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# Guidelines for

# Plantation Fire Protection

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## Guidelines for Plantation Fire Protection

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**FIRE & RESCUE**  
SERVICE OF WESTERN AUSTRALIA



**FESA**  
Fire & Emergency  
Services Authority of  
Western Australia



The Bush Fire Service of WA and the Fire & Rescue Service of Western Australia are divisions of the Fire and Emergency Services Authority of Western Australia.

# Guidelines *for* Plantation Fire Protection

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# Guidelines for Plantation Fire Protection

## Foreword

The conservation and economic benefits associated with tree planting in the South West of Western Australia have been widely presented and publicised. Not so well presented are the special fire protection issues associated with large scale planting, particularly of high value exotic species which are located in a rural landscape.

The Fire Services of Western Australia promote that potential fire protection should be recognised in the early stages of plantation development and that appropriate action is taken to reduce possible hazards. It is widely recognised that attention to fire protection early in the life of a plantation can dramatically reduce future risks and costly fire protection measures.

These guidelines have been developed by the Regional Plantation Fire Advisory Committee in co-operation with the Department of Conservation and Land Management, the Australian Forests Growers, Agriculture WA, Local Government bush fire control and the Ministry for Planning as an informative town planning resource and to encourage tree plantation fire protection planning.

It is recommended these guidelines be used as part of the overall land use planning process in the South West of Western Australia by plantation developers, Local and State Government decision-making Authorities and fire control personnel.

These guidelines should be read in conjunction with the *West Australian Planning Commission Rural Land Use Planning Policy* and accompanying *Guidelines for the Preparation of a Local Rural Strategy – Planning for Better Bushfire Protection*, in addition to the *Land Capability Assessment for Local Rural Strategies*. At the time of printing, the Commission is in the process of revising its *Rural Land Use Planning Policy* and also preparing a new *Bush Fire Planning Policy*. The new Western Australian Planning Commission policies will include reference to the *Guidelines for Plantation Fire Protection* so that they can be integrated with other relevant rural planning considerations.

It should be noted that these guidelines are not a definitive reference for local fire break requirements and/or standards. Plantation developers should consult with the relevant Local Government Authority with regard to current fire protection requirements within that district.

# 1. Introduction

Tree planting on a large scale is being promoted and is occurring in many of the higher rainfall areas of the South West of Western Australia.

The Fire Services of WA recognise that plantations are a legitimate land use within agricultural areas. At certain times during the life of these plantations, fire hazards may reach significantly higher levels than are normally experienced in these areas. In the majority of cases, these high hazard levels are unavoidable and traditional hazard reduction methods by controlled burning may not be appropriate.

It is in the interest of the whole community to ensure that proper fire protection measures are planned and implemented from a very early stage.

Naturally, these measures represent the protection of a considerable interest that continues to be addressed by the plantation owners in conjunction with the relevant Local Government Authorities.

Management of plantations and indeed all rural land use requires proper planning. In general, specifications of fire protection measures and fire break standards are a Local Government responsibility. It is therefore important that standards are agreed to and accepted by both Local Government and plantation developers so that long term safety and management requirements can be properly met and incorporated in Management Plans to be approved by the Local Government Authority.

It is important that each case be considered on its merits due to the large number of variables in every instance. It is not possible therefore, to adopt a totally uniform approach.

Tree planting should be recognised as a legitimate rural land use activity when assessing planting proposals and when working on plantation design so that these benefits can be realised without compromising fire safety of the local community.

These guidelines are to be incorporated in the *Western Australian Plantation Code of Practice*.

## 2. Glossary of Terms

### Compartment

A subdivision of a plantation area for fire control or management purposes. (Refer 4.1).

### Fire Break

An area on which flammable material has been removed or modified/reduced. (Refer 4.2).

### Low Fuel Areas

Any area where fuels have been modified/reduced to the satisfaction of the Local Government Authority by chemical, mechanical, grazing or fuel reduction burning operations.

