NIGHTCAP NATIONAL PARK
NIMBIN
THE CHANNON
TERANIA
TERANIA CREEK
TUNTABLE FALLS
Tuntable Creek
JOHNSON BRIDGE
GIBBERGUNYAH RANGE
NIGHTCAP RANGE
MOUNT MATHESON
MOUNT NARDI
Protestors Falls
Bat Cave Creek
Misty Mountain

Fire

7455

85.3 × T3.3

New South Wales Government

Co-ordinating Committee of the Bush Fire Council of N.S.W.

All mail to be addressed to
121 Macquarie Street, Sydney 2000

Telex: AA71438

Our reference:

Your reference:

Telephone: 2 0529
Extension:

The Town/Shire Clerk

~~CIRCULAR NO.~~ 25/87

Dear Sir,

The Co-ordinating Committee has for some time been concerned at the growth of rural residential developments whether or not established in accordance with local government ordinances and planning provisions, which by their nature have potential to pose a serious fire threat to the lives of residents. Unapproved multiple-occupancies, although by no means alone, are particularly significant in this respect.

Whilst the administrative difficulties created by these types of development are recognised, the Co-ordinating Committee considers that a serious attempt to address the problem must nevertheless be made.

To this end Councils are urged to improve existing development standards, through the courts if necessary, to minimise the risk from such development.

With respect firstly to statutory planning, the Co-ordinating Committee has asked its Regional Fire Associations to consider any implications the draft S.E.P.P. (multiple occupancy) might have in containing this problem and to seek the assistance of the Department of Environment and Planning in addressing specific defects perceived in planning legislation.

Secondly, and of more immediate importance, Council's co-operation is sought to have the District Fire Committee identify potentially risky rural developments which presently exist, for the express purpose of having the Committee then prepare as an adjunct to its Bush Fires Act, Section 41A planning function documentation that deals in a realistic way area by area with:-

(a) Fuel management in and around developments so identified and

(b) Appropriate provisions for the safety of persons in the form of suitable access/egress and refuge areas.

Such documentation to be effective, must of course prescribe not only what measures should be taken but who, by agreement or otherwise is going to take them in pursuance of powers which now exist for such purposes.

The District Committee should also be invited by Council to provide advice with regard to development standard which should be applied to existing and future developments.

To assist with this process and to provide guidance for the future, the Committee intends to prepare a model plan based on an existing development that is generally perceived to have successfully addressed its fire protection problems but this project will not provide an immediate solution.

In the meantime the Co-ordinating Committee wishes to provide such other assistance as it can both directly and through its regional organisation to help councils come to terms with this potentially explosive problem. It would like consequently to be kept informed of progress.

Yours faithfully,

T.J. ANDERSON
Secretary.

HAZARD REDUCTION
FOR THE
PROTECTION OF BUILDINGS
IN
BUSHLAND AREAS

CONTENTS

See also the notes on both sides of the back cover concerning the assessment of basic risk, and the precautions that householders should take.

New South Wales Fire Brigades
Board of Fire Commissioners of N.S.W.
1984

FOREWORD

Following recent amendments to the Fire Brigades Act, the Board of Fire Commissioners of NSW has been authorised to carry out hazard reduction schemes within the State.

Although urban fire protection is the Fire Brigades' normal role, bush fires pose a threat in many fire districts. Fire fighters are able to cope with bush fires under most circumstances but resources may be strained when fire danger is extreme.

The safety of buildings then largely depends on the effectiveness of firebreaks provided in advance. Relatively narrow fire breaks can shield buildings from flames and radiated heat. A greater width is needed for protection against the air-borne fire brands associated with fires burning under extreme conditions.

Normally, a firebreak designed to protect houses consists of two portions. In an Inner Zone usually occupying the whole of a householder's allotment and sometimes extending beyond its boundaries, there should be no flammable material. In an Outer Zone extending into neighbouring bushland, the objective is to reduce the volume of fuel and thereby decrease the speed, heat and fire brand production rate of any bush fires which might subsequently occur.

Keeping the household blocks in the Inner Zone free of fuel is the householder's responsibility. If the Outer Zone lies within public land, the trustees or managers of such land bear most responsibility but other organisations such as local councils, bush fire brigades and the NSW Fire Brigades may accept some part of this responsibility by arrangement with the trustees or managers.

Hazard reduction burning (using low intensity fires during mild weather conditions) is the most practicable means of keeping fuel in the Outer Zone within acceptable proportions. Restricting scorch and other undesirable effects is part of the burning prescription.

Before the NSW Fire Brigades agree to participate, it is important that public authorities requesting such work should supply the following information:

a. *Identification of the area;*

b. *Details of possible environmental problems;*

c. *An indication of the extent to which fire safe boundaries (e.g., chipped tracks) will be provided;*

d. *An indication that the local council will require householders to bring their allotments to a satisfactory condition so that full firebreak specifications can be reached (councils have this power under Section 13 of the Bush Fires Act).*

W. R. Beare

This document has been prepared for the Board of Fire Commissioners of N.S.W. by R.H. Luke (bush fire control consultant to the Board) in conjunction with officers from the Board's bush fire section and with the co-operation of the Bush Fire Council, Forestry Commission, National Parks and Wildlife Service and Outer Sydney Bush Fire Prevention Association.

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1. Introduction to the problems of protecting buildings in bush fire prone situations:

The eastern and most densely populated part of NSW, stretching from the coast to the tablelands, is well known as a bush fire risk region. Due mainly to considerable annual and seasonal rainfall variations, the degree of risk is by no means consistent.

Years may go by without serious threat. In dry years many districts may be invaded by fire over a period of several months or, as happens from time to time, come simultaneously under pressure during short but potentially highly destructive periods of extreme fire danger.

This inconsistency presents many problems for bush fire control authorities. They realise that planning must be based on being able to cope with extreme rather than average weather conditions but they have difficulty in maintaining public awareness at the same level. Even people who have witnessed disasters tend to forget with the passage of the years.

The bush fire protection task mainly involves fire prevention, the establishment of firebreaks and the organisation of fire suppression forces. During fire fighting the two main objectives are saving life and property and bringing a fire to a halt. Under extreme conditions the latter objective has sometimes to be abandoned in favour of the former. Dealing with these objectives is simpler if property has been made safe well in advance of any threat from fire.

The Board of Fire Commissioners is interested in and participates in many fire protection activities and is particularly concerned with the protection of life and property in areas where housing has been developed in proximity to bushland.

There are many thousands of buildings in NSW in this situation, and because of it the Blue Mountains has a long fire history. Risks abound on the outskirts of Sydney and even some inner suburbs have problems. In one area of about 1500 hectares, only 10 km from the G.P.O., nothing separates the bush from some 1100 houses.

Reference could be made to many past disasters but two come readily to mind. In 1957, about 120 houses were lost at Leura within a couple of hours. In 1977, the tally for Hazelbrook and several adjoining towns was 50 houses during a similar brief period.

The demands made by these and similar situations are too great for urban and rural brigades to cope with unless adequate attention is given to firebreaks.

Fires need fuel, heat and oxygen. Oxygen is abundant in the atmosphere. Man cannot control the weather. But he can control fuel and that is what these notes are all about!

2. Firebreaks:

Firebreaks can take various forms. If preventing flames and heat from setting fuel alight down wind or up slope were the only problem they could be fairly narrow. In practice they must be wide enough to reduce the chances of fire brands carrying across to the other side and starting new fires (spot fires).

To maintain wide breaks in an entirely fuel-free state is impracticable. The solution is to reduce the fuel to such proportions that subsequent bush fires do less damage to vegetation and so that firefighters will be able to operate safely with good prospects for success.

Controlling fuel to a sufficient width by manual or mechanical means may sometimes be achieved on a small scale but it is not possible on the large areas where the Board and certain other public authorities see the need for wide firebreaks.

The practical solution is to carry out hazard reduction burning (also known as prescribed or controlled burning) using low intensity fires under mild weather conditions. Some other authorities need to do this work on a large scale, described as broad area controlled burning.

The Board's main interest lies in fuel reduction in long stretches of bush to a width of the order of 40 to 150 m on public land adjoining rows of housing allotments. Obviously such work cannot be fully effective unless householders maintain their own allotments in good condition too.

Thus the firebreak requirement for the protection of houses in a bushland setting takes two parts.

In the Inner Zone adjoining houses and other buildings, the specification requires the removal by the householder of any fuel which might be set alight by a bush fire, whether by means of flames, heat or sparks.

In the Outer Zone the fuel is reduced sufficiently to isolate the Inner Zone from flames and heat and lessen the chance of houses being subjected to a shower of fire brands and sparks during a bush fire.

