

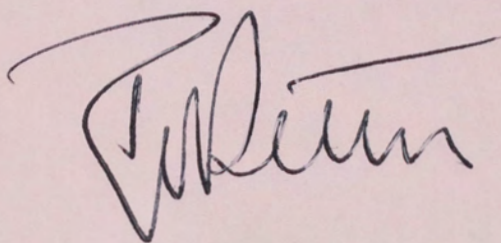
**CONFIDENTIAL**  
**CABINET DECISION**  
**No. 7573**

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Submission No: 6408

Title: **WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER**

Cabinet approved the release for public comment of the draft Discussion Paper aimed at developing a Wildfire Management Strategy for the Northern Territory.



**R.A.SETTER**  
Secretary to Cabinet

1 December 1992

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**CONFIDENTIAL**

CONFIDENTIAL

6408

FOR CABINET

SUBMISSION No: .....

Title:	WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER
Minister	MINISTER FOR CONSERVATION, THE HON MIKE REED MLA
Purpose:	SEEK APPROVAL TO RELEASE FOR PUBLIC COMMENT A DISCUSSION PAPER ENABLING THE PREPARATION OF A WILDFIRE MANAGEMENT STRATEGY
Relation to existing policy:	CONSISTENT
Timing/ legislative priority:	AS SOON AS POSSIBLE TO ENABLE A STRATEGY TO BE IN PLACE FOR THE 1993 FIRE SEASON
Announcement of decision, tabling, etc:	THE STRATEGY IS BEING RELEASED FOR PUBLIC COMMENT
Action required before announcement:	NIL
Staffing implications, numbers and costs, etc:	NIL
Total cost:	NIL

**CONFIDENTIAL**

DEPARTMENT OF THE CHIEF MINISTER

**COMMENT ON CABINET SUBMISSION:**

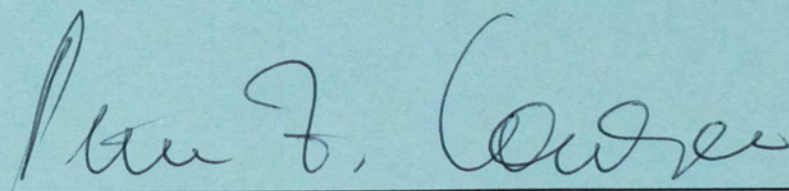
**TITLE:** WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION  
PAPER

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**COMMENTS:**

The following Departments/Authorities support the submission -

Department of the Chief Minister  
NT Treasury  
Office of Local Government  
Department of Lands and Housing  
Department of Law



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**SIGNED:**

**DESIGNATION:** SECRETARY

**DATE:** 23 NOV 1992

**CONFIDENTIAL**

Department/Authority.....

**COMMENT ON CABINET SUBMISSION No.**

**TITLE:** ..... WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER .....

.....

.....

**COMMENTS:**

The following Departments support the submission:

- ✓ Department of Primary Industry and Fisheries
- ✓ Department of Law
- ✓ Department of the Chief Minister
- ✓ Northern Territory Treasury
- ✓ Office of Local Government
- ✓ Department of Lands and Housing

SIGNED:

DESIGNATION:

DATE:

Department/Authority: **DEPARTMENT OF THE CHIEF MINISTER**

**COMMENT ON CABINET SUBMISSION No.**

**TITLE: WILDFIRE MANAGEMENT STRATEGY -  
A DISCUSSION PAPER**

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**COMMENTS:**

The recommendation is supported.

*Peter J. Conran.*

**SIGNED: PETER CONRAN**

**DESIGNATION: SECRETARY**

**DATE:**

30 SEP 1992

**CONFIDENTIAL**

Library & Archives NT, NTRS 2575/P1, Volume 401A, Decision 7573

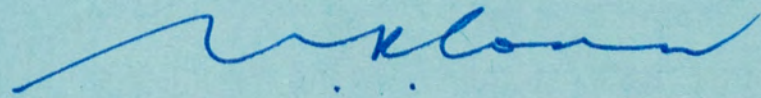
Department/Authority..... **NORTHERN TERRITORY TREASURY**.....

**COMMENT ON CABINET SUBMISSION No.**

**TITLE:** ..... **WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER**

**COMMENTS:**

The Submission is supported.



**SIGNED:** N R CONN

**DESIGNATION:** UNDER TREASURER

**DATE:** 28 SEPTEMBER 1992 **CONFIDENTIAL**

~~CONFIDENTIAL~~

**DEPARTMENT:** OFFICE OF LOCAL GOVERNMENT

**COMMENT ON CABINET SUBMISSION No.**

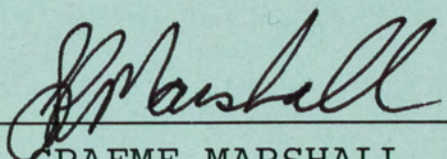
**TITLE:** WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER

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**COMMENTS:**

The above Submission is supported.

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**SIGNED:**  GRAEME MARSHALL  
**DESIGNATION:** CHIEF EXECUTIVE OFFICER  
**DATE:** 6 OCTOBER 1992

CONFIDENTIAL

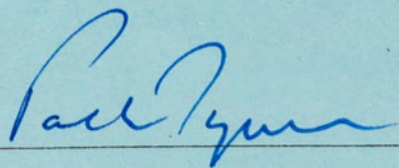
Department/~~XXXXXX~~ DEPARTMENT OF LANDS AND HOUSING

COMMENT ON CABINET SUBMISSION No.

TITLE: WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER

COMMENTS:

This Submission is supported.



SIGNED: PAUL TYRRELL

DESIGNATION: SECRETARY

DATE: 6/10/92

CONFIDENTIAL



Department/Authority: LAW

COMMENT ON CABINET SUBMISSION NO.

TITLE: <sup>FIRE</sup> WILDLIFE MANAGEMENT STRATEGY - A DISCUSSION PAPER

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COMMENTS:

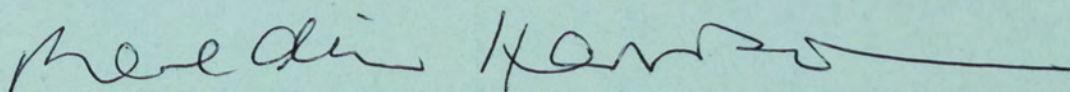
The proposal is to release for public comment a discussion paper on a strategy for the management of wildfires in the Northern Territory.

There appear to be no constitutional or legal barriers to the proposal.

The proposal does not raise any consumer implications.

RESOURCE IMPLICATIONS:

The Submission does not appear to raise any additional resource implications at this point in time.



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8 SIGNED: Meredith Harrison  
DESIGNATION: Secretary, Department of Law  
DATE: 5 October 1992

Department/Authority.....DEPARTMENT OF PRIMARY INDUSTRY & FISHERIES.....

COMMENT ON CABINET SUBMISSION No.

TITLE: ..... WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION  
..... PAPER  
.....

COMMENTS:

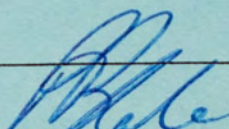
Release of the discussion paper is supported.

The Cabinet Submission notes that development of a Wildfire Management Strategy before the 1993 fire season would be beneficial. Identification and perhaps recommendation of a timetable to achieve this (release of discussion paper, period for adequate and reasonable public comment, preparation of a draft strategy, etc) would be valuable, especially as it is now October 1992.

The Discussion Paper would benefit from a comprehensive Table of Contents and a List of the References that are included in the text.

Inclusion of degrees of latitude on the map on page 7 would help to identify the regions named on page 5.

