Fire Management Planning for Urban Bushland

A Guide for Landowners, Fire Officers and Bushland 'Friends' Groups

THE GOVERNMENT OF WESTERN AUSTRALIA

FESA
Fire & Emergency Services Authority of Western Australia

Urban Bushland Council WA Inc

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A Guide for Landowners, Fire Officers and Bushland 'Friends' Groups

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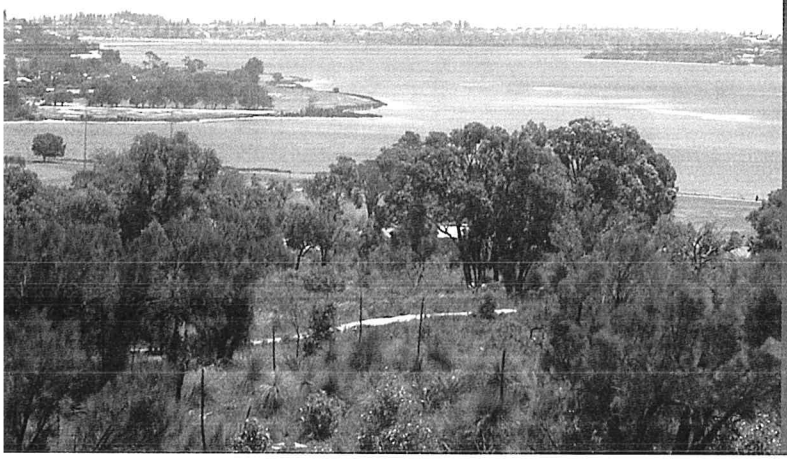


...it is important that all parties who have a vested interest in the management of the bushland are involved...

Introduction

Areas of urban bushland are environmentally valuable and they should be managed in a sustainable manner. The landowner/manager of the bushland is encouraged to write and implement a comprehensive management plan for the protection of bushland, which includes fire management planning.

Some ecosystems have evolved to survive fire and some plants may even require fire to regenerate. However, in metropolitan Perth, the influence of disturbances (by vehicles or people) and weed invasion on bushland must be considered carefully when deciding whether planned burns are appropriate.

In planning fire management for bushland areas, it must be remembered that many initiatives designed to reduce fire hazard also reduce environmental quality. Similarly, some initiatives to protect the environment can result in an undesirably high fire hazard. It is therefore important that all parties who have a vested interest in the management of the bushland are involved in planning the best possible solution to this conflict of interest between the potential for degradation to the environment through fire prevention measures and the damage caused by fire.

The purpose of this Guide

This document will attempt to give some guidance for the fire component of management planning for areas of urban bushland, as well as to give some background information on how to reduce the number and impact of fires in urban bushland.

The major concepts covered in this Guide include:

- What an Urban Bushland Fire Plan is and why it is necessary.
- Who should be involved in creating the Fire Plan.
- What information is necessary to construct a Fire Plan and suggestions as to ways of collecting this information.
- The responsibilities of the parties involved with the urban bushland.
- Fire prevention strategies suitable for urban bushland.
- Fire preparedness strategies which aim to reduce the size and impact of fire on urban bushland.
- Fire response strategies to coordinate the response to and management of fire when it occurs.
- Fire recovery strategies to assist the urban bushland to recover from the effects of fire.
- Reviewing and updating the Urban Bushland Fire Plan in the light of experience and time.

The Urban Bushland Fire Plan

This chapter covers:

- *What is an Urban Bushland Fire Plan and why is it necessary?*
- *Who should be involved in creating the Fire Plan?*
- *What information is necessary to construct a Fire Plan and suggestions as to ways of collecting this information?*
- *What are the responsibilities of the parties involved with the urban bushland?*

AN Urban Bushland Fire Plan sets out the basic strategies for the protection of a specific area of bushland from fire, and should form part of the overall management plan for the bushland. Where the landowner/manager has not as yet developed a comprehensive management plan, a fire plan can be developed as an interim document.

Consultation is the key to developing a good fire management plan. The consultation process brings together all relevant and interested persons to decide on the most appropriate strategies for the bushland. This document should be used as a basis for discussion about fire management strategies in urban bushland.

Who should be involved?

The identification of individuals and organisations with a vested interest in the management of the bushland and consultation between these groups and individuals (commonly known as stakeholders) are a vital part of plan development.

Stakeholders may include the land owner/manager, Local Government, the urban bushland 'Friends' group, interested individuals and the Fire Service. If the number of stakeholders is large, a working group can be formed from representatives of the most concerned organisations and committed individuals. This group can be directed by the larger community, and then report back to a general meeting on a regular basis.

The working group should appoint a Chairperson/Liaison Officer to be involved in the ongoing consultation process as the plan develops.

Progressive feedback and review should be done through public consultation.

Objectives of the Fire Plan

The fire management plan should begin with a clear statement of the objectives about what the plan will achieve. The objectives for the fire management plan will, to some extent, dictate the fire management strategies that are appropriate for the bushland.

The objectives of the fire management plan should be:

- obtainable
- measurable
- representative of the overall views of the stakeholders.

If the fire management plan does not form a part of a comprehensive management plan, a brief description of the area should be included which sets out the known information.

This information would normally be contained in a management plan, and would include the:

- Ownership or tenure of the bushland.
  (Eg. who is responsible for the land?)
- Protection status.
  (Eg. is the land heritage listed or proposed as a reserve?)
- Ecological significance of the area.
  (Eg. does the land form part of a corridor? Is it a significant refuge for wildlife? Does it represent a rare ecosystem type?)
- Geological information.
  (Eg. what are the soil structure types, are there outcrops of rock or slopes?)
- Vegetation structure.
  (Eg. is there any distribution of rare or priority species of flora, or threatened ecological communities?)
- Animal communities.
  (This should include the occurrence of endangered species.)
- Hydrology of the area.
  (Eg. streams, open water bodies, dry watercourses, seeps, soaks.)
- Local conservation priorities.
  (Eg. preservation of aesthetic values, tourist roads, visibility from picnic and recreation areas.)

Collecting data

Maps may be a useful way to present some information. Compile as much information as possible to make sure the fire strategies used to protect the area are in harmony with the local environmental protection priorities and strategies. By gathering all the relevant information, informed decisions can be made to ensure the preservation of the bushland.

This information can be obtained by speaking to local residents, consulting with the local fire service for data contained on fire history maps, speaking to officers from the Local Government, conducting a literature search, and by obtaining base maps (such as those produced by DOLA).

Clear plastic overlays may make it easier to view and sort mapped information. Overlays can be updated easily as older information becomes irrelevant, and different layers can be used to display different combinations of data, such as hydrology and vegetation types.

