FIRE SUPPRESSION ON CALM MANAGED LANDS

A Paper for the National Parks and Nature Conservation Authority
by R J Sneeuwjagt

1. INTRODUCTION:

Each year Western Australia experiences a hot, dry summer during which wildfires regularly occur. In the forest lands in the south-west, CALM attends an average of 280 wildfires each year. In addition, about 60 fires are fought on other lands managed by CALM throughout the State. In some years the total number of fires can exceed 500.

In the south-west, many of these fires are a direct threat to the 0.5 million people and their properties. Forest wildfires can severely damage recreation sites, hardwood timber resources, and destroy softwood plantations and can kill wildlife and damage water catchments. Such losses can have significant impact on the State's economy and the regional employment. Many of CALM's reserves outside of the south-west forests are isolated islands surrounded by cleared agricultural lands. Where such reserves are burnt out by a single fire there is a significant risk of losses of restricted wildlife which are not able to re-colonize from adjoining areas. Severe wildfires can also lead to siltation of stream and reduction of landscape values.

The suppression of high intensity fires is usually highly dangerous and very costly. The suppression operation, if done inappropriately, can also result in long term environmental damage including soil erosion, dieback disease infection, scarring of landscape, and destruction of rare flora and rare fauna habitats.

The over-riding consideration in CALM's fire control policy is to minimize undesirable consequences from the effects of the wildfire and the suppression operations. Fire suppression decisions must therefore take into account both environmental and social responsibilities.

2. THE FIRE SUPPRESSION POLICY:

The principal goal of the Department of Conservation and Land Management (CALM) for the fire management of CALM lands is "to protect community and environmental values on and adjacent to lands managed by the Department from damage or destruction from wildfires". The secondary goal is to use fire as a management tool to achieve land management objectives.

CALM's Fire Management Policy sets out the rules for the suppression of fires occurring on or near CALM managed lands. Under the heading "Fire Suppression" the policy states:

The Department will:

(1) 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.

(2) 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 environmental values);

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

(3) Provide a detection system where values dictate this to be necessary and beneficial.

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

This policy has been developed as a result of long international, national and local experience, and wide ranging discussions and consultations between groups and individuals throughout the community and within CALM and other Government Departments.

3. BASIC ASSUMPTIONS:

The Fire Policy is underlain by several basic assumptions. The most important of these are:

(a) Unplanned wildfires will inevitably occur, either as a result of natural causes (eg: lightning) or of human activity (ie: deliberately lit or accidental causes).

(b) The speed, intensity and damage level of wildfire is related to the weather conditions, topography and quantity of accumulated dry litter and vegetation material. In Western Australia the prediction of wildfire behaviour is reasonably accurate and reliable for the forested lands, and is less accurate for other vegetation types including Coastal heaths and mallee, desert spinifex, and the woodlands of the semi-arid and subtropical regions.

(c) Weather conditions occur every year in Western Australia in which wildfires spread rapidly and are so intense as to be impossible to contain with 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 fire fighters.

(d) Forest litter decomposes slowly and thus accumulates rapidly, creating a high fuel load, so high that fires occurring during extreme weather conditions are uncontrollable.

(e) In many ecosystems, accumulated fuel loads can be reduced by prescribed burning, which reduces the likelihood of intense fires developing even under severe conditions, and improves the capacity of fire fighters to safely control a fire.

(f) The ability and effectiveness of fire fighters to safely attack and contain a fire is dependent on the fire intensity and rate of spread, as well as such factors as the availability of rapid access to the fire, the topography and ground surface, the effectiveness of the fire fighting organisations and the quantity and quality of the fire fighting men and equipment.

(g) Much of Departmental land, particularly in the south west has a common boundary with private assets such as towns, housing developments and farms. The proximity to these high value areas affects the decision to suppress fires and the strategy option. The "let-burn" options cannot be considered where there is any likelihood of wildfires spreading into and threatening life and developed property values.

(h) Large areas of Departmental lands exist in remote parts of the State including the Kimberley, the Pilbara, the Goldfields and South Coast Regions. Due to lack of roads, lack of fire fighting resources, and the long distance from highly values private assets, and the high costs of providing effective fire fighting resources in such remote sites, there is little that can be done about suppressing fires on such lands. In these areas, the only approach is to instal low fuel buffer zones which may limit the spread of huge fires.

(i) Fire suppression operations can have some detrimental effects on ecosystems threatened by fire. These effects can include the introduction and spread of dieback diseases by fire fighting machinery, soil erosion on firelines, removal of or damage to endangered species, scarring of landscape features by firelines, and intrusion of fireline access into wilderness areas.

(j) 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.

(k) The extensive application of fuel reduction burning programs within the forest lands since the early 1960's has resulted in a very low incidence of large and damaging wildfires, despite the annual occurrence of severe fire weather conditions and extreme events such as those experienced during the passage of Cyclone Alby in Autumn 1978.

These factors and other local requirements are taken into account in the decision making process which leads to certain courses of action being taken in the event of a single as well as multiple wildfires.

4. FIRE SUPPRESSION OPTIONS:

There are basically three response options to a wildfire:

1. attempt to suppress the fire immediately, ie the direct approach;

2. allow the fire to run until it reaches strategically placed fuel reduced areas, ie the low fuel buffer approach;

3. let the fire burn until it rains. ie the "let burn" approach.