SIGNED: Peter G Blake



DESIGNATION: Secretary

DATE: 6.10.92.

CONFIDENTIAL

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Library & Archives NT, NTRS 2575/P1, Volume 401A, Decision 7573

Department/Authority ..... **NORTHERN TERRITORY POLICE, FIRE AND EMERGENCY SERVICES** .....

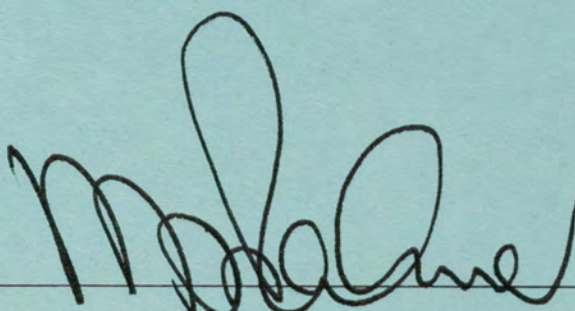
**COMMENT ON CABINET SUBMISSION No.**

**TITLE:** ..... **WILDFIRE MANAGEMENT STRATEGY - A DISCUSSION PAPER** .....

**COMMENTS:**

The Northern Territory Fire Service (NTFS) has previously read and discussed this paper with the Bush Fires Council of the Northern Territory in its draft form.

Although not in full agreement with the thrust of this document the NTFS has no objection to the release of the Discussion Paper for public comment.



SIGNED:

M J PALMER

DESIGNATION: COMMISSIONER OF POLICE

DATE: OCTOBER 1992 **CONFIDENTIAL**

**CONFIDENTIAL**

**RECOMMENDATION**

1. It is recommended that Cabinet approve the release of the attached draft Discussion Paper, aimed at developing a Wildfire Management Strategy for the Northern Territory, for public comment.

**BACKGROUND**

2. There is a growing public concern about the fire prevention and control measures used to effect fire management. Much of this concern is based on the so-called "annual burn-off", as distinct from bushfire control. It is believed to come largely from people who are not directly affected by bushfires and who may lack the basic understanding of the need for preventive measures in fire management.
3. The concerns expressed include those of the urban dweller who is subject to smoke pollution during the fire season and also visitors to the Territory who see blackened road verges. This situation is not unique to the Territory and follows a growing trend throughout Australia. There is also an increase in public concern with regard to burning operations as preventive measures. In the Northern Territory, the recent adverse publicity could place pre-season fire prevention measures in jeopardy for ill-informed reasons.

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**CONSIDERATION OF THE ISSUES**

4. A Discussion Paper, aimed at identifying the issues with a view to seeking public comment, has been prepared with the assistance of Mr Phil Cheney, the former Director of the National Bushfire Research Unit of the CSIRO. Mr Cheney is a recognised world authority on bushfire management and control.
  
5. The Discussion Paper reviews the role of fire in the Northern Territory and addresses concerns most frequently expressed by people directly and indirectly affected by bushfires. It also considers directions for more effective fire management throughout the Northern Territory and contains some suggestions as to the main elements of a Fire Management Strategy. Public comment on this paper and any issues arising from it will be important in formulating a Fire Management Strategy for the Northern Territory.

**OPTIONS**

- 6 The options are:
  - (a) Continue with the established procedures of seeking advice from the Bushfires Council on fire management policies and strategies. This is not the preferred option as public pressure requires that these matters be addressed.

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- (b) Release the Discussion Paper as a public document requesting the views of concerned citizens prior to formulating a fire management strategy. This is the preferred option as all issues can be discussed and considered in the formulation of a strategy.

**PUBLIC IMPACT OF THE RECOMMENDATIONS**

7. There is likely to be considerable public comment on the Discussion Paper. Sections of the community have strong views on some of the issues raised.

**FINANCIAL CONSIDERATIONS**

8. Release of the Discussion Paper, public consultation and preparation of a draft Strategy can be accomplished within existing resources. Resource implication of the final Strategy would need to be further considered by Cabinet and would be the subject of a separate submission.

**REGULATORY IMPACT**

9. Nil

**EMPLOYMENT AND INDUSTRIAL RELATIONS**

10. Nil

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**COMMONWEALTH AND LOCAL GOVERNMENT RELATIONS**

11. Local Government will be invited to comment on the Discussion Paper. There may be implications for the Commonwealth with respect to Aboriginal and Crown lands.

**CO-ORDINATION AND CONSULTATION**

12. This Submission has been circulated to the Departments of Law, Lands and Housing, Primary Industry and Fisheries, Chief Minister, Treasury, the Office of Local Government and the NT Fire Service.

**LEGISLATION**

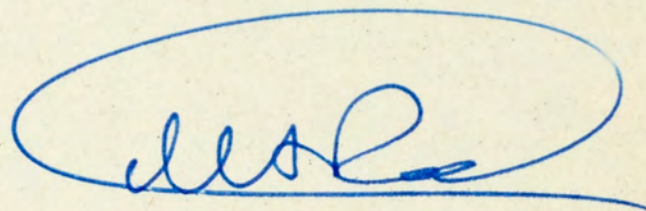
13. Nil.

**PUBLICITY**

14. It is necessary that the draft Discussion Paper be publicised throughout the Territory and that public comments be sought.

**TIMING**

15. There is no particular urgency for this project, although it would be beneficial if a Strategy existed prior to the 1993 Northern fire season.

