

Fire Management in Forest Practices

**Pre-course Reading & Assignment
for Participants**

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Fire Management in Forest Practices

Sections:

1. **Planning:** (a) Strategic (landscape level) Fire Management Planning – reference Forest Practices Code E3.1
(b) Operational (coupe level) Forest Practices Plans – reference Forest Practices Code C1.2, E3.2
2. **Implementation:** Prescribed Silvicultural Burning Standard – reference Forest Practices Code E3.3

Learning Outcomes: at the completion of this session participants will be able to:

- 1.1 Identify the criteria which determine the need for a fire management plan to be in place for an area of commercial forest.
- 1.2 List the key issues to be addressed in the development of a Fire Management Plan.
- 1.3 Identify a stage in the sequence of operational planning for forest harvesting which will deliver the best fire management outcomes.
- 1.4 Determine whether or not a particular prescribed silvicultural burning regime is appropriate for a forested area under a Forest Practices Plan.
- 2.1 Identify five parts of the Draft Forest Industry Prescribed Silvicultural Burning Standard 2009.
- 2.2 Reference the Draft Forest Industry Prescribed Silvicultural Burning Standard 2009 from the Forest Practices Authority's web site.
- 2.3 Provide a summary of each part of the Draft Forest Industry Prescribed Silvicultural Burning Standard 2009.

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Section 1(a) Fire in the Landscape

The frequency of bushfire occurrence is an important influence on the vegetation of Tasmania. The mosaic of a forest type map demonstrates the historical contribution of fire, together with rainfall, soils and topography in shaping the vegetation of the Tasmanian landscape. Fire management should be a priority in planning for most silvicultural projects.

“Fire Management” is a term used to describe all of the activities which either use fire as a tool (when it is called “prescribed fire”) or prevent unwanted fire (when it is called “bushfire” or “wildfire”) from occurring.

Properly applied, prescribed fire can be effective in the removal of hazardous vegetation and in the preparation of land for the sowing of tree seeds or the establishment of plantations. Bushfires are a threat to life and / or property, which includes forest assets as well as structures.

In silviculture, planning for the use of prescribed fire and protection from bushfire needs to begin at the earliest stages of a project. This is because under the right conditions any fire can spread across the landscape regardless of roads, land tenure or other management boundaries.

The earlier that fire is considered in project planning, the easier it will be to manage later on as there will be more options available and fewer constraints on land managers. It is particularly important to do this before committing to significant expenditure on permanent infrastructure such as roads and bridges.

Fire management in forest practice can be identified as two activities: **planning** for fire management and the **implementation** of fire management strategies.

There are two levels of planning, beginning with **strategic planning**. This refers to planning at a landscape scale.

Imagine being in a helicopter on the ground at the centre of a project area. The view is limited to what you can see around you. As the helicopter rises, the project area reduces in apparent size and blends into the landscape overall. At about 600 metres above the surface, the project can be seen as part of a pattern of land use with positive, neutral and negative fire risk elements interacting with the subject area.

A fire management plan is based on a strategic overview. This is usually gained from aerial photographs or maps together with field inspections.

All the surrounding assets need to be identified – things of value, where they sit in the landscape and who owns them. Any threats which have the potential to impact on the project area must be identified. For a forested area typical threats are fuel loads in adjacent flammable vegetation types, but features such as roads, tracks, picnic areas and rubbish tips might also be potential sources of bushfires.

Features which are likely to mitigate or exacerbate threats are noted. These may include the prevailing fire weather direction, fire history, access, constructed firebreaks, wet gullies and recently burnt areas.

Actions which are needed to reduce the threats are identified. These could include fuel reduction strategies such as prescribed burning or the construction of additional firebreaks. In some circumstances, identified threats may cause the project's objectives to be changed.

How far should the strategic overview extend at the coupe level?

It should relate to the scale of the project and what can be reasonably expected to impact on it. For example, the relationship between a fire management plan covering a whole region of the State and a forest coupe of 50 hectares within it will be too distant to be useful at a project scale, whereas a fire management plan which covers the watershed around the coupe will be operationally more relevant.