The mapping of fire access tracks, gateways and priority areas for protection from fire, will provide a useful tool for both fire management planners and firefighters. Any changes in status should be updated on your maps.

The major management issues

As with any emergency management plan, the fire management plan should address the basic management issues of Prevention, Preparedness, Response and Recovery.

These issues can be summarised as:

- **Prevention** 'Stop a fire starting in the bushland'
- **Preparedness** 'Get ready to keep the fire small'
- **Response** 'Put the fire out quickly'
- **Recovery** 'Help the bush to recover'

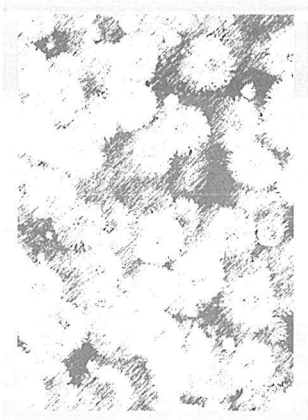
In addressing these issues, many strategies and initiatives will be suggested. It is important that the plan details **who** will take responsibility for the initiative, **where** the necessary resources are to come from, and **when** the task will be completed.

It is important to note that fire management planning is an ongoing, dynamic process, and that **fire management plans are not static documents.** Regular reviews and updates are required to ensure that fire prevention and preparedness initiatives are completed. Strategies must also be regularly assessed for their effectiveness and impact. A review timetable should be included in the plan and a person or organisation should be nominated to ensure that the reviews are conducted as planned.

Responsibilities

In general, the landowner/manager, with support of 'Friends' groups, is responsible for prevention, preparedness and recovery initiatives. The local fire service is responsible for response activities and will provide advice and support on all aspects of fire management. All stakeholders and interested parties should be consulted during the ongoing planning process.

STAKEHOLDER	RESPONSIBILITY
Land owner/manager	Overall fire management planning. Implementation of prevention, preparedness and recovery strategies.
Local Government	Compliance with the *Bush Fires Act 1954*, including firebreak inspections and exemptions. Overall fire management planning and implementation of prevention, preparedness and recovery strategies for vested lands. Support of Volunteer Bush Fire Brigades (in areas outside the gazetted fire district).
Fire and Rescue Service or Volunteer Bush Fire Brigade	Planning and implementation of response strategies. Response activities. Provision of advice on all aspects of fire management planning, including prevention, preparedness, response and recovery.
'Friends' group	Contribute to fire management planning. May include overall management of the reserve or responsibility for certain tasks.



SUMMARY

- An Urban Bushland Fire Plan sets out the basic strategies for the protection of a specific area of bushland from fire.
- The Fire Plan may or may not be part of an overall management plan.
- All stakeholders should be identified and involved in the development of the Fire Plan.
- Clear objectives, which are obtainable, measurable and representative of the views of the stakeholders, should be established.
- The Fire Plan should address the key issues of prevention, preparedness, response and recovery.

Prevention strategies

This chapter covers:

- *Fire prevention strategies suitable for urban bushland including:*
  - *preventing or reducing arson*
  - *controlling access to the bushland*
  - *separating the sources of fire risk*
  - *community involvement.*

FIRE prevention is all about stopping fires from starting in bushland and minimising the impact of any fires that start. The total prevention of fires in urban bushland may not be possible but steps can be taken to reduce the number of unplanned fires through consultation with community members.

The fire history of the bushland area can provide vital clues which can be used to develop local priorities for prevention and preparedness strategies. As an example, where past fires have commonly started around a picnic/barbecue area or by a roadside, fire prevention and preparedness initiatives can be specifically targeted at that area. All stakeholders and interested parties should be involved in identifying specific strategies and actions to target fire prevention.

Avoiding arson in bushland is very difficult. Reducing the incidence and opportunity for arson is the practical option. There are two Fire Services initiatives that are aimed specifically at reducing the incidence of arson.

The Wildfire Investigation Action Team (WIAT) investigates the cause of unknown or suspicious wildfires. The WIAT is an interagency team from FESA, CALM and the Police Service Arson Task Force. It works to identify fires that have been started by arson and assist in the apprehension of arsonists.

The Juvenile and Family Fire Awareness (JAFFA) program is aimed at juveniles from 4–16 years of age who have been involved in the lighting of unsanctioned fires. The program aims to help juveniles understand the dangers of fire play, educate them in various aspects of fire behaviour, and alert them to the consequences of fire.

Strategies to prevent arsonists starting fires in urban bushland may include:

- controlling the access of unauthorised persons
- separating sources of risk from the bushland
- encouraging community involvement.

Each of these points is discussed in more detail on the following pages.

...controlling access to an area reduces the chances of the area being used for illegal activities...

Controlling access

Controlling access to an area with fencing which excludes vehicles, reduces the chances of the area being used for illegal activities, such as the burning of stolen cars or drug- and alcohol-related activities, and may help reduce the incidence of arson.

In some cases, this initiative may need to be supplemented by frequent patrols of the area to ensure the integrity of the fence and discourage illegal activities.

Where access can be controlled, it is important that firefighters and firefighting vehicles and equipment are not denied access in the case of fire.

Separate the sources of fire risk

Nominating areas for recreation and other human activities within bushland areas, and taking specific action to control the risk of fire in these areas are two important steps that can prevent fires in urban bushland. For example, a low fuel area should surround areas of high visitor use such as barbecue and picnic areas. Converting wood-burning barbecues to use gas or electricity can further reduce the fire risk.

Community involvement

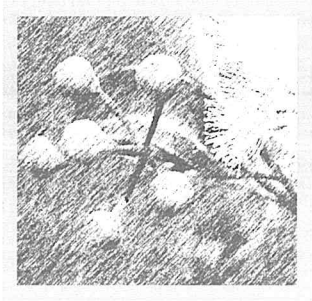
Informing the local community about the value of their bushland and involving the community in the management of the bushland will help them gain an appreciation of the area and a knowledge of the dangers of fire to bushland. This information can be conveyed using letterbox drops, public meetings and newspaper articles.

...it is important that the community understand that the bushland is being actively managed...

It is especially important that the community understand that the bushland is being actively managed, and how they can contribute to fire prevention initiatives.

Simple precautions, like encouraging neighbours to keep a watch on bushland for suspicious activity, can help reduce the incidence of arson. Even the presence of other people in the bushland area may discourage arsonists.

It is also important that neighbours appreciate that initiatives to prevent arson in bushland also help to protect their own properties.



SUMMARY

- Fire prevention is all about stopping fires from starting in bushland and minimising the impact of any fires that start.
- Fire prevention is more 'proactive' than 'reactive'.
- Three fire prevention strategies that may be appropriate are to:
    - control access to the bushland
    - separate the sources of fire risk
    - involve the community.