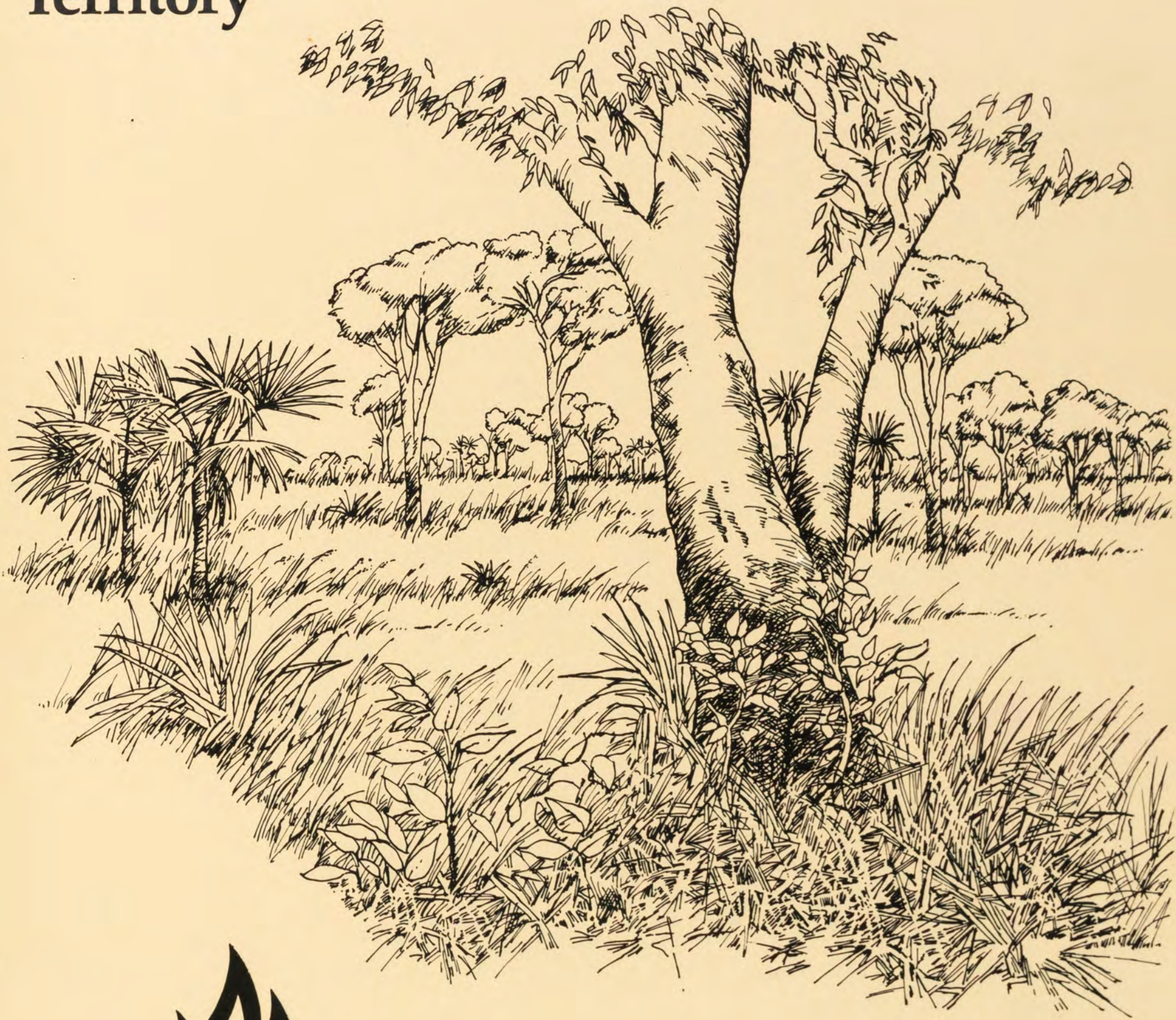


MIKE REED

# Discussion Paper

to formalise

## A strategy for the management of wildfires in the Northern Territory



**BUSH FIRES COUNCIL N.T.**

September 1992



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<b>Introduction</b>	<b>1</b>
A history of fire; Aboriginal burning; the pastoral industry; a rural fire authority.	
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<b>Effects of Fire and Management Techniques</b>	<b>11</b>
Concerns of landholders; people affected by fire; response and awareness to the need for fire control.	
<b>The need for Fire Management</b>	<b>13</b>
Avoidance of further major fires; the effect of better land management techniques; smaller block subdivisions; factors to take into account in developing a fire management strategy; fire management and control; fire suppression and containment; monitoring and research; education and training.	
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Fire control; who lights the fires; the annual "burn-off"; smoke; monitoring of burnt areas; the pluses and minuses of fire.	
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## INTRODUCTION

### HISTORY

The vegetation of the Australian continent is believed to have reached a fire dependent stability tens of thousands of years ago.

Fossil studies of pollen samples indicate that fire was a natural phenomenon and predated Aboriginal occupancy of the Australian continent.

The frequency, extent and effect of fire would be subject to conjecture but must be assumed to have been dependent on the availability of flammable fuel and an ignition source. Fires would have been a less frequent feature of the landscape but, if the fuel were abundant and fully cured, fires would have been extensive and intense.

The Aborigines introduced a pattern of fires and burning techniques which controlled the buildup of fuel, thereby reducing the incidence of large, intense fires. Their techniques resulted in a mosaic of growth in terms of stages and types of vegetation development, which guaranteed food sources and habitats both for them and for the animals they hunted.

Fires were set by the Aborigines for hunting, food gathering, signalling, and ease of movement. Stocker (1966) notes that where Aborigines depended at least partly on the land for their food supply, they exerted controls over their burning practices.

Biological studies in the 1970s and 1980s recognized the value of traditional burning regimes in providing different post fire states for genetic diversity of both indigenous plants and animals.

Griffin (1988), on evidence gathered in studies by CSIRO, suggests that Aboriginal burning in the Arid Zone was not indiscriminate or without short and long term objectives. Similarly, Haynes' studies between 1972-78 around Maningrida found that:

- there was considerable variation in the Aborigines' objectives and management practice between the more broadly defined fire prone biomes (floodplain, woodland, open forest and closed forest);
- seasons were precisely discerned by the Aborigines and recognised as the major determinants of fire behaviour;
- the area burnt by individual fires increased with time after the cessation of the rainy season until a point was reached where control could no longer be exerted as fires burnt through the night and continued over succeeding days;

- burning off in practice produced a sequence of burnt and unburnt land;
- control over fires was achieved by timing and placement of fires. Fires that burnt through the night and into the next day were considered beyond control.

There are records of fires lit to waylay and attack the early explorers so it is possible that indiscriminate burning also took place to protect tribal territory.

The nett result of traditional burning practices was a greater frequency of fires, that left a mosaic of many post fire states. The amount of fuel available to carry fires was broken up into patches and in occupied areas, fires could be contained.

By the time the early European explorers came to the Territory they witnessed the widespread use of burning for a variety of purposes. However, European colonisation and settlement, which started in earnest in the 1870s, had a profound effect on the habits of the Aboriginal population. Many were moved from their traditional lands or shifted to centralised communities and the management of the land changed, with livestock exercising an increasing influence on burning patterns throughout the Territory. Pastoralists burnt to obtain green pick for their cattle and assist in mustering.

Unlike other parts of Australia, early European settlement did not significantly impact on the pattern of existing fire regimes.

However, over time the introduction of domestic and feral stock has had an effect on the fire regimes in the arid zone. Frequent burning as practised by Aborigines prior to European settlement ceased but these fire regimes are being reinstated in some NT conservation areas.

Extensive wildfires occurred throughout the Territory in the 1920s, 50s and mid 70s. In later years, a range of measures, including protection burning, have diminished the recurrence of such widespread fires and restricted the amount of damage.

Given the area of fire prone country in the Northern Territory and the distances between adequate water sources, particularly in the more arid central region, it's an economic and practical necessity to fight fire with fire. Over most of the Territory, there is no alternative.

Synonymous with any fire is fuel, the material which the fire burns. The greater the fuel buildup, the worse the fire.

## A RURAL FIRE AUTHORITY

The Bush Fires Council of the Northern Territory, a statutory body established under the Bushfires Act, is responsible for the control of wildfires in all areas, except those which are within the boundaries of small fire districts under the jurisdiction of the Northern Territory Fire Service.

Under the Act, the Territory is divided into nine Fire Control Regions, each with a local committee largely made up of landholders and a Regional Fire Control Officer.

The Bush Fires Council is comprised of the Chair of each of the regional committees, with representatives from relevant Territory and Commonwealth Government departments. It advises the Minister for Conservation on policies and strategies for protection against fire.

The Council has policies in place designed to achieve its fire management objectives:-

"To protect life, property, productive lands and environmental assets from bushfire damage" and

"To maintain natural resources including indigenous ecosystems and productive lands, by the use of appropriate fire regimes in accordance with management objectives".

The Council recognises that while its policies will assist in the reduction of damage from wildfires, it remains the clear responsibility of landholders to control fires within the boundaries of their properties.

The Government employs specialist staff to assist the Council in the implementation of its policies and strategies. They provide fire fighting training for volunteer bushfire brigades, technical advice and assistance to landholders on fire suppression, planning for fire prevention including the maintenance of Council fire breaks, as well as undertaking the annual prescribed burning program to prepare fire breaks and to reduce fuel.

The Bush Fires Council feels the community should be better acquainted with the need for burning and fuel hazard reduction to prevent major fires. Prescribed burning is regarded as the most efficient, ecologically suitable and economic method of reducing fire fuel loads over large areas.

With a view towards greater community awareness, the Council has produced this discussion paper, which was developed around the findings of Phil Cheney, Principal Research Scientist with the Bushfire Research Unit of the CSIRO's Forestry Division.