### Local Development

All land contained within Urban, Special Residential, Residential Development, Special Rural, Light/General/Special/Noxious/Services Industry and Local Shopping Zones in addition to land identified with forward planning strategies where such development is likely.

### Plantation

Any area of planted trees, other than a windbreak, within gazetted townsites exceeding 3 hectares and elsewhere exceeding 10 hectares.

### Plantation Influence Area

An area up to 3 km distance from local development or gazetted townsite boundaries in which graded responses to fuel reduction measures for plantations are required.

### Plantation Owner

Person or entity responsible for management of the plantation. This may include the owner, lease holder or manager.

### Windbreaks/Shelter belts

Planted area of trees not exceeding 100 metres in depth and 1 kilometre in length. Separation between wind breaks must be 50 metres (sides) and 15 metres (ends) to provide for vehicle access.



### 3. Planning the Location of Plantations

As with other land uses, during various stages of the life of tree plantations, fuels accumulate to levels that pose a fire hazard. In these circumstances, particularly during the severe fire weather conditions frequently experienced in the South West of Western Australia during summer, fires will be very difficult to contain within a plantation area and intense 'spotting' activity can be anticipated.

This potential threat to life and property must be recognised and planning controls implemented to avoid plantation development in areas where this potential may be realised.

It is recommended that 'plantation influence' areas be recognised. These areas provide a buffer between plantation areas and local development. The extent of plantation influence areas will vary according to local conditions and factors such as the flammability of the plantation, topography and prevailing fire weather conditions.

In addition, local development, life and property values of the surrounding community should be taken into consideration.

#### 3.1 Prior to Establishment

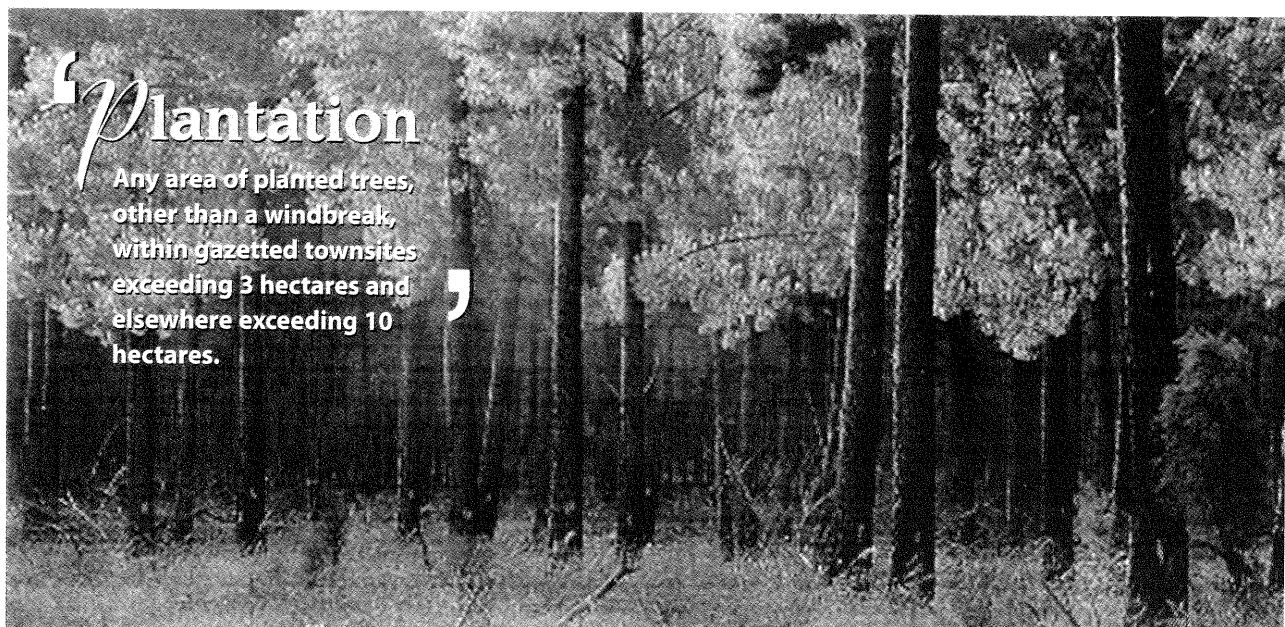
Any decision to plant either broad scale plantations, wind breaks or shelter belts must consider factors such as:

- Presence of existing heavy vegetation in streams and wetlands.
- The ability to provide access for fire control whilst integrating into other plantation management activities.
- Topography, slope and aspect as they relate to fire control, harvesting and soil conservation.
- Proximity to local development.

#### 3.2 Close to Local Development

As a general guide, broad scale plantations established within 1 km of the boundary of any local development shall provide additional fire protection measures as determined and approved by the Local Government Authority. These additional fire protection measures shall be documented in a fire management plan for the plantation/local development.

Low fuel buffers must be established between any plantation and local development. These buffers shall be maintained by respective owners.



### 3.3 Close to Structures

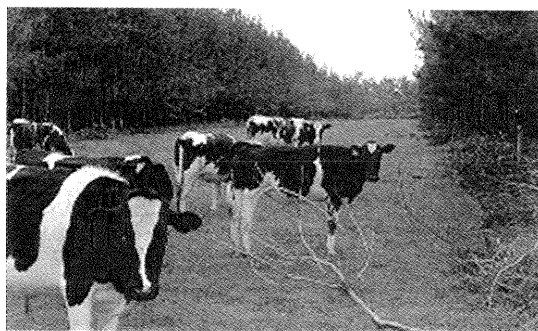
No plantation trees shall be planted within 50 metres of any existing or proposed structure (i.e. house, shed etc) and that a further 50 metres of plantation be pruned and have ground fuels reduced so as to provide a minimum of a 100 metre low fuel area immediately surrounding the structure.

### 3.4 Plantation Influence Area

In addition to measures employed close to local development, fuel reduction should also be an objective for defined plantation areas located up to 1 km from any local development. Such fuel reduction is the responsibility of the plantation manager.

Fuel reduction measures to minimise fire hazards in such areas can include:

- Low and high pruning of pines.
- Removal of pruning debris.
- Strictly controlled grazing.
- Application of special harvesting methods.  
(e.g. remove the whole tree including branches to a point outside the plantation rather than leaving debris within the planted area).
- Broad scale fuel reduction burning.
- Herbicide spray weed control.



*Grazing, when strictly controlled, can provide an effective means of fuel reduction.*

### 3.5 Management Plans

*(To be presented to Local Government Authorities.)*

Plantation management is essentially a long term process and accordingly, it is strongly recommended that prior to establishment, Local Government Authorities require developers to submit a Fire Management Plan for Council's approval.

The Fire Management Plan should include fire protection measures designed in accordance with these guidelines. A draft Fire Management Plan format is included in *Appendix 1*.

### 3.6 Endorsement

The Bush Fire Service of WA and the Western Australian Planning Commission endorse these guidelines and encourage local authorities experiencing demand or the potential for tree plantations to adopt these guidelines either by statutory or non-statutory means.

### 3.7 Implementation

A statutory ability for Local Government Authorities to consider plantations and implement provisions of these guidelines may be achieved by their inclusion within a town planning scheme. This may be by the use of a policy statement and/or by the consideration of tree plantation as a development requiring Local Government determination through town planning scheme provisions.



## 4. Fire Protection Specifications

### 4.1 Compartment Size and Layout

There is a need for access within a plantation so that firefighters are able to concentrate their efforts on containing fires to a relatively small area rather than waiting for the fire to reach the boundary fire break.

If potential losses are to be minimised, there must be an emphasis on safe internal access for firefighters. The recommended maximum compartment size for both pine and Eucalyptus species plantations is 30 hectare compartments. Up to 100 hectares may be considered depending on prevailing conditions such as local climate, terrain, topography and proximity to local development.