Each of these 3 basic options and some combination of options, may be applied by CALM. The choice taken depends on a range of factors. Foremost is the level and types of values threatened. Options 1 and 2 are applied where life and property values are present, and where environmental and resource values are high. Option 3 is only applied where community and environmental values are very low, and where the cost of suppression exceeds any benefit gained. The management objectives of the reserve affects the decision on the fire suppression strategies.

Other factors that are important in determining the most appropriate response include the size and intensity of the fire; the impending weather conditions; the fuels ahead of the fire; the suppression capability; the likely costs of suppression action;the level of understanding of the role of fire in the particular ecosystem, and the likelihood of significant long-term damage by the suppression activities. Each of the three basic options are dealt with in further detail below.

Option 1 - Suppress Fires Immediately, Or The Direct Approach.

In areas where values such as lives, property and timber values are high, it is necessary to contain the potential damage from wildfire to the minimum possible. In areas such as the south-west forest region and immediately adjacent to settlements and farmlands, there are too many values at stake to risk allowing fires to simply burn out, while we hope for cooler, or wet weather.

Long experience has shown that the likelihood of successful suppression is greatest wherever suppression forces are able to attack fires that are small and have not yet fully developed. There are a range of tactics that can be applied to achieve the objective of restricting fires to small sizes.

Basically the strategy is:

* rapid accurate detection

* quick mobilization of fire fighters

* good access

* direct attack

Direct attack involves extinguishing the fire by building a mineral earth firebreak either on the fire flame front or at some short distance parrallel to the fire. The parrallel attack method is used where fire intensity is too high to allow firefighters to work too close to the fire.

Both the direct attack and parallel attack methods cannot be applied to headfires which have flame lengths greater than three or four metres. Direct attack with bulldozers is unsafe and usually fails when fire line intensities exceed 2,000 kw/hr (or flames greater than three metres tall). Thus the probability of success of fire containment by direct attack methods is highest where vegetation and ground fuels are sufficiently low to limit fire behaviour. Experience over a wide range of weather conditions including severe weather episodes, has shown that fires burning in fuel reduced areas can be attacked on their flanks, with eventual control of the headfire by pincer action from the flanks.

Backburning ahead of the fire is applied whenever fires are too large and too intense, or where access is too difficult for direct attack. Backburning is a highly demanding tactic which can often "backfire" and cause a further extension of the fire. For it to succeed you must have a large number of crews who burn back ahead of the fire from well prepared fire breaks or low fuel barriers.

Adequate time (usually more than an hour) is needed for the backburn to burn out a sufficiently wide strip to prevent the main fire from burning through or leaping the backburn. Escapes from backburns are highly likely where weather conditions are hot, dry and windy, or where atmospheric instability leads to willy-willies along the fire edge.

The direct attack methods are potentially the most hazardous to fire crews and require a high degree of training and expertise of the fire controllers and section supervisors. Unless such operations are handled sensitively and follow the environmental protection guidelines, they also have potential for causing damage to fragile and susceptible ecosystems.

In general, direct attack of large fires can be costly as these require large numbers of machines, pumpers and manpower. These costs can be prohibitive where values are marginal and where fires are located at long distances from CALM centres. Thus the immediate response option is rarely applied outside the south-west and agricultural land divisions, or in areas where community values are low or absent, or poor access prevents rapid response whilst fires are still small and manageable.

Exceptions to this occur where it is considered necessary to suppress a fire to prevent it burning out an entire reserve of special conservation significance including reserve remnants.

Option 2 - Contain Fires Within Fuel Reduced Buffers:

This option is applied in circumstances where it is necessary to confine the wildfire, but where due to the fire intensity or location it is not possible or practical to suppress it by direct means. The basis for this option is that fire behaviour is strongly affected by the amount of fuel, and most fires burning into and within fuel reduced areas can be attacked directly and safely contained even under severe weather conditions. Areas of light fuel provide anchor points for suppression lines, refuge areas for threatened fire crews and civilians, and provide access for suppression forces on a fire edge or suppressing spot fires ahead of the main fire front.

The contribution of prescribed burning for fuel reduction to forest fire control in Western Australia has been demonstrated in numerous instances. The most spectacular demonstration of this was provided during the Cyclone Alby fires on 4 April 1978, when dozens of fierce wildfires driven by cyclonic winds of over 120 kph, were contained to relatively small sizes within fuel reduced forested buffers that had been prescribed burned 2, 3 and 4 years previously. These and other case studies were reported by Underwood et al (1985)*. More recently, a fuel reduced buffer installed by CALM in the West Kimberley, protected the Prince Regent Nature Reserve from a huge wildfire.

The success of this option is dependant on the proximity and the effective width of the low fuel zones. Fast spreading grass fires can be contained by low fuel buffers that are 100 metres wide. At the other extreme, very high intensity forest fires that are crowning, and which generate large numbers of spot fires ahead of the flame front, require up to 6 kilometres wide low fuel zones. The width of the fuel reduced zones is therefore dependant on the likely fire behaviour, including spotting, in the specific fuel type as well as the type of values requiring protection.

---

* R J Underwood, R J Sneeuwjagt and H G Styles (1985) "The Contribution of Prescribed Burning to Forest Fire Control in Western Australia : Case Studies" Proceedings of the May 1985 Symposium. WAIT Environ Studies Group report No 14.