This paper reviews the role of fire in the Northern Territory and addresses concerns most frequently expressed by people directly and indirectly affected by wildfires. It also considers directions for more effective fire management throughout the Northern Territory.

Public comment and any issues arising from this paper are welcome. Written comment should be addressed to:

The Chief Fire Control Officer  
PO Box 37346  
WINNELLIE NT 0821

## WHY FIRES OCCUR IN THE NORTHERN TERRITORY

The Northern Territory covers 1,346,000 square kilometres, extending from the coastal tropics in the North to Semi-arid subtropics in the South and can be divided into these broad regions - the Top End (north of 16°S), the Central Region (16 - 21°S) and the Southern Region (21 - 26°S).

The Northern Region, the coastal tropics receive 95% of rainfall between November and April. The total annual rainfall in this region varies between 1,000 and 1,700 millimetres.

Europeans generally divide the year in the Top End into only two seasons, the Dry and the Wet. However, there are transition periods in and out of both, which are now recognised by the scientific community and divide the year into six distinctive periods, each with its own characteristics.

The Dry Season months of May to September are characterised by prolonged periods of fine, sunny conditions and low humidities. Southeast winds dominate, occasionally fresh to strong in force.

During October and November, the southeasterly winds weaken, temperatures and humidity levels increase and land-based thunderstorm development becomes more frequent. The arrival of the monsoon trough over the Top End, most frequently during December and January, is characterised by a shift in the prevailing winds from east to west, increased cloudiness and prolonged periods of heavy rain.

The majority of the annual rainfall is received during these monsoon periods, which occur sporadically throughout the Wet season and may last several weeks at a time. Intervening 'break' periods are characterised by reduced cloudiness, high temperatures and scattered thunderstorm activity.

The amount of fire fuel which will develop is dependent on the level of rain which falls during this period - a factor in all areas of the Territory but one which varies with the plant communities which occur in different regions.

The Central region rainfall varies from 500 - 1,000 millimetres and 95% of the rainfall is received during the months of November through to April. The region is a transition zone between the Top End and the Southern region and displays climatic characteristics of both.

In the Southern region, annual rainfall is between 250 and 500 millimetres. Droughts are not uncommon and may persist for up to seven or eight years (Luke and McArthur 1978). The Southern region also experiences wet and dry seasons, although less strictly delineated.

Rainfall is more variable and heavily regulated by the degree to which the monsoon influence penetrates south, at times reaching Alice Springs.

During the spring and summer months, surface prefrontal troughs associated with higher-latitude frontal systems may generate hot, fresh and gusty northerly winds and 'dry' thunderstorms. Winters are generally fine and mild, although night-time temperatures regularly fall below freezing.

### VEGETATION

Major seasonal fires in the Territory occur across three broad classifications of grasses.

In the Top End, the monsoon affected area, fires are generated mainly by a buildup of tall grasses.

Mitchell and Flinders grasses are typical of the Barkly and Central regions while, in the Southern region, fire fuel is mainly spinifex.

This is not to say that each species is confined to one area. The accompanying map on page 7 gives a broad indication of the distribution of grasses.

### FIRE WEATHER

#### SEASONAL VARIATION

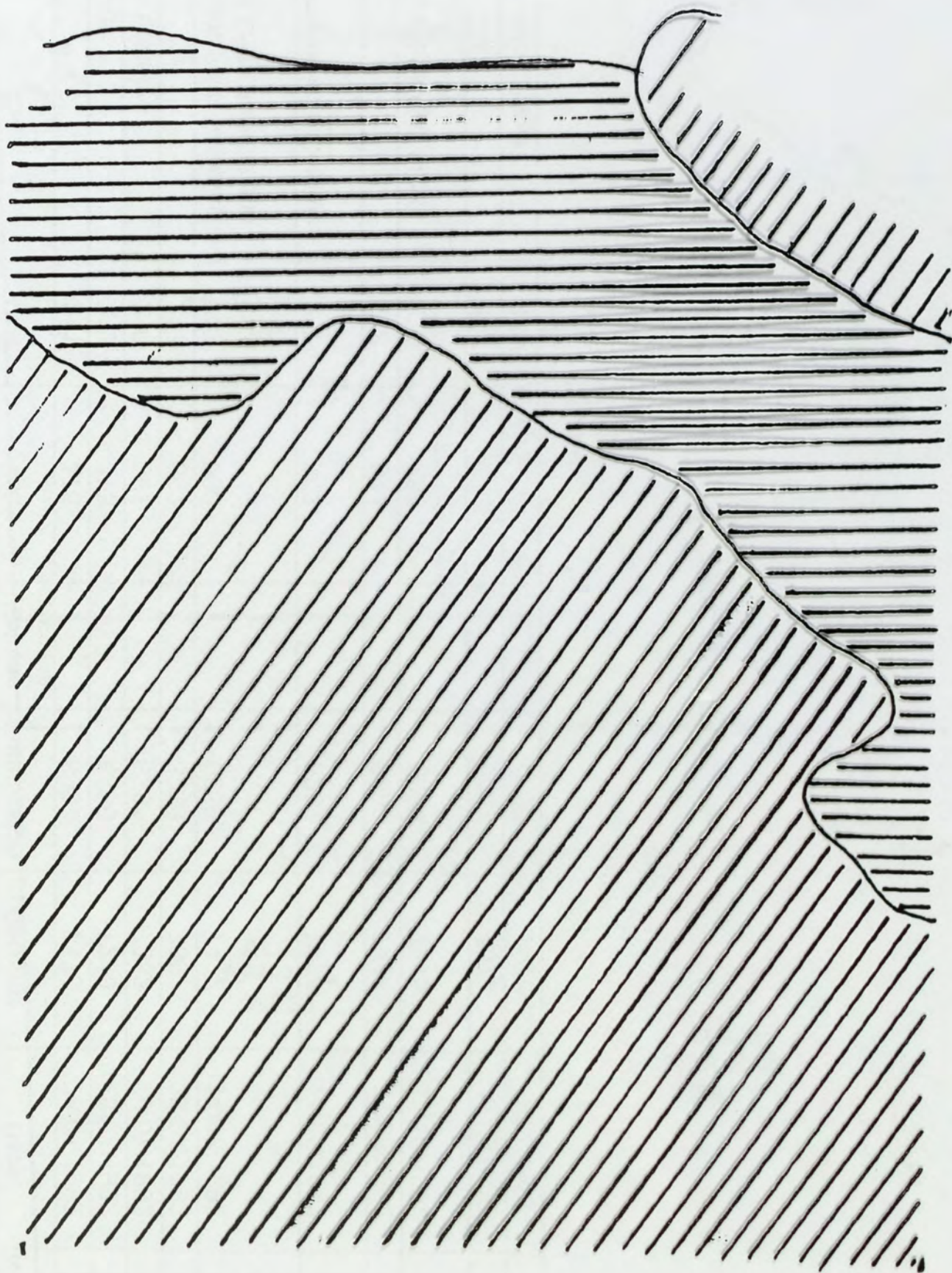
##### *Northern Region*

Extensive thunderstorm activity over the Top End during the Wet means that fuel moisture levels are high, significant wind surges are uncommon and the fire spread potential is low.

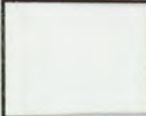


However, during the Dry season, fuel rapidly cures under the influence of low humidities, high insolation and strengthening southeast winds.

Accordingly, the fire season tends to be confined to the dry season months of May to October. There is natural fire suppression potential during the early Dry; steady, low-burning scrub fires are common, in part due to the ready availability of understorey fuel and the steadiness of the winds.

As the season progresses, fires become more intense until the onset of the Wet season, when green growth and moisture reduce that intensity.