Preparedness strategies

This chapter covers:

- *Fire preparedness strategies which aim to reduce the size and impact of fire on urban bushland. These include:*
  - *Fire Watch by neighbours*
  - *fire access tracks—including location, firefighting considerations and environmental considerations*
  - *firebreaks and their alternatives*
  - *water supplies*
  - *weed reduction*
  - *fuel load monitoring and reduction*
  - *the relocation of people.*

IT is important that all stakeholders are involved in planning and preparing for fire. Fires often start in periods of 'very high' or 'extreme' fire danger days when the likelihood of a dangerous wildfire developing is high. Preparedness strategies aim to keep fires small, to help firefighters effectively fight the fire. Preparedness strategies help to minimise environmental disturbance during fire, and generally reduce the impact of wildfire.

It is vital that the community is made aware how quickly and easily a small fire can become a large fire with devastating consequences.

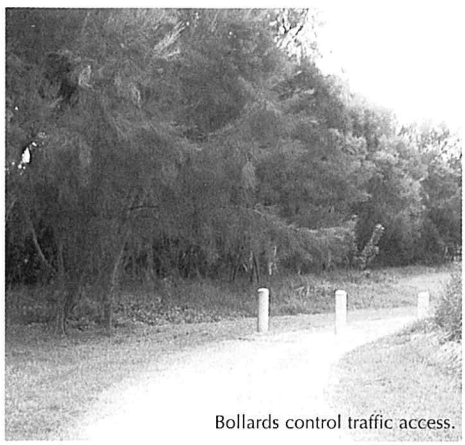
Fire watch by neighbours

An early response helps to keep the fire small. Encourage neighbours to report fires in bushland with the same urgency accorded to house fires. All fires in bushland should be reported by dialling '000'.

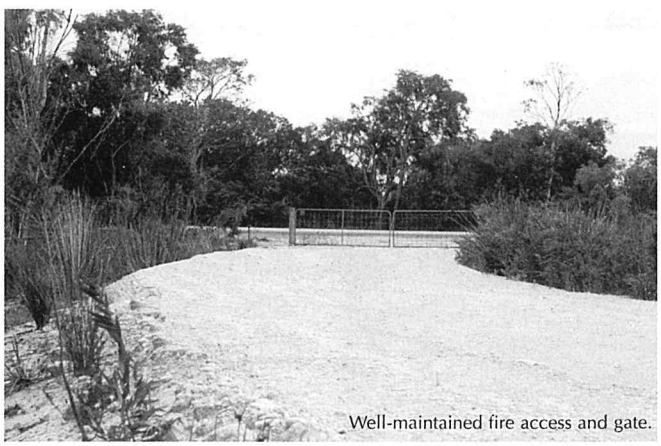
Fire access tracks

The provision of access for firefighting purposes is a key preparation for fires in urban bushland.

Traditionally, as required by law, firebreaks have been ploughed or graded around the edges of bushland (cadastral boundaries), and were not accepted unless all vegetation was removed to expose 'mineral earth' (bare earth that does not contain any flammable material). Because of the environmental importance of urban bushland—and, in some cases, its small area—this simplistic approach is not always appropriate. An alternative approach to traditional ploughed firebreaks is to provide fire access tracks in association with low-fuel areas.



Bollards control traffic access.



Well-maintained fire access and gate.

Fire access tracks are a disturbance to the vegetation in bushland. Any disturbance will encourage weed invasion, the spread of dieback and cause other environmental problems. Fire protection requirements must be balanced by the potential for damage to the environment.

Where fire access tracks are located in well planned, strategic positions, they can be used to halt the spread of fire and will help to minimise the disturbance caused by fire suppression activities.

...fire access tracks can also act as nature walks, pedestrian walkways or cycle-paths...

The purpose of fire access tracks

Fire access tracks serve several purposes. They can help to:

- protect nearby property values from a fire in bushland
- protect the bushland from fires starting on private property
- give firefighters access to the bushland, to allow a direct attack on the fire
- provide a fire line when indirect firefighting methods are necessary
- conserve high priority areas, including threatened ecological communities and rare or endangered species of flora and fauna.

Fire access tracks can also perform a dual service as nature walks, pedestrian walkways or cycle-paths.

Location of fire access tracks

Fire access tracks should be located so that they separate houses and other property values from areas of urban bushland.

Fire access tracks can also be used to break up large areas of bushland into appropriate compartments (smaller areas bounded by the tracks) so that fire will be more easily be contained during fire suppression operations, and not all of the bushland area is burnt in any one fire incident. However, using fire access tracks to divide up a small area of remnant bushland would not be appropriate.

Careful placement of fire access tracks will minimise the use of heavy machinery required to create access for firefighters and contain a wildfire.

The placement of fire access tracks should be a balance between environmental and fire fighting considerations. The placement can be determined by the vegetation distribution, the potential for weed invasion, and the location of different vegetation community types. Where possible, parts of a vegetation community should be within different compartments, as the fire access tracks will be used to contain a wildfire. This will assist firefighters avoid total burning of any vegetation community within the bushland during any single fire event.

Fire access tracks—firefighting considerations

The main requirements for fire access tracks are that the track must be trafficable and safe.

Fire access tracks may need to accommodate vehicles up to the size of this 3.4 appliance.

Trafficable

Firefighters, their equipment and vehicles must be able to get to the fire. "Trafficable" means easy to drive along in a heavily loaded 4WD vehicle at all times of year.

- The surface needs to be able to support the vehicle. In particularly sandy or fragile soils, some material such as limestone may need to be laid to prevent excessive erosion and, make the track serviceable for firefighting vehicles.
- The track needs to be cleared of vegetation, rocks or soil mounds that will impede the movement of the vehicle to a minimum of 3 metres wide, and provide at least 4 metres of vertical clearance so that medium-sized fire vehicles can be accommodated. Trees should be pruned to provide this vertical clearance. In corners, the width should be increased to at least 5 metres to allow firefighting units to negotiate the corners safely. (Strategic firebreaks around residential areas should be wider. For details, refer to *Planning for fire*.)

Safe for firefighters

'Safe' means a firefighter will not be endangered by using the track. This means:

- There is a way out—through access should be provided. Dead ends are very dangerous during a fire because firefighters may become cut off from any means of escape. Tracks must be able to be accessed from both ends.
- Gates—access through fences must be strategically placed to provide the best possible access during a fire incident. If the gates must remain locked to restrict access to unauthorised vehicles, master keys should be provided to the local fire station/s. Key numbers should be clearly visible on both the lock and its key. If keyed-alike locks are not to be used, a map should be provided to the local fire stations on which the key numbers are clearly marked.
- Passing and turn around areas points are provided at intervals.
- Adjacent low fuel areas—where possible, locate fire access tracks near low fuel areas. Areas of low fuel beside a fire access track will make controlling a fire easier, as well as increasing the safety of firefighters.
- Avoid slopes and high fuel areas—fire access tracks must avoid dangerous areas such as steep slopes or high fuel areas that could cause firefighters to become trapped or overcome by fire.

