FIRE CONTROL MANUAL

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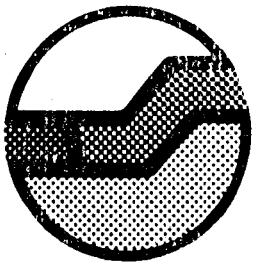

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

JANUARY 1988

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APPENDICES

1. INTRODUCTION

1.1 Introduction

The problem of fire control is intimately connected with the protection of life and property associated with the Department of Conservation and Land Management (CALM) land, as well as the need to protect the conservation values and timber resources within these lands. The ultimate success of the Department's efforts in these areas is largely dependent on a strong measure of public sympathy and co-operation in dealing with the fire problem.

Safety of personnel must be given detailed consideration. All persons engaged in fire control operations must have read, understood and signed Bulletin No. 71, "Safety in Bush Fire Control". This Bulletin provides information and guidance on the correct procedures for prescribed burning. District Managers are responsible for ensuring that all personnel involved in fire control are trained in and are familiar with these procedures.

2. DEPARTMENTS FIRE MANAGEMENT POLICY

This policy is based upon the following premises:

- Fire has occurred naturally from time to time in practically all lands managed by CALM. Fire has therefore played some part in determining present vegetation structures and composition.

- Under natural conditions, practically all ecosystems are made up of a mosaic of vegetation associations and structural stages according to their fire histories. The scale of the mosaic varies in different ecosystems.

- Fires from natural causes (eg, lightning) will inevitably occur. Fires resulting from human activities, either deliberate or accidental will also occur, but may be minimised by effective public education and awareness, and by legislation.

- In Western Australia, weather conditions occur every year under which fires can be so intense as to be impossible to contain with currently available technologies and resources. Such fires can threaten human lives and resources valued by the community, and their control involves considerable public expenditure and risks to firefighters.

2 (continued)

- The speed and intensity at which a fire burns is related to the quantity of accumulated dry litter or other fine plant material. In some ecosystems, or in some high risk/high value situations, accumulated fuel loads can be reduced by prescribed burning. This reduces the likelihood of intense fires even under extreme conditions, and improves the capacity for fire-fighters to safely control a fire.

  Within each major fuel type there is a recognised weight of dry fuel above which fire-fighting forces are not likely to be able to contain wildfires burning under normal hot summer conditions.

- Much of CALM land, particularly in the south west, has a common boundary with well-developed private assets such as towns and farms, the protection of which reduces the flexibility for fire management.

- Information about the long term effects of different fire regimes, including fire exclusion on many ecosystems is limited, and any management policy must be under constant review and accompanied by research and monitoring programmes.

2. (continued)

- The Department has a moral and legal obligation to comply with those provisions of the Bush Fires Act and CALM Act relating to fire prevention and control of wildfires on or near CALM lands.

2.1 Objectives

The fire management goal of CALM is:

- To protect community and environmental values on lands managed by the Department from damage or destruction from wildfire.

- To use fire as a management tool to achieve land management objectives, in accordance with designated land use priorities.

2.2 Fire Suppression Policy

- The Department will meet its legal obligations under the Bush Fires Act and CALM Act by responding to fires occurring on or near CALM land to a degree that is appropriate to the values at risk.

- The Department will assess its response to a fire in the light of potential damage to the following values in order of priority.

  (i) Human life;

  (ii) Community assets, property or special values (including environment values);

  (iii) Cost of suppression in relation to values threatened.

2.2 (continued) - Where values dictate the Department will:

(i) Provide a detection system which will give timely warning of the presence of a fire threatening community or environmental values;

(ii) Provide a well-trained and equipped suppression organisation capable of containing several simultaneous uplanned fires under extreme weather conditions in conjunction with other fire fighting organisations.

2.3 Use of Fire The Department will:

- Use planned fire only where this use is in accordance with an approved management plan, or, where such a plan does not exist, to protect and maintain the designated priority land use.

- Prepare written prescriptions in advance, for approval by senior designated officers, before any planned fires are undertaken.

- For areas where primary land use is wild-life conservation, use fire in such a way as to promote the greatest possible diversity and variety of habitats within prevailing physical or financial con-straints.

2.3 (continued) In small conservation reserves and where information on the impact of fire is limited, fire will be used conservatively. In such areas the use of fire will be restricted to:

(i) Protection of neighbouring community assets; and

(ii) As far as is achievable and within safe limits, ensuring that different seral stages following fire are represented.

- Use prescribed fire or other methods to reduce fuels on appropriate areas of CALM lands, where it can be demonstrated that this is the most effective means of wild-fire control, and where undesirable ecological effects do not result.

The frequency of fuel reduction measures will be governed by the rate of build-up of fuels; the degree of risk to human lives; the value of the assets to be protected; the known sensitivity to fire, or dependence on fire, of the kinds of plants and animals present; and the resources available to carry out the work.

2.4 Liaison

The Department will:

- Ensure effective liaison with neighbours, Bush Fire Brigades, Local Authorities, Bush Fires Board and other fire control organisations.

- Support the concept of Local Authority District Fire Plans and promote mutual aid interagency agreements for fire control on lands of mixed tenure with common fire problems.

2.5 Public Awareness

The Department will provide for public education in relation to the prevention of fire, and the role and use of fire in ecosystem management, and hazard and risk reduction.

2.6 Research

The Department will undertake research into fire prevention and control, fire ecology and fire behaviour on CALM lands to improve the scientific basis for, and effectiveness of Fire Management Programmes.

3. STRATEGIES

3.1 Fire Suppression

Suppression of unplanned fires on or threatening Departmental land will be given priority over normal activities, except for those involved with safeguarding of human life.

3.1 (continued)

A detection system based on aircraft, lookout towers or ground patrol, will be used in designated areas where early warning of a fire occurrence is essential to enable rapid control measures.

In other areas, the Department will rely on neighbours, staff presence, the public, or commercial aircraft for reports of fire outbreaks.

When a fire is detected an appreciation will be made to estimate its likely spread and potential to cause damage to life, property or environmental value.

Unplanned fires will be contained to the smallest possible area by the most appropriate means available taking into consideration the values at risk and the impact of the suppression activity on the environment.

3.2 Use of Fire

Prescribed fires will be used to achieve a range of management objectives, including fuel reduction, habitat management, forest regeneration and the management of scenic values.

3.2 (continued)

According to management objectives, approriate prescriptions will be developed, and staff will be trained in their application.

Monitoring of the effcts of fires will be undertaken wherever effective systems have been developed and resources are available.

3.3 Liaison Arrangements

The Department will participate in the preparation and implementation of Local Authority District Fire Plans and interagency agreements.

Departmental staff will attend Bush Fire Advisory Committees and Brigade meetings where appropriate, to foster and encourage good working relationships with other fire fighting organisations.

Where practical, Departmental staff will assist with fire control activities on a neighbour to neighbour basis with local Bush fire Brigades and other fire control organisations.

3.4 Public Awareness

Education of the public on the prevention of wildfire and on use and role of planned fires will be promoted through the provision of literature, films and talks. Special attention will be directed towards school groups.

3.5 Research Priorities

The Department will undertake research and will encourage research by other agencies and institutions into the fields of:

(1) Fire Behaviour in major vegetation types;

(2) Fire Ecology;

(3) Fire Equipment development;

(4) The application of information technology to fire management;

(5) Fire detection, prevention and suppression systems;

(6) Remote sensing for fire mapping and detection purposes;

(7) Alternative methods of fuel reduction;

(8) Social aspects of fire prevention and arson.

3.6 Operations-Research Interface

The Department will ensure that there is a rapid transmission of research results into policy and operations. Research and specialist staff will help to develop and update operational prescriptions and monitoring systems.

The Department will sponsor relationships between its staff and other agencies or organisations concerned about fire by the publication of research findings, holding workshops and seminars, and public participation in management plans.

4. LEGAL ASPECTS

4.1 CALM Act

The attention of all officers is drawn to the following fire provisions of the CALM Act and Regulations:

- Penalty for unlawfully lighting fires - Section 46.
- Forest officers calling for suppression assistance - Section 47.
- Setting fire to bush without notice to forest officers - Section 48.
- Mill protection - Regulation 140.
- Responsibilities of licensees and permit holders - Schedules.

4.2 Bush Fires Act

All C.A.L.M. personnel involved in Fire Control must acquaint themselves with the Bush Fires Act (1979) and Regulations. A simple summary of the major sections of this Act is contained in the pamphlet Fire Law, provided by the Bush Fires Board of W.A.

The following sections of the Bush Fires Act are of particular significance.

Prohibited Burning Times and Restricted Burning Times	Prohibited and Restricted Burning Times Declaration
Service Notice to Burn	Regulations Part IV
Bush Fire Emergency	Section 21
Burning during prohibited and restricted burning times	Section 18 Regs. Part IV
Occupier of land to extinguish bush fire occurring on his land	Section 28
Disposal of Cigarettes and Matches	Section 30
Wilful Lighting of Fires	Section 32
Local Authority to Require Fire Breaks	Section 33
Burning of Crown Lands	Section 34
Executive Directors Authority to Require Firebreaks	Section 34 (2)
Appointment of Bush Fire Control Officers	Section 38
Duties of Bush Fires Control Officer	Section 38 (4)
Fire Weather Officer	Section 38 (6)
Special Powers of Bush Fire Control Officer	Section 39 (1) Section 59 & Regulations
Conditions when Forest Officers exercises authority of Bush Fire Control Officer	Section 39 (2) Section 45
Bush Fire Brigades	Section 41 - 44
Bush Fire Control Officer or Forest Officer may postpone lighting of fires	Section 46 (1)
Requests for Coroner's Inquiry	Section 49
Duties of Persons Discovering an Offence	Section 56
Obstruction of Officers	Section 57
Recovery of Expenses	Section 58 (3)

4.2 Bush Fires Act (continued)

Protection of Officers			Section 63
Advisory Committees			Section 67
Regulations	Part IV	Part VII	Part VIII

4.3 Prohibited burning times

The Bush Fires Act provides for a period each year during which the lighting of fires, except for certain specific purposes, is prohibited. The dates for the prohibited periods for different zones are published in the Government Gazette from time to time and District Managers should acquaint all personnel with the dates of local zone restrictions.

Provision is also made for this Department to obtain a suspension of the Prohibited Period to enable us to carry out protective burning and special purpose burning.

4.4 Suspension of the prohibited burning times

Applications for suspension of the prohibited burning season must be lodged with Protection Branch, Como, at least one week before the closing date of the Restricted Times. Except for special purpose burns, suspension will normally only be granted by the Bush Fires Board to enable burns already commenced to be completed.

4.4 (continued) The District Manager is required to submit applications for suspension through the Regional Manager and supported by the following information:

- Reason the suspension is required.
- Period for which the suspension is required (dates).
- Area of each job to be burnt.
- Prohibited burning zone for each job.

Maps showing each job area with fuel within the burn and for a 4km width outside the burn boundary. Values at risk in the event of an escape must be shown on these plans, e.g., farm crops, plantations, buildings etc.

Before submitting any request, the District Manager will be required to contact Local Authorities in which the proposed burns are located and obtain the endorsement of the Chief Fire Control Officer for the extension. This endorsement must be specified in the above application.

Where suspensions are requested for several jobs (e.g., karri regeneration burns) the application must show constraints imposed to avoid too many burns lit at once and over-commitment of forces.

4.4 (continued) Once Departmental requirements have been satisfied, Fire Protection Branch will arrange for the suspension through the Bush Fires Board.

The District Manager must notify the relevant Local Authority and Fire Protection Branch on the morning of each burn of the intention to proceed with the burn.

4.5 Fire notifications to local authorities

When illegal burning outside C.A.L.M. land boundaries is located, the Local Authority should be notified immediately by telephone of the fire's position and a record made in the office log book.

Fires reported to or detected by the Department which are outside CALM lands, will be reported to the Local Authority or appropriate Fire Control Officer for initial action.

Once a week, written advice using form CLM573 should be sent to the Shire Clerk listing all the fires located in their area during the week, including those already notified by telephone.

4.6 Prosecution by local authority

Where a breach of the Bush Fires Act occurs on private property outside the boundary of CALM lands, the Local Authority, which is charged with the policing of the Act, should carry out the prosecution.

CALM personnel may assist officers of the Local Authority to obtain evidence, but as far as possible should leave prosecutions to the local authority if the breach occurs on private property.

If the Local Authority is known to be taking legal action in any case, advice of this should be sent to Fire Protection Branch, Como without delay.

4.7 Failure by local authority to prosecute

Where a Local Authority fails to take legal action against flagrant breaches of the Bush Fires Act, particularly if there are several cases of such failure, immediate advice of the incidents, together with full details, should be sent to Fire Protection Branch, Como.

4.8 Fire investigation

In every case of a wildfire on C.A.L.M. lands the District Manager must take immediate steps to ascertain the cause. Where it is obvious that it is directly due to human agency, immediate steps should be taken to obtain more specific information concerning the identity of the offender with a view to possible legal action. Further detailed information is also contained in "Wildfire Cause Determination Handbook".

4.9 Coronial Inquiries

The circumstances under which a Coronial inquiry into the cause and origin of a fire may be found in Section 49 of the Bush Fires Act. Additional details are contained in Administrative Instruction No. 28 dated 23rd June 1987. This instruction also covers the procedures for reporting fires to the Police.

4.10 Legal Actions

District Managers must provide a prompt, comprehensive and accurate report on all fires or incidents associated with fire control likely to involve the Department in action to:

- Recover costs or damages from the Department, or
- Recover costs or damages by the Department.
- Where a Coronial Inquiry seems likely.

4.10 (continued) In either situation the District Manager will:

- Provide immediate advice of the event to the Region.
- Initiate an immediate investigation by the most senior officer available who is not directly connected with the incident.
- Follow-up with a comprehensive and objective written report to Fire Protection Branch and Region, no later than five days after the incident.

Rapid investigation and reporting is required to allow Departmental and SGIO assessors (if necessary) to gather evidence and appraise damage before the facts are obscured by the passage of time.

In all circumstances reports must be confined to statements of fact and are not to offer opinions or conclusions.

4.11 Fire Incident Report

The written report is to include the following information:

- Full name and address (for serving notices) of the owner or occupier of the land on which the fire burnt and details of property locations.

4.11 (continued)

- Where the Department is plaintiff, full name and address (for serving notices) of person(s) suspected of lighting the fire with a signed statement by them where possible.

- Where the Department is defendant, full details of where the fire escaped, or other explanations of what happened.

- Plan of the area showing origin of the fire, fire boundary and land tenure where the fire burnt.

- Circumstances of the fire or accident including the date, time of occurrence and when reported, source of escape (eg, hay-stack), cause, initial action by occupier or plaintiff and Department, subsequent action, sections of Bush Fires Act or other Acts infringed and costs incurred by the Department.

- Details of property damage and assess-ment of damage. When damage is extensive, the assessment will need to be carried out by the SGIO or other experts but should not hold up the report.

4.11 (continued)

- Proposed legal action (by a Local Authority or any other person) which is relevant to the incident and which is known at the time.

4.12 Legal Action Against the Department

Where a fire lit by the Department escapes into private property or the Department carries out any other action which causes damage, it is possible that legal action to recover the cost of damages may follow.

There are definite constraints on negotiations between the Department's staff and the plaintiff to ensure the Department's legal position is not jeopardized. These are based on:

- The Department's public liability insurance policy with SGIO.

- SGIO's sole perogative to decide the Department's legal liability for payment of claims under the policy. SGIO will make its own judgement on settlements and whether it is prepared to contest a claim in court.

- A claim for damages is unlikely to succeed in court unless liability can be proven.

4.12 (continued)

- Proof of liability depends on evidence of negligence or malpractice.

- Negligence or malpractice is unlikely to be demonstrated if accepted practices (such as those set out in this manual) have been implemented in a reasonable time and a responsible manner.

4.13 Dealings with Plaintiff

Staff and employees are not to make statements which can be construed as an admission inferring negligence or malpractice. In particular, they must not:

- Discuss circumstances of the fire or accident associated with fire control with the plaintiff or any other member of the public.

- Surmise, or in any way indicate to the plaintiff, or any other member of the public, that procedures or precautions were not fully observed. These judgements remain the perogative of the Executive Director and SGIO.

4.13 (continued) Dealings with the plaintiff will be restricted to the most senior officer available who may:

- Advise the plaintiff that the circumstances of the fire incident or accident has or will be reported to the Executive Director and SGIO;

- Refer the plaintiff to SGIO in respect to the fire incident or accident associated with fire control.

4.14 Legal Action by the Department

If there is reasonable justification, the Department will undertake action to recover the costs for suppressing illegal fires entering or lit on C.A.L.M. land, where the offender can be identified. The field report must clearly set out the basis of justification for recovering costs.

There are a number of legal avenues open to the Department for recovering costs. (e.g., Section 58 Bush Fires Act 1979). The procedure in each case must be decided on its merits and requires consideration by the Executive Director and Crown Law before any direct action takes place. Local action such as a direct approach to Local Authorities or landowners for fire fighting costs is to be avoided

4.14 (continued) except in circumstances where prior formal agreements on cost payments have been reached.