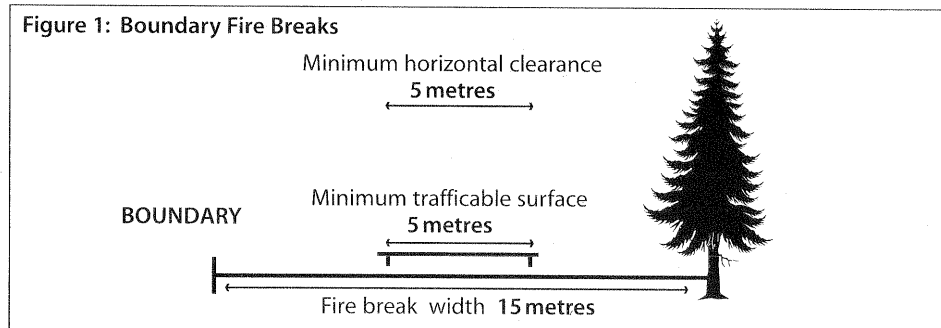
Compartment boundaries should as far as possible, follow existing roads or natural features and avoid situations where soil erosion problems may be aggravated.

### 4.2 Minimum Fire Break Standards

The following fire break standards are recommended for plantations:

- **Boundary Breaks**

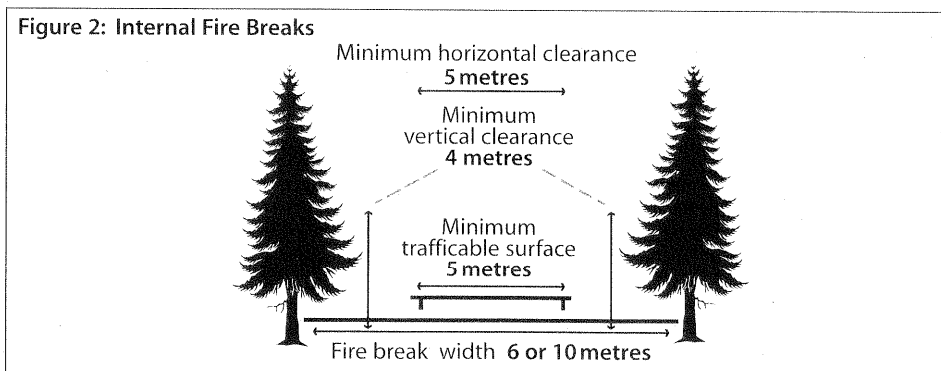
Fire breaks constructed 15 metres wide on the boundaries of plantations or on such alternative locations as may be agreed between the Local Government Authority and the plantation owner. (See Figure 1 below.)



- **Compartment Break**

Internal fire breaks between compartment up to 30 hectares must be a minimum of 6 metres wide and for compartments over 30 hectares, a minimum of 10 metres wide. In all cases a 5 metre running surface should be maintained to allow access by firefighting appliances. (See Figure 2 below.)

**Note:** For all fire breaks it may be necessary for trees on both sides of fire breaks to be progressively pruned to a minimum height of 4 metres to allow unrestricted access for maintenance and firefighting equipment and so as to maintain an effective width of fire break.



**NOTE:** For compartments up to 30 hectares internal fire break width should be 6 metres.  
For compartments over 30 hectares internal fire break width should be 10 metres.

- **Fire Breaks Along Public Roads**

Fire breaks adjoining public roads must be constructed to a width of 15 metres.

#### • Fire Breaks Along Power Lines

Where power lines pass through plantation areas, fire breaks and clearing corridors must be in accordance with Western Power specifications. Contact Western Power for current standards. (See 'For Further Information' on back cover.)

**Note:** For all of these fire breaks, vegetation overhanging fire breaks must be pruned back so that fire breaks have a minimum 5 metre horizontal clearance between tree canopies. (See Figures 1 and 2, on previous page.)