Fire Management Plans checklist:

- Assets – identify type, scale, location, ownership
- Threats – identify type, scale, location, ownership
- Note features likely to reduce threats, including prevailing fire weather
- Note features likely to increase threats, including prevailing fire weather and fire history
- Record actions needed to reduce threats
- List resources need to support actions
- Set timelines for actions
- Recognise special values requiring protection

Section E 3.1 of the Forest Practices Code advises (should statement) the preparation of a fire management Plan for **all** consolidated areas of commercial forest over 50 hectares. **Section E 3.2** advises the specification of measures in the Forest Practices Plan to protect new forest from fire in the absence of a formal fire management plan.

Section 1(b) Fire Management in Forest Practices Plans

Planning for fire management at the operational level falls within the scope of the Forest Practices Plan. The location of roads and landings is one example. Bark heaps have been the cause many bushfires so landings should not be located where smouldering bark heaps will be a problem. Another is the location of coupe boundaries. If constructed firebreaks are necessary, boundaries should be located with this in mind.

Particular measures are specified in the Forest Practices Plan to prevent fires which may occur during harvesting from spreading to adjacent land. The Forest Industry Fire Prevention Protocol and the firefighting equipment provisions of the Fire Service (Miscellaneous) Regulations 1996 specify the amount and types of firefighting equipment required and actions to be taken to monitor severe fire weather conditions leading to the temporary suspension of operations.

Guided by the strategic fire management plan, decisions can be made about fire's role in the treatment of the area to be harvested. For example, does the fire management plan provide a basis for ongoing, safe and effective fuel management? If the fire management plan identifies

an upwind threat which cannot be reduced, such as fuel under recently thinned forest, is it prudent then to specify a “no burning” option in the Forest Practices Plan? Will this decision compromise the FPP objective to regenerate the area?

The burning prescription in the Forest Practices Plan should match the burning objective for the area. Burns can be either “high” or “low” intensity. Intensity is the measure of heat generated in the release of energy stored in forest fuel. It strongly correlates with the amount of fuel available to burn which is usually expressed in terms of tonnes per hectare (tph). In the dense, wet mixed forests, post harvest fuel loads of around 400 tph are common whereas the drier open forests may have post harvest fuel loads of only 50 tph.

High intensity burns are used to remove large amounts of fuel to expose a mineral earth seed bed in applications, such as “regeneration burns”. High intensity burns are also used to remove stacked and heaped fuels such as plantation clearing windrows.

Another recently identified form of high intensity burning prescribes specific conditions to moderate fire activity in the burning of coupes which have been harvested using “variable retention” methods.

Low intensity burning can be used where fuel loads are light and damage to retained trees can be minimised in treatments such as shelterwood and single tree selection. It is usually applied in forest types where the ambient fuel load is already low, such as “dry” and some “intermediate” forests.

The recognised industry practice described in Forestry Tasmania’s manuals for burning at high and low intensity and more recently, the interim guidelines for variable retention burning should be followed.

(Forestry Tasmania’s Prescribed Burning manuals for High Intensity, FFFOP402A/FT016, and Low Intensity, FFFOP401A/FT016R, are the relevant references. “Feasibility of burning debris from wet eucalypt forest harvested with the aggregated form of variable retention”, Forestry Tasmania Technical Report 10/2007 provides detailed information and interim prescriptions.)

A guide to determining an appropriate prescribed burning regime after forest harvesting may be found in Forestry Tasmania’s Technical Bulletin Number 11, “Silvicultural Use and Effects of Fire”.

Questions to be asked about operational fire management in Forest Practices Plans include:

Is burning necessary to prepare the area for sowing tree seed or planting seedlings?

Is burning necessary to reduce the risk of fire and consequential loss of assets?