It follows that it is just as important — or even more important — for householders to keep their areas in good order as it is to restrict the amount of fuel in the Outer Zone. Both firebreak components are needed under the conditions of very high to extreme fire danger when houses adjoining bushland areas are most vulnerable.

The protection of public buildings requires similar consideration and is especially important when an institution maintains several large buildings on a bushland site and the safety of children, aged or sick persons must be assured.

Nor should sites used for temporary accommodation be ignored. Tents and caravans can be vulnerable to bush fires unless adequate provision has been made for the removal or reduction of fire hazards along lines similar to those set out here for houses.

3. Main factors affecting the vulnerability of buildings adjoining bushland areas:

The size of the adjacent bush can be very important and have a considerable bearing on firefighting strategy and tactics. A fire in the Blue Mountains might bring hundreds of buildings under simultaneous threat. For areas of 1000 to 2000 ha the figure might be 50 to 100 houses. At the bottom end of the scale the simultaneous threat to houses might affect one to ten when they adjoin areas of less than 50 ha of bush. Obviously the capacity of firefighting forces to respond to calls is likely to be inversely proportional to the size of the bushland area.

Slope is also very important. Compared to their rate of spread on flat terrain, fires are likely to travel twice as fast up ten degree slopes and four times as fast up twenty degree slopes. Many thousands of houses within 150 km of Sydney G.P.O. lie above bushland slopes of 15 to 20 degrees or more.

Aspect is another vital factor. Fires burning under conditions of very high to extreme fire danger are much more likely to be driven by N, NW, W, SW and (immediately after a wind change) S winds than by winds from NE, E and SE.

Vegetation types on slopes facing northerly and westerly are likely to be drier and more flammable than vegetation on slopes facing to the east and south.

(These factors of bushland area size, slope and aspect are considered later in the discussion of a basic risk index).

Composition of the vegetation in a bushland area has a considerable influence on fire behaviour.

If the trees in an area have fibrous bark or carry long strands of candle bark, fires are likely to ascend into the crowns and the chance of fires spotting ahead of main flame fronts is also increased. Similar remarks apply to standing dead trees, especially those close to the edge of a line held by firefighters.

Fallen heavy dead wood may take days to burn out or go out and poses problems for firefighters close to a held line.

The amount and the composition of the scrubby under-storey is important. Such fuel is likely to flare and change the nature of a fire from what might be termed two dimensional to one of three dimensions, thus causing greater damage to vegetation, aggravating fire behaviour and lessening the chances of success during firefighting.

But the most important part of the fuel complex is the mixture of tree litter and low surface vegetation which provides the main fuel for a bush fire. Its weight, volume and composition is more likely than any other factor to determine the degree of vulnerability of adjoining houses.

(See later references to the current hazard index which takes the condition of both house allotments and adjacent bushland into account).

4. Methods of recording Basic Risk and Current Hazard:

Observations of a general nature such as "an extremely hazardous stretch of bush" may be useful but are not very helpful when trying to compare areas and sort out work priorities. It is desirable instead to assign figures on some such scale as 0 = safe and 100 = very risky or very hazardous.

With this purpose in mind two sets of values, basic risk and current hazard, are now presented.

The Basic Risk Index:

This table relates a house or a group of houses to the local environment but takes no account of current fuel loading.

Two factors are used — the size of the adjoining bush and the aspect and steepness of the slopes in the vicinity of houses. The reasons for using these factors were given earlier in the text.

The points systems runs as follows:

BASIC RISK INDEX

(i) Size of adjoining bush, 10 to 50 points.

Over 2000 ha	50
1000 to 2000	40
500 to 1000	30
50 to 500 ha	20
Below 50 ha	10

(ii) Slope and aspect, 5 to 50 points.

Slope	N,NW,W,SW,S aspect	NE,E,SE aspect
0	15	5
5	20	10
10	30	15
15	40	20
20	50	30

(iii) Add the assessments from (i) to (ii) for a range of value from 15 to 100. A group of houses near 10 ha of flat bushland would rate 15. Houses adjoining a steep slope facing west in the Blue Mountains would rate 100.

In broad terms the basic risk for the latter group is about six times that of the former.

Current Hazard Index:

The factors used here are the condition of householders' Inner fire protection Zones and of the Outer fuel reduction Zones to the widths recommended later for various slopes and aspects. For example, houses adjoining 20 degree slopes facing west would need an Inner (fuel free) Zone of at least 40 m and an Outer (fuel reduction) Zone of at least 60 m (See Fig. 2).

Methods of recording Basic Risk and Current Hazard: (continued)

(i) **POINTS SCORE FOR INNER ZONE**

Points to be allotted from 0 to 50 on the personal judgement of the person making the inspection:

Excellent 0
Generally Good 10
Fair 20
Poor 30
Very Hazardous ..... 40 to 50

(In this system houses may be considered individually or collectively. When individually, fuel on roofs, in gutters and below houses should be taken into account).

(ii) **POINTS SCORE FOR OUTER ZONE**

Points can be allotted ranging from fuel recently satisfactorily reduced (a rating of 0) to fuel accumulated for many years and thus in extremely hazardous condition (a rating of 50).

(iii) Add the ratings for (i) and (ii) for tallies ranging from 0 (houses made as safe as it is reasonably possible to make them) to 100 (both Inner and Outer Zones in a dangerously hazardous condition).

Using both Indices Together:

A house or group of houses with a basic risk rating of 80 and a current hazard rating of 100 could be described as heading for disaster but an 80/20 rating would be reassuring.

ADDITIONAL NOTES:

(a) These methods of assessing basic risk and current hazard do not apply to some areas where there are very small public reserves on moist slopes covered with non-flammable species such as wandering jew, crofton weed, morning glory and privet. In such places an examination of two or three adjoining houses is not likely to be followed by recommendations for wide firebreaks in the Outer Zone provided the Inner Zone is maintained at a reasonable standard.

(b) Information concerning a particular section of bush can be expanded to include some other relevant data. For example: "Section A (of the council area under review) has a perimeter of 1.2 km in the 80 ha Blackbutt Reserve adjoining Smith, Brown and Jones Sts. House tally — 20 adjoining the bush and 5 separated from the bush only by a street. Average slope 15 degrees. Aspect W to SW. Average basic risk 60. Average current hazard 40". (In practice such data can be recorded more simply by using a standard tally form).

See also the back cover for an alternative method of assessing basic risk

5. Assessment of Fuel Loading:

When estimating the amount of fuel on an area it is hard to know where to draw the line. If trees and fallen logs are included, the tally could run to hundreds of tonnes per hectare. But, except at the perimeter of a fire, the slow burning of heavy fuels after the main front has passed has limited significance for the firefighter, whose main interest is in the finer material which is rapidly consumed and contributes most to the spread of fire per medium of flames, heat and flying embers.

Thus the normal practice in a fuel assessment is to ignore most of the woody material and concentrate on the fine fuels on or near the ground surface.

The main kindling agent there is usually the dead litter, consisting mainly of twigs, bark and leaves deposited by trees and shrubs. Grass and ferns may also act as kindling if they carry enough cured material.

Under wild fire conditions most of the green material close to the ground can be quickly set alight by the kindling and so all grass, ferns and low surface plants up to a height of one metre must be considered.

Some observers include woody material and bark up to 25 mm diameter or thickness when sampling fuel. As fuel in excess of 6 mm (pencil thickness) tends to burn after the fire has rushed through the finer material, it can be excluded from a fine fuel sample.

Decaying material at ground level should be included. Though seldom consumed during controlled burning much of it is likely to be burnt by a wild fire.

Tree litter suspended amongst surface vegetation must be included. Flaming increases considerably amongst loosely arranged and well aerated fuels.

Under-storey vegetation ranging from about 1 to 3 metres should be considered when assessing the degree of hazard in an area. Leaves of oil-bearing species are likely to flare when the fine fuel burns. The extent to which other species will burn is variable. But inclusion in an estimate of the weight of fine fuel is not practicable.

The same remarks apply to fibrous bark and the crowns of trees which may flare under extreme fire conditions.

6. Methods of estimating the amount of Fine Fuel on an area:

Because of wide variations in the moisture contents of both green and dead or cured material, estimates of fuel weight need to be made in terms of Oven Dry Weight (with virtually no residual moisture) to allow comparisons to be made.

This is easy enough for research workers who can get fuels down to O.D.W. under laboratory conditions. The man anxious to get an immediate estimate in the field has no such facilities.

If all of the fuel in a sample is dead or cured and if it is dry to the touch, the field worker can apply a weight reduction factor of 10% or 15% and get a reasonable estimate of O.D.W.