The Department has, for example, formal agreements to fight fires in certain areas on a recoup basis. Casual agreements for fire fighting may be entered into locally for reasons of urgency, but recoups should be arranged through Fire Protection Branch.

Cost of recovery action by the Department must not result in damage to its public relations and would be expected to provide a deterrent or warning effect.

In the case of costs recouped by the Department as a result of legal action, only direct charges i.e., wages and vehicle mileages or hours are admissible.

5. PUBLIC AWARENESS

5.1 Wild fire prevention through education

The most effective means of fire prevention is through education. The objective is to make everyone fire conscious, and to make the general public realise the value and necessity of fire control.

Special attention should be given to the training of the younger members of our society. Every effort should be made by C.A.L.M. personnel to introduce the subject of fire prevention into their local schools.

5.2 Fire danger signs

Signboards showing the daily fire weather forecast are an effective means of educating the travelling public. The information on the board must be kept up to date. Within Forest Regions signs are to display fire danger as defined by the Forest Fire Behaviour Tables.

The signs will conform with the national standards. See Appendix No. 8.

5.3 Pamphlets

Pamphlets giving information concerning fire effects, provisions of the Bush Fires Act, etc., are prepared as required by CALM and the Bush Fires Board from time to time, and should be distributed to neighbours, visitors and the public.

Personal discussions at the time these pamphlets are distributed are of considerable value. In addition, pamphlets may be sent with notification of intention to burn, or similar correspondence.

6. LIAISON

6.1 Bush Fires Board Liaison Officers

It is important that there be close liaison with the Bush Fires organisations, at district and regional level.

For large fires involving both CALM lands and private property, the Bush Fires Board will provide liaison officers to assist in co-ordinating the fire fighting efforts between the Department's forces, Bush Fires Brigades and any other organisation helping to suppress the fire.

A service is provided to Local Authorities and volunteer bush fire brigades by the Bush Fires Board Liaison Officers comprising advice, co-ordination and planning oriented towards fire prevention and fire suppression activities.

The Bush Fires Board also provides a regulatory and advisory service to industry concerning the safe disposal of industrial waste by burning. This includes all saw-mills, gas and oil flaring, mineral sands, superphosphate industries and rubbish disposal.

6.1 (continued) Liaison Officers attend Local Authority advisory committee and brigade meetings to advise on district fire problems, assist with organisation and execution of developmental burning, provides instruction and advice on aspects of bush fire legislation, arranges local training sessions and seminars, identifies fire hazardous areas and organises local volunteer brigade effort. They provide advice, command communication facilities and co-ordination at large fires.

6.2 Shire Bush Fire Advisory Committee

Regional and district managers should ensure that every effort is made for the department to be represented at all Local Authority Bush Fire Advisory Committee Meetings. Information concerning our past and programmed burning as well as arrangements for mutual assistance and training, where applicable, should be discussed with the committee.

6.3 Bush Fire Brigades

Close liaison with Fire Control officers and Brigades is essential. When the opportunity arises, CALM personnel are encouraged to become closely involved in local Bush Fire Brigade activities.

6.4 Department assistance for fires on private property and Vacant Crown Land

When Departmental assistance is requested to suppress fires which do not threaten CALM lands, the following policy will apply:

- Assistance can only be given when it will not prejudice other Departmental commitments.
- Assistance on a neighbour to neighbour basis should be the keynote of decisions to provide help.
- Assistance should only be given following a request through the Chief Bush Fire Control Officer or, in the event of such officer not being available, through a responsible Local Authority officer or senior Brigade Officer. Requests from individuals will be discouraged in all cases except where life or property is threatened or where there are breakdowns in communication within the rural fire organisation.

6.5 Recoup of Costs

Assuming local fire brigades have been fully committed, circumstances will then decide whether recoups are warranted.

Where a recoup is proposed, provide early advice of the details to Fire Protection Branch.

6.5 (continued) Where special protective burning is done at the request of a Government Department or other organisation and costs are to be recouped, Fire Protection Branch will issue a Recoup Works Order. The District Manager will be responsible for ensuring costs for such burns are accurately recorded and returns are forwarded promptly to Fire Protection Branch.

6.6 Burning of lands other than CALM Lands

The Department undertakes prescribed burning of Crown Lands other than on land under its control on behalf of other Government and Land Management organisations. Where formal arrangements have been made (e.g., Interagency Agreements), it can be assumed the Department has been vested with the necessary authority to burn the area.

6.7 Approval required to Burn "Other" Lands

Where no formal arrangements exist, the Department or its staff have no legal authority to burn these lands without the written approval of the organisation concerned. This provision extends even to areas of unvested Vacant Crown land.

6.7 (continued)

The District Manager is required to check each year's burning programme and list reserves or areas vested in other organisations which should be included. The following information is to be forwarded each year, before the 1st July, to Fire Protection Branch, Como, to obtain the necessary approval:

- Reserve number (if applicable) and area to be burnt;
- Owner or occupier of the reserve or land;
- Map reference for the reserve or land;
- Proposed season for burning;
- Reason for burning.

6.8 Burning road verges

Before any burning on road verges takes place, permission from the controlling authority must be obtained.

Main Roads: Proposals are to be submitted through the Region to Fire Protection Branch for approval by the Main Roads Department Environmental section.

Local Authority Roads: District Managers are to obtain approval from the Local Authority concerned.

6.9 Westrail locomotives

It is the policy and practice of Westrail to fit all locomotives with spark arresters during the summer months. CALM officers have no authority to stop or inspect any locomotive suspected of being faulty, however, District officers must maintain close liaison with local Westrail officers in all matters of fire prevention.

Any fire suspected of having been lit by a locomotive should be reported immediately by the District Manager to the local Westrail Distict Engineer together with the following information:

Number of the locomotive
Locality
Date and Time
Direction of travel
Any other relevant information.

6.10 S.E.C.

To minimise the risk of fires from powerlines, close liaison with the S.E.C. must be maintained in all matters of fire prevention.

Where a fire has started from or threatens a powerline, the S.E.C. must be notified immediately.

6.10 (continued) The locality of all Telecom and S.E.C. lines in CALM Lands and other areas where the Department is carrying out prescribed burning must be recorded on plans for easy reference when programming burns. Where lines are not adequately protected, the organisation concerned must be given ample notice of proposed burns, as this Department may otherwise be held responsible for damage.

Any accident or incident concerning high tension powerlines is to be reported immediately by the District Manager to the nearest S.E.C. office, Regional Manager and Fire Protection Branch.

6.11 Responsibilities of sawmill owners — The District Manager is to ensure sawmill owners comply with fire control provisions of the sawmill permit document and that all sawmills conform to requirements under Section 25.1(g) of the Bush Fires Act.

6.12 Road signs — Road signs warning the public shall be erected on roads around or within areas to be burned. Refer to paragraph 9.7 (Prescribed Burning-Notification).

6.13 Public warnings

The need to publicise the locality of extensive aerial burns to travellers and other CALM land users for the sake of their safety and welfare cannot be overemphasised. District Managers should ensure that the procedure of public warnings through the local radio stations is followed. The procedure is to be reviewed and arranged by the Fire Protection Branch at the commencement of each fire season.

7. PRE-SUPPRESSION

7.1 Planning for fire control

All systematic fire control depends on advance planning. The planning unit to which separate plans are required range from single Reserves on Forest Blocks, through to District and Regions, upto Departmental and Statewide.

7.2 Protection Plans

Plans for individual Reserves, National Parks or Forest blocks are covered either by Area Management Plans, or Interim Guidelines for Necessary Operations including Fire Protection. District level plans for fire protection are covered by District Fire Control Working Plans (FCWP's).

Planning for CALM lands must be done in association with those plans developed for other lands such as Vacant Crown Lands, Local Authority Reserves, Private Property etc. These areas are normally catered for by the Bush Fires Board, District Fire Protection Plans or Special Zone Protection Plans.

7.3 Requirement of Plans

There are several needs that require advance planning of the fire organisation and its facilities. The most common cover the the need for:

7.3 (continued)

- maintain readiness to attack a fire at any time and any place within the protected unit;

- flexibility for the organisation to respond to wide fluctuations in the size and nature of fire fighting jobs from day to day;

- rapid and effective action in high value, vulnerable areas;

- establishing quick and reliable contact with fire fighting and wildfire organisations, for resources, supplies, welfare, communications, back-up forces etc.

7.4 Content of Fire Protection Plans (FCWP)

The District FCWP's consist of the following sections designed to satisfy the above-mentioned needs:

(i) Objectives - describes the values to be protected; the protection objectives; the standards to be achieved; and the strategies to be adopted.

7.4 (continued)

(ii) Planning Measures - includes the following: Data maps, Master Burning Plans, Detection and Communication facilities, training programmes, liaison arrangements, officer responsibilities in District and Large Fire Organisations, Routine reports;

(iii) Action Measures - includes the important Suppression Standing Orders in the event of fires;

(iv) Inventory of Resources - including manpower, equipment, and outside organisational resources.

Appendix 4 shows the proforma for the layout to be used by all Districts.

In planning for Fire Control it has been found necessary to divide Regions into several zones indicating the degree of fire protection.

7.5 "A" Zone

This will comprise all land on which fires will be attacked as soon as they become known.

7.6 "B" Zone

This will include land on which protection is provided by prescribed burning and where suppression of uncontrolled fires may be delayed when commitments on Zone "A" or "P" require the postponing of immediate attack.

7.7 "P" Zone

This will comprise areas on which exotic or indigenous species have been established, areas cleared or partcleared awaiting planting, areas under regeneration, paired catchments or other nominated areas. Where necessary a protective buffer should be provided, not less than 1km in width.

"Priority" P zone fires will be attacked as soon as they become known. They will be given precedence for fire attack and will be defined for planning and fire suppression action. Despatch action for each of these areas will be detailed in District standing orders under the title of Red Action Order (see Prescription Section 9.1).

The boundaries of these zones will be reconsidered annually by the District Manager and where necessary, will be revised after discussion with the Regional Protection officer.

7.7 (continued) All fire reports dealing with damage to the forest will refer to the area in terms of these zones.

7.8 Town Protection Zones

Experience indicates that the effective width of a strategic fuel reduced buffer needed to contain a high intensity wildfire in the forest, is a minimum of 3km. However, where long-range spotting is likely to threaten very high community values (eg, towns, settlements) the effective width needs to be increased to about 6km. The optimum town protection low-fuel buffer system in forest communities needs to have a 3km radial buffer where fuels are maintained at less than 7 tonne/ha in jarrah, and 15 tonne/ha in karri fuels. In addition an outer buffer system should be maintained which extends 6km to the northern quadrant and 4km in the southern quadrant. The fuels in the outer buffer should be maintained at less than 9 tonne/ha jarrah on 19 tonne/ha in karri.

The buffer limits for protection of towns adjoining non-forested vegetation types can be reduced considerably due to the reduction in fire intensity and long-distance spotting associated with these scrub dominated fuels.

7.8 (continued) Effective town protection buffers should be not less than 500 metres and scrub fuel quantity limits should be 8 tonnes/ha in this zone.

7.9 Large Fire Organisation The Departmental booklet "Fire Suppression Organisation" sets out the roles and responsibilities of all the staff functions in District level fires, large fires and Campaign size fires. District Managers and Regional Managers must ensure that all their staff are aware of their designated roles and are given adequate, effective training in their implementation.

7.10 Fire Suppression Staff Accreditation District Managers, Regional Managers and Protection Branch are responsible for preparing and checking staff accreditation lists for approval by Protection Branch. The lists are to be used to identify training needs, and determine requirements for assigning skilled staff to Large Fires and Campaign Fires.

8. FIRE PROTECTION SERVICES

8.1 Fire Weather Forecasting

Weather forecasts are distributed during the fire season to centres within the three Forest Regions directly from the forecasting service via the Departments computer network. These are provided daily at 0745 hours, and amended at 1000 and 1300 hours, with an outlook at 1600 hours.

Spot forecasts will be provided by telephone from the forecasting service on request. The location for which the spot is required must be defined by the Grid reference on the Weather Forecast Area plan.

To assist the preparation of and verification of forecasts, selected weather observations are required at 0700 hours, 0900 hours, 1200 hours and 1500 hours from nominated stations. Weather forecasts for areas outside the forest regions can be arranged through Protection Branch.

8.2 Fire Danger Calculations

The Fire Danger Index must be calculated for for each major forest type in each District using the 0745 hours forecast and updated with the 1000 hours amendments. This will provide the basis for all fire control planning and should be displayed prominently at the District Centre.

District Managers should ensure that all staff with fire control duties are trained and fully conversant with the use of the Fire Behaviour tables and computer fire system: Refer to Forms CLM 646 and CLM 647 for Manual Daily Calculations. This is to ensure all days suitable for prescribed burning are utilized and suppression operations are conducted safely and efficienctly.

8.3 Aerial Detection System

Early detection and accurate location of fires is paramount to successful fire suppression. The detection system in the three Forest Regions is provided by a combination of spotter aircraft and lookout towers. Adequate tower or aircraft coverage in these areas is to be maintained when FDI is greater than 20. In other areas the Department will continue to rely on traditional source of fire reporting.

The Department employs managers, pilots and aircraft to cover surveillance circuits between Walpole and Mundaring.

8.3 (continued) Regional and District Managers have the prime responsibility for ensuring proper functioning of the detection system, and that standards are maintained. District Managers will be responsible for day to day supervision of pilots covering the District circuits and ensure that pilots are properly briefed and provided with Daily Work Sheets.

The District Duty Officer should endeavour to fly the local circuit at least once a week to check hazardous areas and to provide on-job training in detection standards for the pilot. The District Manager is to ensure field staff are trained in aerial detection systems and be familiar with the Aircraft Operations Manual.

The District Manager is responsible for ensuring a Search and Rescue Watch is maintained whenever an aircraft is working on Departmental operations in the District's area. The pilot will call on taxiing from the airstrip, take-off, landing approach, after landing and at half-hourly intervals during flight, giving "operations normal" and position. The calls must be acknowledged and recorded in the daily log book.

8.4 Search and Rescue Watch

Search and Rescue (SAR) procedures must be prominently displayed at each District Office and base centres. District Managers are responsible for ensuring all staff, including clerical and weekend staff, and pilots are fully familiar with these instructions. See Appendix 9.

8.5 Tower Detection

Departmental fire lookout towers are categorised as follows:

(a) Operational Towers: these are manned continuously throughout the fire season.

(b) Key Towers: to be maintained and equipped for immediate use in an emergency situation.

(c) Back-up Towers: are to be maintained in a serviceable condition and equipment for manning to be on hand at District Headquarters.

(d) Non-Functional Towers: these include non maintained and condemned structures. District Managers are to ensure that the climbing facilities are not available to the general public.

8.5 (continued) Towers must to be maintained in good working order District Managers shall arrange for the annual inspection of all operational towers to ascertain what repairs are necessary and to see that the area around all towers is clear of debris.

The District Manager will ensure that equipment for operational and key towers is installed and working at the beginning of each fire season.

When the tower is manned District Manager will arrange for towers to be visited at regular intervals, and any officer carrying out an inspection should satisfy themselves that all equipment is being correctly handled and cared for and the tower log book properly maintained.

Inspecting officers should initial the log book on the day of their visit.

The equipment required in the tower is shown in Appendix 5.

Prior to the fire season the District Manager will ensure that an adequate number of towerpersons are suitably trained and is available when required.

8.5 (continued) Each towerperson should possess the qualifications set out in Appendix 5 and should be tested for them prior to the start of the fire season.

8.6 Communication System

Effective means of communication are vital, to fire control as well as the successful administration of the Department.

District Managers must ensure that all staff and crewleaders are trained and fully conversant with the proper use of the fire control communications system. The District Manager should maintain close liaison with Communications Branch to ensure the radio equipment is in good effective working order. District staff should refer to the Communications Section of the CALM Manual for information on the radio equipment and procedures.

Spotter aircraft are equipped with radio telephone for communication with District officers and with VHF for around the fire communication. Spotter VHF radios are equipped to act as mobile repeaters in emergencies.

Where the use of radio from point to point around the fire proves to be difficult, portable repeaters and portable radios are available through Communications Branch.

9. USE OF FIRE

9.1 Prescribed Burning on CALM Lands

Prescribed burning can be used to achieve a wide variety of land management objectives, for example:

1. Fuel reduction for wildfire control.
2. Hardwood regeneration.
3. Clearing burns for plantation establishment.
4. Tops disposal for protection of standing crop trees.
5. To achieve ecological objectives e.g., habitat management.
6. For the study of fire effects and fire behaviour research.

There are several standard burning practices available to achieve the required burn objective.

9.2 Types of Burning

Buffer Systems

- High Risk: Buffer burning of strips or firebreaks around areas, to contain fires within areas where they frequently occur, eg, external boundaries, railway lines, main roads, and certain areas of private property.

9.2 (continued)

- High Value: Buffer burning of strips or firebreaks around areas, to keep fires out of places such as sawmills, schools, townsites, isolated settlements, plantations, research areas, regeneration, recreation etc.