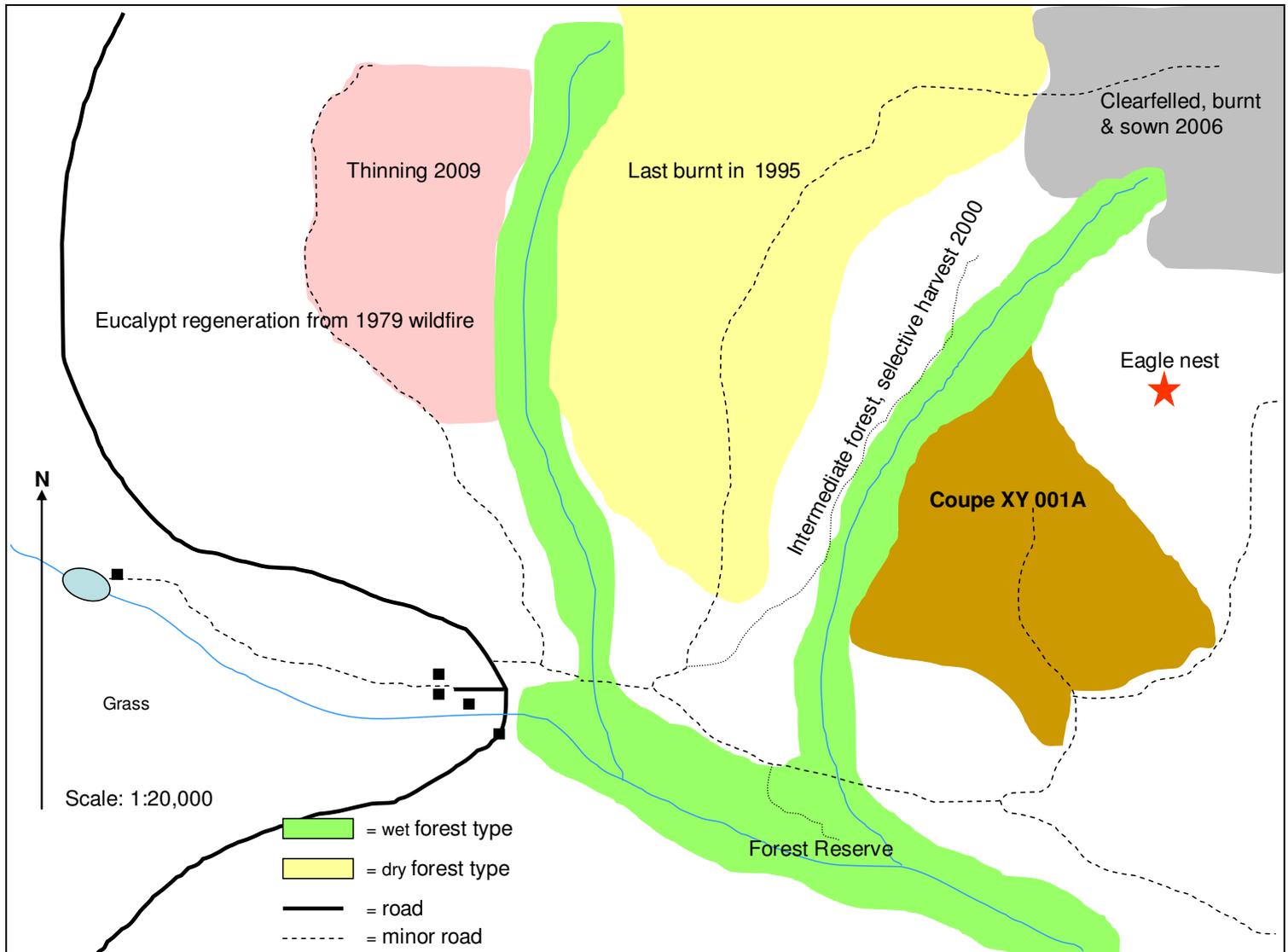
Under what circumstances is the use of fire precluded?

How to manage conflicting objectives – the imperative to regenerate logged forest versus the needs of special values?

**Fire Management in the Forest Practices Plan Checklist
(Sections C1, C3 and E3.2 of the Forest Practices Code):**

- Defines the burning objective

- Identifies constraints & exclusions
- Specifies measures to protect new forest
- Specifies measures to protect adjacent land & neighbours -
- Forest Industry Fire Prevention protocol and the Fire Service (Miscellaneous) Regulations 1996 (*Firefighting equipment to be kept at forest operations*)



Section 1 Exercise: Fire Management Planning.

(The 75 ha coupe XY001A is a 110 year old wet sclerophyll Eucalyptus regnans forest. It has scattered small patches of 31 year old regrowth poles within the planned boundaries.)