When much of the material is green estimating moisture content becomes too much of a guess. The alternative is to store samples under cover until they dry out and then make a 10% to 15% reduction on the weight of the sample as then recorded.

A further alternative is to measure the volume of green or dry material and relate this to the O.D.W. of the same volume of the same material.

Bearing in mind that broad estimates are permissable in this work and that there can be considerable fuel load variations in one area, the volume method should be suitable for circumstances when it is not possible to measure or estimate the moisture content of wet or green fuels.

7. Procedure for measuring or estimating the Weight of Fine Fuel on an area:

In the notes which follow, both the direct method of weighing fuel samples and the indirect method of getting weight estimates from volume measurements are discussed and some thought is given to making ocular estimates.

The tools which are suitable for both of the main methods are a measuring stick of 50 cm or a square of 50 x 50 cm, a spade or hatchet, and a knife or shears. In the direct weight method a weighing device is needed. In the indirect method a two litre container provides a suitable means of recording volume.

PROCEDURE COMMON TO BOTH MAIN METHODS

(a) Mark out a sample area measuring 50 x 50 cm (which is 0.25 square metres). One hectare is equivalent to 40,000 such sample areas.

(b) Sever the vegetation along the boundaries and push the outside material aside.

(c) Sever vegetation at ground level within the plot (ferns, grass and plants to 1 m high).

(d) Discard anything over 6 mm (pencil) diameter or thickness, whether green or dead.

FURTHER PROCEDURE FOR DIRECT WEIGHT METHOD

(e) Record the weight of the remaining litter, decaying material, vegetation and suspended material.

(f) Divide the weight in grammes of the sample by 25 to arrive at the estimate in tonnes/hectare.

(g) Estimate or measure the moisture content of the fuel and apply a reduction factor to arrive at the estimate for Oven Dry Weight.

FURTHER PROCEDURE FOR VOLUME METHOD

(h) Break or cut long material into lengths of about half the width of the two litre container.

(i) Put the gathered material into the container and press down firmly without ramming. Record the level in this pressed down condition before the material is released and springs upwards.

(j) Count the number of full and part full containers in the pressed down condition.

(k) Convert volume to weight as follows:

Weight per full 2 litre container

Composition	Tonnes/hectare O.D.W.
All litter plus decaying material	12
L + DM 75% vegetation 25%	10
50 – 50	9
25% L + DM Veg. 75%	8
100% Veg + DM	6

(N.B. People interested in testing this method can weigh these and other fuels per container full, adjust for moisture content and arrive at their own estimates).

OCULAR ESTIMATES

Once observers get their eye in, they are likely to rely on visual estimates most of the time. Photographs of various fuel concentrations and occasional weight or volume/weight sampling should help to maintain consistency.

ARRIVING AT AVERAGE AND OTHER ESTIMATES FOR AN AREA

An appreciation of the general fuel load on an area can be got by averaging the results from several samples. Upper limits can also be estimated. Scattered heavier than average patches may produce scattered higher than average scorch during controlled burning. If above-average fuel extends over a considerable portion of an area, appropriate notes should be made. It may be necessary to deal with such portions separately from

Procedure for measuring or estimating the Weight of Fine Fuel on an area: (continued)

the rest of an area during a hazard reduction operation (e.g., by choosing evening rather than daytime burning hours).

Assessing fuel weight is necessary but is not the be-all and end-all of estimating how a bush fire or a low intensity hazard reduction burn is likely to behave. Observing whether fuel lies flat on the ground or has a vertical arrangement is equally, if not more, important. Nor are weight estimates likely to help much in very moist situations occupied by succulent plants. Describing such locations as natural firebreaks has more value.

Ocular estimates of flammable material come into their own when the fine fuel is mixed amongst sprawling clumps of lantana and some other weeds and it is not practicable to lay out a 50 cm x 50 cm sample plot.

8. Specifications for the Inner fire protection Zone on and near House Allotments:

In many bushland areas houses front on to a street constructed on the relatively level ground of a ridge top. A neat lawn and front garden of perhaps 5 to 10 m in width, in conjunction with the street and probably other neat front gardens next door and across the street, generally provide adequate protection in that quarter.

In most cases protection standards fall off alarmingly at the back. The steeper blocks which require good wide fire breaks are generally the ones which are worst cared for.

Pools, paths, green lawns and well kept gardens coupled with the sensible selection and placement of tree and shrubs and general tidiness add to safety. Leaving untended shrubs, grass and trees as a wick leading from adjacent bushland to the very walls of a house is inviting trouble, if not disaster.

Some houses do not adjoin a street and are surrounded by bush, picturesque before and a scene of havoc after a bush fire. Unless of course, something sensible is done about firebreaks.

Heeding the standard advice about enclosing the eaves, keeping the outside walls in good condition and removing leaves from roof and gutters is particularly relevant in such situations.

The good work some householders do is often undermined by a neighbour's neglect. Unoccupied adjoining blocks can be a great source of trouble. A comprehensive co-operative effort is necessary.

Keeping houses and other buildings out of reach of flames and excessive radiated or convected heat requires a considerable firebreak in all directions. Controlling and reducing the fuel in adjoining bush to reduce the chances of flying firebrands setting houses alight is important but is more appropriately dealt with later in connection with Outer bush fire protection Zones.

Here we are discussing the householder's Inner fire protection Zone which, to afford maximum safety, should contain no material or very little material which could be set alight. Making the house a place of refuge for one's family is important. Householders or brigade members must not be driven off by excessive heat if they are to save a house exposed to a shower of sparks.

Based on the experience of 1977 when 50 houses were lost in the Blue Mountains the following minimum dimensions are desirable for these Inner Zones, measured from the walls of buildings:

Slopes facing N,NW,W,SW, and S

Flat to 5 degrees	20 m
10 degrees	25 m
15 degrees	30 m
20 degrees	40 m

Slopes facing NE,E and SE

Flat to 15 degrees	20 m
20 degrees	30 m

These recommended widths might sometimes be reduced if bare rock faces or ledges provide a useful barrier.

But a considerable problem often emerges. If the back boundary of a block is a lesser distance from the back of a house than the recommended width of Inner Zone, what can the householder do about it?

The problem may be solved by firebreak work done in the Outer Zone (mentioned later) by a council or other public body. Alternatively, if householders are able bodied and willing and have the necessary permission, they may protect themselves by raking up and disposing of the finer fuels that constitute most of the bush fire hazard beyond their own boundaries.

Councils have the power to require householders to clear up hazards on their own blocks but, with so many thousands of houses in difficult situations, it is a mammoth task. Urban or rural brigade members can help considerably, firstly by getting to know how to assess degrees of hazard and secondly by advising people who live close to the bush.

Householders cannot be expected to turn their back yards into bare deserts or to eliminate all native plants. Some sensible compromise is necessary but this should be based on a greater public awareness of safety requirements under the stress of very high to extreme fire danger.

For further information on this subject see the following publications:

"ISN'T IT TRAGIC — BUT IT COULD BE YOU" issued by NSW Bush Fire Council.

"FOREST FIRES, ORNAMENTAL TREES AND HOUSES" issued by NSW Forestry Commission.

"BUSH FIRES" — A Commonwealth Department of Housing and Construction Pamphlet.

"BUSH FIRE CONTROL AND URBAN DEVELOPMENT IN THE SYDNEY REGION" — NSW Planning and Environment Commission.

9. General specifications for the Outer bush fire protection Zone:

If the householder's Inner fire protection Zone is clear of hazards but the adjoining bush carries an excessive fuel load, the safety of houses cannot be assured. Flames may not reach the house but excessive heat and flying fire brands could. An Outer Zone is required, but with the objective of reducing rather than removing fuel. The bush may burn in an bush fire but its burning will be less likely to threaten houses.

Clearing up debris with hand tools has been successfully achieved by groups of people working in small areas but is too costly and difficult on a large scale without the use of fire. How to use controlled burning as a fire protection tool is discussed later. Here our main concern is with the minimum recommended dimensions for such work.

Remembering that the Outer Zone starts at the boundary of the Inner Zone, the following minimum widths are recommended:

ON N,NW,W,SW AND S SLOPES

Flat land	10 m
5 degree slopes	15 m
10 degree slopes	20 m
15 degree slopes	40 m
20 degree slopes	60 m

ON NE,E AND SE SLOPES

Flat to 5 degree	10 m
10 degrees	15 m
15 degrees	20 m
20 degrees	30 m

These recommended figures might be varied because of changes in slope, proximity to creek bottoms and various other local factors. And it may be convenient and desirable for people who do this work to extend their efforts to a greater width.