Fire access tracks—environmental issues

Environmental issues that should be considered when placing fire access tracks include:

- Erosion—where possible, fire access tracks should follow a contour line. Allowance must be made for drainage, particularly on slopes, as severe erosion problems can occur if water is channelled downslope through only one or two areas.

  Avoid placing fire access tracks up and down steep slopes. On vegetated slopes, the downward movement of water is slowed by vegetation, sticks and rocks and most of the rainfall soaks into the ground. On bare vertical slopes, unimpeded water gains momentum, washing soil away and creating washouts and gullies.

- Weed invasion—disturbed areas, such as fire access tracks, can be a major source of weed invasion. The number and location of fire access tracks should be carefully planned to minimise the potential for weed invasion.

  A program of weed control measures may also need to be implemented to help to maintain the integrity of the bushland.

- Dieback infection—any soil disturbance, including the installation and maintenance of fire access tracks, must not be allowed to contribute to the spread of dieback disease. The location of areas of known dieback infestation should be considered when planning the location of fire access tracks.

  Heavy machinery should only be used when the soil is driest (usually in summer) to prevent diseases being carried to uninfected areas by mud, transported earth, and vegetative matter.

  For the same reason, machinery used in the construction of fire access tracks must be washed down and inspected before starting work. This will also help to reduce weed invasion.

- Hydrology—consider the location of the water table, streams, lakes and wetlands. Where possible, fire access tracks should not be routed through wetlands, or in very close proximity to streams and rivers. Care must be taken to ensure that fire access tracks do not impinge on wetlands or interfere with the movement of water within the wetland.

- Ecological communities—some plant communities should be avoided when planning fire access tracks. For example, areas on the edges of wetlands which flood in a wet season contain a large number of species but these areas are also prone to weed invasion.

  Areas of rare or endangered species will require Ministerial permission before they can be disturbed or 'taken'.

Where several communities of a specific flora occur in pockets, fire access tracks between pockets may allow a fire to be contained to one small area, and prevent the fire burning the entire community. (See *'Location of fire access tracks'*.)

- Fauna—fire access tracks may be barriers to fauna movement and promote predation by feral animals. Where possible, incorporate a number of gentle curves into fire access tracks. This limits the distance over which predators can see the movement of potential prey and reduces their chances of successfully hunting smaller mammals, reptiles and amphibians.
- Minimising disturbance—where possible, fire access tracks should follow existing tracks. If it is no longer appropriate to retain an older track, the track should be 'ripped' (to reduce the compaction of the soil and encourage colonisation by plants), blocked to prevent vehicular access, and brushed with local plant material during late spring (when seeds are mature but have not had a chance to fall) to assist in the rehabilitation of that area.

Alternatives to conventional 'mineral earth' firebreaks

In some areas, it may be possible to reduce the width of the 'mineral earth' area, if sufficient weed control is undertaken and the bushland is maintained in a low fuel state. Because a fire access track has the potential to be used as a fireline (the 'line' from which the fire is fought) during a fire incident, an area of 'mineral earth' devoid of vegetation at least 1m wide is recommended.

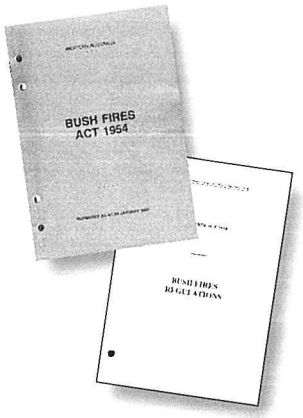
In some vegetation types, it may be appropriate to have no 'mineral earth', but to slash the vegetation instead (say, to a width of up to 10m) in order to be able to contain a fire. An example of when this may be appropriate is in coastal heathland where combating wind erosion is a major consideration.

Where traditional firebreaks are located parallel to existing roads, consideration can be given to firebreaks not being required within the bushland area, but to maintaining the road verges in a low fuel state.

Consideration should be given to combining fire access ways with pedestrian or cycle access ways by using sealed paths with low fuel verges.

Making decisions about fire access tracks

This document is not designed to cover in detail how and where fire access tracks should constructed or located. It is merely a guide and a starting point. Discussions between the landowner/manager, the fire service, Local Government, 'Friends' groups and other stakeholders should be used to decide the method of construction and location of fire access tracks.



Firebreak requirements

Firebreak notices are issued by Local Government. They are legally enforceable under the *Bush Fires Act 1954* and the *Local Government Act 1995*. Each Local Government can set and enforce specifications for firebreaks for private land, determining the width and locations of such firebreaks.

Local Laws usually require a 'mineral earth firebreak' at least 3m wide around the perimeter of the land in question (based on cadastral boundaries).

Firebreak notices and laws must be followed unless alternative firebreak permission (in writing) is given by the Local Government. If traditional firebreaks are not considered appropriate for a bushland area, a proposal will need to be submitted to Local Government outlining the proposed alternatives to firebreaks. Alternatives might include low fuel buffer areas or an approved fuel reduction program. In some cases, where bushland is located adjacent to existing roads, a boundary firebreak may not be required—subject to Local Government approval.

The planning and consultation process should be used to determine alternative firebreak requirements.

Instructing contractors

Once the location and width of the fire access track is determined, care should be taken during construction to avoid creating problems associated with erosion, dieback or weed invasion. The bush beside the fire access track should be disturbed as little as possible. Contractors using heavy machinery often cut into bushland at the sides of firebreaks to create a dumping ground for weeds and other debris they have skimmed off the firebreaks. For overhanging trees, consideration should be given to removing the overhanging branches rather than the whole tree.

In all cases, when hiring contractors to carry out work on fire access tracks, make sure that they fully understand what is required. Specific details of environmental requirements must be included in tender documents and contractor briefings.

Water supplies

Providing adequate water for firefighting is essential in ensuring the fire can be kept as small as possible. In many urban areas, there are adequate fire hydrants provided as a part of the reticulated water supply. For bushland areas, this may not always be the case.

Determine whether the urban bushland is in close proximity to a reticulated water supply. If it is not, it may be necessary to provide an alternative source of water such as:

- The installation of more water hydrants. This a cost consideration for Local Government.

- Preparation of static water supplies. Typically used in outer metropolitan and country areas, these include dams with prepared drafting areas and tanks (which can be gravity-fed or pump-assisted), built to Fire Services standards. Consult with the local fire service for advice on fittings and positioning of these tanks.
- Mobilisation of water tankers that are sent to the fireground as a part of the standard confirmed fire response.