- Referring to the map above, identify and describe eight features which are relevant to a fire management plan for the proposed coupe XY001A.
- Describe the fire history which can be determined from the information available.
- List and prioritise the actions required for the ongoing management of fire in this area of forest.
- Identify how you have determined the priorities for the actions.

a. Features Relevant to the Fire Management Plan:

- 1:.....
- 2:.....
- 3:.....
- 4:.....
- 5:.....
- 6:.....
- 7:.....
- 8:.....

b. Fire history:.....
.....
.....

c. Actions to be taken under the Fire Management Plan (in order of priority)

- 1:.....
- 2:.....
- 3:.....
- 4:.....
- 5:.....

(Add more if needed)

d. The actions listed above were prioritised on the basis of:

.....
.....
.....

Section 2. Implementation: operational planning for fire management

(a) Boundary Location

When designing coupes where fire will be used, choose natural fire boundaries – along ridgelines and gullies. If a constructed fireline is planned, locate the coupe boundary with this in mind and avoid steep sided slopes into creeks where constructing the fireline may involve extensive earthworks and damage to the retained vegetation. If firelines are to be trafficable by vehicles, a higher standard of location will be required.

Well designed boundaries will ensure that there is minimal disturbance of vegetation outside the coupe. It is important to ensure that undisturbed fire-safe vegetation such as wet gullies and corridors of rainforest understorey are treated as “assets” and not compromised by careless felling practices or boundary location or indeed the building of firelines of questionable value. The boundary markers should indicate the strict limits of cutting, allowing sufficient adjacent area for the later construction of the fireline, if required. In particular circumstances it may even be preferable to construct the fireline, prior to harvesting. Trees which fall outside marked or constructed boundaries should have all debris carefully removed, causing the minimum of disturbance to the retained forest edge.

(b) Firelines

Firelines should be constructed to provide a mineral earth break in the continuity of fuels where appropriate. The break should be at least 5 metres wide. Debris from the clearing should be pushed or thrown to the coupe side of the line leaving a clean edge to the retained forest. The slash pushed to the coupe side should be spread evenly to avoid creating windrows of long burning fuels. Excavators can spread heaped slash quickly and with minimal site disturbance.

It is possible to put in trafficable firelines with minimal disturbance to adjacent vegetation by using a combination of ‘dozer and excavator provided that the integrity of the coupe boundary has been maintained during the operation.

In some circumstances, clearing a fireline to mineral earth may actually compromise the fire management objective and a “raked edge” may be all that is needed to break the continuity of fuels. This is likely to be the case when the boundary is a low flammability type such as undisturbed rainforest and the topography precludes vehicular access.

(c) Water Storage

At strategic locations around the boundary, water storage may be prepared when building the fireline. This is likely to be needed where other water sources are remote or the topography is difficult. If the fireline is to be of trafficable standard, the area around the water storage should be large enough to allow for the turning and passing of vehicles.

In specific locations, water storage should meet the specifications for use by a helicopter with a bucket underslung. This requires a surface area of at least 20 metres by 20 metres, minimum 2 metres depth of water and an approach and departure path, clear of obstructions for an angle of 40 degrees from the water.

Any development of water storage which involves earthworks and water courses must comply with the relevant provisions of the Forest Practices Code and the State water management regulations which apply.

(d) Bark Heaps

Bark heaps adjacent to uncut forest are a significant risk as they smoulder for months and even years after the main fire has long gone. Escaped fires costing hundreds of thousands of dollars have resulted.

A strict regime is necessary for checking burnt bark heaps in unsafe locations before each summer, preferably using infra red scanning equipment. Many thousands of dollars are spent by forestry companies each year excavating and extinguishing burning bark heaps. A fraction of this expenditure could be redirected to careful coupe planning which can reduce or eliminate the risk by ensuring that all landings are well inside coupe boundaries, accessed by either spur roads or a centrally located trunk route. Other solutions include returning bark to the forest, particularly in selective harvesting where no burning is planned.

(e) Forest Plantations

There has been growing public concern about the implications for fire management caused by plantation developments, particularly those close to urban areas.

The main issues are with the plantations' proximity to dwellings, the area of contiguous plantation development, local fire frequency and provisions for fuel management and firefighting.

These concerns prompted the State Fire Management Council in 1999 to endorse a set of interim guidelines for use by plantation developers. These should be consulted at the early stages of planning. (See Appendix 1 for a copy of "Interim Fire Management Guidelines for Plantations").