If a tally were made of the perimeters along all of the houses adjoining bushland in NSW it would run into many thousands of kilometres. Planning and organising the work is a big task for the public authorities concerned with the bush fire protection problem.

The specifications mentioned here for both the Inner and Outer bush fire protection Zones are appropriate for the fringes of suburbs and villages where rows of houses arranged along a street tend to support one another in providing a barrier to the progress of fire from adjoining bushland.

These specifications are also appropriate for isolated houses surrounded by bush except that householders in these situations are likely to be dependent solely on their own efforts to provide adequate firebreaks in all directions.

This problem of isolation may also arise when a public institution maintains several buildings scattered over a considerable area where the safety of large numbers of people and the vulnerability of large buildings must be considered. In such cases it is preferable to prepare a comprehensive firebreak plan for the whole area rather than deal separately with the requirements for each building. (Evidence of this need was provided in December 1977 when several large buildings in a convent complex at Bullaburra suffered major damage from a fire which rushed up an adjoining steep slope. The Inner fire protection Zone was in fair order but intense radiation and spotting from adjacent bushland, coupled with the many openings in the large area of walls, allowed numerous outbreaks to start within the buildings).

Similar problems exist on farms where sparks from bush fires may have ready access into open-sided outbuildings. Farm protection lies outside the scope of this discussion but it is appropriate to recommend that firebreaks adjoining farm buildings should be at least 50 per cent wider than for the normal outer suburban housing situation. Planning a comprehensive firebreak system for the whole farm area is just as important as it is for a public institution occupying a large open space.

10. Information to be considered when studying the vulnerability of Houses Adjoining Bushland:

REQUESTS by local people or public authorities for hazard reduction work.

SIZE and shape of the bushland area.

SLOPE and aspect adjoining houses.

VEGETATION — types (trees, scrub, surface vegetation and litter).

FINE fuel weight and arrangement.

CONDITION of householders' allotments.

BASIC risk index.

CURRENT hazard index.

INFORMATION about past fires and the routes they have followed.

LOCATION of existing road, tracks and other natural barriers.

INFORMATION about the intentions of the trustees of public land or of local councils with respect to the provision of additional tracks.

MEANS to be employed for persuading or requiring householders to bring their allotments up to suitable Inner Zone standards. *(N.B. Persuasion is preferable to using Section 13 of the Bush Fires Act to require people to clear their blocks).*

11. Rates of Fine Fuel Accumulation: – for FNC?

When considering the hazard reduction requirements for an area it is desirable not only to decide the details relevant to a specific operation but also to estimate the frequency with which such operations should be carried out. Thus, having some knowledge of the rates at which fuels are likely to accumulate is required.

Valuable information on this subject is available in Research Note No. 33, Forestry Commission of NSW, *"Bushland Fuel Quantities in the Blue Mountains"* by A.P. Van Loon.

The fuel on sample plots was studied at various times after wild fires (i.e. at various fuel ages). The investigation indicated that surface fine fuel (decaying material, litter and surface vegetation) tends to build up at the rate of 1.7 tonnes per hectare per annum for the first 6 or 7 years after a fire and then declines to a build up of about 0.3 per annum.

The higher early rate may be due to the recovery of vegetation, the contribution to the litter by material killed but not consumed by the fire and high rates of bark and leaf shedding after a fire.

Fine fuel on the ground and up to one metre high is likely to reach 10 T/ha at a fuel age of 5 years, 13 T/ha at 8 years and 16 T/ha at 20 years.

The weight of the shrub understorey (1 to 3m high) tends to decline for about five years after a fire and then increase steadily as the shrubs grow. The finer fuel in this understorey is probably not more than 2 T/ha at any time during the first 8 years. Later as the vegetation recovers, total weights of 4 T/ha could be reached at 14 years and 6 T/ha at 18 years.

The rate at which the shrub understorey increases in height may be more important than its weight, as a loosely arranged and aerated fuel complex tends to burn more fiercely in a wild fire than do fuels lying flat on the ground. Heights of 1 m are likely to be reached at six years after a fire and 2 m at 20 years.

Although Research Note No. 33 was mainly concerned with the Blue Mountains, fuel accumulation after fires follows much the same lines in areas close to Sydney but varies considerably from site to site.

In theory it seems desirable to reduce the amount of fine fuel from about 10 tonnes/hectare down to about 2 T/ha every five years. In practice the frequency of hazard reduction burning could vary from three to eight years in accordance with such variables as rate of fuel accumulation and the availability of suitable weather conditions.

12. Fire Behaviour under conditions of Extreme Fire Danger:

In most parts of Australia the McArthur fire danger meter is used, either in its grassland or its forest fire form, for predicting the behaviour of fires under various weather and fuel conditions. Near Sydney and in the Blue Mountains the forest fire danger meter is more appropriate than the other.

Fire danger can be expressed in figures from 0 to 100 or in words ranging from low to extreme. Once the basic rating is known or has been predicted probable fire behaviour on an area can be estimated in relation to slope and fuel loading.

A fire danger rating of 90 and land sloping upward at 15 degrees are realistic parameters for assessing the extreme fire behaviour to which houses in and near the Board's fire districts are sometimes subjected. (Lower standards for planning are unacceptable even though ratings of 90 are unlikely to be reached on more than about five days per 10-year period).

Under these conditions of slope and fire danger fires can be expected to behave in relation to the amount of fine fuel along the following lines:

Fine fuel T/ha	Rate of spread (a) M/min	Fire intensity (b) kw/m	Flame Length (c) m
2½	12	800	to 5
5	25	3,300	5 - 10
10	50	13,000	10 - 15
15	75	30,000	15 - 20
20	100	53,000	20 - 30

NB:

(a) These rates of spread are for flame fronts and do not take the effect of spotting into account.

(b) Fire intensity is a product of the rate of spread of a flame front and the amount of fine fuel consumed. The figure of 53,000 is close to the upper limits likely to be reached in a forest fire. (The 13,000 to 53,000 range is intolerable to fire fighters at close quarters.

(c) Flame length is difficult to estimate and can depend on fuel quantity, the bending effect of the wind and up slope draughts and the extent to which crown fires have developed. The figures quoted are regarded as conservative.

This table and tables for other angles of slope were used to decide the minimum widths which were recommended earlier in the text for the Inner and Outer fire protection Zones in the vicinity of houses when their survival under extreme conditions is the objective.

These tables also serve to show that fine fuel loadings in excess of 5 tonnes/hectare are undesirable in the Outer Zone.

13. Fire Behaviour under Mild Conditions:

During hazard reduction burning, the problem to be solved is how to reduce a fine fuel loading of the order of ten or more tonnes per hectare to the safer level of five tonnes or less per hectare.

Part of the problem is that it is difficult to control the height to which vegetation is scorched. A good working rule is to estimate that scorch height is likely to be about five times flame height.

If it were desired to keep the scorch level below two metres flames would need to be restricted to 40 cm. This is difficult to achieve as fires with low flames may travel too slowly for an effective operation, or may even go out. A further complication is that if the surface vegetation is one metre high, as it often is, flames are likely to exceed one metre and be followed by scorch in excess of five metres.

In fuels which have accumulated for many years, keeping scorch below the level that would please everybody is almost impossible. In subsequent operations, perhaps repeated at intervals of four to five years, the fuel bed would probably be closer to the ground and it should be possible to restrict the scorch level.

Broadly speaking, it is desirable to keep fire intensity below 300 kw/m. This objective contrasts dramatically with the fire intensities of 13,000 to 53,000 kw/m to which vegetation may sometimes be exposed during extreme fire weather. All exponents and opponents of controlled burning should study the effects on vegetation of both wild fires and low-intensity controlled fires.

During hazard reduction burning it is seldom desirable to burn uphill and so the usual prescription is to burn downhill. Downhill burning is slower than on flat terrain and is many times slower than when burning uphill.

More details are provided later about the conduct of burning operations. The table which follows broadly indicates the type of fire behaviour likely to be encountered during hazard reduction burning.

T/ha ..... the amount of fine fuel likely to be burnt
F.D. ..... the forest fire danger index within the low to moderate range
R.O.S. ..... rate of spread in metres/minute
F.H. ..... flame height
S.H. ..... scorch height
F.I. ..... fire intensity in kw/m

(Where a 15 degree slope is mentioned the fire behaviour figures relate to burning downhill).