The location of the water supply should be as close as possible to the bushland in order to reduce the time taken by firefighters to refill their fire appliances.

Consideration should be given to locating water sources close to access gates.

Weed reduction

Since the settlement of Western Australia, our bushland has been subject to invasion by a vast array of weeds. Weeds are now a major consideration in determining the fire regime of an area and the implementation of a weed reduction program is a critical part of fire management in urban bushland.

Weeds like wild oats can add to the fuel loading, making fires more intense. Such grasses can also swiftly invade bushland after a fire, before the native vegetation can re-establish.

The effect of weeds on fire

In many areas of urban bushland, the major contributors of bush fire fuels are weeds. In areas of heavy infestation, weeds may increase the fire intensity to a level which makes it unsafe for firefighters to attack the fire directly with hoses. This means that other firefighting methods must be used which will result in a larger area of bush being burnt. Grass fires are typically very 'hot' because dry grass burns so readily.

Grass also has the ability to carry a fire very quickly through bushland. These fast-moving 'hot' fires may result in the death of a greater number of native plants, and the bushland may take longer to recover than it would from a lower intensity fire in largely weed-free native vegetation.

Many weeds, especially herbs and grasses, are able to invade bushland after a fire before the native vegetation can re-establish itself. Many grass weeds dry off in summer, adding to the amount of fine fuel which will carry a fire easily. After burning, the grasses return in even greater abundance, making the fire problem even worse and further degrading the native bush. This is known as the fire–weed cycle.

Controlling weeds

Because fire access tracks are highly disturbed areas, they are often the first areas where weeds gain a foothold because of the lack of competition from other plants, extra water from runoff and

water infiltration into bare soil. Disturbances in bushland, such as installing fire access tracks, should be kept to a minimum.

Many 'Friends' groups are actively involved in weed control as part of bush regeneration. The Environmental Weeds Action Network is a good source of information on weed types and their control.

Comprehensive information on weed reduction programs may be found in 'Integrated Weed Management' (Safstrom, 1999) in *Managing Our Bushland*, and how to target individual species of weed is detailed in 'Suggested methods to control weeds' (Dixon and Keighery, 1995) in *Managing Perth's Bushlands*.

Fuel load monitoring and reduction

In deciding how to manage areas of urban bushland, land managers often get conflicting views concerning planned burning from stakeholders. There are those that recommend the area must be burnt regularly for safety, and those who say the area should never be burned. Reconciliation at the local level, using discussions between all stakeholders, is vital to ensuring the area is managed effectively.

Assessing the issues

The basis of fire planning is a sound knowledge of the issues. These include:

- a realistic assessment of the fire risk
- an assessment of the potential effectiveness of fire protection works
- the recognition of environmental values
- the effect of fire protection initiatives on those values.

In the urban environment (as distinct from more remote or isolated areas), fire is often a prime cause of degradation of bush areas. There are two primary causes of this degradation—fire encourages weed growth and a too-frequent fire regime interferes with the regeneration of native plants.

...in urban areas, fire may encourage weed growth...

Most plants and animals are favoured by long periods without fire. Many native plants are able to survive or recover from fire by re-sprouting from buds beneath their bark or their rootstock, germinating from seeds stored on the plant or in the soil, or are able to re-establish in an area by recolonisation.

Some vegetation types, such as some *Banksia* species, rely on fire or smoke to trigger the release and germination of their seed. Other species, such as Rottnest Island Pine *(Callitris preissi)* are 'fire-shy' and the population may be killed by fire.

Fire regime

However, it is the fire regime that is important for the survival or destruction of the vegetation community. The fire regime includes:

- The frequency of fire.
- The time of year at which fires occur.
- The intensity of the fires
- The spatial distribution of the fires.

A fire regime where too-frequent fires occur may cause a change in the vegetation structure or localised extinction of a plant species. For example, when a plant which has grown from seed after a fire but has not matured enough to set seed, is itself involved in a fire, the seed stocks in the soil are depleted. Repeated fires may completely remove that plant species from the community.

An ideal regime must be established that does not favour one species or vegetation complex over another. In general, this will be a mix of fire frequency, intensity and season.

The fire ecology of many vegetation complexes within Perth's urban bushland has not yet been studied sufficiently to determine the appropriate fire regime. However, in most areas of urban bushland, the fire regime has in recent years been of too-frequent fires. Therefore, minimising the frequency of fires may be appropriate for some areas.

For more information on this subject, see Bushfire Risk Management Planning (Thomas, 1999) in *Managing Our Bushland.*

Fuel loading and arson

The current level of deliberately lit fires (arson) suggests that totally excluding fire from urban bushland may not be possible. As arson fires usually occur during summer, the resulting fire intensity is high.

High fuel loads, combined with summer conditions, result in fires which are difficult to suppress and may pose a threat to life and surrounding property values. Very intense fires kill many animals and much of the vegetation, changing the community structure for several years. In order to reduce the likelihood of very intense summer fires, the amount of fuel within a bushland area should be kept to a reasonable loading.

Monitoring the fuel load

Responsibility for fuel monitoring and fuel reduction should be included in Urban Bushland Fire Plans. Fire management in urban bush areas must always be a compromise between the environmental needs and the safety issues involved. Only with adequate liaison, planning and local management can the needs of both fire protection and conservation be met.

Methodologies for monitoring fuel loadings relevant to forest fuels, grasslands and heathlands are contained in the learning manual *3.17—Prescribed Burning 1* (FESA, 2000). Contact the Fire Services Environment Adviser for information about fuel load monitoring.

Methods of reducing fuel loading

Methods available to reduce fuel loading in native bushland are:

- weed control, using hand-clearing or selective herbicides
- selective hand-clearing of dead material
- mowing or slashing
- planned burning.

Weed control and hand clearing

One of the most effective ways to reduce the fuel in urban bushland is to control the weeds. Because of the fire–weed cycle, planned burning for removal of weedy fuel is not recommended as it usually makes the weed problem worse. Weed control using non-burning techniques and selective hand clearing of other vegetation material is preferable.

Mowing and slashing

Where bushland areas are bounded by areas of weeds or cultivated grass (such as, a weed infested road verge or a cultivated lawn), mowing or slashing the adjacent areas may be sufficient to reduce the hazard posed by the fuel loading in the bushland.

Care should be taken not to mow into bushland and gradually extend the weedy area. Bollards help delineate the margin of the bush.

Planned burning

In areas of high fuel loading that are adjacent to life and property, and where narrow tracks are preferred, it may be appropriate to burn small patches of the bushland in a mosaic pattern. This allows some areas of bushland to remain unburnt at all times, while reducing the overall fuel levels. Use of fire in this manner must be ratified in the Fire Plan.