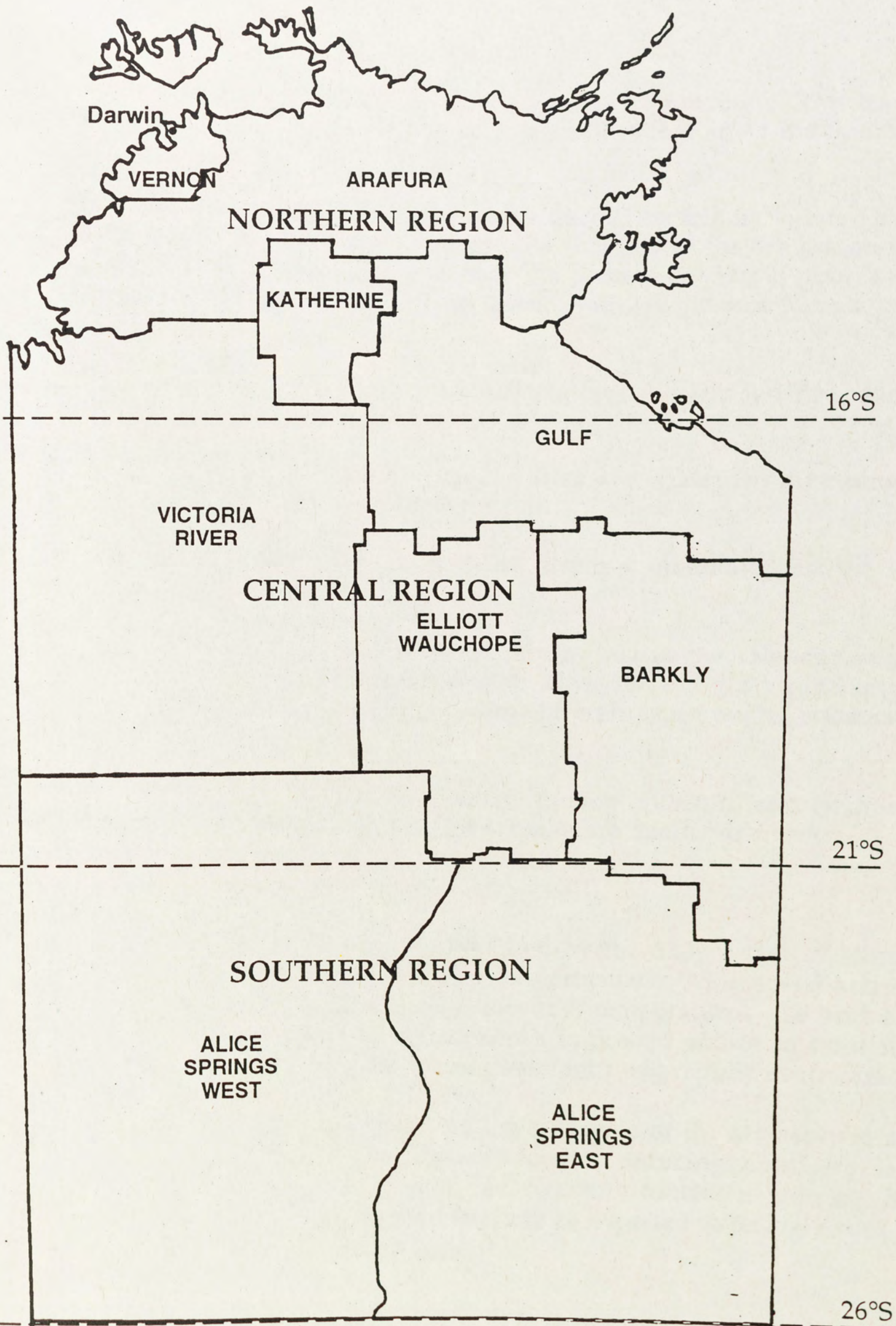


**Grass type Distribution**

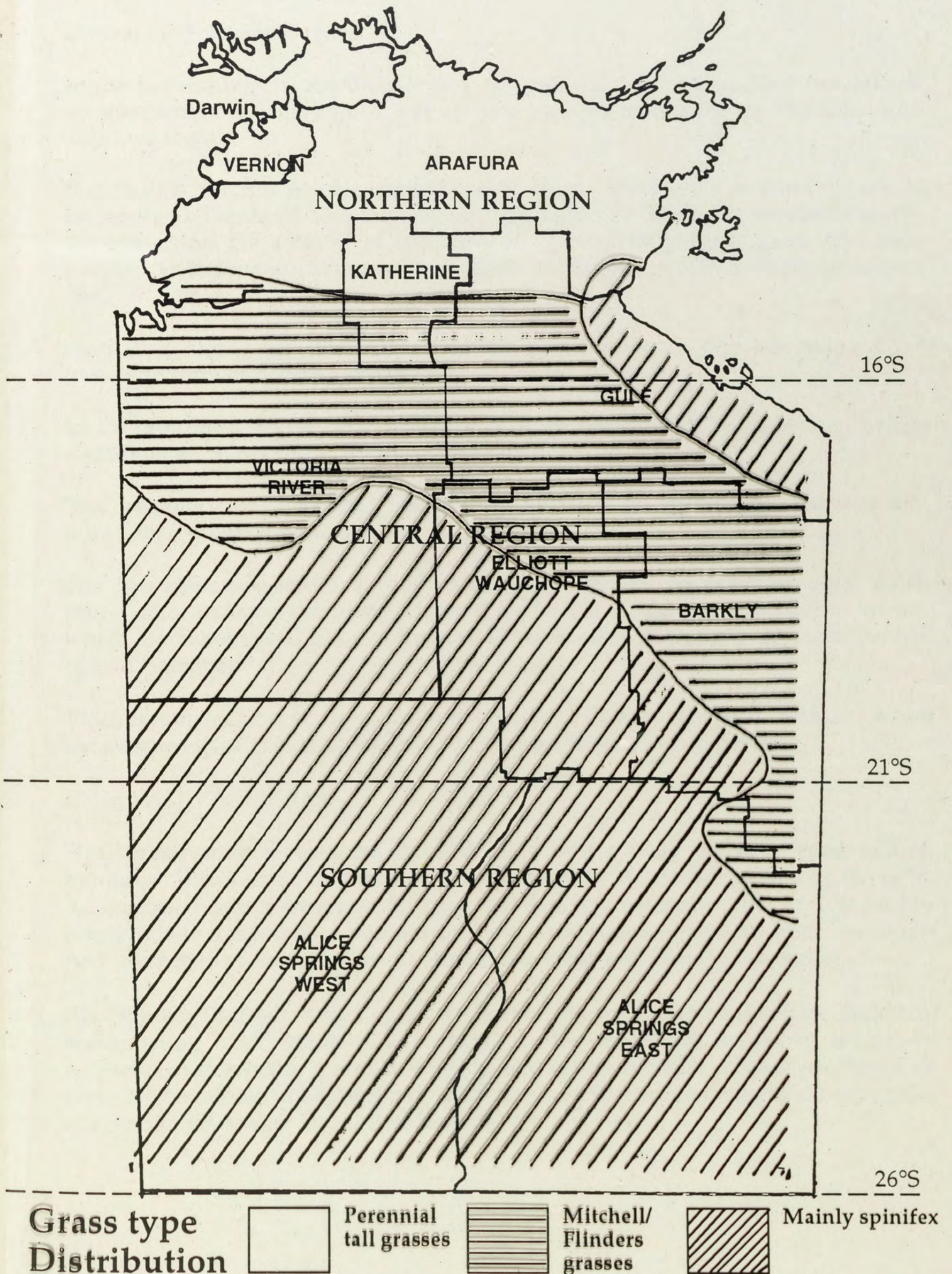
	Perennial tall grasses		Mitchell/Flinders grasses		Mainly spinifex
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# NT Fire Control Districts



# NT Fire Control Districts



### *Central & Southern Regions*

In the Central region, fire danger may be observed year round. This transitional zone experiences a mixture of fire climate regimes that affect the Southern and Top End regions.