Slope	T/ha	F.D.	R.O.S.	F.H.	S.H.	F.I. (Approx.)
flat	5	5	0.5	0.3	1.5	70
flat	5	10	1.0	0.6	3.0	135
flat	10	5	1.0	1.0	5.0	270
15 deg	5	5	0.3	0.2	1.0	40
15 deg	5	10	0.5	0.4	2.0	70
15 deg	10	5	0.5	0.7	3.5	135
15 deg	15	5	0.7	1.0	5.0	280

14. Selecting Conditions suitable for Hazard Reduction Burning:

There are two main restraints to the successful organisation of this work. At one end of the scale there is no point in continuing if weather or fuel conditions inhibit burning and make it impossible to finish a task within a reasonable time or at a reasonable cost.

At the other end of the scale the work should not proceed if fire behaviour is likely to exceed the prescribed limits, containment within the prescribed area cannot be guaranteed or there is a danger that fuels left smouldering may come to life and spread fire at some later date.

The happy medium that lies between cannot be defined easily. Moisture content is very important, whether it has to do with the proportion of green vegetation or the dampness or dryness of dead or cured fuels. But wind, temperature and relative humidity, all subject to changes from day to day must also be taken into account.

Generally speaking it is inadvisable to do the work during the statutory bush fire period from October to March. Certainly this is the case in the spring when, however mild and suitable conditions may seem to be, quick weather changes are always a possibility as summer approaches. More confidence could be felt in late summer or autumn burning provided heavy summer rain has saturated the heavy fuels and stable weather conditions have been forecast.

Thus, while it may sometimes be possible to start operating in late February or in March, the period from April to September is generally the most suitable. But even this should be subject to qualification. Dry Septembers need to be regarded very cautiously and there may be other times in autumn and winter when dry conditions, especially dry windy conditions, make it advisable to suspend operations.

Fuel conditions may vary within an area. Moisture content is generally higher in shaded situations than on those exposed to sunlight. Heavier fuel concentrations are likely to burn in a different manner to those that are sparse.

While it can generally be said that the work should not be performed at a fire danger rating in excess of 12, the appropriate limit might be 6 when dealing with heavy dry fuels. The table in the previous section gives some idea of the range of possibilities.

One of the most useful factors for deciding when conditions are suitable is the difference in the moisture content of the various fine fuel components.

If the decaying material is dry enough to burn it is certainly no time to be burning. Apart from baring the

Selecting Conditions suitable for Hazard Reduction Burning: (continued)

soil to erosion consumption of this material is almost certainly accompanied by the burning of an excessive amount of other vegetation, resulting in high scorch. The objective is fuel reduction not fuel removal.

Apart from its aesthetic disadvantages, high scorch is likely to be followed by heavy leaf fall and partial renewal of the fuel load it was planned to reduce.

The term "fuel availability" is a useful one when considering how much fuel can and should be removed. The amount of fuel available for burning depends on its condition and on the weather when it is burnt. All might be burnt by a bush fire. After a controlled burn, 20 to 40% of the fine fuel might be left unburnt.

Having determined how much of the fuel should be removed, the next step is to decide the range of suitable weather. So many combinations of fuel moisture content, temperature, relative humidity and wind affect this decision that it is not practicable to draw up a series of tables to cover all possibilities. Using the fire danger meter in conjunction with weather forecasts or observations and field examinations of fuel condition is the appropriate course of action.

Despite these observations and calculations the real test of how a fire is likely to behave on a certain area is to make trial burns on small confined spaces. This is particularly desirable on the day selected for an operation.

Burning conditions vary considerably during the day under the influence of the diurnal range of temperature and relative humidity and of wind changes. In the cooler months dew may inhibit starting the work until late in the morning, while fires may cease to run about 4 pm. In view of the low rates of spread typical of these conditions, as much consideration needs to be given to the capacity to complete the job economically during the available burning period as to the safety of the exercise.

Waiting until late morning or even the afternoon before reaching a decision to light up is advisable when fuels are very dry. By then the weather for the day should have "declared itself". If burning is to proceed it should be deferred until the fire danger index for the day has reached its peak and has started to decline.

15. Organising Hazard Reduction Burning:

As set out in Section 10, a good deal of information has to be considered before carrying out an operation on an area. Having decided to do the work the following arrangement will be necessary:

(a) Decide whether it is practicable to exclude sections which the trustees feel should be excluded for ecological reasons. If the value of the firebreak is not unduly impaired, exclusion of small portions presents no problem. The trustees of an area should have resolved all such matters well in advance of the operation. It is not reasonable that objections about matters concerning the trustees should be directed by local residents at fire brigade officers when they are about to start an operation.

(b) Decide whether action on some sections should be deferred for completion separately from the main operation due to local variations in the quantity, arrangement or moisture content of fuel.

(c) Complete the work of establishing fire barriers along the external and sectional boundaries.

(d) Advise local people of intentions.

(e) Seek their co-operation in improving the condition of their allotments and be reassured that the local councils will require that this is done.

(f) Decide suitable weather conditions.

(g) Allot men and equipment for the main operation and subsequent patrol.

(h) Subsequently record the effectiveness of the operation and its effects on vegetation.

(i) The normal procedure during the main operation is to carry a line of fire along a cleared track at the back of house allotments and allow the fire to run downhill until it reaches the track or natural barrier at the outer boundary. This work takes place within a section considered suitable for one day's work and continues on adjoining sections on subsequent days.

Having started burning at the back of allotments it is sometimes found that fires run down hill too slowly to complete the operation economically. In this case it may be necessary to start a line of fire down slope and allow it to run uphill.

This should be done in a series of stages of parallel lighting up lines, gradually working down the slope, in preference to lighting up along the internal perimeter and allowing the burn to travel uphill in one go.

16. Effects of Hazard Reduction Burning:

The main intention is to reduce the amount of fuel to acceptable proportions with least possible disturbance to vegetation. Scorch amongst some of the standing vegetation cannot be avoided and estimating these effects in advance is part of the planning process.

Unfortunately, fuel is seldom uniform and so it is normal to anticipate that scorch level will be in excess of the level generally predicted in patches totalling 10% to 20% of total area. This should be visualised in any prescription.

Another point to be remembered is that excess fuel need not be reduced everywhere throughout an area provided the effectiveness of the firebreak is not affected. If they occur in isolated patches and no continuous wick of fuel is left running from one side of the area to the other, these islands of unburnt fuel may be acceptable for up to about 20% of total area. It is not suggested of course that a deliberate attempt should be made to exclude small patches from burning.

Observers who have worked in forest and bushland for 50 years or so are able to testify that the condition of many of these areas has changed from open forest with little ground and scrub cover to one in which the lower vegetation is much more prominent. Old photographs and very much earlier written descriptions provide similar evidence.

In areas near Sydney, the spread of the suburbs has encircled areas of bush and reduced their size to such proportions as to allow fire protection to succeed under conditions of low, medium and high fire danger.

Fire may thus be excluded for many years, a scrub-like vegetation evolve and litter accumulate in large quantities.

Apart from the obvious conclusion that the vegetation and fuel accumulated on many such areas will probably be consumed by severe fires when fire danger is very high to extreme, it is believed that a regular programme of controlled burning is likely to restore these areas to a condition similar to that of 50 years or more ago.

The Board is satisfied that hazard reduction, when conducted in accordance with the safeguards set out in this document, is not likely to harm the environment.

It has been mentioned earlier that authorities requesting this work should have drawn the Board's attention to local environmental problems, but this does not exclude supervising officers from considering such matters.

During a field operation officers should carefully consider the views expressed by local people concerning any aspect of the work, including protection of the environment.

Local problems that then arise can be solved generally by reaching a sensible compromise. If it is not possible to reach agreement advice should be sought from an appropriate professional source.

17. Circumstances under which the Board may engage in Controlled Burning Operations:

Although the Board of Fire Commissioners is responsible for the protection of life and property in its fire districts, it is by no means responsible for all of the precautions required to ensure such safety.

Because Section 13 of the Bush Fires Act empowers local councils to require the owners or occupiers of private property to remove or reduce hazards, it is clear that these owners or occupiers have the major responsibility within their own boundaries.

The trustee or managers of public land (often local councils) are required under Section 54 of the Bush Fires Act to take all practicable steps to prevent fires from occurring on or spreading from the areas they control. Providing peripheral firebreaks is a practical means of meeting this obligation.

Section 22 of the Bush Fires Act provides the means for these trustees or managers to allow authorised persons to carry out hazard reduction within the areas they control. Thus local councils and in some cases the Board may be authorised to do this work. And it should also be possible for neighbouring householders, under appropriate supervision, to compete fuel removal work within that part of their recommended Inner protection Zone which lies outside their own properties.

Recent changes to the Fire Brigades Act allow the Board to reduce hazards on public land, but this does not diminish the responsibility of trustees and/or local councils with respect to such work.