Planned burning should not occur without:

- Consultation with all stakeholders prior to the burn.
- A comprehensive written prescription, stating the objectives

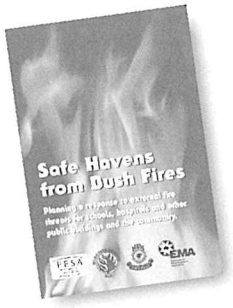
of the burn and methodology to be followed, must be produced and kept in the landowner/managers office and the local fire station.

- The person in charge of the fire being be competent in prescribed burning (preferably having completed *AFAC Module 3.17—Prescribed Burning 1*).
- Adequate resources being available (including personnel, machinery, equipment and vehicles) on the day of the burn.
- Compliance to Local Government requirements (including: Restricted and Prohibited Burning Times, obtaining a 'Permit to Burn the Bush', and notification of neighbours).

...where bushland is bounded by areas of weeds or grass, mowing or slashing these areas may be sufficient to reduce the hazard...

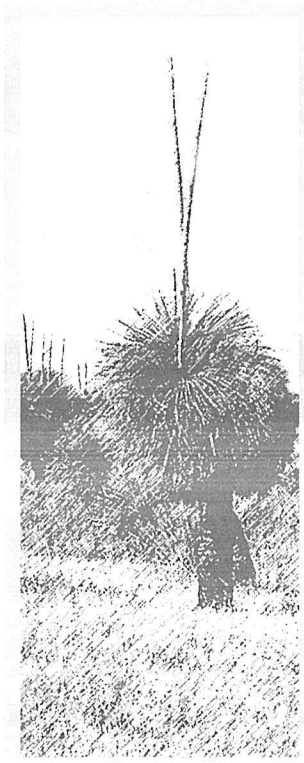
Relocating people

The Urban Bushland Fire Plan should give details of high use areas within the bushland and vulnerable adjacent areas. For bushland with high visitor numbers, wildfire contingency plans should be developed for:



- Relocating people out of the bushland and/or adjacent areas.
- Developing a Safe Haven where people can seek refuge during a wildfire. (For more information on developing a Safe Haven, contact your local FESA office for a copy of *Safe Havens from Bush Fires*.)
- Preventing local residents and sightseers from endangering themselves during a wildfire.

  A traffic plan should be developed to ensure people are not required to go through the fire area, or are likely to impede firefighting resources from reaching the fire.



SUMMARY

- Preparedness strategies aim to keep fires small, which helps to minimise environmental disturbance and generally reduces the impact of wildfire.
- Preparedness strategies can also help firefighters to effectively suppress wildfires.
- Preparedness strategies may include:
    - Fire Watch by neighbours organised.
    - Location and construction of fire access tracks, which must be:
        - trafficable
        - safe
        - carefully located—both for firefighting and environmental concerns
        - carefully constructed—both for firefighting and environmental concerns
    - Water supplies for firefighting must be readily available.
    - Weed reduction programs should be implemented.
    - The fuel load needs to be monitored and reduced where practicable.
    - The relocation of visitors must be considered.

Response strategies

This chapter covers:

- *Fire response strategies to coordinate the response to and management of fire when it occurs. These include:*
  - *Who has the responsibility of responding to fire?*
  - *How the fire response is managed.*
- *Guidelines for the Incident Controller, including:*
  - *Use of the Urban Bushland Fire Plan.*
  - *Keeping the fire as small as possible.*
  - *Use of resources, waterbombers, foam heavy machinery, backburning and vehicles.*
  - *Extinguishment, mop-up and patrol.*
  - *Keeping the community informed.*

THE response to fire within urban bushland is the responsibility of the Fire and Rescue Service, Local Government through their Volunteer Bush Fire Brigades, the Department of Conservation and Land Management (on CALM estate), and other organisations (such as the Defence Force and the Airport Fire Service). The responsibility for the fire will in most cases be decided by land tenure and the gazetted fire district.

The primary fire services in Western Australia, including FRS, BFS and CALMfire, use a common Incident Control System during fire response. This ensures the response is coordinated, available resources are used efficiently, and safety standards are maintained.

Any stakeholder who wishes to communicate with the Fire Service during an incident, or to enter the fireground, should attend the Incident Control Point and liaise with the Incident Controller or an appointed representative.

Guidelines for Incident Controllers

Use of the Urban Bushland Fire Plan

The Urban Bushland Fire Plan is the key to a fire response that does not compromise the conservation value of the bushland.

The fire plan sets out clear priorities for protection. It provides details of the areas within the bushland of highest conservation value including; rare and endangered flora and fauna, threatened ecological communities and other vulnerable areas.

Objectives for firefighting relevant to the particular reserve are included. An example might be not allowing the whole area of a threatened plant community to burn during any fire incident by using fire access tracks to control the spread of the fire from one part of the community to another.

The plan also details preparedness initiatives, such as the location and condition of fire access tracks and access points, the location of water supplies, and suggested points for the Incident Management Team to assemble.

Keep the fire as small as possible

The aim of response to fires in urban bushland is to extinguish fires as quickly as possible and confine them to as small an area as possible. Most of Perth's urban bushland has been subject to too-frequent fires, and therefore fire should be excluded if possible. (See *'The effect of weeds on fire'*).

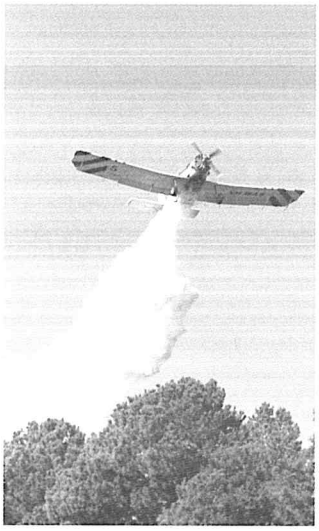
Use of resources

Standard mobilisation for a fire in the area should be included in the individual Urban Bushland Fire Plan and noted on the Brigade Operational Management System in the Fire Services Communication Centre. Standard mobilisation will detail the number and type of appliances responding to:

- an initial fire call
- a confirmed fire
- a sustained attack.

Mobilisation will depend on the weather conditions (Fire Danger Index).

The type of appliances may include standard fire appliances, a Mobile Control Unit, reconnaissance vehicles, water tankers, and welfare support. It is the Incident Controller's responsibility to ensure sufficient resources are available at the fire to bring the fire under control as soon as possible. In areas of high environmental significance, backup needs to be called immediately.



Use of waterbombers

For all areas of urban bushland, waterbombers should be activated where a fire is not likely to be contained quickly by an initial attack. Activation is via the normal procedures (Standard Operations Procedures—Aerial Waterbombing). The Fire Services have improved the early response time of waterbombers by allowing the first responding crew to call for the waterbombers at any time.