For example, the fuel reduced buffers that surround forest townships such as Dwellingup which was almost entirely burnt down in 1961, range in width from 6 kilometres on the northern perimeter (because northerly winds are usually the hottest and driest) down to 3 kilometres on the southern perimeter. Fuel reduced buffer zones in the karri forest are spaced such that the average area consumed by a serious wildfire does not exceed aproximately 2,000 ha before it encounters a low fuel buffer. For the jarrah forest this "maximum loss" area ranges from 4,000 to 6,000 ha as these types can survive severe fires better than karri.

The use of the fuel reduced buffers strategy is widely applied within large conservation reserves where it is deemed important to minimize the possibility of fires consuming large sections in one hit. Examples of the use of broad fuel-reduced buffer strategies are present within forested reserves (eg Shannon - D'Entrecasteaux National Park, Leeuwin-Naturalist National Park, Lane-Poole Reserve and Walpole-Nornalup National Park) and non-forested reserves (eg Fitzgerald River National Park).

In many instances both the direct response and the low fuel buffer option are applied in combination. Direct attack may be applied to the flanks where fire behaviour is of low to moderate intensity and where there is potential for a wind change to extend the size and damage potential of the fire. Work on this headfire may be deferred until it burns into a low fuel buffer.

Option 3 - 'Let Burn'

Fires that occur in or near reserves in the Kimberley, Pilbara and arid inlands are usually allowed to burn as these rarely threaten human assets, and because of their large size and remoteness they are too difficult and expensive to attempt to control. Some suppression action may need to be undertaken where the fire front threatens outlying communities or station homesteads. Very often such fires are monitored either by aircraft, or ground reconnaisance, or by satellite imagery. This information may be necessary to alert isolated residents in proximity to the fire.

The 'let burn' option cannot be contemplated in forest situations in the south-west, or anywhere else where community assets such as farms and settlements can be threatened directly by fire. Wildfires in forest areas quickly develop in size and intensity. Once they become large and intense they can rarely be stopped at firebreaks, and represent an extreme danger to the lives of the fire fighters and residents.

A summary of the situations in which the three different suppression options are applied are listed in the following tables.

Response Option	*Situation Applicable*	*Advantages/Opportunities*	*Disadvantages/Constraints*
A. IMMEDIATE RESPONSE A.1 Direct Attack eg: Machines, hand tools.	. High values (Life/Property/ Environ. values) threatened. . Entire reserve (island) likely to be burnt out. . Necessary to keep fire small. . Low/Moderate fire behaviour. . Adequate forces/machinery. . Flank attack to pinch in the head-fire . Where adequate access for forces. . No time or place to put in a back-fire.	. Minimizes area burnt. . Most positive method. . Immediately separates fire from fuel. . Reduces chance for fire to gain momentum. . Often only option to save communities etc. . Makes use of all dead edges. . Crews can escape into burnt country. . Crews can escape into burnt country	. Restricted to low/moderate fire intensity. . Can be costly. . Most dangerous. . Can be stressful to fire crews - smoke and heat affect work output . May damage fragile vegetation soils/landscape. . Requires rel. large no. of resources . Risk dieback introduction and spread.
A.2 Indirect Attack eg: back-burn from firebreak or pre-burnt buffers.	. Large, intense fires. . Remote areas/poor access that prevent direct attack. . Burn out from back-burn is not likely to cause more damage than wildfires. . Where low fuel zone (natural barriers or prescribed burnt areas) are available. . Adequate access & firebreaks. . Predictable weather patterns. . Adequate time to implement back-burn.	. Often only way to top a large or intense wildfire. . Enables use of natural barriers or pre-burnt low fuel zones. . Less stressful to workers. . Safer for fire fighters. . Less destructive if dozers not required.	. High risk of escape from back-burn If unsuccessful, the back-burn . becomes the second wildfire . Fire area and perimeter is increased considerably. . Need a lot of time and manpower to safely back-burn. . Change in weather can result in large scale escapes and endanger crews. . Difficulty in ensuring that all intervening country between fire and and control line is completely burnt out.

Response Option	*Situation Applicable*	*Advantages/Opportunities*	*Disadvantages/Constraints*
B. Allow to Burn into low fuel zones and/or natural barriers.	. No high values in near proximity. . Existence of broad areas of low fuels (eg: planned burns, previous wildfire). . Fire too hot to control by direct attack and/or back-burning too risky. . Insufficient resources available for effective direct attack. . May be applied on part of fire only.	. May be only way to contain an intense wildfire. . Less need for bulldozed fire breaks with resultant lower risk of environ. damage (eg: dieback). . Requires a high commitment to maintenance of prescribed burning programmes to provide buffers.	. Risk of weather/wind change could result in major escape. . May lose large area by fire before it burns into low fuel zones. . Letting fire dictate could end up with major losses. . May end up burning out entire reserve. . Still need machinery to suppress fires burning into low fuel zones. . Can be costly.
C. Allow to burn. Rely on rain or cold weather to douse fire.	. Values threatened are very low or very distant. . Weather change to rain/cold conditions is very predictable. . No suppression resources available. . Costs of suppression much greater than likely losses. . Difficult terrain, lack of roads, remoteness prevent any cost-effective fire suppression.	. Low costs. . No disturbance by machinery. . No risk of dieback spread, soil damage. . Fire protection infrastructure and resources. . Cannot be applied presence of . mod to high values.	. Not suitable to south-west and settled areas. . Very large fires can result before fire dies. . Can eventually threaten high value areas, at which stage it may be very difficult to suppress. . Regular occurrence can lead to major losses of intolerant species (eg: Mulga, Casuarina).