- Strategic Strips: These are located to limit the extent of wildfires to an acceptable size. These may consist of narrow low fuel strips within two parallel mineral earth firebreaks or may be achieved by narrow wind driven fires.

Broad Area

- Prescribed burning of large areas on a rotational system to minimize the impact of wildfires on forest values (eg, timber) and facilitate the control of wildfires. The application of this system depends on the burn objective, the rate of fuel build-up together with seasonal weather, manpower availability and other local circumstances.

Advance Burning

- Prior to logging operations, for the protection of the residual stand and the safety of the logging crews.

9.2 (continued)

Slash Burning

- For regeneration or hazard reduction, following logging operations.

Under Pine Canopy

- Burning under Pine canopy around areas of high risk and for the purpose of sub-dividing extensive plantation areas to minimise loss in the event of wildfires.

9.3 Planning

Master Plans

District Managers must draw up prescribed burning master plans wich will be reviewed annually. These plans will show areas which will be burnt, the year and season of proposed burn, and preferred rotation length. The plan must show those areas which are not to be burnt, and must be protected for various reasons.

Rotation length of areas to be burnt for protection of community and environmental values will depend on the average rate of fine fuel accumulation for each fuel type, unless defined management objectives dictate otherwise for a particular area. As the Departments suppression organisation can be expected to handle wildfires in fuels up to 8 tonnes/ha in Jarrah fuel types and up to 19 tonnes/ha in Karri fuels, and 6 tonnes/ha in

9.3 (continued) Heath fuels, these should generally be used as the criteria to decide rotation length for designated fuel-reduced buffer zones.

Annual Plans

The District Manager shall draw up a current burning plan each year setting out the proposed programme, and must ensure that environmental conditions can be met by completing the form CLM 32 for each job.

Prescription and preparation for burns in all areas susceptible to dieback disease must be completed during the dry summer months before 1 March each year, to maximise hygiene.

Areas to be Protected

Except for those areas where specific approval for burning has been obtained from S.O.H.Q., complete protection will be afforded to:

"No Planned Burn Areas" as specified in Management Plans and Interim Guidelines for Necessary Operations.

Karri tops or scrub-rolled areas being held for regeneration burning and areas programmed for cutting within three years.

Regenerated hardwood areas where tree saplings or poles have sufficient bark thickness to withstand mild intensity fires.

Areas required for research and investigation.

9.4 Aerial Burn Plans

All aerial burn proposals are to be shown on a 1:50,000 plan with job numbers and areas. These plans will be used to provide:

(a) Detail to the Department of Agriculture for the benefit of beekeepers, SEC for powerlines, and the W.A. Water Authority for catchment areas.

(b) Fire Protection Branch for record purposes.

(c) Mapping Branch with necessary information for the preparation of flight plans.

9.5 Burn Proposal Advise

Proposals for all types of burns must be submitted, after vetting by the Regional Protection Officer, to the Fire Protection Branch by the following dates:

- Pine Plantations - 15 March
- Forest Regions, National Parks & Nature Reserves - 15 May

9.6 Prescriptions

A written prescription is to be prepared for each individual burn. Job specifications have been prepared describing the methods of fuel sampling and proper recording for the prescription form, i.e.:

CLM 763 for forest and woodland

CLM 657 for clearing or regeneration burns

These specifications should cover each phase of the operation, i.e.:

Fuel assessment and burn prescriptions

Preparation of boundary roads

Edge burning

Main burn ignition and mop-up

Post burn assessment

Preburn and Environmental Check

During the inspection and when prescriptions are being prepared, all values which may suffer damage must be identified and action taken to ensure their protection. The location of anything liable to be damaged must be recorded on the Pre-Burn Checklist (CLM 32) so that protection is not overlooked.

9.6 (continued) The District Manager is to ensure prescribed burning conforms with all required environmental standards, for those factors listed in the environmental checklist (CLM 32).

Disease Risk Areas

In Disease Risk Areas (DRA) road preparation will be restricted to log removal and slashing or brushing litter from dry safe road surfaces. No grading is to be carried out in these areas without an approved 7-Way Test.

Rare and Endangered Species

Check records and maps for known locations of any rare and endangered species. Where operations cannot be modified to avoid these locations, Ministerial approval must be obtained before proceeding. Departmental Guidelines on how to request Ministerial approval "To Take" rare flora are available from Wildlife and Land Administration.

Prescription Guidelines

Prescriptions for fuel reduction burning will be based on 1:25,000 scale API plans where available.

9.6 (continued) Preparation of burn prescriptions should follow guidelines set out in job specifications "Measurement of Forest Fuel Quantity". Appendix 6, and "Preparation of Burn Prescription".

The prescription must nominate the number of lightings and fire danger index, including edging for each job.

The number of lightings in each burn will be decided from the range of vegetation types and fuel quantities in the area. Where fuel quantity range is sufficient to introduce a variation in fire danger index of 10 m/hr or more, two lightings should be prescribed. The fire danger index prescribed for any one lighting should be within a range of 4 m/hr. e.g., 20-24 m/hr.

The following guidelines apply to forest areas:

Flats should be burnt at FDI	12 to 18 m/hr
Saplings over 5m in height	14 to 20 m/hr
Poles	20 to 26 m/hr
Mature trees	28 to 36 m/hr

9.6 (continued) The prescribed conditions for burning an individual area will be decided by the primary land use objective for that area. Where timber values and preservation of flora and fauna are paramount, the following limits will apply:

(1) **Jarrah Forests:**

Burn coverage in the range of 60 to 80% with minimal crown scorch to dominant trees.

(2) **Karri Forest:**

Burn coverage in the range 60 to 80%. Up to 10% scorch in small areas.

(3) **Heath and Forest Flats:**

Burning to create a mosiac pattern giving 40 to 60% cover.

(4) **Low Forest and Open Woodlands:**

Burn coverage in the range 60 to 80% with up to 30% scorch.

(5) Where fires are specified for a particular management objective, the desired fire intensity and level of acceptable damage must be defined in the prescription.

Soil Dryness Index (SDI)

Soil Dryness Index must be calculated at District Headquarters and used for planning operations such as prescribed burning. The limits to be observed are :-

S.D.I. Upper Limits		Fire Operations
Spring	Autumn	
250	S.D.I. to fall by 500 units	Tops disposal, flammable flats, under pine burning, jarrah edging, thinning debris under karri regrowth.
600	S.D.I. to fall by 500 units	Fuel reduction burning - northern and eastern jarrah forests and wandoo forest
700	S.D.I. to fall by 400 units	Fuel reduction burning - southern jarrah forest, karri forest types 3 and 6
800	S.D.I. to fall by 400 units	Fuel reduction burning - karri types 1, 2, 4 and 5. Karri regrowth stands (12-20 years) dry enough to burn

9.7 Notifications

The Department is required to observe provisions of Section 18 of the Bush Fires Act providing notification to neighbours of intention to burn. Notifications are to be given in writing on form CLM 243 at least four days before the burn, and dates for burning specified on the form are to be not less than 4 days or more than 28 days from the date of the notice.

9.7 (continued)

Permits

A permit to burn under Section 18 of the Bush Fires Act must be obtained to carry out any burning on all CALM lands other than State forest.

Beekeepers

In order that Beekeepers can plan their operations and protect apiary sites, the District Manager must ensure that individual Beekeepers affected by the burning programme are adequately forewarned.

Written notification on CLM 622 are to be sent to individual beekeepers before 31 August for spring burning and before 31 January for autumn burning.

Warning Signs

"Burning Imminent" signs placed three or four days before aerial burn.

"Prescribed Burning" signs placed from the start of all prescribed burns until patrol work ceases.

It is important that as soon as burns are completed or cancelled, that all warning signs be removed.

9.7 (continued)

Low Flying Notices

The Department of Aviation requires that approval be obtained from private property holders where aircraft operate over their land at heights below 460m. The form CLM 562 should be used for this purpose where private properties are close to aerial burning operations.

Specialist Officers

Specialist officers in research, inventory, mapping and wildlife etc., are to check burning programmes for their areas of work. Where burns are programmed in these areas, specialist officers will be responsible for checking burning programmes daily with the local District Office to ensure the safety of their staff.

Neighbours

When any burning is to be carried out by the Department within 3km of private property, notice of our intention to burn must be given on Form CLM243 to all adjoining landholders. (See Section 17 and 18 of the Bush Fires Act).

9.7 (continued)

Assistance to Neighbours

Districts are encouraged to assist adjoining landholders in burning, either on their own property or on other lands adjoining land vested in the Department.

Land holders must be informed that burning by the Department can only be done on private property following receipt of a written request. Any such request should be acknowledged in writing stating the landholders obligations. The landholder must be in attendance and should at least commence the lighting. Landholders must understand that future patrol is entirely their responsibility.

Local Authority Assistance

Where Departmental personnel are assisting Local Authorities by burning non departmental land at the Local Authorities request, a Fire Control Officer or a Bush Fire Brigade Officer must at least commence the lighting. It must be remembered that a C.A.L.M. officer has no legal protection when burning on other than CALM land unless written authorisation is obtained from the occupier and permits have been obtained.

9.8 Methods

Firebreaks Maintenance

An area prescribed for burning must be completely enclosed by firebreaks and cleared to mineral soil at least 3m wide or by a safe edge as approved by the District Manager. Such firebreaks will usually be roads or firelines, but may be effective fuel moisture barriers in mixed vegetation types. In the latter case, the burn must be completed at the earliest opportunity and should take precedence over any new job. Care should be taken to ensure grass is removed from firebreaks adjoining private property.

Area to be Burned

The area so enclosed must be completely burnt out before the following day, except where multiple lightings have been prescribed. No fires should be running out of control on the second day even "inside" the burn.

Checklist for Day of Burn

A Daily Burn Checklist (CLM 33) should be used by Burn Controllers to ensure that all aspects of the burn planning and implementation are considered.

9.8 (continued)

Job Selection

Selection of daily jobs must be based on the 0745 hours fire weather forecast. Local values for rainfall, wind, temperature and relative humidity should be used for calculating local fire danger. Operational spot forecasts are available on request. The forecast is used to determine the fire danger index (FDI) for the specific fuel types. The forecast FDI must be compared with the prescribed FDI for each ignition in each burn job, before the decision to proceed is made.

1000 Hours Check

The 1000 hours weather forecast and subsequent FDI calculation is to be the criteria for implementing prescribed burns. This check must be supplemented by measurements of temperature, relative humidity and fuel moisture content at the site of the burn and wind strength and direction from adjacent towers, or nearby headquarters or field meteorological stations. Any queries on the forecast should be referred to Fire Protection Branch, Como.

9.8 (continued)

Lighting Technique

The burn controller must calculate the least amount of fire to be put into the area to meet the objectives and standards set in the prescription. The general aim is to allow individual spot fires to burn through the day, and join up in the cool of the evening.

Modification of Lighting

The fire behaviour must be observed at each burn to see that prescriptions are followed. Lighting patterns must be varied or even stopped in the light of unexpected weather changes. Weather conditions, particularly wind, must be checked frequently and recorded. If weather changes require lighting to be stopped, immediate action must be taken to secure all edges with firebreaks.

Fire Units at Burn

A sufficient number of fire units including at least one heavy-duty unit must be in attendance at every burn except where otherwise directed by the District Manager.

9.8 (continued)

Mop-up

The perimeter of prescribed burns must be mopped up to the standard set out in "Fire Fighting Personnel Training Manual". Every officer and Crew Leader must become fully familiar with the mop-up standards and procedures.

Patrol must be regarded as a very important duty. It is essential that patrols are carried out daily until the edge is completely safe. Foot patrols may be necessary to check for dangerous burning trees likely to affect roads, railway lines, walking trails etc. The supervisor responsible for the burn should also be responsible for declaring the fire safe.

Post Burn Inspection

The District Manager is to arrange a reconnaissance of the burn to examine the results of the burn. The results of this inspection must be recorded in the Post-burn section of the Burn Prescription form CLM 763. From such examinations follow-up action will be decided.

9.9 Records

Recording Burns

The District Manager is to ensure proper records of prescribed burning are maintained.

Officers directly in charge of burning operations must mark on the plan in the District office each day, the area considered to have been burnt. These areas will not be finally 'washed in' on the District burning plan until they have been inspected and burned quality verified.

A summary of burning is to be prepared on a weekly basis. This summary is to be forwarded to the Regional Office and Fire Protection Branch by 1100 hours each Monday. The summary is to show:

Weekly and progressive total area (ha) of hand burning for season to date.

Weekly and progressive total area (ha) of aerial burning for season to date.

Burning plans must be updated daily, to show known progress of burning by brigades and other organisations in land adjoining Departmental lands.

9.10 Duties of Senior Burn Staff

Duties of Burn Controller

At each aircraft burn there will be a Controller who will direct the aircrew, markers and suppression crews. A Fire Boss will assist the Controller.

The Controller is to:

(1) Maintain liaison with officers responsible for aircraft movement and daily burn jobs.

(2) Ensure flight plans are prepared and that aircrew and markers are fully briefed.

(3) Ensure compliance with the pre burn check list CLM 32.

(4) Check the weather forecast and fire danger regularly.

(5) Consults with Burn Boss on objectives and strategies.

(6) Completes the Checklist for Day of Burn (CLM 33).

(7) Ensure that aircrew, markers and ground staff and crew are fully briefed.

(8) Ensure that proper post-burn inspection records are maintained.

Duties of Burn Boss

The burn boss reports directly to the Controller and is responsible for:

9.10 (continued)

(1) Directing aircraft and ground lighting and suppression crews in the implementation of the burn.

(2) Determining starting and stopping of lighting and the lighting pattern.

(3) Checking regularly the weather forecast, fire behaviour and burn progress and modifying lighting accordingly.

(4) Ensuring the burn is safe before departure.

9.11 Aerial Burn Operations

Regional Fire Protection officers, in consultation with District Managers, will be responsible for determining the daily aerial burn programme. This programme must be within the capacity of the aircraft and District resources to achieve the nominated tasks within the burning time available. Aerial burns should not be started when fire danger tables or aircraft availability indicates little chance of the burn being satisfactory completed on the day.

The aircrew will consist of Pilot, Navigator and incendiary machine operator (I.M.O.). The navigator directs movement of ground markers and reports on fire behaviour to the burn boss.

9.11 (continued)

Aircraft Performance

Guidelines on expected performance by aircraft in area coverage per hour are given in the Appendix 7. However a simple rule of thumb is to allow one hour per fifteen flight lines for an average size burn (3000 ha).

Flight plans

A flight plan must be prepared for all aerial burns. Copies of flight plans are to be distributed to aircrew, markers, suppression forces and controlling officers. Flight plans should show:

(1) the lighting pattern, (strip width, spot distances and flight line numbers).
(2) Distances to be moved by markers;
(3) Forecast and provision for weather readings and fire danger calculations;
(4) Names and call signs of officers and crews;
(5) The Burn Boss and Controllers copies should show the location of suppression forces, equipment and areas where special protection is required, they should also show progressive weather data and fire behaviour. These should be retained for record purposes.
(6) Navigators plan should show ground features obvious from the air.

9.11 (continued)

Beacon Marker Vehicles

The Regional Fire Protection Officer is responsible to ensure that all beacon marker vehicles in the Region are available and fully equipped at the beginning of each season.

The District Manager must ensure that the operators assigned to the vehicles are adequately trained and instructed to operate, service and maintain the equipment.

Beacon vehicles are not to be used under or near transmission wires. In addition to risks of an electrical discharge where beacon aerials are within close proximity to the powerlines, there is also the potential loss of signal strength.

Verey Pistol Usage

Verey pistols are used by crews marking strip lines for aircraft. Safety rules governing their use are contained in Bulletin 71 "Safety in Bushfire Control".

A copy of these instructions are to be displayed in chart form in each beacon vehicle.

Verey pistols may only be used by staff and employees who have been fully briefed and

9.11 (continued) authorised to use them and whose names appear on the Corporate Firearms Licence. For this purpose Districts must provide Fire Protection Branch, Como with the names of nominated operators not later than 1 September each year.

10. FUEL REDUCTION SOFTWOOD PLANTATIONS

10.1 Fire Management Plan

Fire management plans covering fuel reduced buffers, firebreaks, access, water points, etc. are to be prepared for each plantation. Specifications are given in Sections 16.025 to 16.035 of the CALM Manual on Pine Plantations.

10.2 Fuel Management

Fuel reduction can be achieved by:

- Grazing
- Prescribed Burning
- Appropriate Harvesting Method
- Mechanical Crushing of Debris

10.3 Grazing

Grazing as a method of fuel reduction has considerable application in all plantations. Lease specifications for Departmental plantations are to be compiled by the District Manager assisted by the Regional Grazing Manager. These leases will cover the fuel reduced buffer system wherever practicable. Management of stock, pasture and facilities will be the joint responsibility of the lease holder, District Manager and Grazing Manager. The objective for fuel reduced buffers will be to reduce grass height to an average of 30mm by 1st December each year. Regular inspections of leases should be carried out prior to this date to ensure the criteria will be met.