Some operational restrictions are placed on waterbombers. These include the period of the year the waterbombers are available and a 'no-go zone' over urban areas (the inability to fly over urban areas fully-loaded does not generally constrain waterbombers as they can follow rivers, waterways and other non-populated routes). The aircraft are contracted for a specific span of dates, and, as such, are only available for duty between the contracted dates. They are also restricted by law to flying in daylight and so cannot operate at night.

Use of foam

The benefits of using foam and other water additives for firefighting are well known and desirable. However, concern has been raised about the possible ecological impacts of the chemicals in foam. Foam contains:

- Nutrients in the form of phosphates and nitrates. In the low nutrient soil of the Swan Coastal Plain, nutrients give an advantage to weed species and change the nutrient content of the soil and water bodies.
- Surfactants which change the surface tension of water and have an unknown effect on aquatic life.

At this stage, further research is required to determine the effects of foam and other additives on the environment. The detrimental effect is likely to be highest in wetlands and fragile plant communities, such as orchids.

Foam or other additives are **not** recommended for:

- Waterbomber drops over areas adjacent to open water or wetlands.
- Firefighting vehicles working in swampy areas or close to open water, rivers or creek lines.

Use of heavy machinery to create breaks

Use existing fire access tracks to control the fire where possible.

The aim of preparedness initiatives included in the Urban Bushland Fire Plan is to provide adequate fire control line/access tracks to avoid having to create fire breaks during an incident. The Fire Plan should note:

- areas of high conservation priority
- areas of declared rare flora
- threatened ecological communities
- dieback-infected areas
- areas where erosion could become a problem
- wetlands
- areas where unexploded ordinance may be expected.

In the event of the existing firebreaks being insufficient to control the fire, attempt to avoid all sensitive areas as detailed on the plan. An Environment Adviser should be consulted to select the least damaging location for earthworks. The map showing priority conservation areas should be consulted.

...areas sensitive to the construction of fire breaks would include wetlands...

Use of backburning

The aim of fire response must be to minimise the area of the bushland that burns during any one incident. As a minimum, the fire should be contained to a compartment of the bushland within existing fire access tracks.

Consider all direct methods of firefighting before backburning. Direct methods of attack are the preferred methods of firefighting where these are safe.

The use of a backburn from existing fire access tracks to confine the fire to a particular compartment of the reserve is only acceptable where:

- fire behaviour during a particular incident makes the use of direct methods dangerous for firefighters
- fire behaviour during a particular incident indicates the fire cannot be confined to a particular compartment using direct methods of attack
- the Urban Bushland Fire Plan indicates a particular strategy
- mop-up of the fire will be compromised without a mineral earth fireline but it is not favourable to the environment to create a fireline—leaving the possibility of the fire escaping to other compartments of the reserve.

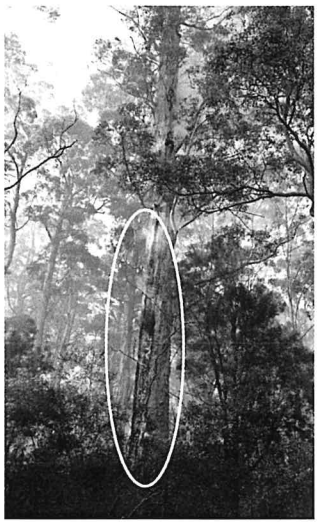
When backburning is necessary to control a fire, minimise environmental damage by minimising the area included in the backburn.

Use of vehicles during fire operations

The clear ground devoid of vegetation after the fire is easy to drive over (except in sandy soils where bogging the vehicle is a real possibility) but this is not recommended. Driving over burnt areas damages the ground causing potential erosion problems, encourages others to drive off the tracks, exacerbating the problem, and reduces the regeneration ability of the damaged vegetation.

The problem of tracks becoming boggy in sandy areas should be addressed in the preparedness stage.

As much as possible, firefighting appliances should remain on fire access tracks during firefighting operations, including during mopping-up.



Smoke indicates that this tree is still smouldering. If not extinguished properly this may cause a bush fire that was under control to re-ignite.

Extinguishing burning or smouldering trees

Trees in areas of urban bushland, particularly jarrah *(Eucalyptus marginata)*, marri *(E. calophylla)* and tuart *(E. gomphocephala)*, provide valuable habitats for many animal species. During mop-up and patrol, after a fire has been contained, trees close to the perimeter (within 100 m of the fire edge) must be extinguished in order to prevent the escape or further spread of the fire.

In preference to cutting trees down, water should be used to extinguish fires in trees. Consideration should be given to using water to extinguish habitat trees over all of the fireground where possible.

Keep the community informed

The Incident Controller must keep the community and all stakeholders informed about the fire at all times. This involves:

- keeping the Communications Centre informed about the progress of the fire response operations
- appointing a Media Liaison Officer to provide general information to the community
- liaising directly with stakeholders at the Incident Control Point on the fire ground (it is important that the Incident Control Point is easy to locate for all stakeholders).

Mop-up and patrol

When a fire has been contained, adequate mop-up and patrol must be carried out to prevent escape or re-ignition of the fire. The Incident Controller is responsible for specifying necessary activities to be carried out during this period and declaring the fire 'Safe' when the fire can be left without further patrol and members of the public may return.

Once the fire is declared 'Safe', the Incident Controller should hand responsibility for the management of the fireground back to the Landowner/Manager.

SUMMARY

- Guidelines for Incident Controllers include:
    - Use the Urban Bushland Fire Plan.
    - Call for backup early.
    - Call the waterbombers early.
    - Use existing fire access tracks where possible.
    - Keep the fire as small as possible.
    - Don't drive off the track wherever possible.
    - Mop-up and patrol must be thorough.
    - Keep the community informed.

Recovery strategies

This chapter covers:

- *Fire recovery strategies to assist the urban bushland to recover from the effects of fire. These include:*
  - *Debriefing the stakeholders*
  - *Recording and, if necessary, investigating the cause of the fire.*
  - *Assessing the safety of public facilities.*
  - *Rescuing animals.*
  - *Controlling access, erosion and weed invasion.*
  - *Choosing regeneration initiatives.*

RECOVERY is the process of returning an area to 'normal' after the impact of a fire. It includes both short and long-term activities. The responsibility for post-fire recovery initiatives usually rests with the landowner/manager. The Urban Bushland Fire Plan should detail specific responsibilities.

Debriefing

All stakeholders, including Friends Groups and landowner/managers, involved in development of the fire management plan should be involved in a debriefing after any major fire incident.