5. PLANNING FOR FIRE RESPONSE ACTIONS

1. Response Zones:

CALM field managers are required to develop and implement written fire control emergency plans. These provide the basis for decisions on the suppression response to fires that occur anywhere within the boundaries of their area of control. An important component of this plan is the identification of response priority zones and suppression strategies for each of these zones.

The Wildfire Threat Analysis (WTA) technique is applied to identify the response zones with each District or Region. The WTA provides an objective means of combining the various factors that affect the fire proneness of the area. These factors include community and environmental values; the fuels and likely fire behaviour; accessibility; environmental factors such as disease susceptibility; and the fire fighting capacities of CALM and other agencies.

The Response Zones that are identified are then mapped and rated within four categories according to the urgency and degree of response. These are:

1. **"Red Action" or "P" Zones** - apply to vulnerable settlements, pine plantations etc. In these high priority zones, a pre-determined set of despatch orders are applied which ensure the automatic and appropriate response from local and neighbouring districts to fire threatening designated high value assets. Fire suppression is generally by direct attack while fire is small.

2. **"A" Zone** - applies to high value areas where some preventative measures (eg prescribed burning) have been undertaken. The fire response is generally by direct attack or by use of strategically located fuel reduced buffers.

3. **"B" Zone** - applies to areas where low to moderate values are at stake. Areas are generally more than two hours travel by fire crews from despatch centre. In south-west forests high reliance is placed on fuel reduction burning programs so that any wildfire is likely to be able to be contained in low fuel buffers.

4. **"C" Zone** - applies to remote areas with little or no values at stake. This zone is confined to the mostly arid lands of the South Coast, Goldfields, Pilbara and Kimberley Regions. Usually no response is made except for monitoring of fire by aerial surveillance or by satellite photography.

An example of response zones in the South Coast Region are shown in Map 1.

The fire emergency plans also spell out the standing orders including the preparedness measures and the initial despatch of forces that apply to each different Response Zone. These instructions provide only broad guidelines for District Fire Controllers who must consider each fire on its merits in order to determine the appropriate suppression strategies and tactics.

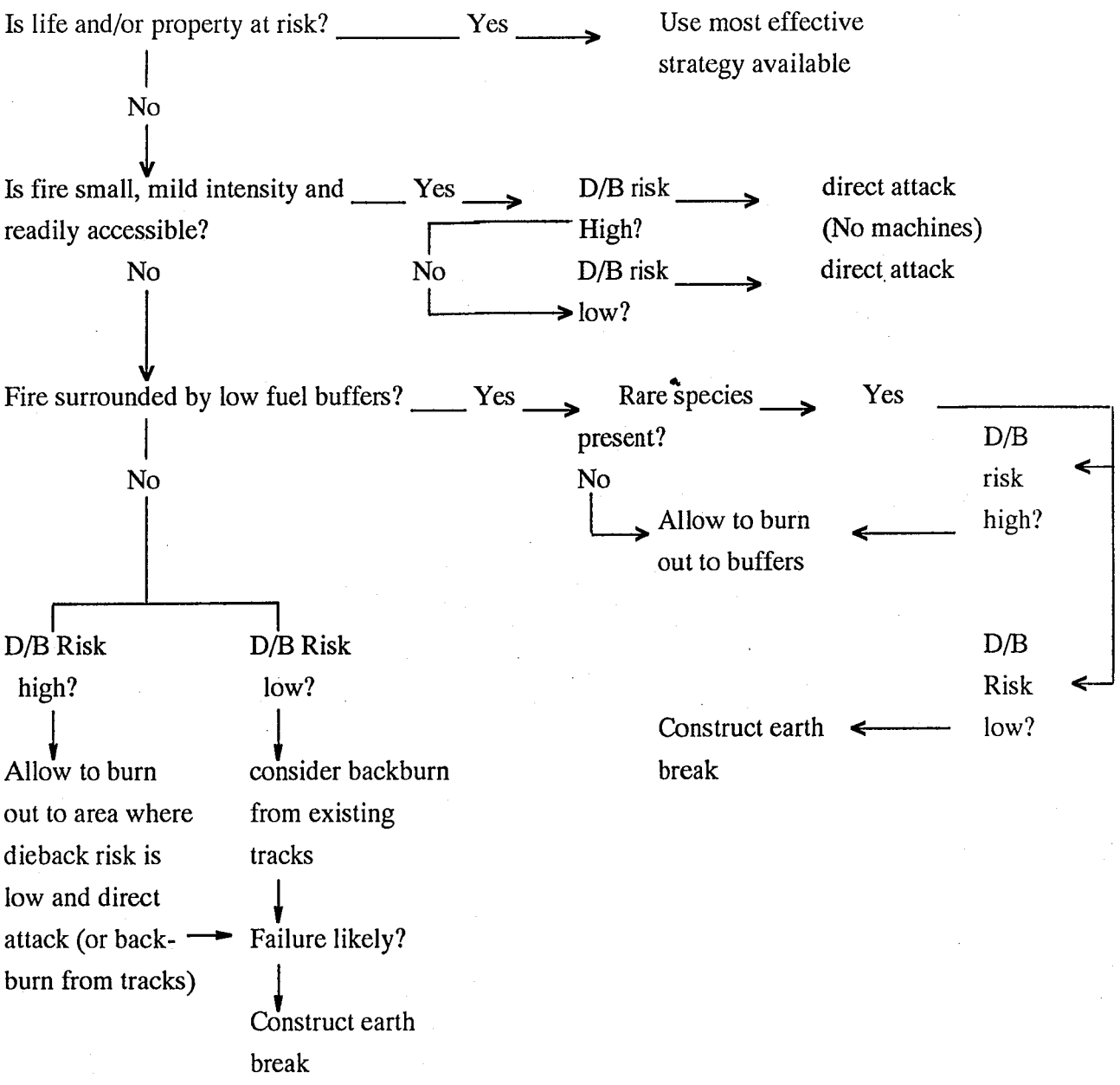
2. Suppression Decision Support System:

CALM's Controllers are trained to evaluate the range of factors that must be considered in determining the most appropriate fire response. In complicated situations such as in highly sensitive reserves with high fauna or flora values, it has been found necessary to provide decision support systems which integrate all the factors that contribute to the fire decisions. An example of such a fire suppression decision model is shown in Figure 1. This example applies to conservation reserves in the South Coast Region and attempts to integrate factors such as life and property values, fire behaviour, presence of low fuel buffers, firebreaks, dieback disease, rare species, and fire suppression capability.

FIGURE 1.

FIRE SUPPRESSION DECISION MODEL - SOUTH COAST NATIONAL PARKS

(Guide to fire controllers to preserve Park values and control fires)



While the decision model allows any strategy to be applied, the nature of the management unit will generally determine the strategy chosen.

Rare Fauna Management Unit - known fauna-rich pockets, high property and life values, good access and buffer system.

Natural Environment Management Unit - few tracks, poor access, few buffers, low life/property values.

Recreation Management Unit - reasonable access and buffer system, high life, low property values.

In the event of a fire, the controller must quickly determine what the fire will do, what it is threatening, and what may be affected by the fire suppression actions. He must then assess what the fire organisation can do about the fire.

Fire suppression objectives are determined on the basis of the priorities of values that require protection. As part of the fire appreciation, the Controller must determine what resources are required to implement the preferred fire suppression strategy that will enable the objective to be achieved. The Controller must also consider alternative strategies and contingency plans needed in the event that the preferred strategy fails. To assist the Controller in these tasks he has a team of specialists such as the Intelligence, Plans and Supply officers, who in turn work closely with field reconnaissance, fire line officers and spotter aircraft. A copy of the Fire Appreciation Form is included in the Appendix.

CALM's Fire Protection Branch is currently developing computerized models which will enable fire controllers to determine the most appropriate suppression response and priorities in situations where there are multiple fires affecting a wide range of values. This model is called the Wildfire Information Management System, or WIMS and is designed to simulate the growth of fires with specified time, and to show potential losses. WIMS will allow determination of the resources needed to control these fires within set time frames, and thereby enable controllers to experiment with alternative strategies. A full description of this system has been published in a Landscope article (1990) by Judi Beck currently working on a CALM PhD research scholarship.

6. FIRE SUPPRESSION ORGANISATION

Fire fighting is by nature an emergency operation that calls for fast, aggressive and efficient action under a wide range of difficult and hazardous circumstances. To achieve such action, good organisation of well trained and well equipped fire fighting forces is essential.

Over the years, the Department has developed a fire suppression organisational structure which incorporates the personnel, procedures, facilities, equipment and communication required to manage small and large fires within the "P", "A" and "B" Response Zones. The Department has developed co-operative arrangements with other fire combat authorities, particularly the Volunteer Bush Fire Brigades of the Local Government Authorities, and the W A Fire Brigades in the outer Metropolitan and Regional centres. The Department has become increasingly reliant on these organisations for fire suppression on areas of mixed tenures, and in the reserves outside of the Forest Regions where CALM's fire fighting resources are limited.