The Board is willing to negotiate with other public authorities with a view to accepting some part of the hazard reduction task, subject to consideration of the following conditions:

(a) The trustees or managers should have dealt with environmental issues prior to making a proposal.

(b) Councils, trustees or managers should indicate the extent to which they are prepared to provide chipped lines or other barriers along hazard reduction burning boundaries.

(c) It should be indicated that local councils will persuade or require adjoining householders to bring their allotments up to suitable protection standards.

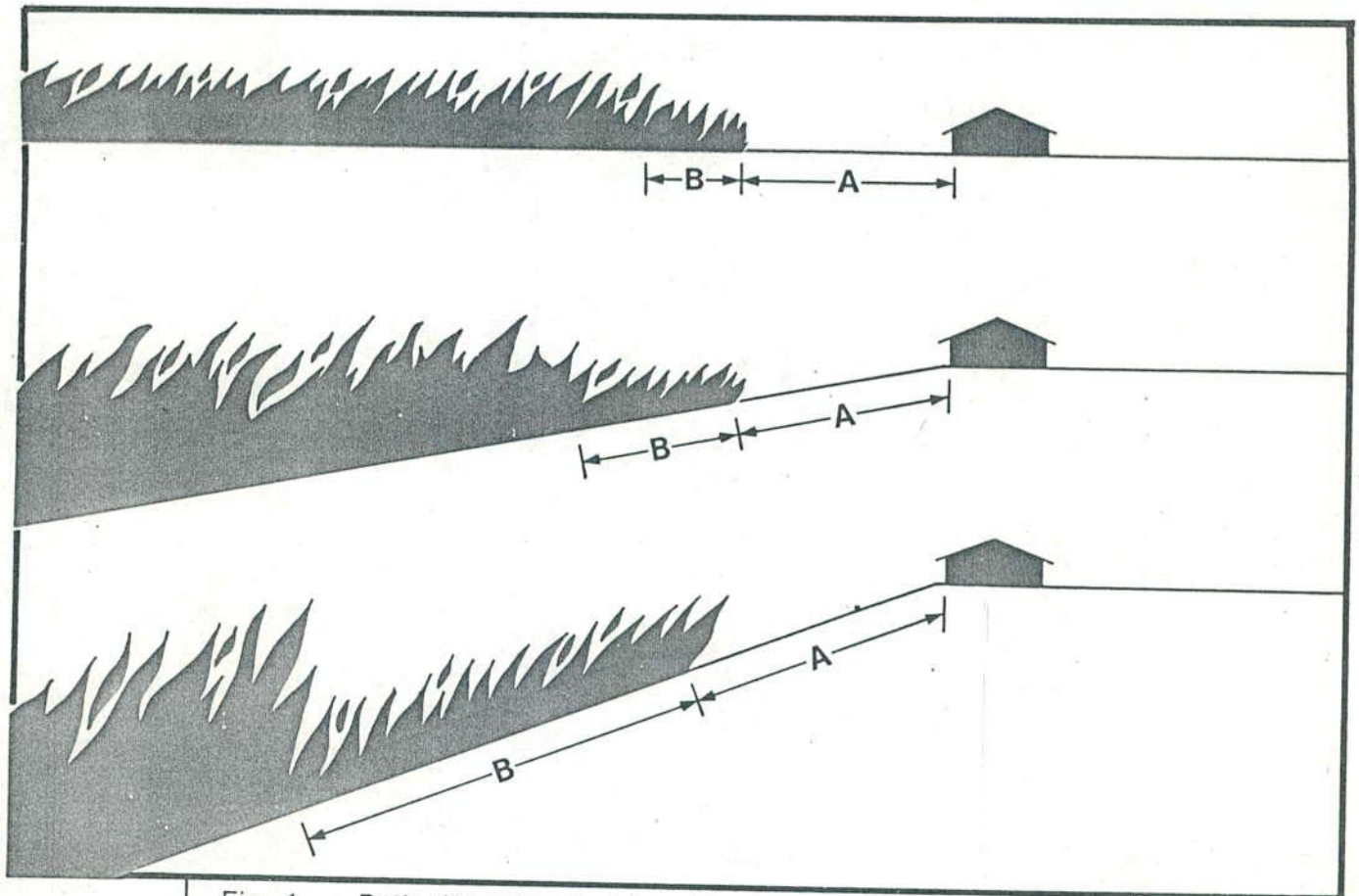

Fig. 1 — Both the Inner fuel free Zone (A) and the Outer hazard reduced Zone (B) need to be wider on steep slopes to isolate houses, householders and fire fighters from the flames and heat of bush fires.

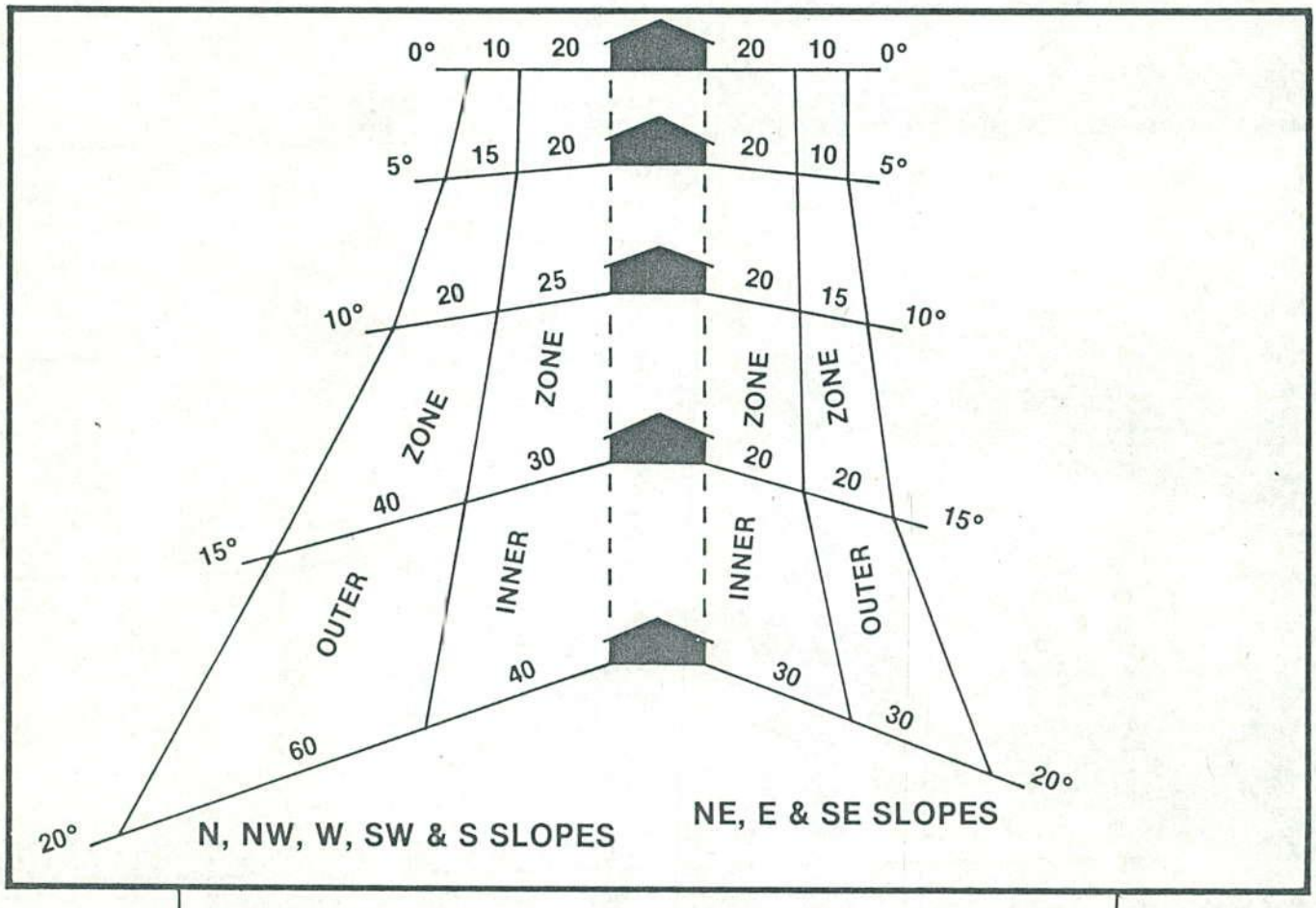

Fig. 2 — Recommended minimum width in metres of firebreaks adjoining buildings in bushland areas. (See Fig. 3 for possible variations).