10.4 Prescribed Burning

Generally, prescribed burning in pine plantations will be confined to high risk areas and fuel reduced buffers. Approval will need to be obtained from the Regional Manager to burn areas outside designated buffer areas. Location and timing of logging proposals must be considered, to ensure there is no conflict between operations.

Rotational burning of the entire area may be considered for small plantations, or plots where normal detection and suppression arrangements cannot ensure a reasonable level of protection.

10.5 Proposals by 15th March

District burning proposals will be submitted for approval by the 15 March to the Regional Manager after vetting by Regional staff.

10.6 Burn Prescriptions

Burn Prescriptions, as described for hardwood burning, are to be prepared for each proposed burn in plantations. These burns will be carried out to meet stated objectives and under conditions which minimise risk of crown and bole damage. Other constraints are to be observed as listed below.

10.6 (continued)

- The minimum age at which burning can be undertaken in a pine stand will be determined by the time taken for trees to attain thick plated bark structure to 4m. Usually this is not before age 11 in either P.pinaster or P.radiata.

- No burning may be undertaken unless the fuel profile has first been completely saturated and is drying from the top. This requires a physical check before lighting commences at each burn. Surface fuel moisture reading must be taken before and during each burn.

Prescribed conditions for satisfactory pine underburning for both needlebed-only, or tops disposal burns are provided in the Forest Fire Behaviour Tables (1985) Table 7.9. Refer to "Radiata Pine Slash Burning Guide" for guidelines for tops disposal burning procedures under pine.

The Soil Dryness Index (SDI) should be used as a guide to recognizing the potential for fires to "re-burn", or for hardwood logs to smoulder. Unless Regional approval is obtained no burning is to be carried out at SDI grater than 250.

10.7 Recording of Plantation Burns

The following information will be recorded for each burn:

- Date, time of commencement and duration;
- Area burned and detailed costing;
- Weather and fuel conditions;
- Fire behaviour notes and results obtained.

As burning is completed, each area should be hatched and dated on Divisional records. At the end of each season a copy of this information is to be forwarded to Protection Branch, Como.

10.8 Logging Operations within Pine Plantations

All logging activities and other operations involving mechanical equipment must comply with the Fire Prevention section of the "Code of Softwood Logging Practise".

It is the responsibility of the District Manager to ensure that all staff and contract operators are instructed in and are familiar with the fire prevention sections of the "Code of Softwood Logging Practises".

11. FIRE SUPPRESSION

11.1 Fire Attack

The method of fire attack depends on a number of factors including values at risk, weather conditions, fire behaviour, men and equipment available, fuel type, topography, environmental constraints, e.g., dieback, fragile soils.

It is important to develop an aggressive attitude, but to keep options open.

The fire attack strategy may depend on constraints laid down in Fire Management Plans for each of the areas concerned.

Each Districts Fire Control Working Plan sets out the action required against fires according to the fire danger of the day.

11.2 Suppression Tactics

Guidelines and rules on fire suppression strategies and tactics are provided in the "Fire Fighting Personnel Training Manual", and the Booklet "Backburning".

The District Manager is responsible to ensure that all personnel likely to be involved with fire suppression must be instructed in and be familiar with the contents of this Manual.

11.2 (continued)

Irrespective of the strategy adopted, the safety of fire crews and equipment must, be given prime consideration. All those involved in fire fighting must be taught the principles of self protection and given detailed briefing at each fire, in the light of local circumstances and suppression strategies.

11.3 Action to be taken for Fire on or threatening CALM lands

The following sequence of action will be taken in the event of a fire on or threatening CALM lands:

a. Plot the fire;
b. Check values at risk;
c. Check fuel ages and suitable access;
d. Determine current and potential fire behaviour and development, and complete fire appreciation form CLM 613;
e. Despatch forces according to the local fire danger index and the guidelines in the Despatch Tables of the Red Book;
f. Adjust the despatch requirements accordingly to updated information of weather, fire, fuels and suppression progress;
g. Arrange advice as required to the Region and Fire Protection Branch;
h. Commence a fire diary recording the time and despatch action taken.

11.4 Fire Organisation

Set up a A Large Fire Organisation if the following situations occur:

(i) The rate of spread in forest fuels exceeds 140m/hr in forest fuels or 2500m/hr in Grasslands.

(ii) Three or more crews are committed.

(iii) When the District Manager considers it appropriate (eg, when District ressources are depleted).

Set up a Campaign Fire Organisation following discussion with the Regional Controller/Duty Officer and the Departmental Duty Officer. A Campaign Fire Organisation is likely to be required when values at risk include large numbers of people, assets and private property; where several other Government organisations and a large number of resources are required; where there is a high degree of interest from the public, Media and Politicians; where the fire control task is likely to be very large and last over several days.

11.5 Action by First arrival (Officer/Crew Leader)

Fire crew must proceed at a safe speed to the fire by the route nominated by the despatcher.

11.5 (continued)

On arrival at the fire the crew leader will:

a. Reports arrival;

b. Arranges for the protection of equipment and initiates suppression actions;

c. Conducts a reconnaissance of the fire;

d. Provides PAFTACC reports to headquarters;

P - Position of fire;

A - Area and details of fire size;

F - Fuel type in and around fire;

T - Time estimated to gain control of the fire;

A - Additional assistance required;

C - Cause, or suspected cause if known;

C - Communication arrangements.

e. Nominates Field Control Point and implements suppression strategies as directed by the Controller;

f. Arranges for escape routes on refuge areas are cleared and known by all crew.

g. Continues control of suppression forces until relieved;

h. Provides regular reports to headquarters on progress of the fire and suppression action;

i. Reports when the fire is safe and departure time of all crew.

j. Advises Control what further patrol action is necessary.

11.6 Fire outside CALM Lands

When a fire is detected on Crown Land or Private Property within 3km of land vested in the Department, action should be as follows:

- Advise the appropriate Fire Control Officer and Local Authority.
- Check whether the Department has been notified of intended "controlled" burning.
- Despatch suppression forces as the situation requires.
- Where assistance is requested, refer to section on liaison arrangements with private property owners.

11.7 Red Action

A Red Action is pre-determined set of despatch orders which ensure the automatic and appropriate despatch of resources from local and neighbouring districts to fire threatening designated high value areas.

District Managers are responsible for nominating and plotting the Red Action areas within these Districts, eg, pine plantations, karri regrowth and other areas of high value.

The buffer zone round the high value area will be included in the Red Action area. The Buffer will be wide enough to expect suppression activity to be successful before the fire enters the protection area.

11.7 (continued)

Red Action boundaries must be reviewed annually to take into account changes in values and hazards.

If a smoke is reported in the Red Action Area, a Red Action must automatically be called by the most senior officer present at the time in the District Office.

"Calling Off" a Red Action can only be authorised by the District Manager or the District Duty Officer.

Prior to the commencement of each fire season, orders are to be drawn up outlining the automatic despatch procedure that will take place within the District.

Automatic assistance from neighbouring Districts will be forthcoming. It is the responsibility of the Duty Officer in charge to ensure the neighbouring District is aware of its requirements under the red action orders.

These despatch orders will be prominently displayed near the co-ordination board with a copy kept in the Fire Control Working Plan.

11.7 (continued)

Annual training sessions will be arranged to familiarise staff and fire crews likely to be involved in Red Action procedures.

Familiarisation tours of plantations and high value areas should be carried out where necessary.

All Red Actions called are to be notified to the Region and Fire Protection Branch, SOHQ.

11.8 Large Fire Organisation

All fires controlled by CALM personnel involve the use of a standard chain of command structure of the specific organisational functions. The roles and responsibilities of all staff functions in the CALM fire organisation are detailed in the Departmental booklet "Fire Suppression Organisation" (FSO).

The booklet shows the chain of command and reporting channels for office and field staff; the duties of each function; and a checklist of tasks of each key role.

Also included is a standard Field Control Point layout for L.F.O.'s and Campaign Fires.

11.9 L.F.O. Training

Regional and District Managers are responsible for ensuring that each officer is trained in their nominated roles (including relief roles) in the fire organisations. Training must be planned for the beginning of each season, and should include "mock" exercises and "role playing" sessions, as well as practical training on prescribed burns and small fires during the fire season.

All staff should understand the command structure and reporting networks of the Large Fire Organisation.

It is the responsibility of every staff member prior to the start of the fire season to determine what specific role they are expected to fulfill, and to be fully aware of these roles and those associated with them.

11.10 Relief of Fire Fighting personnel

The relieving of all personnel, including officers at the fire and Headquarters, must be planned for. Award conditions must be complied with by those responsible for planning and implementing shift changes.

11.11 Mopping-up and Patrol

Mopping-up is the term used for the work done in rendering a fire safe after it has been brought under control.

Mopping-up means completely extinguishing burning material that might permit the fire to escape.

Detailed specifications for mop-up standards are contained in the "Fire Fighting Personnel Training Manual".

Mop-up operations are greatly improved by the use of fire retardant. The District Manager is to ensure heavy duty crews are trained in its use and that supplies are available at the fire. Patrol of the fire must be regarded as a very important duty. It is essential that patrols are carried out until the fire is completely safe. Foot patrols should be made, to check for dangerous burning trees. The fire boss is responsible for declaring the fire safe.

11.12 Identification at Fires

CALM staff at L.F.O.'s or Campaign fires involving outside organisations must wear the appropriate identification markings, eg, arm bands, shoulder flashes and vests in accordance with Administrative Instruction No. 17.

11.13 Fire Sources Recording System

Details on the procedures for the recording of personnel and equipment etc. at a large fire are provided in the booklet "Fire Resources Recording System".

11.14 Fire record to be maintained

A complete record of events, instructions and reports must be maintained for all fires. This may be in the form of a diary or appropriate recording forms and message sheets filed together in chronological order, once they have received attention.

Every item recorded must be dated, and the time of initiation and receipt entered, using the 24 hour clock. Later this provides a basis on which to conduct a fire review from which much vital information may be obtained.

A fire plan must be kept in conjunction with the written records.

All messages dealing with fires must also be recorded either in the office log or on message pads CLM 42. When message pads are used they will be treated as permanent records and are to show the action taken by the person to whom they are directed.

11.14 (continued) Messages should be written out before transmission by radio or telephone. This is particularly important for radio transmission, to prevent unnecessary traffic.

11.15 Fire Suppression Near Power-lines

Extreme caution must be exercised when fighting fires in the immediate proximity of powerlines. Jets of water must never be directed at powerlines. Avoid all contact with fallen powerlines. When powerlines are touching crashed vehicles or persons, keep clear until the area is declared safe by the emergency services.

If powerlines are causing sparks near a crashed vehicle but are not touching it, remove people from the vehicle and the vicinity quickly in case any spilt petrol is set alight. Any activity connected with powerlines is the responsibility of the SEC.

11.16 Emergencies Involving Hazardous Chemicals (HAZCHEM)

Any incident attended by CALM personnel in which hazardous chemicals have been spilled or are on fire must be treated with the utmost caution. Water can react violently and explosively when it contacts certain chemicals. District Managers are to ensure that all pumper operators are trained in and are aware of the HAZCHEM rules contained in "Safety in Bush Fires Control" Bulletin No. 71.

12 FIRE REPORTS

12.1 Fire Report Form CLM 304

At the first opportunity after a fire, the District Manager shall fill in the fire report CLM 304 while details are fresh in mind. A copy of the completed form must be forwarded to Protection Branch, Como within 14 days.

12.2 Initial Fire Reporting

Regional Offices are responsible for collecting Districts initial fire reports (CLM 660) by 0830 hours each weekday, and must relay these to Fire Protection Branch before 0845 hours on the day following the fire.

12.3 Running Fire Reports

All fires still running at 1600 hours must be reported to Fire Protection Branch, on weekdays and to the Regional Duty Officer on weekends and holidays, by 1615 hours of the same day. Information required as per CLM 660.

12.4 LFO and RED ACTION REPORTS Initial Notification

The District Manager or Duty Officer is responsible for immediate notification to the Regional Duty Officer and to Fire Protection Branch of any LFO or Red Action fire or a fire which may draw comment from the media, or a fire likely to cause claims for damages.

12.4 (continued) Outside office hours, the Regional Duty Officer is to be notified.

The initial report of a Large Fire Organisation or Red Action should include:

- Size of fire in hectare units;
- Location;
- Fuel type and amount;
- Values damaged or threatened.

12.5 Periodic Situation Reports

The Fire Controller is required to submit the completed Controller's Report - CLM 693 to the Regional Controller at 0700, 1430 and 1900 hours.

In turn, the Regional Controller must forward the completed Regional Report to the Departmental Commander by 0900, 1630 and 2130 hours.

12.6 Fire Appreciation Forms

Fire Controllers are required to complete the Fire Appreciation section of Controllers Suppression Guide CLM 613 in the initial stages of all LFO fires. This must be submitted with the Controller's Report (CLM 693) to the Regional Duty Officer (and there after by the Regional Duty Officer to the Departmental Duty Officer) at the times specified above.

Both forms may be transmitted by Vocafax.

12.7 Annual Fire Report

Immediately on the close of the fire season, but not later than May the 31st the Annual Fire Report CLM 753 and the annual summary of wildfires CLM 434, with the Fire Plan, must be forwarded to Fire Protection Branch, Como with a copy to the Region.

13. EQUIPMENT

13.1 Listing in Fire Control Working Plan

All sources of auxiliary manpower and equipment must be listed in the Fire Control Working Plan.

13.2 Pumper Unit Maintenance

The District Manager is responsible to ensure all fire units and vehicles are maintained in peak operational conditions during the fire season.

In the winter months units are to be correctly and safely stored and must receive regular maintenance.

Procedures covering summer and winter maintenance and storage requirements are set out in Circular 17/86.

13.3 Operator Training

District Managers must ensure that there are sufficient heavy duty operators who are fully trained in:

13.3 (continued)

(a) pumper and vehicle maintenance requirements.

(b) overall pump operation.

(c) procedures for use and care of all hoses.

13.4 General Fire Equipment Checks

At the end of the fire season all equipment is to be checked, repaired where necessary and any losses replaced.

13.5 Damaged Equipment

In the case of damage to fire units a report must be promptly submitted to Fire Protection Branch. This Department accepts no responsibility for any loss of non-essential personal items carried on Department vehicles and employees should be advised accordingly.

Procedures for the reporting and writing off of unserviceable equipment are outlined in the "Audit Manual".

Where theft is suspected, it must be reported to the Police.

13.6 Marking of Containers

Containers used and their identification must be as follows:

Petrol: Jerry-can containers or permanently mounted tanked painted silver with word "PETROL" in red, above a central red band.

13.6 (continued)

Repeater Avgas: 18L drum painted green with the words "REPEATER AVGAS" in yellow, on two sides.

Chainsaw fuel: Jerry-can container painted red with a central green band, and the words "CHAINSAW FUEL" in white, above the band.

Kerosene: Jerry-can container or permanently mounted tank painted silver with a central yellow band and the word "KEROSENE" in yellow, above the band.

Distillate: Jerry-can container painted orange with central white band the word "DISTILLATE" in black, above the band.

Oil: 18L drum painted yellow with a central black band and the work "OIL" in black, above the band.

Water containers are to be identified with the word "WATER" in large white letters on a black background. Drinking water must only be carried in jerry- cans. If the water is unsuitable for drinking, the container must be labelled accordingly.

13.6 (continued) No unlabelled containers are to be carried.

Plastic Containers

Crew Leaders are to ensure the plastic containers are not being used to carry flammable liquids, and regular checks are to be made to see this practice is avoided.

13.7 Carrying Petrol T.I.R. Regulations

The Timber Industry Regulations Act (T.I.R.) require that, except as provided in the following sub-clauses (a) and (b), a truck shall not carry liquid fuel whilst also conveying personnel.

(a) A truck carrying a fire-fighting unit may carry petrol in the fuel tank of the pump engine.

(b) For chainsaw or fire pumper operation, a truck carrying personnel may carry two leakproof metal cans of petrol, not above 23L capacity.

13.8 Ethyl glycol and permanganate

Ethyl glycol and permanganate crystals for incendiary ignition must not be carried on the same vehicle.

All containers must be securely fastened during transit.

13.8 (continued) District Managers must ensure that all staff, overseers and drivers are also familiar with the information outlined on page 22 of the Booklet "Safety in Forest Fire Control" (Bulletin No. 71).

13.9 Windproof and Waterproof Matches (Fusees) The following rules apply to fusee match use:

- Matches carried in vehicles will be stored in small metal containers with lids, eg, powdered milk tin or coffee tin, etc.

- Matches are only to be carried in essential fire vehicles.

- No matches to be struck within a vehicle.

- Matches are to be struck using a sweeping motion away from the body. Striking by "digging" into the striker plate greatly increases the risk of flying heads and must be avoided.

- Never attempt to strike dripping wet matches - dry them first.

All vehicles are to be regularly checked for compliance.

13.10 Maintenance of canvas hose

An annual programme of maintenance for canvas hose will be undertaken at the Collie Fire Store.

All 38mm canvas hose, whether unserviceable (U/S), on list or otherwise, will be sent to Collie, where testing and classification of hoses into four categories and couplings are painted accordingly.