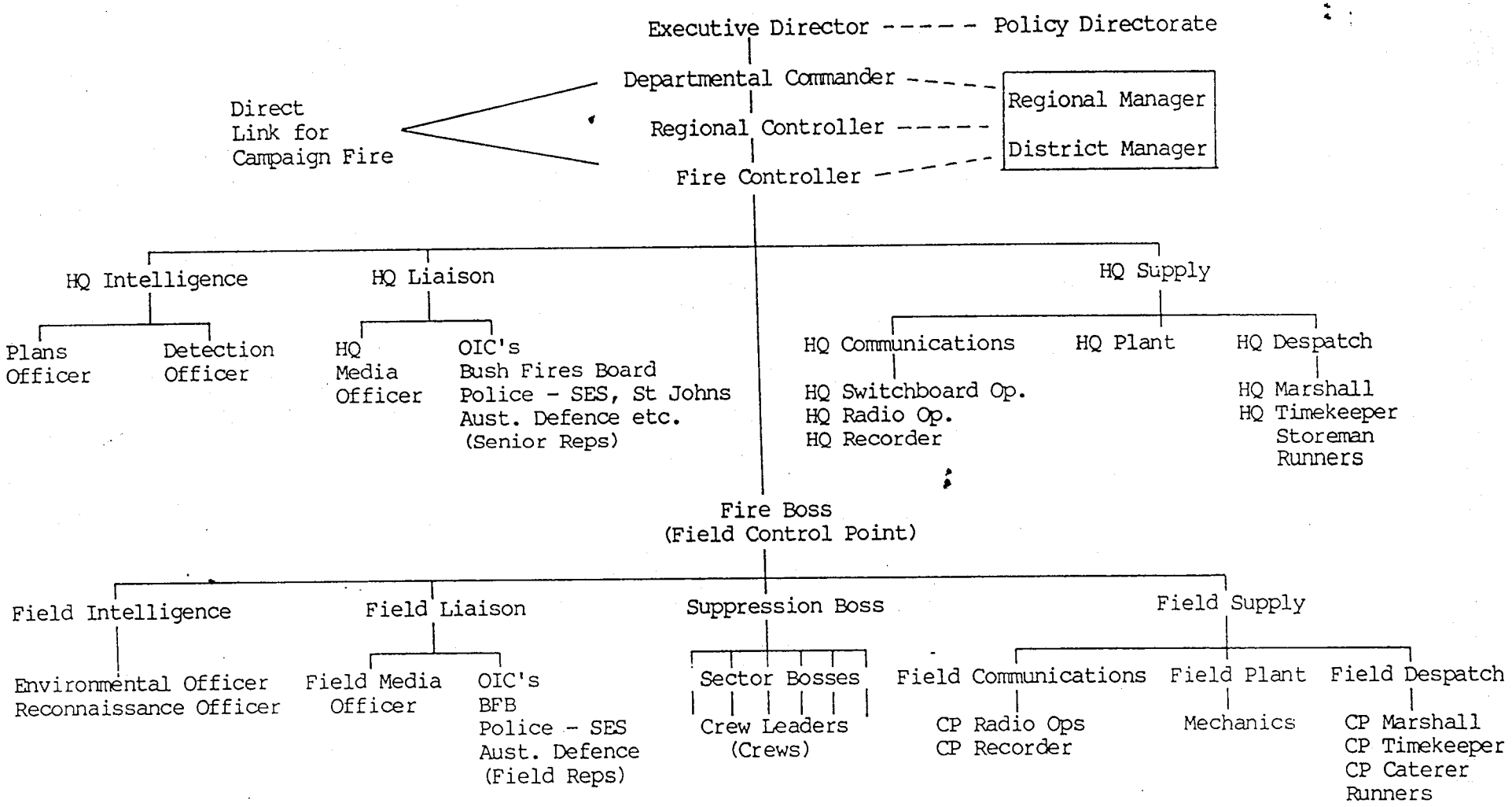
The Department's Large Fire Organisation which has been successfully applied in forest areas for the past twenty years, is soon to be replaced by the Australian Inter-Service Incident Management System (AIIMS). This change has been deemed necessary as the AIIMS System allows for better co-ordination and integration of different combat and support agencies likely to be involved in any type of incident, whether large or small.

Training of key personnel of the Incident Control System of AIIMS is currently underway to enable the system to be used at the start of the 1992/93 fire season.

Figure 2 shows the usual fire organisation structure that is established for very large fires (campaign fires) such as the Yanchep fire of 31 January 1991. The roles and responsibilities of all personnel that make up this structure are detailed in the Department's fire Suppression Organisation booklet. Most staff are trained in a range of roles in the fire suppression organisation. Fire Controllers and Fire Bosses are required to maintain a high level of qualifications and competencies to ensure they are able to take control of major emergencies including decisions on life and death.

FIGURE 2.1

CAMPAIGN FIRE ORGANISATION
Functions and LIne of Responsibilities



7. ENVIRONMENTAL CONSIDERATIONS IN FIRE SUPPRESSION:

The potential impacts of wildfires and fire suppression operations on environmental values is a critical consideration on all CALM lands. These considerations are part of the set of constraints and opportunities that have to be taken into account at all stages of the planning and implementation of fire management on CALM lands. For example, the potential for spreading dieback disease in fire suppression operations must be assessed by a Fire Controller before any decision is made on the use of bulldozers and other machinery for this task.

All Controllers are trained to use a Fire Appreciation form (in Appendix) which contains a Dieback Checklist. This allows Controllers to develop alternative strategies for minimising risks of dieback spread and risks of fire suppression failure. Controllers and Fire Line Supervisors have clear responsibility for ensuring that environmental damage agents such as dieback spread, and soil erosion are minimised at a fire.

Where fires occur within sensitive areas, an "Environmental Advisor" is appointed to provide intelligence to the Controller and Fireline Supervisors on the risks of environmental damages, and appropriate measures needed to minimise their impact.

Examples of some measures used to minimise potential impacts on some of the recognised environmental and social values are given below.

Dieback Disease:

* demarcate for dieback presence.

* apply strict hygiene precautions ie brush down of machines entering area, or between sub-catchment boundaries.

* allow fire to burn out to buffers or tracks

* dry soil conditions operations only.

Rare Flora And Fauna Habitat:

* use location maps to identify presence.

* consider vulnerability to fire.

* if vulnerable, attempt to prevent fire from burning out specific areas.

* relocate fire lines to avoid sensitve sites.

* allow fire to burn into pre-existing buffers

* minimise use of chemical retardants.

Soil Damage/erosion:

* identify fragile soil areas (eg sand dunes or steep slopes).

* avoid using bulldozers in sensitive areas (eg use hand tool attack if risk of failure is low).