The most active fire weather period occurs during the middle to late Dry season under the influence of southeast winds. The volatility of the fire season is highly dependent on the amount of rain over the preceding year; if good rain falls, coupled with numerous sunny days, these conditions promote ample grassland fuel.

Rainfall is highly variable in the Central region however, and fire seasons can pass with little or no fire activity.

In the Southern region, the majority of fires are ignited by lightning strikes (Griffin et al., 1983) from dry thunderstorms.

The frequency of such fires is therefore strongly modulated by the size and duration of these thunderstorms.

The fire season is confined predominantly to late in the calendar year, when thunderstorms are most likely to develop. Hot, dry and gusty northerly winds, which are experienced prior to the passage of prefrontal troughs, enhance the fire spread potential.

Thunderstorms occur less frequently during autumn and winter when temperatures are generally too low for extreme fire danger to develop.

### *DIURNAL VARIATION*

Fire spread potential is strongly modulated by the daily cycles in temperature, humidity, fuel moisture content and, most particularly, wind speed and strength. As surface heating increases during the day, temperatures rise and humidity levels fall in response to the atmosphere's improved ability to hold moisture. Any surface dew that may have formed overnight will rapidly evaporate.

Additionally, turbulent mixing of the lowest layers of the atmosphere assists in transporting drier air to the surface, further reducing humidity levels. In response to this heating and drying, fuel moisture content is reduced. Based on these factors alone, fire spread potential may be expected to be highest in the mid-afternoon and lowest just before sunrise.

There are other variables which can result in the most intense fire danger during the day. Fire spread is highly sensitive to wind and the strongest winds often occur in the morning, particularly in the Central region.

During the day, the surface winds weaken due to turbulent mixing with low-momentum upper air and fire danger decreases, despite higher temperatures and lower humidities.

In the Southern region, there is a different diurnal cycle associated with eastward travelling prefrontal troughs.

Northerly winds ahead of the trough are often stronger aloft than they are at the surface.

Accordingly, turbulent mixing during the afternoon reinforces the wind speed which, in concert with very high temperature and low humidity, leads to the highest fire danger ratings. Atmospheric instability can lead to gusty winds which increase the fire spread potential due to 'spotting'.

#### FIRE EFFECTS ON FLORA AND FAUNA

In the tropics, fires early in the Wet season and again early in the Dry are generally of low intensity, generating little heat. They have low flame heights, often cover only small areas and burn patchily.

Fires in mild conditions will do little or no damage to flora and fauna. Many plant species are fire tolerant, while insects and animals which have evolved within a fire prone environment have their own protective behaviour patterns. In mild fires of short duration, unburnt vegetative matter, root and soil crevices and waterways can afford protection.

Later fires are usually much more intense, often scorching all the leaves on the trees. They may engulf areas and produce a clean burn with very few unburnt patches. At the beginning of the Wet season, conditions again favour small, milder fires.

Irrespective of fire intensity, fires at different times of the year will affect flora and fauna differently because of life history differences between species (Braithwaite 1987).

Insects are vulnerable to fires either through radiant heat, exposure to predators through loss of protective cover, or loss of food source.

Faunal species can suffer disorientation caused by smoke and sudden updrafts. They can also suffer the longer term effects of heat exposure, habitat loss, loss of food sources and increased exposure to predators.

The severity of the damage is commensurate with the intensity of the fire and its extent. Losses during early season fires are negligible.

Post fire regeneration favours some birdlife in that there is improved accessibility and enhanced food resources as well as security from mammalian and reptilian predators on burnt areas.

The adaptability of flora and fauna to fire regimes varies according to the region of the Territory. Some animals may benefit from a particular fire regime while others may suffer. This could justify a continuum of fires throughout the season, ranging from mild to hot, to provide a mosaic of areas, some burnt to different intensities and others remaining unburnt, resulting in a broad diversity of habitat

## THE EFFECTS OF FIRE AND MANAGEMENT TECHNIQUES

Loss of life, property and productive pasture are of major concern to all landholders. The effects of smoke on the environment and the irritation of smoke and haze are of less concern though it is for these reasons most complaints come from urban dwellers.

Extensive research is needed into the effect of bush fires or their contribution to greenhouse gases.

The frequency of wildfires in specific areas or zones is basically governed by the annual rainfall and the growth response of vegetation in the area to the extent of the rain.

Park and reserve managers, farmers, pastoralists and small rural block holders within the area which regularly receives rain through the monsoon influence, can expect to face an annual wildfire problem - *particularly if they don't carry out prevention measures.*

Those in areas of lesser rainfall may experience differing degrees of fire danger governed by variations in fuel loading. In country dominated by slow growing spinifex, there will also be a correlation between fire danger and the number of years since the last fire.

Intense fires cause damage. When they occur, not only are flora and fauna directly affected but aesthetic changes, soil erosion and loss of nutrients may also result.

Controlled fires are an important and often essential tool in good land management. Fires may be set in the open to achieve specific land management objectives such as protection of specified areas and assets, shrub, weed and feral animal control, pasture improvement and to guarantee public safety.

Under conditions where dry fire-fighting techniques are employed because of a lack of water or the impracticality of carrying it over large distances, back burning is the major management tool in containing wildfires.

In regions of less reliable rainfall, the frequency of fires lit for specific purposes reduces in direct relationship to the level of fuel.

Many properties and rural blocks are owned by people non-resident in the NT and many of those who do live close at hand to their unimproved properties show little interest either in the condition of their blocks or whether they constitute a problem to neighbouring properties. Often, they are not concerned whether properties burn or not.

Some land users deliberately light fires illegally for purposes such as ease of access, protection of vehicles and bush camps and to expose the natural ground surface.

While all land owners are responsible by law for the management of fire on their properties, it remains essential to have established organisations charged with the overall responsibility of ensuring a reduction in the number and frequency of illegal fires and to constrain or suppress wildfires before they get out of hand.

The task of the BFC is to promote fire awareness, prevention and suppression methods, achieved through education of the general public and training of staff and Volunteer Bushfire Brigade personnel.

## THE NEED FOR FIRE MANAGEMENT

### CURRENT FIRE REGIMES

Initiatives by the Bush Fires Council, including the strategic location of graded fire breaks, burnt buffer zones and fuel hazard reduction measures prior to the fire danger periods, have helped prevent a recurrence of the 1975/76 run of fires which burnt out nearly a third of the Territory.

The establishment of Fire Control Regions, Regional Bushfires Committees and Volunteer Bushfire Brigades has further contributed to improved fire control.

During the 1991/92 fire season, although fire weather was relatively mild in the Top End, more than 170 wildfires were reported and some 40,000 square kilometres of land was burnt during the six month fire danger period from the end of June. Damage estimated at over \$750,000 has been reported in the Darwin hinterland and several claims were subject to Coroners' inquiries. In the Southern Region some 8,500 square kilometres were affected by fires.

Very hot fires are uncommon in the NT. High levels of decay during the Wet season and termite activity reduce the levels of fuel. This, coupled with our flat terrain and the lack of constant, strong, dry winds, means the Northern Territory is unlikely to suffer damage and loss of life from fires on the scale of the Ash Wednesday blazes in southern states.