Tested at 1725 kPa - yellow

Tested at 1035 kPa - white

Tested at 690 kPa - blue

Training hose only - black

At the beginning of the each season, hoses will be issued to Districts according to requirements. These requirements will be decided by the Fire Equipment Officer (Protection) and District Manager and will be assessed on numbers and classification of fire units, plantation and hardwood etc. This initial assessment will need to be carried out in the early winter.

Collie Fire Store will arrange:

(a) Write-off all U/S hose in bulk;

(b) A continued supply of replacement hose based on first-hand manual inspection of all hoses held by the Department.

13.10 (continued) In addition to the annual hose maintenance programme, the District Manager is responsible for ensuring hoses are properly maintained in the District, ie,

(a) Cleaned and dried after use;

(b) Stored in a clean and dry condition;

(c) Checked regularly for mildew or other deterioration;

(d) Hose is not painted;

(e) Hose is not contaminated by oils or paint etc.

13.11 Protection of Equipment at Fires

All equipment taken to the vicinity of a fire must be adequately protected.

Particular attention must be given to cleanliness of bulldozers working near a fire face to minimise chances of the machine catching alight. The chassis must be cleaned of trash and fuel or oil spillages at frequent intervals. Particular attention must be given to removal of trash accumulation around the sump plate, loose flammable material, eg, cleaning rags, must not be carried while the machine is on the fire face.

The bulldozer must be fitted with a chemical fire extinguisher (suitable for oil or diesoleum fires) at all times.

13.12 Vehicle Safety

Safety procedures involving vehicles at burns or fires are contained in the booklet "Safety in Bush Fire Control" Bulletin No. 71. All staff and employees must be fully aware of these procedures.

14. WATER SUPPLIES

14.1 Establishing Water Points

It is important that adequate static water points are available in the field for fire control.

In forest areas the objective should be to provide major points on a predetermined grid pattern.

In plantations they should be sufficiently close to allow a 20 minute turn-around of heavy duty units.

For all other areas, reliable water points should be established to ensure a satisfactory turn around, based on the values at risk and the availability of water and suitable access.

14.2 Location of Water Points

They should be placed as close to major access roads as possible. Access to water points should be sufficient to allow the safe turn-around of heavy duty units. Where possible the clearing should be surfaced to minimize the spread of dieback.

The location of all water points should be sign posted and mapped. Mapping Branch should be notified of any new water points established, so that master plans may be kept up to date for future inclusion in Departmental plans.

15. AIRCRAFT OPERATIONS

15.1 Aircraft Managers

The Aircraft Manager based at Fire Protection will arrange for the supply and maintenance of aircraft, initial training, rostering of pilots and flight checking. He will also ensure the provision of ancillary supplies, eg, fuel, and assist in maintaining and improving detection standards.

15.2 Department of Aviation Regulations

The Department of Aviation requires that approval be obtained from private property holders where aircraft operate above their holding at heights below 460m. The Form CLM 562 should be used for this purpose where

15.2 (continued) private properties are close to aerial burning boundaries. If forwarded by post a stamped self address envelope should be enclosed.

15.3 Aircraft Insurance

It is the responsibility of the District Manager to ensure that personal insurance has been arranged for all aircrew and passengers operating from there district. The procedure to be implemented is as follows:

(1) A list of personnel on aircraft flights is to be kept in each District office on SGIO Form 323 and filled in daily as required.

(2) Form SGIO 323 is to be kept on a monthly basis, from the 16th of each month until 15th day of the following month.

(3) The monthly forms are to be forwarded after the 15th day to State Operations Headquarters for the attention of Registration Branch.

(4) It is the responsibility of the District Manager to ensure forms are properly filled in and forwarded on time. If forms are not completed, personal insurance will automatically lapse.

15.4 Aircraft Passengers

The O.I.C. of aircraft base may authorise flights for passengers in the Department's aircraft providing they are employed by the Department and they are undertaking legitimate Departmental business, and insurance has been arranged.

Under no circumstances are passengers not employed by the Department to be carried without the prior approval of Fire Protection Branch Manager.

Passengers who are not employed by the State Government cannot be covered by the Department's insurance policy. These persons must provide evidence they have aircraft insurance before being eligible as passengers.

It is the responsibility of OIC's of aircraft bases to ensure pilots are properly briefed on the above requirements for carrying passengers and that requirements are observed.

15.5 Aircraft Hire

The Department of Aviation requires that all aircraft hired by CALM meet certain standards and conditions laid down in Air Navigation Regulations and Air Navigation Orders. Prior to hiring any aircraft for any purpose, staff

15.5 (continued) must ensure that they are aware of the conditions prescribed in Circular 13/86 dated 22/9/86 and abide by there instructions.

APPENDIX ONE

FIRE CONTROL PUBLICATIONS AND BOOKLETS

TITLE
Safety in Bush Fire Control (Bulletin No. 71, Revised 1986).
Fire Law (Published by Bush Fire Board summarizing Bush Fires Act.
Wildfire Cause Determination Handbook - Protection Branch.
Forest Fire Behaviour Tables of Western Australia - Sneeuwjagt and Peet (1985).
Fire Suppression Organisation - Sneeuwjagt and Vear (1987).
Code of Softwood Logging Practise.
Radiata Pine Slash Burning Guide - N Burrows (Fire Research Note 1984).
Fire Fighting Personnel Training Manual - Level 1.
Fire Resources Recording System.
Radio Communications Booklet.
Describing Forest Fires in Western Australia - A Guide for Fire Managers - N Burrows, Forests Dept. Tech. Paper No. 9 (1984).
Predicting Blow-up Fires in the Jarrah Forest - N Burrows, Forests Dept. Tech. Paper No. 12 (1984).
Guidelines for Slash Burning in the Karri Forest - R J Underwood, R Sneeuwjagt, D Haswell.
Soil Dryness Index for Use in Fire Control in South West of W.A. - Tech. Report No. 17 (1987).
Computer Fire System Overview - G van Didden, Fire Protection Branch 1985.
Forest Fire Management - Western Australia - R J Underwood, P Christensen - Special Forest Focus No. 1.

APPENDIX TWO

FIRE PROTECTION FORMS

TITLE	FORM NO.	AVAILABLE FROM
Staff Fire Attendance Record	CLM 070	Stores
Pre-burn Checklist	CLM 32	Stores
Checklist for Day of Burn	CLM 33	Stores
Fire Control Message	CLM 42	Stores
Fire Tower Inspection	CLM 48	Stores
District Fire Control Checklist	CLM 67	Protection Branch
Fire Attendance Record	CLM 70	Stores
Record of Aerial Burn	CLM 88	Protection Branch
Large Fire Organisation Chart	CLM 111	Stores
CLM Personnel and Vehicle/Plant Register	CLM 112	Stores
Non-CLM Personnel and Vehicle/ Plant Register	CLM 113	Stores
Sector Deployment Order	CLM 114	Stores
Fire Situation Report	CLM 115	Stores
Title Cards	CLM 116	Stores
Personnel Cards	CLM 117	Stores
Crew Cards	CLM 118	Stores
Vehicle Cards	CLM 119	Stores
Equipment Cards	CLM 120	Stores
Plant Cards	CLM 122	Stores
Brigade Cards	CLM 126	Stores
Aircraft Cards	CLM 127	Stores
Prescribed Burning Report	CLM 128	Stores

APPENDIX TWO (continued)

TITLE	FORM NO.	AVAILABLE FROM
Notification of Prescribed Burn (Adjacent to Private Property)	CLM 243	Stores
Towermans Daily Log	CLM 262	Stores
Fire Report	CLM 304	Stores
Annual Summary of Wildfires	CLM 434	Stores
Low Flying Aircraft Authorisation Paper	CLM 562	Stores
Confirmation to Shire Clerk Re: Fires outside State Forest	CLM 573	Stores
Fuel Assessment Sheet	CLM 576	Stores
Controllers Fire Suppression Guide	CLM 613	Stores
Recoupable Works Order	CLM 621	Stores
Notification of Prescribed Burns Affecting Apiary Sites	CLM 622	Stores
Fire Control Overtime Record Sheet	CLM 623B	Stores
Aerial Fire Surveillance Smoke Reporting Log	CLM 624	Aircraft Manager
Daily Moisture Content Record - Northern Jarrah	CLM 646	Stores
Daily Moisture Content Record - Karri and Southern Jarrah	CLM 647	Stores
Slash Burning Prescription	CLM 657	Stores
Initial Fire Report - Message to Protection Branch, SOHQ	CLM 660	Stores
Daily Aerial Fire Surveillance Flight Log Book	CLM 679	Protection Branch
Large Fire Organisation Controllers Report	CLM 693	Stores
Radio Message Form for Aircraft Hours	CLM 711	Protection Branch

APPENDIX TWO (continued)

TITLE	FORM NO.	AVAILABLE FROM
Environmental Protection During Prescribed Burning	CLM 713	Stores
Mount Soil Dryness Index - Monthly Record Sheet	CLM 715	Stores
Interagency Agreement - Hazard Reduction Burning	CLM 731	Stores
Annual Fire Report	CLM 753	Stores
Prescribed Burns - Other Lands	CLM 756	Protection Branch
Gang Unit Cards	CLM 762	Stores
Burn Prescription	CLM 763	Stores
Aircraft Unserviceability Report	CLM 785	Protection Branch
Weather Observations	CLM 788	Protection Branch
Fire Duties and Overtime Claim	CLM 790	Stores
Divisional Fire Control Record Sheet	CLM 791	Stores
Field Sheet - Aerial Report	CLM 792	Protection Branch
Flight Crew Record	CLM 793	Protection Branch
Cancellation of Prescribed Burn	CLM 795	Stores
Office Daily Log Book	CLM 815	Stores
Inserts for 815 (Aircraft Log - S.A.R. Watch)	CLM 815	Stores

APPENDIX THREE

GLOSSARY OF TERMS

ADVANCE BURN	:	A prescribed fire that reduces fuel through a forest area before felling operations to improve the efficiency of timber marking and harvesting.
ADVANCE MOP-UP	:	The pushing of logs and other heavy debris away from the burn perimeter before burning commences.
AERIAL DETECTION	:	A system for or the act of discovering, locating, and reporting fires from aircraft.
AERIAL FUELS	:	The standing and supported forest combustibles not in direct contact with the ground and consisting mainly of foliage, twigs, branches, stems, bark, and creepers.
AERIAL IGNITION	:	The igniting of fuels by dropping incendiary devices or materials from aircraft.
AERIAL OBSERVER	:	A person specifically assigned to discover, locate, and report fires from aircraft and to observe and describe conditions at the fire scene.
AERIAL RECONNAISSANCE	:	Use of aircraft for observing fire behaviour, values threatened, control activity, and other critical factors to facilitate command decisions on tactics needed for suppression.
ANCHOR POINT	:	An advantageous location, generally a fire barrier, from which to start constructing a fireline. Used to minimize the chance of being outflanked by the fire while the line is being constructed.
ANEMOMETER	:	A meteorological instrument to measure wind strength and expresses the result in speed per hour.
ANTI-CYCLONE (HIGH)	:	An air mass, in which winds swirl in an anti-clockwise direction around a high pressure area in the Southern Hemisphere.
A.P.I.	:	Aerial Photographic Interpretation. Relating to plans derived from aerial photographs.

ASPECT	:	The direction toward which a slope faces.
ATMOSPHERIC STABILITY	:	The degree to which the atmosphere resists turbulence and vertical motion.
ATTACK TIME = RESPONSE TIME	:	Elapsed time from the end of report time to the first organized attack; includes both get-away time and travel time.
AVAILABLE FUEL	:	The part of a fuel mass sufficiently low in moisture content to allow ignition and burning to take place.
BACK FIRE (BACKBURN)	:	The technique of lighting a fire to eliminate fuel by burning in front of an advancing wildfire.
BAROMETER	:	A meteorological instrument used to measure air pressure expressed in hectopascals.
BLACK OUT = DEAD OUT	:	The status of a fire when all phases of suppression, including the patrol phase, are completed.
BLOW-UP	:	A sudden increase in fire intensity and rate of spread, sufficient to preclude immediate control or to upset existing suppression plans; often accompanied by violent convection.
BOLE DAMAGE	:	Damage to the trunk of a living tree by fire, mechanical equipment or disease.
BROADCAST BURNING = BROAD AREA BURNING	:	(1) Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both. (2) Burning over an entire area.
BUFFER = FUEL REDUCED BUFFER	:	A strip or block of land on which the fuels are reduced to provide protection to surrounding lands.
BURNING OUT	:	Setting fire so as to consume islands of unburned fuel inside the fire perimeter.
BUSH	:	General term for all types of forest or woodland, normally applied only to indigenous forest.

BUSH FIRE ADVISORY COMMITTEE	:	A committee whose function is to advise a Local Authority on matters relating to preventing, controlling and extinguishing bushfires, firebreak planning, prosecution of offences, formation of brigades, ensuring co-operation and co-ordination of brigades and all other matters pertaining to bushfire prevention and control.
BUSH FIRES BOARD (B.F.B.)	:	The senior Bush Fire Control Authority in the State and is required to advise the State Government on measure which should be taken for prevention and extinguishing fires and to co-ordinate activities appropriate to these objectives.
BUSH FIRE CONTROL OFFICER (B.F.C.O.)	:	An Officer appointed by a Local Authority who controls the issue of permits to set fire to bush may impose additional pre-cautionary requirements during burning operations an may also take any such measures necessary to ensure prevention or suppression of fires.
BUSH FIRE EMERGENCY PERIOD	:	Where the Minister is of the opinion that where weather conditions are conducive to the outbreak or spread of serious bush-fires, or that such weather conditions are imminent, the Minister may declare a Bush Fire Emergency Period for a defined area of the State (Section 21B of the Bush Fires Act).
BUSH FIRE LIAISON OFFICER	:	An officer appointed by the Bush Fires Board to effect liaison between all fire prevention and suppression organisations and interests.
CAMPAIGN FIRE = PROJECT FIRE	:	A fire normally of a size and/or complexity that requires a large organis-ation and possibly several days or weeks to suppress.
CANOPY (DENSITY/COVER)	:	The foliage cover from crowns of trees in a forest; usually expressed in percentage of areas of the ground covered.
CENTRAL IGNITION	:	A method of broadcast burning in which fires are set in the centre of the area to create a strong draft; additional fires are then set progressively nearer the outer control lines as indraft builds up so as to draw them in toward the centre.

CHIEF BUSH FIRE CONTROL OFFICER (C.B.F.C.O.) : An officer of the local authority appointed to act as a direct link between the Council and the Fire Control Officer and Brigades and to act as Senior Bush Fire Control Officer within the Shire.

CLOUD COVER : The amount of sky covered or obscured by cloud, expressed in eighths. Eight eighths is complete cloud cover.

COMBUSTION : Consumption of fuels by oxidation, evolving heat, and generally flame.

COMPARTMENT : The basic administrative unit of a forest.

CONTAIN A FIRE : To take suppression action as needed, which can reasonably be expected to check the fire's spread under prevailing conditions.

CONTROLLED BURNING : See Prescribed Burning.

CONTROL A FIRE : To complete control line around a fire, any hot fires therefrom, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control lines; cool down all hot spots that are immediate threats to the control line until the line can reasonably be expected to hold under foreseeable conditions.

CONTROL LINE : A comprehensive term for all the constructed or natural fire barriers and treated fire edges used to control a fire.

CONVECTION COLUMN : Is the vertical uplift of a column of air caused by heating at its base. The height of this column can be arrested by a sufficiently deep upper air inversion layer.

CROWN FIRE : A fire burning through the crowns of trees in advance of the following surface fire.

CROWN SCORCH : Browning of the needles or leaves in the crown of a tree or shrub caused by heat from a fire.

CYCLONE (LOW) : An air mass, in which winds swirl in a clockwise direction around a low pressure area in the Southern Hemisphere.

DESPATCH : (1) The act of ordering attack units and/or support units to respond to an emergency.

(2) The implementation of a command decision to move a resource or resources from one place to another.

DIEBACK : The progressive dying, from the top downward, of twigs, branches or tree crowns.

DIEBACK DISEASE : In Western Australia, particularly applied to the effects of the root rot fungus Phytophthora cinnamomi (also dieback forest).

DIEBACK DISEASE RISK : The likelihood of introduction of Phytophthora cinnamomi to a locality by either natural or artificial spread.

DIEBACK-FREE FOREST : Forest apparently free of infection.

DIRECT ATTACK : Any treatment of burning fuel, for example, by wetting, smothering, or chemically quenching the fire, or by physically separating the burning from unburned fuel.

DROUGHT INDEX = SOIL DRYNESS INDEX : Is a measure of moisture content of heavy fuel such as logs and deep fuel beds. It indicates suppression difficulty and reflects the effect of long term past weather.

DUFF : The mat of undecomposed or partly decomposed vegetable matter on the forest floor, the original structures still being recognizable.

ECOSYSTEM : The interacting system of a biological community, both plant and animal, and its non-living surroundings.