### 4.3 Firefighting Water Supplies

Plantation firefighting water supply facilities must be designed and constructed so that heavy duty firefighting equipment, built to BFS or CALM specifications, is able to access the supply. (See Appendix 2 for standards.)

### 4.4 Sign Posting/Maps

Sign posting must be established to indicate:

- **Compartment Boundaries** (consistent with plantation map and by name or number).
- **Water Supplies.**
- **Emergency access/egress.**
- **Structures** (houses, sheds, etc).
- **Significant features** (creek crossings, dead ends, etc).

**Note:** Plantation Maps showing above details must be provided to the Local Government Authority for distribution to the Fire Services.

### 4.5 Equipment Standards

It is generally recognised that the establishment of plantations in a brigade area may increase the need for efficient firefighting equipment.

Where insufficient brigade firefighting equipment is available (within 20 minutes response time) for plantation fire protection, plantation growers may be requested to contribute to community-based equipment or provide the recommended minimum equipment levels as listed below:

#### Recommended Minimum Equipment Standards

Plantation Area (hectares)	Fast Attack	2.4 (M/Duty)	3.4 (H/Duty)
Less than 100 hectares	1		
100 to 1000 hectares		1	
More than 1000 hectares			1

**Definition:** Fast Attack relates to a 1 tonne 4x4 vehicle carrying a minimum of 450 litres of water.  
2.4 Medium Duty relates to a 4x4 vehicle carrying 2000 litres of water.  
3.4 Heavy Duty relates to a 4x4 vehicle carrying 3000 litres of water.

#### Performance Specifications for Fast Attack

##### Pump and Motor (Petrol/Diesel)

- 200 litres/min at 700 kPa and at no flow 1000 kPa.

##### Ancillary Equipment

- 1 x 30 metre length (38 mm) and 1 x 10 metre length (38 mm) PVC/Nitrile extruded hose (or equivalent).
- 1 Controlled Branch.

#### Performance Specifications for 2.4 Medium Duty & 3.4 Heavy Duty Appliances

##### Pump and Motor (Petrol/Diesel)

- 450 litres/min at 700 kPa and at no flow 1500 kPa.

##### Ancillary Equipment

- 10 x 30 metre and 2 x 10 metre (38 mm) lengths of PVC/Nitrile extruded hose (or equivalent).
- Dividing Breeching Controlled.
- 2 x Branches controlled.

All vehicles shall be 4 wheel drive and preferably have diesel engines.

# APPENDIX 1

## Model Fire Management Plan

*(To be prepared in accordance with the guidelines.)*

### 1. Basic Data

- Land-holder's name.
- Address.
- Telephone number.
- Location number where plantation is to be established.
- Species of tree to be planted.
- Total area to be planted.
- Previous land use and condition (i.e. pasture or ex-bush site).

### 2. Fire Protection

#### Risk of Ignition

Comment on adjacent land clearing, power lines, high visitor use, picnic areas, fire lighting, deliberate lighting, etc.

#### Detection of fires

What existing fire detection and reporting system is in place?

Will this be sufficient? If not, what measures are proposed?

List call out response procedures including names of personnel to be contacted and telephone numbers.

#### Initial Attack on Fires

How will the initial attack on fires be mounted?

What is the existing equipment in the area?

What equipment does the landholder propose to provide?

Who will form the crew?

Where will the equipment be located?

Have any formal fire suppression agreements been entered into with other agencies or organisations?

#### Access in and Around the Plantation

What internal access will be provided?

What pruning is planned?

Will access be conventional or 4 wheel drive?

Will roads be through roads?

Are slopes greater than 1 in 4 to be traversed?

Sign posts on access roads?

#### Water Supplies

What is proposed to ensure an adequate, permanent water supply is available within a 20 minute turn around time?

#### Surrounding Fuels

What are the surrounding fuels?

- Predominantly grazed farmland?
- Bush area regularly prescribed burnt?
- Can fuel reduction be carried out on adjoining land without restriction?

