acmena smithii* • NSW Christmas Bush *Ceratopetalum gummiferum* • Snow Gum *Eucalyptus pauciflora* • Scribbly gum *Eucalyptus rossii* • Spotted gum *Corymbia maculata* • Smooth- Barked Apple *Angophora costata* • River Red Gum *Eucalyptus camaldulensis*
Plants with salt in foliage	Plants that accumulate salt in their leaves are often less flammable. The salt can act as a natural fire retardant, and the silvery-grey coloration typically indicates higher levels of plant protection and lower flammability.	Ground covers: • Bladder Saltbush *Atriplex vesicaria* • Creeping Saltbush *Rhagondia spinescens* Shrubs: • Old Man Saltbush *Atriplex nummularia* • Coastal Saltbush *Atriplex cinerea*

*Plant moisture content- The moisture content in foliage is the most critical factor in determining plant flammability, influencing how readily a plant will ignite. Moisture content is affected by various factors, including:

- Seasonal Changes
- Weather Conditions
- Plant Species
- Soil Conditions
- Irrigation Practices
- Plant Health

Worksheet

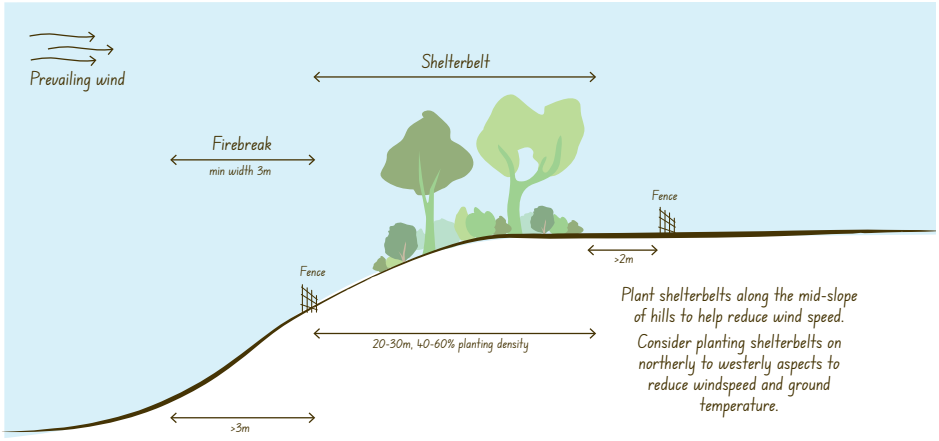
Make a list of plants you want to plant in your garden. Consider:

- Is it native/local?
  (using local native species promotes higher plant survival rates)
- Local growing conditions
- Check legislations
- Check flammability*
  (using CFA's online interactive plant selection tool)

* Interactive online Plant Selection Key
https://www.cfa.vic.gov.au/plan-prepare/how-to-prepare-your-property/landscaping/plant-selection-key

After consulting with the CFA online plant Selection Key (and/or consulting with a local specialist), write down some firewise plants that you think would be a good match for your garden/property.

PLANTS	Does this plant suit the local growing conditions?	Have you checked the legislation and is it approved?	Have you checked and confirmed it has low flammability?
Trees			
Shrubs			
Grasses/grass-like plants			



Shelter Belts

Shelter belts are rows of trees or shrubs planted to protect areas from wind and erosion. When it comes to shelter belts, it's important to avoid creating a direct path for fire from high vegetation zones to your house. Shelter belts can be effective tools that can help mitigate the risks of fire in several ways:

1. **Windbreaks:** Shelter belts reduce wind speed, which can slow down the spread of fire and prevent embers from traveling long distances.
2. **Fuel Breaks:** By using fire-resistant species, shelter belts can act as barriers that reduce the amount of flammable material and help stop or slow the progress of a fire.
3. **Moisture Retention:** Trees and shrubs in shelter belts can help maintain higher moisture levels in the soil and surrounding vegetation, making it less likely to catch fire.
4. **Temperature Moderation:** Shelter belts can create microclimates with lower temperatures and higher humidity, reducing the likelihood of fire ignition and spread.
5. **Erosion Control:** By stabilizing the soil, shelter belts can prevent the erosion that often follows fires, thus reducing secondary damage and aiding in quicker recovery.

Tips and advice for planting Shelter belts:

- Plant tall trees in the center (6m spacing) and dense shrubs on the edge (3m spacing).
- Use the edge of an existing creek for the shelterbelt if possible.
- Avoid large species of wattles due to their short lifespan and potential to damage fences.
- Do not use barbed wire for fencing to prevent harm to wildlife.
- Keep a record of the planting date and species used.
- Ensure the layout of the shelterbelt does not act as a "wick" that can spread a fire from a heavy vegetated area, into your landscaped defendable space around your home

Overall, shelter belts can serve as effective tools in fire management strategies, providing physical and environmental barriers that reduce fire risk.

Ongoing Maintenance and Preparedness

To help your garden remain effective and resilient to bush fires, it is important to ensure you conduct ongoing and regular maintenance of the garden and defendable space around your house.

A list of some regular maintenance actions you can undertake:

- Regular Inspections: Conduct regular inspections of your property to identify and mitigate potential fire hazards.
- Clear ground fuel from underneath plants, on and around the house.
- Prune plants with low-hanging branches, providing separation of at least 2 metres above the ground.
- Replace plants that die or become diseased.
- Keep plants well hydrated through watering and mulch. Watering less frequently but for longer encourages the plants to develop deep roots reducing moisture loss during dry periods.
- Replace or cover organic mulch such as woodchips, straw or dead plant matter with non-flammable mulches.
- Remove other flammable objects from your defendable space.
- Remove any fine, dead material that might accumulate in plants.
- Remove weeds from defendable spaces as these often contribute to high fuel loads.

By employing these strategies and incorporating fire-resistant vegetation into landscaping plans, communities can effectively reduce the impact of wildfires and enhance overall resilience to fire-related hazards.

Effective bush fire preparedness involves a combination of structural resilience and strategic landscaping by creating a defendable space around your home. By selecting appropriate plant species and using firewise landscaping techniques, you can significantly reduce the risk and impact of bush fires on your property. Regular maintenance and having a clear emergency plan are also crucial components of fire preparedness.

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PEOPLE LED PREVENTION PROJECT

Landcare NSW's People Led Prevention project empowers communities across regional NSW in developing disaster resilience and preparedness skills. Jointly funded by the Australian and NSW Governments.