(f) Prescribed Silvicultural Burning (PSB) means the planned burning of forest residues after harvesting or clearing to establish forest regeneration and plantations. This is commonly referred to as "regeneration burning" and "plantation establishment burning". It includes the burning of residues from all types of forest harvesting regimes and plantation rotations. Other types of forest burning are included where the operation is subject to the Forest Practices Code and included in a Forest Practices Plan.

In 2007 the Forest Practices Authority appointed a working group of forest industry and environmental officers to collate the best of current PSB planning tools and guidelines into a "Forest Industry Standard" which has been endorsed by the Forest Practices Advisory Council. The standard for each procedure within the scope of PSB is defined as a series of actions to be taken. Where appropriate implementation tools are currently in use, they have been identified and referenced.

It is planned to include the Forest Industry Standard for Prescribed Silvicultural Burning in the next revision of the Forest Practices Code.

The forest industry standard for PSB covers:

- PSB Planning
- Public Notification of PSB
- PSB Smoke Management
- PSB Risk Assessment
- PSB Practitioner Competency

The Standard can be accessed from the Forest Practices Authority’s website under Smoke Management.

Forest Practices Plans Operational Fire Management Checklist:

- Select an appropriate burning prescription
- Take care with the location of boundaries
- Consider the coupe shape
- Note the location of long duration fuels in relation to edges
- Consider the flammability and extent of surrounding fuels
- Consider the type of burn required when doing the FPP
- Refer to the Forest Industry Standard for Prescribed Silvicultural Burning

Exercise 2: Operational planning for fire management

Refer again to the map on page 7:

(a) The FPP for the coupe XY 001A proposes landings at the end of the spur road and at the road junction at the south east corner of the coupe. Comment on these two locations with regard to fire management:

Landing at the end of the spur:.....

.....

Landing at the road junction:.....

.....

(b) The 75 ha coupe XY001A is a 110 year old wet sclerophyll *Eucalyptus regnans* forest. It has scattered small patches of 31 year old regrowth poles within the planned boundaries. The landowner wishes to retain several patches which are about a hectare in area and clearfell the rest of the coupe. It is proposed to remove the harvesting debris with a high intensity broadcast burn. Describe how you would assess the viability of this regeneration plan from a fire management perspective.

.....

.....

(c) Using the scale of “High” “Medium’ and “Low”, classify the burning risk posed by Coupe XY 001A in relation to:

Fuel type flammability:.....

Coupe shape:.....

Coupe size:.....

Escape consequences:.....

(d) Provide a brief summary of the forest industry’s current procedure for managing smoke from prescribed silvicultural burning.

.....

.....

.....

.....

.....

Appendix 1 -INTERIM FIRE MANAGEMENT GUIDELINES FOR FOREST PLANTATIONS

1. INTRODUCTION

Forest plantations present particular issues for fire management because of their relative fire sensitivity, their structure and high value.

The structure of plantations often provides continuous fuels for fire to move across the plantation and up into the crown. The key to fire prevention and suppression is to break this fuel continuity. However, the costs of pre-suppression works need to be weighed against the potential fire risk.

The following guidelines for plantation fire management works are considered to be the minimum protection required.

2. PLANNING THE LOCATION OF PLANTATIONS

During various stages of the life of a plantation, fuels accumulate to levels that pose a fire hazard. In these circumstances and particularly during severe fire weather, fires will be very difficult to contain within a plantation area and intense spotting activity can be anticipated.

This threat to life and property must be recognised and planning controls implemented to avoid or modify plantation development in populated areas where the potential for wildfires may be high.

2.1 Prior to establishment

Any decision to establish plantations must consider fire management factors such as:

- the proximity to local development;
- the type and fire frequency of local vegetation;
- the maximum area of contiguous plantation, commensurate with fire protection capability (undivided areas should not exceed 100 hectares);
- the ability to provide access for fire control;
- the topography, slope and aspect as they relate to fire control;
- the sequence of establishment so that plantations more than four years old are not threatened by slash or windrow burning on adjoining areas, adversely positioned relative to the prevailing fire weather direction.
- the need for prescribed burning of adjacent land where it is ecologically appropriate and
- the provision of water points.