Specifications for householders living in other States
The fire break specifications set out in Fig.2 and elsewhere in this document relate to coastal and nearby tableland areas in New South Wales where fire seasons normally peak in spring but may extend into summer, considerable variations are found in the vegetation and fuel types in areas of bushland, and grasses in paddocks seldom reach a fully cured condition over large areas.

As conditions may be considerably different elsewhere, people in other states who may read this document should consult appropriate local authorities for suitable firebreak specifications.

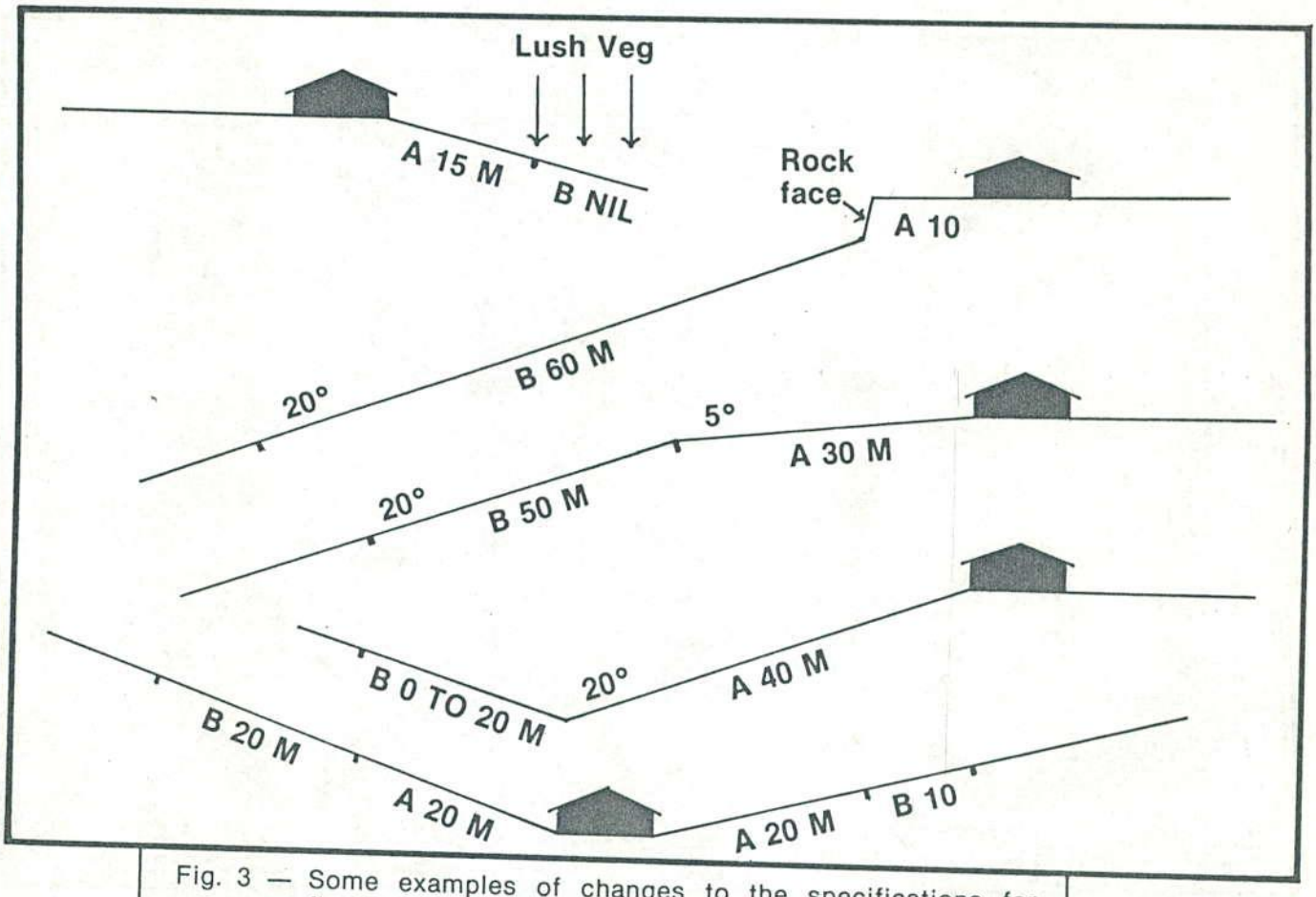

Fig. 3 — Some examples of changes to the specifications for firebreaks due to nearby lush vegetation, rock faces, slope changes or reverse slopes. (A = Inner fuel free Zone; B = Outer hazard reduced Zone).

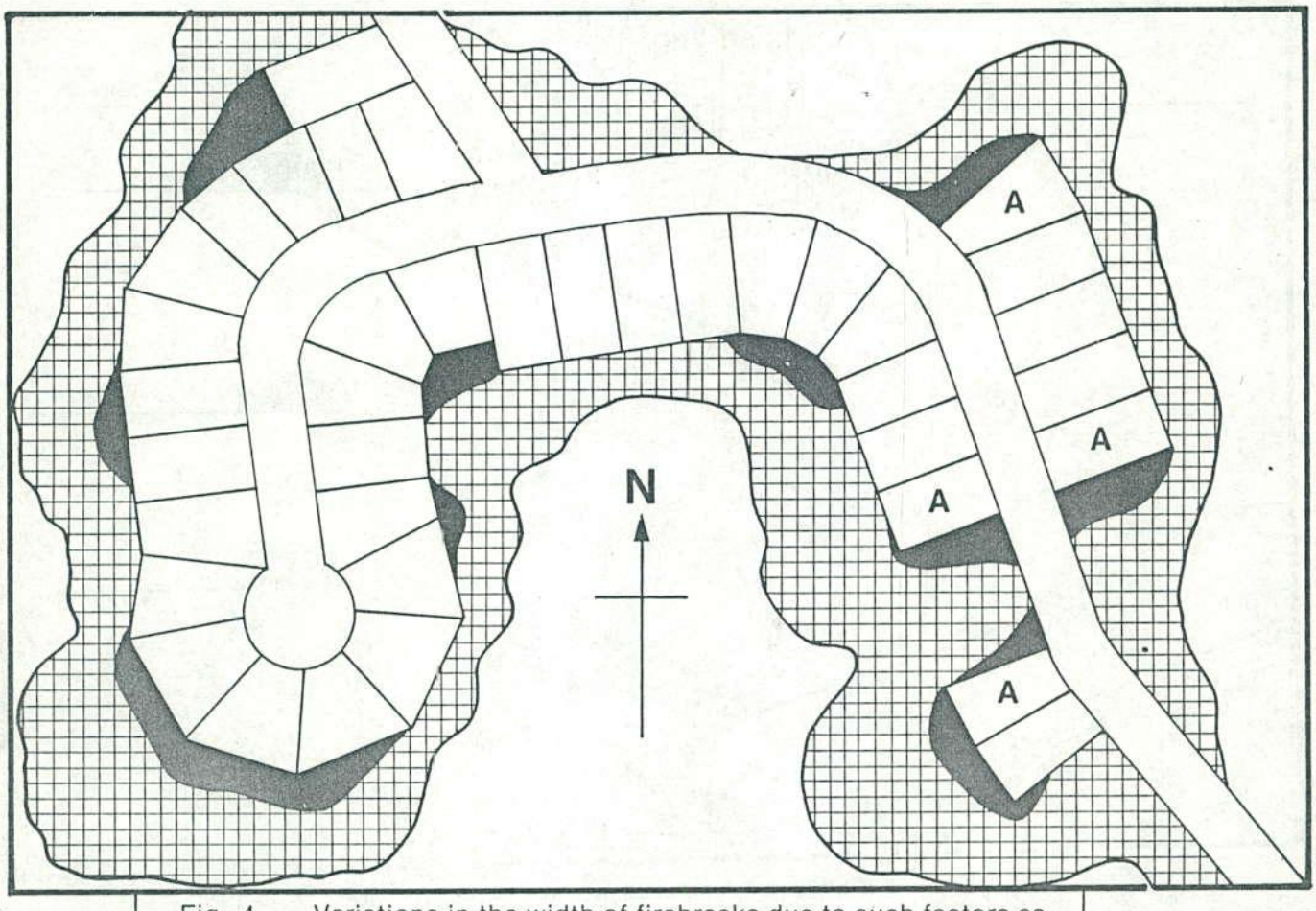

Fig. 4 — Variations in the width of firebreaks due to such factors as the location of houses on their blocks, aspect, slope, vegetation and natural barriers. The black areas denote the occasional extension of the Inner fuel free Zone beyond allotment boundaries. Houses on end blocks such as those marked "A" almost always need extra protection. The hatching represents the Outer hazard reduced Zone.