EDGING = EDGE BURNING : A term used to describe perimeter burning of an area in mild conditions prior to large scale prescribed burning.

This practice is used to strengthen fire-break systems and to reduce mop-up operations.

ESCAPE ROUTE : A route away from danger spots on a fire; should be pre-planned.

EXTREME FIRE DANGER : The highest fire danger class.

FIELD CONTROL POINT = FORWARD CONTROL POINT : A selected location at or near a fire which provides co-ordination, control and communication between local and other authorities, and also for the sectors at the fire face.

FIRE : Is a chemical reaction between fuel, oxygen and heat. Heat is necessary to start the reaction and, once started, fire produces its own heat and becomes self-supporting.

FIRE BEHAVIOUR : This is a broad term encompassing the characteristics of a fire such as: -

Flame height
Rate of Spread
Flame depth
Scorch height
Spotting, etc.

FIRE BOSS : Responsible for directing and supervising all work on the fire face at the direction of the Controller.

FIREBREAK : Any natural or constructed discontinuity in a fuelbed utilized to segregate, stop, and control the spread of fire or to provide a control line from which to suppress a fire.

FIRE CONTROLLER : The person responsible for all fire suppression and service activities on a fire.

FIRE CONTROL WORKING PLAN : An operational plan defining procedures to be followed in the event of a fire and listing the resources available to attain suppression.

FIRE CREW : A general term for two or more fire-fighters organized to work as a unit.

FIRE DANGER : Fire danger is defined as a general term expressing the resultant of the fire danger factors which affect the chances of a fire starting, spreading, doing damage and the degree of difficulty in controlling the fire.

The main constant fire-danger factors relate to fuel, ie, type, quantity, size, arrangement, and inflammability; topography including aspect and access; ignition sources or risk; value of resources and the efficiency of the fire control organisation.

FIRE DANGER INDEX : The calculated maximum head fire rate of spread (in metres per hour) predicted from the weather factors (wind speed, temperature, relative humidity), fuel moisture content, standard fuel conditions (fuel type and quantity) and level topography.

FIRE DANGER RATING : A fire-danger rating system is a mathematical method of integrating the combined effects of a number of measurable weather and fuel factors into relative index numbers related to the chances of a fire starting, its rate of spread, damage potential and difficulty of suppression.

FIRE DANGER TABLES : A guide in the form of tables, establishing the values of the meteorological factors determining fire behaviour under known fuel and topographic conditions.

FIRE EDGE : Any part of the boundary of a fire at a given moment. NOTE: the entire boundary is termed the fire perimeter.

FIRE EFFECTS : The physical, biological, and ecological impact of fire on the environment.

FIRE HAZARD : (1) A fuel complex, defined by volume, type condition, arrangement, and location, that determines the degree both of ease of ignition and of fire suppression difficulty.

(2) A measure of that part of the fire danger contributed by the fuels available for burning.

FIRE HAZARDOUS AREAS : Those areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems.

FIRELINE : (1) That portion of a control line from which flammable materials have been removed by scraping or digging down to the mineral soil.

(2) A line cleared around a fire, generally following its edge to prevent further spread of the fire, generally following its edge to prevent further spread of the fire and effectively control it.

FIRELINE INTENSITY (BYRAM'S INTENSITY) : The product of the available heat of combustion per unit area of ground and the rate of spread of the fire. The primary unit is kilo watts per meter of fire front.

FIRE MANAGEMENT : All activities required for the protection of values from fire and the use of fire to meet land management goals and objectives.

FIRE PRE-SUPPRESSION : Activities undertaken in advance of fire occurrence to help ensure more effective fire suppression. Includes over-all planning, recruitment and training of fire control personnel, procurement and maintenance of firefighting equipment and supplies, fuel treatment, and creating, maintaining, and improving a system of fuel reduced buffers, roads, water sources, and control lines.

FIRE PREVENTION : Fire Prevention is the activity aimed at reducing or eliminating the occurrence of fires from any source other than the planned use of fire.

FIRE PROGRESS MAP : A map maintained on a large fire to show at given times the location of the fire perimeter, deployment of suppression forces, and progress of suppression.

FIRE PROTECTION : The activity aimed at reducing fire damage and aiding fire suppression.

FIRE REPORT : An official record of a fire, generally including information on cause, location, action taken, damage, costs, and so on, from start of the fire until completion of suppression action.

FIRE RETARDANT : A chemical preparation which when applied to fuels will suppress or retard combustion.

FIRE REGIME : The history of fire in a particular vegetation type or area including the frequency, intensity and season of burning.

FIRE RISK : The probability of a fire starting. Dependent on the presence of causative agencies and the likelihood of effective ignition.

FIRE RUN : A rapid advance of a fire front characterized by a marked transition in intensity and rate of spread with respect to that noted before and following the advance.

FIRE SCAR : (1) A healing or healed-over injury caused or aggravated by fire on a woody plant.

(2) The destructive mark left on a landscape by fire.

FIRE SEASON : The period(s) of the year during which fires are likely to occur, spread, and do damage to land values sufficient to warrant organized fire control.

FIRE, SPOT : Fire set by flying embers or sparks in advance of the main fire.

FIRE STORM : Violent convection caused by a large continuous area of intense fire; often characterized by destructively violent surface indrafts, a towering convection column, long-distance spotting, and sometimes by tornadolike vortices.

FIRE SUPPRESSION = FIRE CONTROL : All the work and activities connected with fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

FIRE SUPPRESSION ORGANIZATION : (1) The management structure, usually shown in the form of an organization chart, of the personnel collectively assigned to the suppression of a going fire.

(2) The supervisory and facilitating personnel so assigned.

FIRE TRAIL : A temporary, cleared narrow strip from which to counterfire or do prescribed burning.

FIRE TRAP : Any situation in which it is highly dangerous to fight fire.

FIRE TRIANGLE : An instructional aid in which the sides of a triangle are used to represent the three factors (oxygen, heat, and fuel) necessary for combustion and flame production. When any one of these factors is removed, flame production ceases.

FIRE WIND = INDUCED WIND : The inflow of air at the fire source caused by the action of convection and not to be confused with a prevailing wind.

The strength of these fire winds is proportional to the heat of the fire and the height of the convection column.

FLAMMABILITY	:	Is the susceptibility of the fuel to ignition and is closely related to its moisture content.
FLAME ANGLE	:	The angle of flame in relation to the ground caused by wind effect or slope effect.
FLAME HEIGHT	:	The average vertical height of flame on a given fire front.
FLANKING A FIRE = FLANKING FIRE SUPPRESSION	:	Working along the flanks, whether simultaneously or successively, from a less active or anchor point toward the head of a fire in order to contain the latter.
FLANK FIRE	:	Those parts of a fire's perimeter that are roughly parallel to the main direction of spread.
FLAREUP	:	Any sudden acceleration of fire spread or intensification of the fire or a part of the fire. Unlike blowup, a flareup is of relatively short duration and does not radically change existing control plans.
FLASH FIRE	:	A fast moving fire consuming most of the fine fuels available.
FOREST	:	A ecosystem characterized by a more or less dense and extensive tree cover. An area of land proclaimed to be forest under the CALM Act.
FOREST OFFICER	:	An officer of the Department of Conservation and Land Management designated as a forest officer under Section 45(1)(b) of the CALM Act 1984.
FOREST TYPE	:	An expression referring to the predominant tree species in a forest.
FUEL	:	Combustible material.
FUEL (FINE)	:	All fallen leaves, bark and twigs up to 10mm diameter and all the dead understorey of shrubs and plant growth present. Fuel in the form of branches, limbs and logs are not usually considered in fuel weight calculations since this heavier material would not directly affect the forward rate of spread of the head fire. As the intensity of the fire increases added fuel in the form of green foliage may become part of the fuel.

FUEL AGE	:	The period of time lapsed since last burn.
FUEL ASSESSMENT	:	The means of calculating total and available fuel present in a given area.
FUELBREAK	:	Generally wide (20 to 300 meters) strips of land on which the native vegetation has been permanently modified so that fires burning into them can be more readily controlled.
FUEL MANAGEMENT	:	The act or practice of controlling the flammability and reducing the resistance to control of vegetation fuels through mechanical, chemical, or biological means, or by fire.
FUEL MODIFICATION	:	Any manipulation (eg, lopping, chipping, crushing, piling, and burning) of fuels for the purpose of reducing their flammability.
FUEL MOISTURE CONTENT	:	The amount of water in liquid and vapour form present in fuels and is expressed as a percentage.
FUEL PLAN	:	A plan showing areas of varying fuel quantities and types and usually indicates past fire history.
FUEL PROFILE	:	The vertical cross section of a fuel bed down to mineral earth.
FUEL SEPARATION	:	The action of separating fuel for the purpose of providing a mineral soil fire-break, eg, raked or bulldozed firebreak.
FUEL TYPE	:	An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause predictable rate of fire spread or difficulty of control under specified weather conditions.
FUEL WEIGHT	:	The oven dry weight of fuel per unit area usually expressed in tonnes per hectare.
GANG TRUCK	:	A vehicle designed to carry fire crews and equipment with a medium size tank, pump, necessary tools and equipment for fire suppression.
GOING FIRE	:	Any fire on which suppression action has not reached an extensive mop-up stage.

GRID IGNITION : A method of lighting prescribed fires where ignition points are set individually at a predetermined spacing through and area.

GROUND FIRE : Fire that burns the organic material in the soil layer (eg, a "peat fire") and often also the surface litter and small vegetation.

HABITAT : The place in which an animal or plant lives.

HARDWOOD : Refers to a tree, or the timber of a tree, belonging to the botanical group known as angiosperms.

HAND CREW = GROUND CREW : A fire crew, trained and equipped to fight fire with hand tools.

HAND LINE : A control line constructed with hand tools. Normally, it is a narrow line constructed through country too rough for the use of tractors.

HEAD FIRE : Head component part of a fire where rate of spread, flame height and intensity are the greatest. Either wind or slope may produce head fire characteristics.

HEAVY DUTY UNIT = PUMPER : A vehicle equipped with a large capacity tank, pump, and necessary tools and equipment for spraying water and/or chemicals on fires.

HEAVY FUELS : A term used in slash burning to indicate fuels of large diameter, such as snags, logs, and large branchwood, that ignite and burn more slowly than flash fuels.

HELD LINE : All the prepared control line that contains the fire until mopping up is completed.

HOPOVER : (1) A fire edge that crosses a control line intended to confine the fire.

(2) The resultant fire.

HOSE-LAY : The arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

HOSE STRANGLER : A crimping device for stopping the flow of water in a hose.

HOT SPOT : A particularly active part of a fire.

HYGROMETER : A meteorological instrument used to measure relative humidity.

INITIAL ACTION : The steps taken after report of a fire and before actual firefighting begins.

INITIAL ATTACK = FIRST ATTACK : (1) The first action taken to suppress a fire.

(2) Resources initially committed to an incident.

INSTABILITY : See Atmospheric Stability.

INVERSION : The temperature of the air generally decreases with increasing height but occasionally the reverse is the case within one layer of air. Where the temperature increases with height this is said to be inversion.

ISLAND = POCKET : An unburnt area within a fire perimeter.

JUNCTION ZONE : A zone where two fire faces meet, resulting in an increase in flame height and intensity.

KNOCK DOWN : To reduce the flame or heat on the more vigorously burning parts of a fire edge.

LADDER FUELS : Fuels that provide vertical continuity between strata. Fire is able to carry from surface fuels into the crowns with relative ease.

LIGHT FUEL : A subjective assessment of fuel quantity indicating weight of fuels. A low amount of fuel.

LIGHTING FORMATION : Refers to the formation adopted by fire-lighters during burning operations.

LITTER : The uppermost layer of organic debris on the ground, composed of freshly fallen or slightly decomposed materials.

LIGHT PATROL UNIT : A vehicle equipped with a small tank and pump designed for rapid initial attack and patrol of fires.

LIVING FUELS : Naturally occurring fuels in which the moisture content is physiologically controlled within the living plant.

MINERAL SOIL : Soil layers below the predominantly organic horizons; a soil that has little combustible material.

MOPPING UP = MOP-UP : Making a fire safe after it has been controlled, by extinguishing or removing burning material along or near the control line, and felling stags, etc.

NEEDLE BED : A fuel bed consisting mainly of pine needles.

OVEN-DRY : Applied to wood or other material dried in an oven at 105 C until it ceases to lose weight.

PARALLEL ATTACK = PARALLEL METHOD = PARALLEL FIRE SUPPRESSION : A method of suppression in which fireline is constructed approximately parallel to, and just far enough from the fire edge to enable workers and equipment to work effectively, though the line may be shortened by cutting across unburned fingers. The intervening strip of unburned fuel is normally burned out as the control line proceeds, but may be allowed to burn out unassisted where this occurs without undue delay or threat to the line.

PATCH BURNING = MOSAIC : Prescribed burning for the purpose of forming a barrier to subsequent burning or for conservation management.

PATROL : (1) Generally, to travel over a given route to prevent, detect, and suppress fires.

(2) More specifically, to go back and forth vigilantly over a length of control line during and/or after construction, to prevent breakaways, control spot fires, and extinguish overlooked hot spots.

(3) A person or group of persons who carry out patrol actions.

PERIMETER : The exterior boundary of a fire area.

PLAN OF ATTACK : The selected course of action and organization of personnel and equipment in fire suppression.

POCKETS = ISLANDS : Unburned indentations in the fire edge formed by fingers or slower burning areas.

PREDICTED RATE OF SPREAD : The forecast spread of a fire having due consideration for fuel, topography and weather factors.

PREPAREDNESS = READINESS : (1) Condition or degree of being completely ready to cope with a potential fire situation.

(2) Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.

PRESCRIBED BURNING = PRESCRIBED FIRE : Controlled application of fire to fuels in either their natural or modified state, under specified environmental conditions that allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to attain land management objectives.

PRESCRIPTION : A written statement defining the objectives to be attained, as well as the condition of temperature, humidity, wind direction and speed, fuel moisture, and soil moisture under which the fire will be allowed to burn, generally expressed as acceptable ranges of the various indices, and the limit of the geographic area to be covered.

PRE-SUPPRESSION : See Fire Pre-Suppression.

PREVENTION : Those fire control activities concerned with the attempt to reduce the number of fires through Education, Law enforcement and Hazard reduction.

PROFILE MOISTURE CONTENT : The moisture content of the entire leaf litter bed above the mineral soil surface, expressed as a percentage of over-dry weight.

PROHIBITED BURNING PERIOD : The period of the year when lighting of fires is strictly controlled under the provisions of the Bush Fires Act.

PUMPER : See Heavy Duty and Gang Truck.

RATE OF SPREAD (R.O.S.) : Is the rate of forward movement (in meters per hour) of a head fire.

RELATIVE HUMIDITY (R.H.) : The amount of water vapour in an air mass at a given temperature, expressed as a percentage of the amount of water vapour the air can hold before saturation.

REBURN : (1) Repeat burning of an area over which a fire has previously passed but has left fuel subsequently ignitable.

(2) Also the area so reburned.

RECONNAISSANCE : To examine a fire area for the purpose of obtaining information about current and probable fire behaviour and other related fire suppression information.

SCORCH HEIGHT : The height at which foliage is damaged by heat from a surface fire (forest scorch height is approximately flame height by 5).

SECTOR : A designated segment of fire perimeter or control line comprising the suppression work unit for two or more crews under one leader.

SEEN AREA : The ground, or vegetation growing thereon, that is directly visible under specified atmospheric conditions from an established or proposed lookout point or aerial detection flight route.

SITUATION REPORT = SITREP : A brief, up to date report of a fire situation.

SLASH : The unusable residue after logging or any other waste deposited on the forest floor by a tending operation such as pruning.

SLASH BURN : Burning of logging debris in preparation for forest regeneration.

SLEEPER : (1) A fire that remains dormant for a considerable time after it starts.

(2) A fire that starts up again after appearing to be extinguished.

SLING : A net attached by a lanyard to a helicopter cargo hook and used to haul supplies.

SLING LOAD : Any cargo carried beneath a helicopter and attached by a lead line and swivel.

SLIP ON TANKER = SLIP ON UNIT : A tank, a live hose reel or tray, an auxiliary pump, and an engine combined into a single one-piece assembly that can be slipped onto a truck bed or trailer.

SOFTWOOD : A conventional term used to denote the timber of trees, and the trees themselves, belonging to the botanical group Gymnosperms.

SOIL DRYNESS INDEX = S.D.I. (WA) : A numerical value reflecting the seasonal dryness of soils, heavy fuels (branches, logs) and living vegetation. The S.D.I. estimates the amount of effective rainfall required to saturate the soil profile to a depth of 200mm. S.D.I. ranges from "0" when soils are saturated, to 2000 when soils are extremely dry.

SPAN OF CONTROL : The maximum number of subordinates who can be directly supervised by one person without loss of efficiency. In fire suppression the number varies by activity, but is in the general range of three to eight.

SPOT DISTANCE : The distance between spots of fire in a strip and is usually one half of the strip width.

SPOT FIRE : Fire set outside the perimeter of the main fire by flying sparks or embers.