2.2 Establishment near habitable buildings

The edge of plantings for any new plantation should not be established within 50 metres of any existing habitable building (i.e., a building used as a dwelling or workplace). Where it is appropriate for the species, adjacent plantations should be high-pruned for a width of 50 metres in from the edge, with any elevated fuel reduced for the same width.

Where habitable buildings are already located adjacent to existing plantation, the recommended pruning and /or fuel reduction should be applied. If this is not possible, the fuel management zones contained in the *Guidelines for Development in Bushfire Prone Areas in Tasmania 1999* may be implemented as far as possible to reduce the existing fire risk.

3. FIRE PROTECTION

3.1 Firebreak standards

An assessment of potential fire behaviour, taking account of the fuels and topography adjacent to a plantation should be applied to determine firebreak needs.

As a guide, firebreaks between plantations and vegetation of high to moderate fire frequency should be at least 6 metres wide.

Otherwise firebreaks should be constructed to a width which will:

- meet firefighter safety requirements; and
- satisfy fire suppression objectives.

3.2 Firebreaks as access

Where practicable, firebreaks should be constructed to provide access for four wheel drive vehicles.

3.3 Maintenance of firebreaks

Firebreaks must be kept free of flammable material.

3.4 Fuel reduction standards

Where plantation adjoins vegetation with a high to moderate fire frequency, strategic fuel reduction burning should occur for a minimum of 500 metres from the plantation or to the extent of the flammable vegetation boundary, whichever is closer.

Where planted forest and adjoining vegetation have separate owners the cooperation of the adjoining landowner should be engaged to implement mutually beneficial fire protection measures.

Fuel Reduction Burning should be carried out by competent persons, conforming to the current industry standards of prescription and practice.

3.5 Roads and tracks

A road and track network is required to provide access by ground fire fighting forces and must be maintained for fire protection purposes. In general, a 4 metre wide track, constructed to meet the specifications of the Forest Practices Code Road Class 4 is acceptable

Specific Requirements:

- fire protection access which connects to perimeter firebreaks should be constructed at the time of plantation establishment;
- access should be of a suitable surface condition and width to allow the safe movement of fire fighting vehicles;
- suitable passing bays and turnarounds should be formed and maintained at intervals not greater than 200 metres;
- dead-end access should be avoided if possible. Where this is not practicable a turning circle, or a bay must be provided;
- all access must be kept in a negotiable state. Encroaching vegetation must be cut back and overhanging branches cleared to a minimum height of four metres from the road or track surface;
- roads and tracks should be signposted to indicate road or track identification, or alternatively, be indicated on maps which are regularly updated.

3.6 Firefighting water supplies

Water supply points must be located and /or constructed at strategic sites to enable quick and safe access for firefighting vehicles and pumps.

Specific Requirements:

- water points should be established such that the distance between any two is no greater than 5 kilometres;
- water points established in association with a helipad for helicopter bucket or water bombing operations should have an installed minimum capacity of 200,000 litres;
- wherever practicable, permanent helipads should be developed alongside major water supply points;
- pump access must be no more than 3 metres above or 2 metres away from the water and be in an area large enough for fire fighting vehicles to manoeuvre;
- all water points must be kept maintained and should be sign posted, or alternatively, be indicated on maps which are regularly updated.

4. GLOSSARY OF TERMS

Fire Management means all activities associated with the management and use of vegetation fire, including prescribed burning to meet land management objectives.

Fire Frequency means the history of fire in a given area over a period of time as defined by its frequency and the intensity of fires. Vegetation of high to moderate fire frequency includes buttongrass moorland, heathland, dry sclerophyll forest and grassy woodland.

Firebreak means a strip of land where vegetation has been removed to reduce the risk of fire starting or spreading.

Habitable Building means a building of Classes 1-9 of the *Building Code of Australia* used as a dwelling or workplace.

Plantation means a forest stand established by the planting of seedlings or cuttings of trees of either indigenous or exotic species, selected for their wood producing properties and managed intensively for timber.

Prescribed Burning means the controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity and rate of spread required to attain planned resource management objectives.

Wildfire means any unplanned vegetation fire.

Document endorsed by the State Fire Management Council, 10th December 1999.