#### Fire Breaks

Fire breaks to be provided in accordance with guidelines.

### 3. Area at Risk

#### Existing Plantations in the Area

Does the area adjoin existing plantations?

If the total plantation area exceeds 500 hectares what fuel modification or other precautions will be taken to restrict the potential for major fire development?

#### Surrounding Values

Are there any values at risk on surrounding lands that may be affected by development of the plantation?

If there are, what protection is to be provided?

#### Proximity to Townsites

If the plantation is proposed within 1 km radius of a townsite, what special protective measures are proposed and guaranteed to provide for safety of life and property?

**Note:** A map indicating areas to be planted, fire breaks, water points, initial access and other protective measures must accompany the plan.

# APPENDIX 2

## Water Supply Standards

### Dams or Water Points

#### Location

Water points should generally be located adjacent to primary or secondary roads for:

- Safety: Reliably open escape route(s) in an emergency situation. These roads are generally well sign-posted.
- Maintenance and easy location: Water points hidden on little used tracks are difficult to locate, especially for incoming crews at night. They are also more likely to be forgotten and therefore deteriorate from lack of maintenance.
- A well-constructed and maintained road can mean a substantial saving in turn around time when compared to rough surface tracks.

Ultimately however, water points should be established at the best possible permanent water source available.

#### Site Selection

The following points should be considered when selecting the location for a water point:

- Permanency: To be effective, water should be available year round.
- Soil Type: Choose clay type soils to prevent loss by seepage.
- Entry/Egress: Avoid construction of water points on blind corners
- Manoeuvring room: Sufficient room for trucks to manoeuvre, especially at night, should be available.

#### Site Construction

A minimum area of 40 metres x 20 metres should be cleared or retained unplanted to allow sufficient room in which to excavate the hole and to manoeuvre trucks. The area should be left smooth enough to create a hardstanding area for heavy duty fire appliances.

Due to limitations on suction hose lengths, access to water must be within 6 metres of the pump of any fire appliance.

Bed logs (up to 45cm crown diameter) should be arranged at the site as safety barriers so as to ensure vehicles cannot accidentally fall or roll into the water point.

To ensure animals are not trapped within the water hole, at least one side should have a slope not exceeding 1 in 6.

### Standpipe

Where static water supplies are provided through a standpipe the following standards are recommended:

#### Location

Standpipes shall be located so as to allow any vehicle using the standpipe to leave the carriageway completely and not restrict traffic flow and visibility.

#### Standpipe Construction

Standpipes shall be of sound construction, made from galvanised steel and shall withstand a load of 150 kg at the pipe outlet without visible deformation of the structure.

Standpipes shall be equipped with a metal stop valve at 1.5 metres above surrounding surface level. 2 metres of flexible hose of appropriate diameter shall be fitted to the discharge pipe outlet.

#### Capacity

The minimum discharge shall be 450 litres/minute. The minimum discharge pipe diameter shall be 75mm.

#### Access

A vehicle hardstanding area shall be constructed between the edge of the carriageway (road) and the standpipe to a minimum length of 25 metres. Such hardstanding areas shall be made to the same standard as the adjoining roadway, recommended to have a minimum compacted thickness of 200 mm at a compaction rate of 95% MDD.

For further information contact:

## Fire and Emergency Services Authority of WA

Prevention and Risk Management Directorate

5th Floor, 480 Hay Street

PERTH WA 6000

Postal Address:

PO Box P1174

Perth WA 6844

Phone: (08) 9323 9395

## Western Power

Vegetation Control Officer

(for Albany and Bunbury areas).

Phone 13 13 53 (local call charge).

## Local Government Authority

Contact your nearest Local Government Authority.

## CALM

Department of Conservation and Land Management

50 Hayman Road

COMO WA 6152

Postal Address:

Locked Bag 104

Bentley Delivery Centre

Bentley WA 6983

Phone: (08) 9334 0333