* allow fire to burn out to low fuel buffers.

* contour fire lines on steep slopes

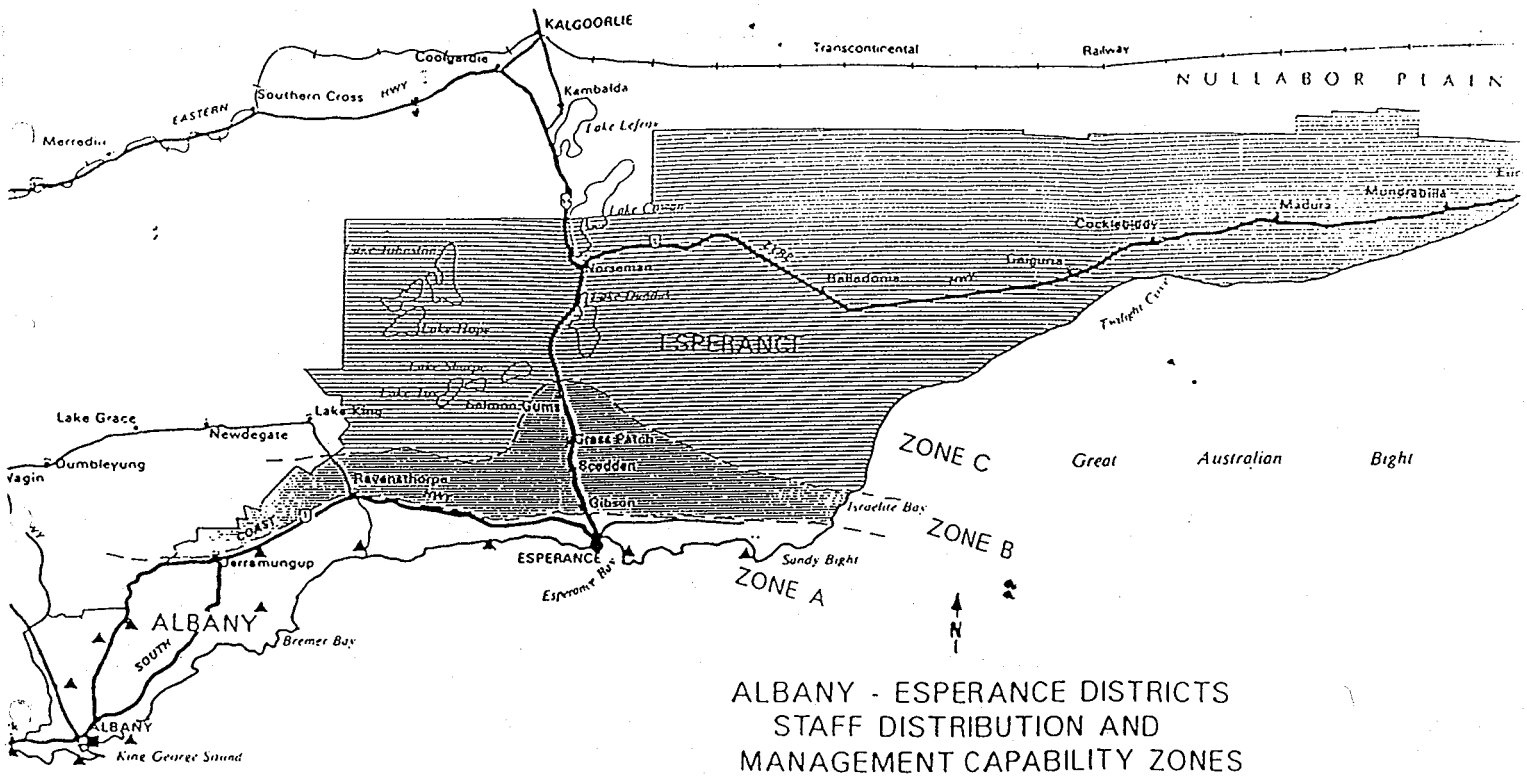
* apply erosion barriers immediately after completion of suppression operations.

* rehabilitate damaged sites.

7. CONCLUSION:

CALM's responsibility in fire management is a most onerous one. Not only do we have the responsibility to ensure that the undesirable consequences of fire on the ecosystems that we manage are minimised, but it is also important that we ensure that our fire management techniques are in themselves appropriate to the management objectives set for those lands.

Perhaps more importantly however are our social responsibilities with respect to fire. Our best efforts at protecting the ecosystems from undesirable fire effects will mean nothing if we fail to take the appropriate measures to protect our neighbours and our own fire fighting staff from injury or even death. The Controller must always keep in mind the safety of his fire fighting personnel and that of our neighbours. The law, and the judgement of society can be very severe on people who make the wrong decision.



ALBANY - ESPERANCE DISTRICTS
STAFF DISTRIBUTION AND
MANAGEMENT CAPABILITY ZONES

Regional & District Headquarters ■
District Headquarters ●
Field Staff Location ▲

0 20 40 60 80 160 240
SCALE IN KILOMETRES

MAP 1 – FIRE SUPPRESSION RESPONSE ZONES IN SOUTH COAST REGION.