*However, the potential remains for loss of life or property.*

In both sparsely settled and more populous rural areas, fires are not necessarily reported if they are unlikely to cause any damage. For that reason, the Bush Fires Council is unable to obtain an accurate record of individual fire occurrences throughout the Territory from fire reports.

In the arid regions, remote sensing imagery has been used to record fire history and the extent of fires can be calculated. Use of this technology is less successful in the Top End because of increased cloud cover and greater difficulty in interpreting reflectoric parameters.

Since 1978, there have been some notable changes to land management practices that have had an effect on fire regimes, particularly in the Top End.

The Brucellosis and Tuberculosis eradication campaign (BTEC) has resulted in the need for stock control and this has required greater capital investment.



Extensive rangeland grazing no longer exists and, combined with the reduction in feral animals, particularly buffalo, the capacity to reduce fuel hazard by grazing has been diminished.

There is potential for more intense fires to develop in lightly grazed productive grasslands.

The last 15 years has also seen extensive subdivision development around Darwin and Katherine. The population mix ranges from permanent residents to part time occupants, absentee landlords and speculators. Initially, capital investment is low and fire fighting resources scanty.

Some rural dwellers prefer nature to take its course and are against fuel hazard reduction. With this mix of land use, fire management and control is complicated and will remain so, at least until sufficient people assume responsibility for fire management on their blocks, either individually or through concerted and co-ordinated actions such as Volunteer Bushfire Brigades.

One concern is that many non-resident small block holders do not consider fuel a hazard until it is too late and conditions are adverse. If they then decide to burn off, hotter fires result, placing their own and neighbouring properties in jeopardy.

#### DEVELOPING A FIRE MANAGEMENT STRATEGY

A Fire Management Strategy for the Northern Territory must take into consideration the following factors:

Wildfires are a natural phenomena and have bear an integral part of the development of Australia's flora and fauna.

The Northern Territory environment guarantees that bushfires are inevitable. Fuel is the only environmental factor that can be managed to achieve fire control.

High intensity fires during severe fire weather cause most damage to the environment, as well as providing the greatest potential threat to life and property. Fire prevention and control measures should be undertaken to minimise the impact of wildfires.

Fire regimes will continue to vary with changes in land use.

Landholders must accept primary responsibility for fire management of land under their control.

Fire management in pastoral areas is designed to limit the amount of damage by fire to productive land - and to prevent late season fires from running unchecked through less productive country.

The aims of a strategy should be:

- 1 To reduce the total area burnt in the Northern Territory by unplanned fires.
- 2 To achieve a greater community involvement in bushfire management on private, leasehold or public land.
- 3 To achieve a balanced use of fire on natural and agricultural or pastoral lands to achieve specific management objectives.

These aims are met by the following:

#### FIRE MANAGEMENT & CONTROL METHODS

- Fire Breaks

Fire Breaks are used throughout the Territory to protect assets from fire. They may be narrow, well defined burnt or cleared strips.

Burnt buffer zones of from half a kilometre to two kilometres wide are also used to protect productive pastoral lands from fires originating on unproductive lands. Another method is to establish patchwork or mosaic burning as practised by Aborigines through fires of varying frequency and intensity. (See introduction)

Unfortunately, none of these methods guarantees control of a wildfire but they do break large tracts of country up into more manageable areas for fire control purposes. There are more than 2,500 km of firebreaks maintained by the Bush Fires Council throughout the Territory to provide a defensive line in the event of wildfire.

The strategic location of firebreaks has assisted the Council in preventing a recurrence of the major fires experienced in the Territory in the mid 1970s.

- Prescribed Burning

Prescribed burning is undertaken by land managers to achieve specific management objectives.

It is the most economic and therefore the most frequently used method of fuel hazard reduction to limit the scope of fires as the season escalates.

These burns are best undertaken when the fire weather is mild and natural suppression can be accomplished. Control is simply achieved when deliberately lit fires self-extinguish overnight, run into an area without fuel or where fuel is too green to burn.

Fuel loading is the only environment factor we can vary. Providing that fuel is continuous, during severe fire weather a fire becomes self propagating and is difficult to extinguish with available fire fighting resources.

The fire can only be halted by starving it of fuel. This can be achieved by a variety of means, grading, rolling, slashing, trittering, grazing. or through burning, which may be carried out, either early in the fire season or directly in the path of an oncoming wildfire.

Prescribed burns are most readily controlled prior to the fire danger period.

- Intense fires for Specific Land Management Objectives

Land managers may wish to burn with very hot fires to achieve woody weed control, noxious weed eradication or other specific land management objectives. Hot fires may be best achieved during the fire danger period but require far more stringent fire control measures.

- Late Season Burning

Land managers may wish to burn when the opportunity presents late in the fire season, to remove rank foliage and achieve desired changes in grass composition.

### FIRE SUPPRESSION & CONTAINMENT

The Bush Fires Council's policy is that direct fire suppression strategies should be adopted only when life and property are in imminent danger.

Where a fire does not pose a direct threat to life and property or other assets and helps to achieve management objectives, the decision to burn out certain areas within a specific time period may be made during the control of a wildfire.

The method adopted to achieve fire control should be cost effective in relation to economic and environmental values.

It is the responsibility of landholders to control fire within the boundaries of their properties. The method they choose to control wildfires is determined by the availability of resources for fire fighting.

Recognising the advantages of co-operative efforts in fire control, the Council has adopted a policy to establish and assist with training of Volunteer Bushfire Brigades to service the community in the more closely settled areas of the Northern Territory.

In the more remote areas, the Council encourages co-operation between adjoining landholders and provides advice on fire management planning, and supervision of fire suppression operations on large or complex fires. Council officers are also responsible for co-ordinating fire management on a regional basis.

Fires can be extinguished by cooling, smothering (oxygen starvation) or fuel removal. Water is the most efficient coolant providing it is readily and economically available. This is seldom the case in the Territory.

The distances between adequate water mitigate against the use of aerial tankers to water bomb wildfires. Even for water buckets carried by helicopters the recommended turn around time from the water source to the fire is only ten minutes. This restricts the possibility of water bombing to a few select situations.

Vehicle mobility is also an essential factor and one which restricts the size of water tankers that can be put into use on most rural wildfires.

Smothering techniques are restricted to mopping up operations on small fires - generally in more closely settled areas.

Back burning against a large running wildfire, commonly called dry fire fighting, is the only technique left if preventive measures have been inadequate.

#### MONITORING AND RESEARCH

More knowledge about fire behaviour and fire ecology is needed for different vegetation associations. Gathering information on differing fire regimes is essentially a long term exercise. Research undertaken indicates that regular burning with low intensity fires in the open forest areas has little effect on composition of plant species but can vary structure.

Biologists need to carry out further research into fire effect. Research findings should be disseminated routinely and incorporated into Plans of Management.

The CSIRO Division of Atmospheric Research constantly monitors greenhouse gases and is involved in researching the contribution of gases from bushfires to the Greenhouse Effect.

This research, which includes Northern Australia, should direct any change in fire management practices.

### EDUCATION

Annual public awareness campaigns are conducted during the leadup to the fire season and emphasize land managers' responsibilities in fire management and the need to undertake preventive measures. Rural newspapers, radio and television media have all been used to successfully disseminate this information.

The farming and pastoral community is well versed in fire management practices but there is a need to increase the level of public awareness among urban/rural fringe dwellers.

Any increased public awareness should be aimed at the months leading up to the fire danger period. This should be advertised and highlighted so the general public can appreciate the difference between periods of prescribed burning activities and the wildfire season.

### TRAINING

Courses in basic bushfire fighting are provided by the Bush Fires Council on both a formal and an ad hoc basis throughout the Territory at a variety of venues and locations. They comprise a balance of theory and practical work designed to equip the bushfire fighter with the skills necessary to combat fires safely and effectively.