Alternative system for the Classification of basic risk in bushland areas
The method described here supplements the 0 to 100 system set out in Section 4, Page 6. This is likely to be useful for councils, brigades, groups of householders and individual householders for assessing basic risk in particular area and for planning hazard reduction programmes relevant to current hazard.

The main criterion is the observer's estimate of the number of houses likely to be at simultaneous risk during periods of very high to extreme fire danger. Consideration needs to be given to the relative flammability of vegetation types the size of adjoining bushland, fire history, slope and aspect.

CLASS 1. Over 20 houses are likely to be at simultaneous risk. This is appropriate to rows of houses adjoining steep slopes carrying dry vegetation types in large areas of bushland e.g., the Blue Mountains and some of Sydney's outer suburbs. Firebreak needs follow the principles set out Sections 8 and 9.

CLASS 2. Similar to class 1 except that a road separates a row of houses from bushland. Householders need to follow the principles set out in Section 8. Hazard reduction is needed on road verges and in dry vegetation types on adjoining bushland, especially on steep slopes, as described in Section 9.

CLASS 3. 6 to 20 houses may come under simultaneous risk from fires in areas of bushland smaller than those appropriate to classes 1 and 2. See section 8 re householder's allotments. Work in the outer zone may consist of controlled burning on raking up material either for removal or for burning in heaps at safe times of the year. If controlled burning is practised consideration may be given to substituting patch burning at strategic intervals in lieu of a continuous line. Such decisions are likely to depend on the width of the adjoining bushland and the fuel types represented therein.

CLASS 4. Similar to class 3 except that a road separates houses from bushland. See section 8 for householders' needs. Section 9 should apply on road verges and on steep slopes carrying dry vegetation types in the bushland.

CLASS 5. One to five houses likely to be at risk adjoining very small or very narrow bushland areas. Section 8 is applicable on allotments. Work in the outer zone may not be necessary in moister fuel types. Elsewhere raking up and removing material or burning in small heaps at safe times should generally be satisfactory.

CLASS 6. Situations where most of the houses in a group are reasonably safe but individual allotments may be a risk to the houses thereon or to neighbouring houses.

Precautions for individual allotments should follow the prescriptions set out for groups of houses in Class 5.

Summary for householders concerning firebreaks in bushfire-prone areas:

MAIN OBJECTIVES: To isolate houses and other buildings from flames and excessive heat and provide conditions suitable for householders and other firefighters to prevent the ignition of buildings by air-borne fire brands.

PRELIMINARY EXAMINATION: Consider the home site in relation to slope, aspect, proximity to bushland, past fire history and the effectiveness of nearby streets, tracks and neighbours' allotments as part of the firebreak system.

DEVELOPMENT OF ALLOTMENT: Location of buildings for greatest safety; construction designed to prevent the ingress of fire brands and sparks; suitable placement of lawns, gardens, etc.; selection of less flammable species.

SITE MAINTENANCE: Removal of flammable material from beside, beneath and above buildings; maintenance of the grounds free of rank growth and flammable material; remote placement of wood heaps, compost heaps, etc.; seeking cooperation along similar lines from neighbours to ensure firebreak continuity (reference to the local council may sometimes be necessary).

CONDITION OF ADJOINING BUSHLAND: If hazard reduction is considered inadequate on adjoining privately-owned bushland, the local council should be advised. If problems exist on public land, contact should be made with the trustees, local council, Fire Brigade Officer or Bushfire Brigade Captain.

MORE DETAILED ADVICE: This is available from local councils and from the city headquarters or country stations of the Board of Fire Commissioners and from the Bush Fire Council, Forestry Commission, National Parks and Wildlife Service and bush fire prevention associations.

In a future issue of the Bush Fire Bulletin, we will look at this aspect in more detail, but it is important to remember that this requirement has been interpreted liberally and that a 'reasonable' rather than a 'perfect' attempt to comply, is the test of what is required.

What if the impact on the environment is considered to be "significant"?

An Environmental Impact Statement must be prepared, but in those circumstances, the hazard reduction burn should be relocated or the fire prescription changed.

I am a private landholder. Do the provisions of the Environmental Planning and Assesment Act apply to me?

Yes, but only if a Section 10 permit to burn under the Bush Fires Act, is required.

The Environmental Planning and Assessment Act's provisions primarily relate to Government agencies and bush fire brigades.

In the case of private landholders applying for a permit to burn, the local council will have advised its permit issuing officers of what areas and circumstances permits should be refused because of "significant impact".

I am a permit issuing officer. What responsibility do I have?

You are acting as an agent of your council. Provided you do not issue permits contravening council's directions, it will be the council that is accountable for your actions.

The local District Fire Committee has prepared a Section 41A Fire Management Plan under the Bush Fires Act. How does that change things?

The policy of the Co-ordinating Committee of the Bush Fire Council requires that fuel management be included in the Section 41A plan. This should take into account the potential impact of fuel management activities and put forward strategies to minimise any impact.

Provided the plan takes into account potential environmental impact and is regularly reviewed, hazard reduction activities in accordance with the provisions of the plan, will generally not need further consideration of potential impact.

What about the Clean Air Act? Why does it prevent fuel management activities from proceeding?

It doesn't. A regulation to the Clean Air Act is designed to prevent pollution from burning household and garden refuse. It only applies in certain areas and specifically exempts fuel management activities (see Circular 6/92 for more detail).

However on *high pollution days* the Clean Air Act provides for bans to be applied to specific categories of fire (including fuel management).

What protection do I have if I am accused of breaching these laws?

Minimising the danger of the spread of fire is a duty under the Bush fires Act. The environmental laws recognise this duty by specifically exempting or allowing for fuel management.

To comply with the requirements of the environmental legislation it is necessary to show that a consideration of "potential impact" was undertaken.

Section 41A plans are the best mechanism for achieving this requirement. It should be recognised that no legal action of any consequence has yet been taken, and no Government agency has yet shown any desire to take or encourage action against any person attempting to act responsibly.

Further information can be obtained by contacting

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A GUIDE TO
environmental legislation and hazard reduction planning

by Tony Gates,
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Acting Manager,
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THIS ARTICLE IS A GUIDE TO THE RELEVANT ENVIRONMENTAL LAW.
Since the document in its entirety has been the subject of professional legal scrutiny, the Department of Bush Fire Services is confident that it provides reliable information. Nethertheless it should not, in whole or in part be regarded as legal advice.

Recent and significant discussion regarding current environmental legislation, and its affect on hazard reduction burning in NSW, has highlighted several areas of concern to fire managers.

A number of statutes are involved including the Environmental Planning and Assessment Act, 1979, the Endangered Fauna Act, 1991 and the Clean Air Act, 1961.

Concern centres around what appears to be the complexity of the requirements of the environmental legislation, and the fear that legal action may be directed towards individuals because of a breach of those requirements.

While the Department has attempted to allay these fears, there seems to be continued confusion of the issues.

It must be stressed that the environmental legislation is not designed to impede the management of combustible fuels in NSW.

The environmental legislation allows inherent responsibilities under the Bush Fires Act, 1949 to be carried out with little or no impediment.

Why does the Endangered Fauna Legislation prevent fuel management (hazard reduction) activity from proceeding?

It doesn't. The Endangered Fauna Legislation amends both the National Parks and Wildlife Act, 1974 and the Environmental Planning and Assessment Act.

Hazard reduction responsibilities under the Bush Fires Act are exempted from the amendments to the National Parks and Wildlife Act (Section 98/99).

The amendments to the Environmental Planning and Assessment Act merely extend the considerations for assessing any potential environmental impact to include impact on endangered fauna and its habitat.

Is fuel management exempted from the Environmental Planning and Assessment Act ?

No, but the Environmental Planning and Assessment Act has been in place since 1980, and to date has not created undue difficulty for fire managers.

How do the changes made to the Environmental Planning and Assessment Act by the Endangered Fauna Legislation affect fuel management?

Unless your local council has considerably complicated matters by adopting a local environmental plan that makes fuel management permissible *only with the consent of council*, bush fire brigades and public authorities need to determine whether or not the proposed activity is likely to cause a significant impact on the environment.

How can I comply with the provisions of the Environmental Planning and Assessment Act?

The Environmental Planning and Assessment Act does not define "significant impact", nor does it require any specific process to be followed.

It does, however, list a number of matters to consider and the Department has prepared a check list to assist in determining whether or not a particular project is "significant".

The relative "significance" of particular areas can also be determined by considering these same matters in preparing a Section 41A plan by the District Fire Committee.

The important requirement is to be able to demonstrate that a determination of "significance" was undertaken.