CONTROLLERS FIRE SUPPRESSION GUIDE

THIS FORM TO BE USED IN CONJUNCTION WITH CONTROLLERS CHECKLIST IN L.F.O. BOOKLET

This guide comprises: Part 1. Strategy Checklist
Part 2. Fire Appreciation
Part 3. Dieback Checklist

FIRE NO. _____ DATE/TIME STARTED _____ LOCATION _____

QUARANTINE AREA PERMIT NO. _____ CONTROLLER _____

PART 1 : STRATEGY CHECKLIST

FIRE REPORT:

1. PLOT FIRE, NOTE DIEBACK OCCURRENCE
   If suppression required, proceed to 2.

2. Decide access route/s to fire and advise Despatcher.
   Ensure vehicle cleanliness and washdown.

DESPATCH:

3. Despatch forces as per Despatcher Tables requirements.

4. On page 2 - Fire Appreciation, complete items (1), (2) and (3) Confirm by field observation. Decide sequence of fire attack (Headfire first? Flanks? Tail?)

5. Initiate immediate attack with hand tools.

6. On page 2 - Fire Appreciation, complete items (4), (5), (6) & (7).

7. Is hand tool attack adequate? If yes, strategy is completed. Proceed to 17. below.
   If no, proceed to 8. below.

8. Heavy plant or alternative strategies are required.

9. Firelines entirely <u>within</u> clean or dieback forest : no hygiene required.

10. Choose a fire strategy.

11. Check "task" against fireline production capacity. If forces are adequate, strategy is completed - proceed to 17. below.

    If force is inadequate, return to 10. above.

12. Fireline will <u>traverse</u> diseased and clean forest : hygiene is required.

13. Assess risks - complete checklist on back page of this guide.

14. Choose a fire strategy.

15. Check "task" against fireline production capacity. If forces adequate, proceed to 17. below.

    If inadequate, return to 14. above.

16. Confer with Fire Boss and nominate fireline hygiene requirements - i.e. washdown points, water treatment, alternative fireline locations to avoid disease spread.

17. Arrange hygiene requirements for vehicles and equipment leaving the fire.

PART 2 : FIRE APPRECIATION

(1) AIM

Suppression Objective _____

_____

Access Routes _____

Control Point _____

(2) FIRE BEHAVIOUR

FACTORS

WEATHER

	current	peak
Temp °C		
RH%		
Wind kmh		
Wind direction		

Likely wind changes(?) _____

_____

FUEL

Type and quantity _____

_____

SMC

	current	min
Fuel type ( )		
Fuel type ( )		

SLOPE

_____ degrees

DEDUCTIONS

F.D.I. (specify fuel type)

_____ _____ m/hr

_____ _____ m/hr

Headfire ROS (fuel type?)

_____ _____ m/hr

_____ _____ m/hr

Flankfire ROS ($\frac{1}{2}$ headfire ROS)

_____ _____ m/hr

_____ _____ m/hr

(3) VALUES ENDANGERED

Describe and assign priority to each (Life, Property, Forest, Other)

_____

_____

_____

_____

_____

_____

_____

(4) RESOURCES	TYPE		STRENGTH & IDENTITY	EST. TIME OF ARRIVAL AT FIRE	FIRELINE PRODUCTION CAPACITY
	GANG UNITS	1.			
		2.			
		3.			
		4.			
		5.			
	RUBBER TYRED MACHINES	1.			
		2.			
		3.			
	HEAVY BULLDOZERS	1.			
		2.			
		3.			
	OTHER				

(5) FIRE PERIMETER AND FIRELINE PRODUCTION

NOTE:
FIRE PERIMETER (A) IS APPROX. 2.5 TIMES FIRE LENGTH

TIME INTERVAL					
TOTAL FIRE LENGTH					
(A) PERIMETER LENGTH NO SUPPRESSION					
(B) FIRELINE PRODUCED IN TIME INTERVAL					
(C) CUMULATIVE FIRELINE PRODUCED					
(D) PERIMETER REMAINING (A) MINUS (C)					

(6) ALTERNATIVE STRATEGIES

1. _____
2. _____
3. _____

(7) STRATEGY ADOPTED

_____
_____
_____

PART 3 : DIEBACK CHECKLIST

This section to be completed if heavy plant is required for suppression, and firelines are likely to traverse clean and diseased forest.

1. Develop alternative strategies : Locate firelines for

   Direct Attack ☐
   Parallel Attack ☐
   Backburning ☐

2. Assess risks for alternative attack methods.

		Risk of Suppression Failure		Risk of Dieback Spread	
		High Risk	Low Risk	High Risk	Low Risk
HEADFIRE					
Sector _____	Direct Attack	☐	☐	☐	☐
Sector _____	Parallel Attack	☐	☐	☐	☐
Sector _____	Backburn	☐	☐	☐	☐
FLANKFIRE					
Sector _____	Direct Attack	☐	☐	☐	☐
Sector _____	Parallel Attack	☐	☐	☐	☐
Sector _____	Backburn	☐	☐	☐	☐
FLANKFIRE					
Sector _____	Direct Attack	☐	☐	☐	☐
Sector _____	Parallel Attack	☐	☐	☐	☐
Sector _____	Backburn	☐	☐	☐	☐
BACKFIRE					
Sector _____	Direct Attack	☐	☐	☐	☐
Sector _____	Parallel Attack	☐	☐	☐	☐
Sector _____	Backburn	☐	☐	☐	☐

Choose attack strategy - preferably with low risk for both fire suppression and dieback spread. Nominate below:

_____

_____

SIGNATURE _____ DATE _____ TIME _____