Record the fire

The landowner/manager of the area should prepare an adequate record of the fire occurrence. Accurate records will provide a valuable information resource necessary for future management of the area. The records should include the extent of the fire, the Fire Danger Index and the weather conditions on the day, the success or otherwise of preparedness initiatives, the fire response activity undertaken and the rehabilitation required. A map of the area should be prepared and photographs taken to provide a visual record of the fire and recovery.

The Fire Services Environment Adviser can provide details of when a fire was reported and which fire appliances attended the incident.

Investigate the cause of the fire

Appropriate investigation of the cause of the fire should be undertaken, in order to assist the apprehension of offenders and the prevention of further fires. The Wildfire Investigation Action Team (WIAT) may need to be consulted.

Activation of the Fire Investigation Team is the responsibility of the Incident Controller. When arson is suspected, the Incident Controller should initiate an immediate investigation.

Safety of public facilities

Public facilities should be assessed for safety as soon as possible. If necessary, restrict public access to the area. For example, where walking tracks have overhanging burnt branches that are in danger of falling on the track, the track should be closed. The land owner/manager should monitor safety as well as any areas of possible re-ignition.

Rescue of animals affected by the fire

The urgency of animal rescue must not compromise the safety of people involved. It is preferable to wait until the fireground has been declared safe.

In some circumstances, where safety will not be compromised, a group of people may be allowed to start this task early, under the direction of the Incident Controller.

Preventing weed invasion

Prevention of weed invasion is probably the most urgent requirement after the fire. Increased nutrients (from the ash-bed) and decreased competition from native vegetation contribute to the growth of weeds. The fire regrowth period should be utilised to help eradicate weeds using a spraying or hand-clearing program.

Some native grasses, such as *Stipa* species, regenerate well after fire. Care must be taken to identify species before weed control is undertaken. It must be remembered that native grasses are also susceptible to grass-selective sprays.

Controlling access

Burnt areas devoid of vegetation are easily trampled, hindering the regrowth process. Damaged fencing should be repaired/replaced as soon as possible after the fire. Temporary fencing may be needed. Signs requesting the public to stay off burnt areas may be appropriate.

Controlling erosion

Burnt areas devoid of vegetation on sloping ground are potential erosion problems, particularly during the winter following the fire. Relevant prevention initiatives should be implemented as soon as possible. This may include planting, direct seeding, channelling of water run-off, or covering the ground with brush.

...controlling access may assist with regrowth after fire...

Regeneration initiatives

In areas where the vegetation community is disturbed, the occurrence of a fire may determine the need for regeneration initiatives, such as planting or direct seeding of locally occurring native species.

Involve the community

Fire in an area of urban bushland can have consequences for nearby residents and members of 'Friends' groups. Involving the community in the recovery of the bushland can assist in this process.

SUMMARY

- Recovery is the process of returning an area to 'normal' after the impact of a fire.
- The responsibility for post-fire recovery initiatives usually rests with the landowner/manager.
- The Urban Bushland Fire Plan should detail specific responsibilities. These may include:
    - Debriefing the stakeholders.
    - Keeping adequate records.
    - Investigation of the cause.
    - Considering the safety of public facilities.
    - Rescuing fire-affected animals.
    - Planning and implementing measures to control access, erosion and weed invasion.
    - Regeneration initiatives.
    - Involving the community in the recovery process.

Review of the Urban Bushland Fire Plan

ONCE an Urban Bushland Fire Plan is written and agreed to by all stakeholders, it is important that all parties maintain familiarity with the plan, that maps are updated as required and that stakeholders meet regularly to review the plan.

A timeframe for review should be included in the plan, along with the names of contact people representing the various stakeholders.

Glossary

AFAC	Australasian Fire Authorities Council.
Backburning	An indirect method of fire response. A fire started intentionally from a prepared fireline to burn an area of flammable material in the path of an advancing wildfire.
Contained	A fire is said to be contained when its spread has been halted while it may still be burning freely within the perimeter.
Compartment	An area of bushland surrounded by fire access tracks.
Dieback	A soil-borne fungus disease, *Phytophthora cinnamoni* and other *Phytophthora* species, which affects many native plants.
Direct attack	A fire response technique in which work is applied directly to the fire edge which then becomes the established control line. This may be achieved by applying water, pushing burning fuel into the fire or smothering with earth.
Fire access track	Track providing firefighter access to an area of bushland. Needs to be trafficable and safe, and located with fire fighting and environmental priorities in mind.
Fireline	A mineral earth fire control line at least 1m wide.
'Friends' group	Group concerned with the conservation of the ecological value of Urban Bushland, recognised by the Urban Bushland Council.
Fuel	Any flammable material. Includes native vegetation and weeds.
Fuel reduction	Removal and modification of bush fire fuel. This may be achieved by clearing vegetation (eg. mowing, slashing), removal of certain parts of the vegetation structure (eg. weed removal), or by planned burning. Also called 'Hazard reduction'.
Incident Controller	The person responsible for the overall direction and management of the fire response. All fire agencies in WA use a common Incident Management System.
Indirect attack	A fire suppression technique in which work is applied away from the fire edge, usually due to fire intensity. Includes backburning and construction of fire control lines.
Mineral earth	A term used to describe the ideal condition of a constructed fire line, being completely free of any vegetation or other combustible material.
Mop-up	The procedure of working around the perimeter of a contained fire to ensure that all burning material adjacent to the perimeter is extinguished and there is no possible re-ignition or escape.
Patrol	Once a fire has been mopped-up, the perimeter should be patrolled for a reasonable length of time to ensure there is no re-ignition.
Planned burning	The planned application of fire to meet land management and hazard reduction objectives.
Rare and endangered species	Rare Species are those which are rare, in danger of extinction, or otherwise in need of special protection. Endangered species are those known from a small number of populations which are under threat. A Priority category is given to these species.
Safe	The stage of fire suppression or prescribed burning when the Incident Controller considers no further suppression, mop-up or patrol is required to prevent the fire re-igniting or escaping.
Threatened ecological community	Naturally occurring assemblages of plants and animals listed by CALM as being threatened with extinction by human activity, or in danger of being destroyed or significantly modified by development and other pressures from people (see *Perth's Bushplan*).
Urban bushland	A general term to describe all areas of native vegetation within the Perth Metropolitan area. Includes all vegetation types, including wetlands. Includes National Parks, Regionally significant bushland and locally significant bushland, under all forms of ownership including State and Local Governments and private ownership, whether formally protected for conservation purposes or not.

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…fire management planning—caring for our bushland…

Fire Management Planning for Urban Bushland

A Guide for Landowners, Fire Officers and Bushland 'Friends' Groups

Areas of urban bushland are environmentally valuable and they should be managed in a sustainable manner. Fire is a major influence on the survival and sustainability of urban bushland.

This book gives guidance for the fire component of management planning for areas of urban bushland, as well giving background information on how to reduce the number and impact of fires in urban bushland.