SPOTTING : Behaviour of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

STRATEGY : An overall plan of action for fighting a fire that gives regard to the most cost-efficient use of personnel and equipment in consideration of values threatened, fire behaviour, legal constraints, and objectives established for land management. Leaves decisions on the tactical use of personnel and equipment to the Fire Boss in the suppression function.

STRIPPING : A lighting pattern used in prescribed burning, eg, the action of lighting lines or spots of fire parallel to each other over the area to be burnt.

STRIP WIDTH : The calculated distance between lines or spots of fire in a prescribed burn.

STRUCTURE FIRE : A fire originating in and burning any part or all of any building, shelter, or other structure inhabited, worked in, or used by people to house or store equipment, livestock, feed, or other items, or used for amusement, recreational, business, or educational purposes.

SURFACE FIRE : The surface fire is one that burns through the scrub and litter on the forest floor.

SURFACE MOISTURE CONTENT - S.M.C.	:	The moisture content expressed as a percentage of over dry weight of the top 5-10mm of leaf litter.
TACTICS	:	Determining exactly where and how to build a control line and what other suppression measures are necessary to extinguish the fire.
TAIL FIRE	:	That component part of a fire which is burning back against the wind, where the flame height and rate of spread is minimal.
TEST FIRE	:	A controlled fire set to evaluate such things as fire behaviour, efficiency in detection, or control measures.
THERMAL IMAGERY	:	The display or printout from an infrared scanning device.
THERMOHYDROGRAPH	:	A meteorological instrument used to continuously record temperature and relative humidity.
TEMPERATURE (DRY BULB)	:	The ambient temperature recorded by a thermometer.
TEMPERATURE (WET BULB)	:	The ambient temperature recorded by a thermometer equipped with a wet cotton jacket over the reservoir bulb of the thermometer. The depression between dry and wet bulb readings are used to determine relative humidity and dewpoint values.
TOP DISPOSAL BURNING	:	A technique to burn forest debris resulting from trade operations.
TOPS	:	Crown debris from felled trees.
TRAVEL TIME	:	Elapsed time from the departure of the initial attack crew until they arrive at and begin work on the fire.
TRASH FUEL (WA)	:	The component of the fuel complex on the forest floor made up of dead twigs, branches and old scrub debris of at least 10mm thickness.
UNDERSTOREY	:	The lower stratum of a multi-storeyed high forest.
URBAN/RURAL INTERFACE	:	That line, area, or zone where structures and other human development meets or intermingles with undeveloped bushland.

VALUES AT RISK	:	Any or all of the natural resources or improvements that may be jeopardized if a fire occurs.
WATER POINT	:	Any strategically located supply of water that is readily available for pumps, tanks, trucks, helicopters, or camp use.
WILD FIRE	:	Any uncontrolled fire.
WIND DIRECTION	:	The direction from which the wind blows.
WIND STRENGTH	:	The speed of the air past a given point.
WINDROW	:	A long line of piled slash or debris resulting from forest clearing.
WOODLAND	:	A plant community in which the trees form only an open canopy, the intervening area being occupied by lower vegetation, usually grass or scrub.

APPENDIX FOUR

GUIDELINES FOR FIRE CONTROL WORKING PLANS

The area O.I.C. is to prepare a Fire Control Working Plan for the division that is to be updated annually. The updated plan is to be checked by the Regional Leader and a copy forwarded to O.I.C. Protection Branch, Como by 15th November.

The Fire Control Working Plan is in three parts as shown in the attached table of contents.

Part A. Sets out the Fire Control objectives for the division an the strategies by which these will be achieved.

Part B. Includes all information necessary for planning and implementing the working plan. It is important this section be set out clearly and concisely and contain full information that can be readily assessed by visiting officers during L.F.O.

Part C. Provides an inventory of manpower and equipment for the division and includes auxiliary resources available in the district. The section also includes working sheets and check-lists to aid staff in procedural requirements for despatch of suppression forces and other fire control activities.

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APPENDIX FIVE

TOWERS AND TOWERPERSONS

The towerperson must possess the following qualifications:

1. Must have good eyesight.

2. Must have good speech and hearing.

3. Must be capable of reading a map and learning the country visible from the tower.

4. Must become proficient in using the instruments and in furnishing reliable information.

5. Must be able to endure the necessary isolation and fend for themselves, and must be sober.

Instructions for Use of Forest Service Eye Test for Fire Lookouts:

The lookout eye test is designed to measure the relative ability of towerpersons to see small smokes. The eye test card may be obtained from Fire Protection Branch, Como for testing of towerperson's eyesight. The eye test is given as follows:

Select a suitable place out-of doors. Either a sunny or cloudy day will do. A dark foreground, such as green grass or earth is necessary. Avoid bright foregrounds, such as dusty or gravelled roads.

Insert the round peg in the block on the back of the board to form a handle, hold eye test board in full light of open sky but shaded from direct rays of sun. Avoid getting under eaves of buildings or under tree crowns.

Hold eye test board upright so that one pair of diagonal black bars is vertical, the other horizontal (the small spot will be up, down to right, or to left), with white side of eye test board facing towards the person being tested.

Have person being tested back away from eye test board until small black spot almost disappears (usually 12 to 14 metres).

Whirl eye test board several times so the small black spot may assume a new position, up, down, right or left. Have observer signal or state new position of the small spot. If correct, have them step back half a metre or more. Repeat procedure until the observer indicates position of small black spot incorrectly. Have them guess when they are no longer certain. They may rest their eyes if they wish.

Record the observer's rating as the distance in metres from eye test board to the last point from which they can indicate position of the small black spot correctly. The distance at which this small spot can be seen is definitely related to the distance at which small smoke columns can easily be detected. The following tabulation indicates quality of eyesight in relation to eye test rating in metres.

APPENDIX FIVE (continued)

Maximum distance at which small black spot can be seen (metres)	Quality of eyesight
> 19	Exceptional
18 - 19	Good
15 - 18	Average
13 - 15	Fair
< 13	Poor

The towerperson will be required to:

1. Make early and late observations which the area O.I.C. shall require.

2. At first observation ensure that the orientation of the plan and finder is correct. This may be done by checking the bearing of one or two known points.

3. At 1 a.m. obtain the early morning fire weather forecast and pass it on to neighbouring towers or Divisions.

4. Report the wind direction, strength and visibility in each of the four quarters of the compass to District Headquarters. This information must be supplied as conditions change, hourly or more frequently as required.

5. Remain on continuous watch during such hours of the day as the Duty Officer shall determine, with stipulated times off for meals or short breaks as advised.

6. Maintain a careful watch for smoke at all times.

7. All smokes will be identified by number, Division and date. Immediately on locating a smoke, the lookout person should take a bearing and estimate the position of the fire. They should communicate this bearing and approximate location, together with a description of volume and character of the smoke, to central towerperson or Divisional Headquarters, as previously instructed by the area O.I.C.

8. When the position of a fire has been definitely determined, the towerperson will be supplied with the location and the serial number of the fire to be entered in the log book and in the margin of the plan at a point which is a continuation of the bearing. This serial number will be used in all further reports concerning such fire.

9. All messages to and from the tower must be entered in the tower log book against the time of the transmission.

APPENDIX FIVE (continued)

In transmitting information from the tower the following codes will be used:

Visibility -

1. Clear vision up to 24 km.
2. Clear vision up to 16 km.
3. Clear vision up to 11 km.
4. Clear vision up to 8 km.
5. Clear vision less than 8 km.

Wind strength will be recorded in kilometres per hour if the tower is equipped with an anemometer or wind speed indicator. Otherwise, Beaufort Scale descriptions will be applied. The minimum period over which reliable wind speed estimates can be made with an anemometer is 12 minutes. Read the meter, wait 12 minutes, read it again. Subtract the first from the second reading and convert to kilometres per hour with the table provided.

Description of smokes:

A - Direct view

B - Not direct view

Volume		Character		Colour	
Fine	1	Columnar	1	Blue	1
Medium	2	Spiral	2	White	2
Heavy	3	Billowy	3	Brown	3
Dense	4	Blankety	4	Black	4
		Drift	5	Copper	5

The towerperson should receive some instructions on the use and care of instruments along the following lines:

Direction Finder: Care should be taken in removing and replacing the steel arm of the direction finder to see that the sighting vane and arm are not damaged. Any damage should be reported immediately.

Plan Board: The plan board should be protected as much as possible from any damage by rubbing and scraping and should be covered in the event of rain.

On vacating the tower each evening, the cover should be placed on the plan.

Binoculars: The binoculars now being issued to towers, besides being a precise optical instrument are also a very costly item of equipment and must receive every care in use.

The binoculars should be worn with a short strap and should not be left lying on the table or box to be picked up when required.

APPENDIX FIVE (continued)

When not in use they should be kept out of the sun, either by keeping them in the cupboard or, if they are hung in their case, the lid of the case must be kept closed to protect the lenses.

Prolonged exposure to direct sunlight causes crystallisation of the cement used in the assembly of the large objective lens, causing a blurring of the image and necessitating complete dismantling and cleaning of the lens at considerable expense of rectification. Under no circumstances should binoculars be left on unattended towers.

Sunglasses: Sunglasses assist in the detection of fires in hazy conditions and to relieve unnecessary eyestrain resulting from continuous observation under conditions of heavy haze, sun glare and high winds. They should be kept clean and placed in the case when not in use. The best type of sunglasses are the "polaroid" type.

Panorams: Panorams should be kept as clean as possible. Covers should be placed over the boards each evening and sometimes during the day to give protection from sun, wind and rain.

The towerperson should be encouraged to make additions to the panorams as points are identified from time to time.

Care of Fire Towers and Lookout Towers:

At the end of the fire season the town plan, sighting vane, log book, panorams, anemometer, binoculars and sunglasses should be removed from the tower and the last two locked up.

At the same time the tower or tree hut should be inspected and a full report with suggested renovations or repairs (if any) should be submitted to the Divisional Office. The tower should be inspected with a view to determining -

(1) The need for iron bands round uprights to control splitting.

(2) The need for treating exposed ends of timber with hot creosote, petrolatum or some similar compound.

(3) The need for painting or otherwise treating any exposed wood or ironwork.

(4) The need for renovations or improvements to the lower cabin and hut.

Trees should be inspected for the following:

(5) Dying back of the limbs or trunk.

(6) Patches of rot in dead areas.

(7) Rot or borer attack in tree pegs.

With the exception of towers which have been erected on a concrete base, each tower should be regularly examined to check condition of piles where they enter the ground.

At each inspection, the ground around the piles should be opened to a depth of 0.5m and any weathered or decayed wood should be scraped off and exposed section should be painted thoroughly with hot creosote. If there are any indications of termites or decay, deeper holes should be opened and affected wood cleaned away. The creosote, before application, should be heated to simmering point, but not allowed to boil violently. The piles should be allowed to dry before treatment.

The tightening of bolts used in the construction of fire towers should only be necessary at the beginning of each fire season for the first two or three years, after which further tightening should not be necessary.

Excessive tightening of bolts is to be avoided.

In the course of this work, any patches of decay noted in the structural timber should be cleaned and a dressing of hot creosote applied to the affected areas.

It is estimated that for the treatment of the supporting piles in each tower 36 litres of creosote may be required. Any excess creosote left after painting the legs and other affected parts can be used for puddling the earth round the legs, particularly in the vicinity of any patches showing rot or termite attack. Supplies of creosote as required should be requisitioned.

In addition to the above periodic inspections, all towers and trees should be inspected before each fire season and officers-in-charge of districts where towers or trees are located should submit a report to the O.I.C. Protection Branch, Como, not later than 30 September in each year, setting out the general condition of the lookout and the towerperson's hut.

At the beginning of the fire season steps must be taken to clear all undergrowth for a radius of 100m around each tower or tree, so that there is no possibility of its carrying fire on the hottest day.

During the fire season at least two packsprays or 18L drums filled with water must be kept on the tower in case of emergency.

APPENDIX SIX

MEASUREMENT OF FOREST FUEL QUANTITY

Introduction

It is essential to know the quantity of fuels present in the forest or reserves areas when prescribed burning is planned. Litter quantities can often be estimated in the office from records of past burning and forest canopy cover. However, complications may be caused by insect infestation of tree crowns, dieback disease, trade cutting and incomplete burning. Other fuel components, such as forest understorey or scrub vegetation and trash fuel made up of twigs and dead scrub, cannot be calculated from maps or records.

An objective method for the assessment of fuel quantity, based on direct measurement of litter depth, trash height, and scrub density and height, is therefore needed.

The assessment techniques described here are designed to enable two men to cover an average size aerial-burning block (about 3000 ha) in two days depending on the forest or vegetation types of the area.

These notes describe the sampling techniques for ground and scrub fuels, and provide examples of the field sheets and fuel quantity tables.

Location of Sample Lines within Burn Area

The fuel sampling techniques described below allow for reliable estimation of fuel quantity on large areas. Three factors which must be considered when planning the sampling intensity and assessment procedure, determine the number of location of sampling sites required. The first consideration is the importance of the area in respect to the value of the timber and conservation assets, the presence of vulnerable regeneration and the proximity to private property. The second is that sampling intensity increases with diversity of the area sampled, whilst the third consideration is the ease of access.

The location of sampling lines must be carefully planned as it is important to assess the full range of major forest or vegetation associations and fuel types in order to reduce costs and damage from the prescribed burning operations.

The following sets out the steps to follow in locating the sample lines.

(a) From past burning plans trace the areas of same age burns onto the 1:25000 (where practical) map of the proposed area. Label with year and season of last burn.

(b) Outline the major forest or vegetation association types within the areas of same burning age.

(c) Isolate the canopy cover extremes of each forest type, and randomly select sites for two sample lines within these extremes.

Sample sites should be located no closer than 100 metres from the edge of major breaks and roads as these edge zones may have received different fire treatment to the internal forest areas.

MEASUREMENT METHODS

1. Litter Depth and Weight

1.1 Litter weight and depth relationships have been determined for all major forest types (See Red Book 7.2.1). This means that litter fuel quantity may be estimated by depthing the litter bed. Litter depth measurements are made with a gauge consisting of a wooden slide between metal rails attached to a scaled stand. The slide is inserted into a small hole made in the litter bed, and the depth is read from the scale. The slide should contact the top of the mineral soil. The base of the gauge should not rest on twigs, stones or other debris, and there should not be any disturbance or mounding of the litter surrounding the hole. The pressure placed on the depth gauge should be only enough to keep the base level with the litter surface.

1.2 Tests conducted in various litter types showed that a reliable depth estimate is obtained by taking ten depth measurements in a straight line at 10 metre intervals. Thus the sample line is 100m long. This sampling intensity ensures that the mean is not greatly biased by local fuel irregularities such as those found in forest openings, on rock outcrops and at the tree base.

The depth readings on each sample line are recorded on a special Fuel Assessment Sheet (Appendix 1 - FD 576).

1.3 The litter fuel quantities (in tonnes per hectare) for karri dominant, jarrah dominant and mixed Marri, Karri and Jarrah associations are listed within litter depth classes in Table 7.2.1 of the Red Book.

2. Trash Height and Weight

2.1 In nearly all karri forests and some marri and jarrah forests the fuel bed includes a trash layer made up of dead tree branches and scrub debris, which is mostly greater than 10mm in diameter or thickness. Trash is a difficult fuel to assess and so far little has been done towards relating its weight or height to changes in fire behaviour. A rough relationship exists between trash height and weight. The trash height is the average trash ceiling level and which excludes irregularities caused by the occasional 'heap' or individual upright branch or scrub stem.

2.2 An average trash height is estimated from the trash present within 3 metres radius of each of the 10 sites located for litter depthing. The trash height must be visually averaged over the entire 3 metre-radius sub-plot. The trash should be given a subjective density rating. Dense trash is normally found in 10 years and older karri fuel and contains a high proportion of large, heavy sticks. Sparse trash is common in 5 to 10 year old K and KM fuels and consists of mostly light tree and scrub debris. Jarrah stands of less than 10 year old fuels are not likely to carry any significant trash.

2.3 Table 7.3.1 of the Red Book lists the fuel weights for dense and sparse trash in trash height classes. The table provides the weights for both all-sized trash and for the trash portion with a diameter of less than 15mm. The latter is the fraction burnt under normal conditions.

3. Scrub Type and Weight

3.1 Estimates of scrub weight are obtained by first classifying the scrub into one of six standard structural types. A structural type is identified by the changes in its foliage density throughout its vertical profile. Each structural type can have a variety of dominant species types, but these must have similar height-density profiles in order to belong to that type. Also, a particular scrub species can belong to more than one structural type depending on the age and development of the individual plant. That is, scrub classification is based on structural rather than botanic differences.

3.2 Figure 7.4.3 in the Red Book shows the scrub height-density profiles of the six standard structural types in histogram form. Each type is broken down into sparse, medium, and dense according to the density of the foliage throughout the scrub profile. With practice, the histogram can be readily used to classify scrub by appearance. However it is often necessary to identify the scrub structural type by field assessment by way of the point-sampling technique.