Courses are provided to individual Volunteer Bushfire Brigades on request and this area is being pursued with an eye to increased participation.

The Brigade Competition Day has become an established event and the keen rivalry is of considerable assistance in reviewing practical techniques prior to the fire season.

## THE ISSUES

- CONTROL OF FIRES - SERVICE OR SELF HELP

Fire management in the Territory developed only recently. Unlike other parts of Australia it was a government initiative rather than a grass-roots movement to protect the livelihood and assets of individuals.

Today, fire control measures are seen incorrectly by many as a service to the community rather than a self-help program to protect individuals, their neighbours and their assets.

In the more closely settled rural areas the Bush Fires Council has assisted in the establishment of Volunteer Bushfire Brigades and these can only be effective if there is sufficient community involvement and support of their activities.

People not involved in fire management expect those who are (e.g. BFC, Volunteer Bush Fire Brigades) to meet conflicting community requirements. There is a perception of brigades as a Government agency and some rural residents therefore expect the same level of protection as provided by a fully paid urban fire service.

*Volunteer Bushfire Brigades are made up of just that - volunteers - who do not receive any remuneration for their arduous and at times dangerous efforts in protecting the community.*

The majority of the community does not appear to comprehend current fire management practices where the primary responsibility for fire control is vested with the landholder. Landholders are responsible for fire protection of their land and for containing any fires originating on their lands. During larger fires or severe fire weather, it is common practice for adjoining property owners to assist each other in fire control and suppression.

This is an area largely unrecognised, particularly by urban dwellers. The work done by landowners, managers and their workers both prior to and during the fire season is of inestimable value in overall fire control.

Existing Volunteer Bushfire Brigades need to review whether there is advantage in amalgamation or redefinition of boundaries as development proceeds. Some Brigades need strengthening through additional training and funding for equipment to gain community acceptance.

Where development is such that the community wishes to have a fire service cover as provided by an urban fire service, the Bush Fires Council could support transfer of a brigade area under its jurisdiction to the Northern Territory Fire Service.

The principles of self-help and volunteerism need to be more widely promoted and supported by the community.

- WHO LIGHTS THE FIRES

Many fires are lit by lightning, but the large majority are caused by humans.

It is the experience of the Bush Fires Council and the volunteer brigades that, apart from fires lit as part of a containment/management program, the number of fires which are started illegally is on the increase.

The Bush Fires Act contains provisions for preventive measures, conditions for the lighting of fires in the open, fire control and fire fighting.

The Act is reviewed regularly by the Bush Fires Council which has recommended increased penalties for breaches under the Act.

- THE ANNUAL "BURN-OFF"

The current objectives for control of fire to achieve the minimum burnt area of productive lands appear to be unrecognised. The role of fire in the management of natural areas is even more poorly understood by those not directly concerned with fire suppression.

The reasons for the view that fire is 'unnatural' and can or should be eliminated from the environment, need to be addressed. Perhaps the advances by the Bush Fires Council in reducing the area burnt by wildfires in the Northern Territory has given rise to the perception held by urban dwellers and the general public that most fires are deliberately and unnecessarily lit by the Council or its agents.

There is growing public concern about fire prevention and control measures used to effect fire management. Much of this concern is based on the so called 'annual burn-off', as distinct from bushfire control. It is believed to come largely from people not directly affected by bushfires and who may lack the basic understanding of the need for preventive measures in fire management.

It is from within the latter group that there is the greatest advocacy of a total 'no burn' policy.

- SMOKE

Smoke from fires is often trapped by temperature inversion, resulting in a low lying pall which spreads over the Top End in particular.

Smoke presents significant visibility problems to aviation and leads to regular complaints from tour operators and, in more closely settled areas, from local residents. If wildfires are accepted as a naturally occurring phenomenon in rural Australia, then smoke from these fires must equally be recognised as being part of the course of nature.

Built up areas may be affected by smoke from fires a great distance away.

The Australian Association of Rural Fire Authorities recommends that research be carried out on smoke from prescribed fuel reduction burning to determine its "fingerprint" and thereby its contribution to atmospheric pollution.

- MONITORING OF AREA BURNT

The extent and severity of wildfires are determined by fuel loading, curing and fire weather. Wildfires are dependent upon sources of ignition, both human and natural. Spread of fires can be controlled by natural barriers and by preventive or direct suppression measures.

However, recent studies indicate that regular monitoring of fuel loadings and weather conditions can identify potential fire danger sites and give an indication of the severity and spread that could occur.

Remote sensing affords the best opportunity to record large wildfires. Monitoring should be on a regular sequence so that planned protective burning and wildfires can be analysed and quantitative assessments made.

- FIRE - NO NEWCOMER TO AUSTRALIA

As mentioned in the introduction to this paper, fire has been around in Australia a lot longer than we have and the vegetation which has developed is the product of long interaction with fire.

Too often, only the destructive aspects of fire are considered and these have been officially promoted in the past in order to gain co-operation to control bushfires.

The positive as well as the negative effects of fire in the eco-system need to be promoted, although this is a much more difficult concept for many people to grasp than the clear cut issue of stopping all fires.



## SUMMARY

This paper, while written from a Bush Fires Council viewpoint, seeks to address the issues of wildfire as they relate to the broader community.

The diversity of conditions experienced in the Northern Territory highlights the need for continuing review of fire management techniques and practices.

A viable fire management strategy will evolve only through the incorporation of specialist skills such as those available from the CSIRO and the Conservation Commission of the Northern Territory and through community support.

## APPENDIX

### DEFINITIONS

**Fire Management** is the planning, conduct, monitoring and review of all aspects of fire prevention, fire suppression and use of prescribed burning in land and natural resource management.

**Prescribed Burning** is the planned application of fire under selected weather and fuel conditions so that the fire is confined to a predetermined area and burns with the intensity and rate of spread necessary to achieve the objectives of management.

**Wildfire** is any unplanned fire.

**Public Land** is land controlled or managed by any public agency or authority.

**Fuel** is any plant or plant product that burns.

**Fire Hazard** describes the fuel potentially available for burning and takes into consideration such factors as location, quantity, arrangement, and current or potential flammability of the fuel. When considered in combination with fire weather variables, it determines the difficulty of suppression once the fuel is ignited and also signifies the potential threat to human life, property and other assets.

**Fire Risk** is the relative chance or probability of fires starting and is determined by the presence or absence of causative agencies. The degree of risk in an area is assessed by studying the probable frequency of dry electrical storms and the ways in which people use or cause fires.

**Fire Danger Rating** is a fire management system that integrates the effects of selected fire danger factors into one or more *qualitative or numerical indices* of current protection needs.

**Fire Danger Period** is a specific time of year when a permit to burn is required for setting fires in the open. Fire danger indices are generally high to very high and severe fire weather usually occurs. Fire danger periods vary between regions and, according to seasonal conditions, can often last up to six months. It is likely they will occur as follows;

Top End	30 June - December
Central	August - December
Southern	October - March

**Council Firebreak** is one established and maintained by the Bush Fires Council.

**Spotting** occurs when fires are lit by burning embers carried on the wind, generally in front of an existing fire.

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## ACKNOWLEDGMENTS

Discussion on critical areas in the development of a fire management strategy was prepared by the consultant, Phil Cheney of CSIRO's National Bushfire Research Unit following meetings with the Arafura and Vernon Regional Bushfires Committees, staff of the Bushfires Council and the Conservation Commission, the Australian National Parks and Wildlife Service, the Environment Centre of the Northern Territory and members of the public.