Before the assessor can utilise these scrub histograms, it is necessary for him to conduct a small point-sampling measurement each time he encounters a new structural type. The measurement requires ten point sample observations, to be made in the new scrub structural type. It is suggested that these 10 samples be taken along a line at 3 metres intervals.

3.3 The point sampling technique involves recording the number and height of scrub contacts made at regular height of 1ft. intervals (30cm) on a thin graduated rod which has been inserted into the scrub. The contact numbers are recorded on a special field sheet from which a scrub height-density histogram can be prepared. Appendix 2 shows a worked examples of this field sheet.

The prepared histogram is then matched with one of the six standard type histograms to give the structural type of the area. Future classification may be done visually by reference to the identified scrub structural type.

3.4 Assessment of scrub is carried out simultaneously with litter and trash assessments. At each of the twelve (10) observation points on the sample line, the following scrub features are recorded on the Fuel Assessment Sheet (Appendix 1):

structural type (1, 2, 3, 4, 5 or 6)
density rating (D, M, S)
average height
dominant species
and percentage scrub dead

Table 7.4.1 of Red Book provides the scrub weights of three scrub components, namely; the entire scrub (including stems), the foliage, and the foliage below 1.2 metres. The latter provides the scrub weight normally consumed in a mild prescribed burn, and therefore is the scrub fraction of most concern to the fuel assessor.

The following is an example to demonstrate the use of Table 7.4.1.

For a dense scrub type 4 of 5.0 metre height,

(a)	the total scrub weight is	26.0 t/ha
(b)	the foliage weight is	5.0 t/ha
(c)	the weight of foliage below 1.2m is	1.5 t/ha

The latter weight is the one used for normal prescription purposes.

3.5 To account for the effects of different scrub flammability on fire behaviour, a Scrub Flammability Factor is to be applied to the Scrub Fuel Weight. The Flammability factor is determined by the foliage condition (i.e., percentage dead or green) and the fineness and distribution of the foliage. See Table 7.4.2 of the Red Book. The Scrub Fuel Loading corrected for Flammability is obtained by multiplying the available scrub fuel weight by the Scrub Flammability Factor.

4. Calculation of Total Fuel Quantities

4.1 The values for the litter depth, trash heights and scrub types and heights measured on each sample line are totalled and averaged. The average value is used to derive the 'available' fuel quantities for the 3 fuel components. The three component weights are added together. The total weights for all the sample lines provide the range and distribution of fuel quantities present within the burn area.

4.2 The fuel qualities are used to develop the burning prescription for hardwood (CLM 763).

SCRUB POINT SAMPLING FIELD SHEET

Location ..... Line No. ..... Date .....

Forest or Vegetation Type .....

	Height Intervals (in feet)													
Point Sample Number	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 13+
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
Totals														
Average														
Histogram														

Scrub Structural Type: .....Density.....Height.....m

Dominant Scrub Species:

APPENDIX SEVEN

GUIDELINES ON AIRCRAFT PERFORMANCE

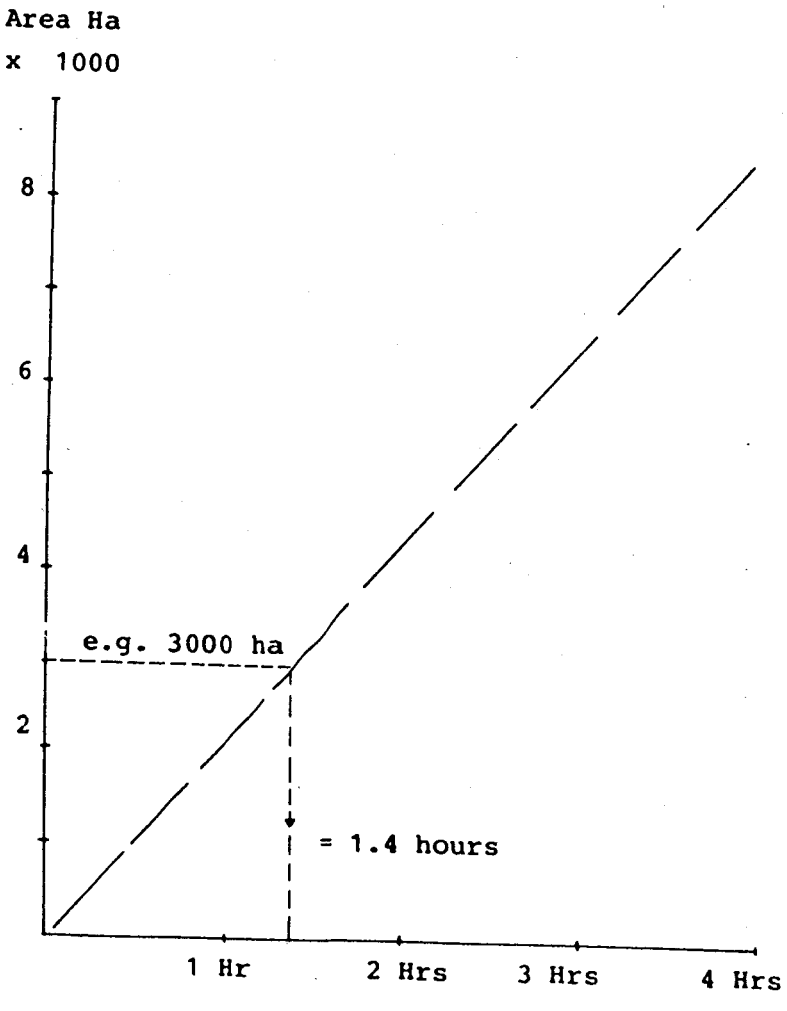
1. The following have been drawn up to assist Districts in estimating the time that the B.N. 2 Islander aircraft can be expected to take to complete a job. These are intended as a guide only.

2. Other factors which should be taken into account, and will affect what time the aircraft can be expected over a job are:

Warm-up and taxiing	5 minutes
Flying to the job	3.5km or 2nm/minute
Reconnaissance circuit of the job	10-20 minutes
Dummy flight line to establish drift	5-10 minutes

3. Graph for calculating the amount of aircraft burning time required in relation to the job size:

ACTUAL TIME SPENT OVER JOB



4. Constraints on Job Size:

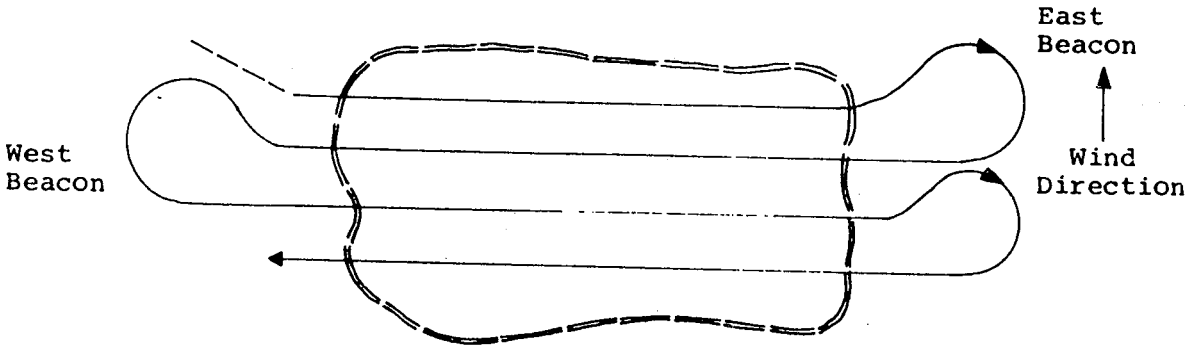
As the aircraft can carry only 4000 capsules, this reasonably limits burn size to an area which will not use more than 4000 capsules with a given lighting pattern. The table below shows the maximum job size for varying lighting patterns based on the 4000 capsule capacity.

Strip Width by Spot Distance	Maximum Job Size
150 x 75 metres	4 500 hectares
200 x 100 "	8 000 "
250 x 125 "	12 500 "
300 x 150 "	18 000 "
350 x 175 "	24 500 "
400 x 200 "	32 000 "

5. Flight Patterns:

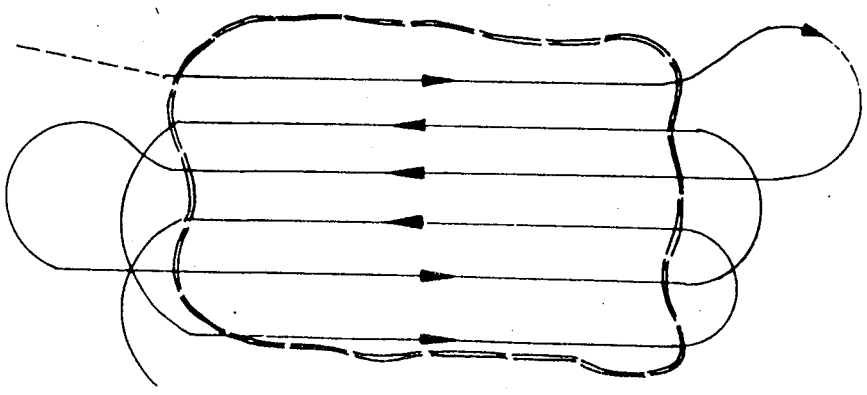
Parallel Method

Consists of marking every line with beacons and verey pistol flares.



Corridor Method

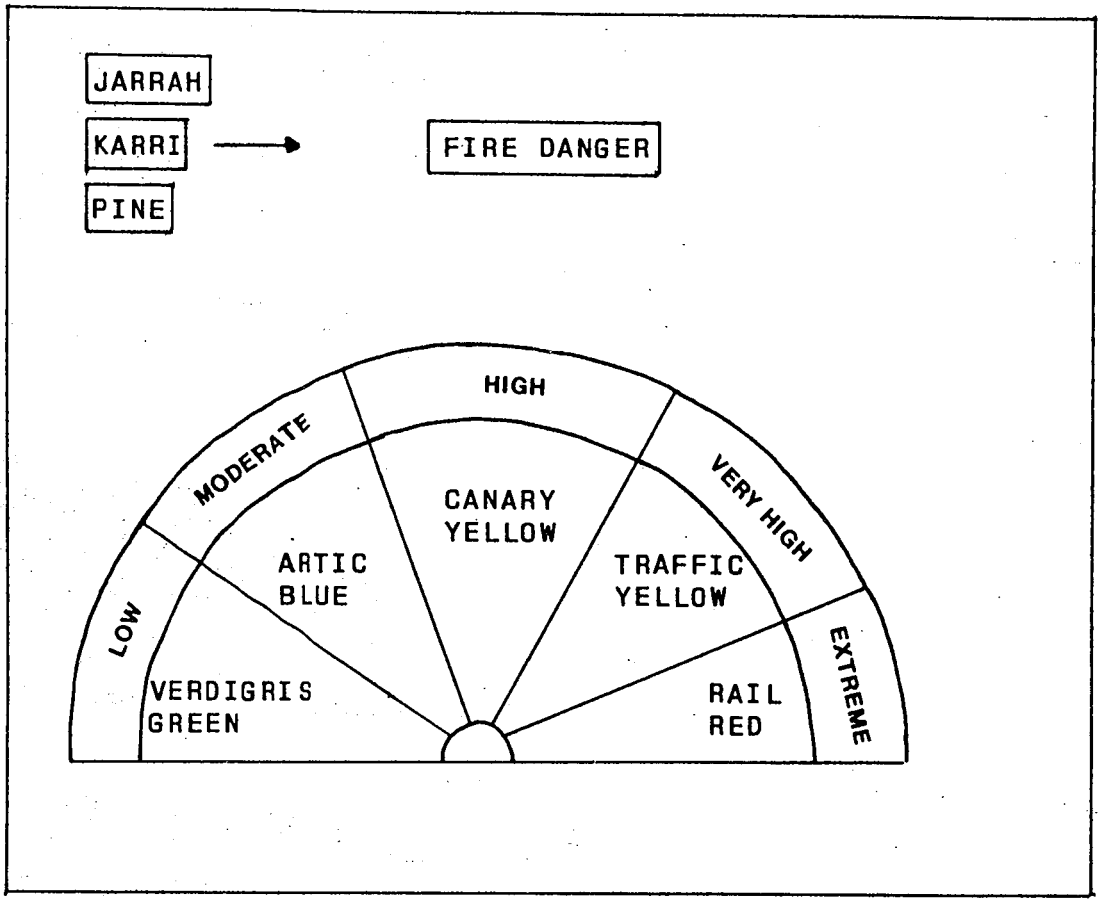
Consists of marking only every second line with the beacon, ie, the beacon has to move 400 metres if flight lines are 200 metres apart. The initial three or four lines are slow as the aircraft waits for the smoke to show up; when this occurs the aircraft flies back between the previous flight lines.



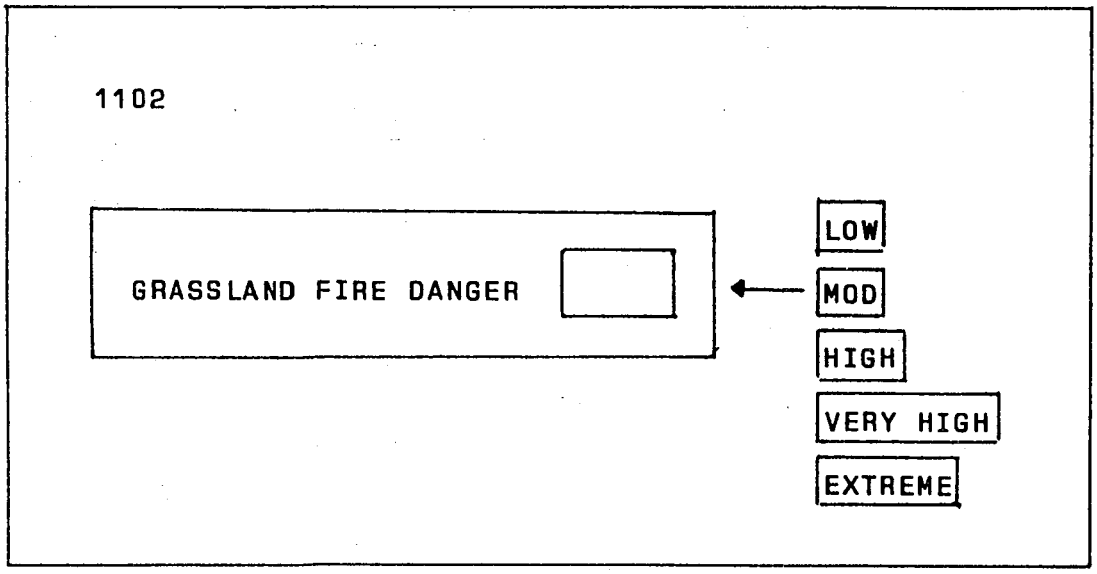
APPENDIX EIGHT

1101

FIRE DANGER INDICATOR SIGNS



1102



APPENDIX EIGHT (continued)

Forest fire danger index	McArthur Index	Colour	Code
0- 20	Low	Verdigris Green	280
21- 40	Moderate	Artic Blue	112
41-140	High	Canary Yellow	309
141-230	Very High	Traffic Yellow	368
>230	Extreme	Rail Red	593

The colour name and code number conforms with British Standards.

APPENDIX NINE

SEARCH AND RESCUE (S.A.R.) WATCH

ACTION TO BE TAKEN IN AN AIRCRAFT EMERGENCY

AIRCRAFT COMMUNICATIONS SYSTEM

R/T - V.H.F. - D.O.T. V.H.F.

1. **UNCERTAINTY PHASE**

   (Distress call or radio failure less than 30 minutes).

   NO ACCIDENT

   Do these things -

   (a) (b) (c) (d) (e) (f) (g)

2. **DISTRESS PHASE**

   (Distress call or radio failure in excess of 30 minutes).

   POSSIBLE ACCIDENT or KNOWN ACCIDENT

   Do these things -

   (a) (b) (c) (d) (e) (f) (g) (h) (i)

3. **OPERATIONS CHECKS** -These must be recorded in log book.

   3.1 Taxi call.

   3.2 Take off call.

   3.3 Circuit area call.

   3.4 Landed call - (Cancel S.A.R.).

   3.5 1/2 hour "Operations Normal" plus position.

APPENDIX NINE (CONTINUED)

(a) Advise most senior officer in office.

(b) Check last known position (from aircraft in distress), or last position report.

(c) Advise any other aircraft in areas.

(d) Call any CALM crews in field near area and instruct them to maintain watch or NO ACCIDENT investigate (give aircraft description clearly).

(e) Call any farm in area.

(f) Advise company concerned etc. - See Radio Room for telephone numbers.

(g) Advise Protection Branch, S.O.H.Q., Como - Phone Perth 09 367 0333, or the Como Duty Officer, Regional Duty Officer and Aircraft Manager outside normal working hours. (Aircraft Manager A/H 09 367 4362).

(h) Advise Senior Operations Officer Perth - 09 478 8640.

(i) Advise: Police

Ambulance

Fire Brigade

Doctor

Every officer should understand this procedure.

Every second lost could be important.

N.B.

All aircraft incidents are to be reported to Protection Branch Como.