AN INVESTIGATION OF KARRI REGENERATION BURNS

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In order to select suitable conditions for slash disposal burns following marri chip cutting, an investigation of past karri regeneration burns was made.

The investigation aimed to define each burn by its weather conditions, then rate the burn against these conditions according to:

(1) Success of burn.

(2) Ease of control.

(3) Lighting method.

Because of successful application in Tasmania, the weather conditions chosen were Adjusted Fire Hazard (A.F.H.) and Byram Drought Index (B.D.I.).

A total of 59 past burns were looked at, 26 from Pemberton, 29 from Walpole and 4 from Manjimup.

For the sake of this article, I will confine comment to the Pemberton burns because:

(a) the subjective nature of the information precludes realistic comparisons between divisions;

(b) many Walpole burns were small pockets in Tingle country;

(c) there were few Manjimup burns.

Nevertheless the trends in the Pemberton data were reflected in the Walpole fires.

RESULTS

Burn Quality

The burns were rated (subjectively) as either fair, good, or excellent, according to their intensity and degree of fuel removal (not according to the amount of regeneration they produced, which is mainly dependent on other factors). Each burn was then plotted against B.D.I. and A.F.H. (See figure 1).

A quick appraisal of Figure 1 shows that burn quality becomes consistently better as both B.D.I. and A.F.H. rise. However, it is noticeable that, despite the fact that less burns were carried out in the low ranges of B.D.I. and A.F.H., an excellent burn is still possible in these ranges. It is general practice to select weather at the high end of the scale for the burns, hence the bias.

Control Problems

Burns were rated, again subjectively, according to their control problems as either major, moderate, minor or none. They were, as before, plotted against B.D.I. and A.F.H. (see Figure 2).

Results show that ease of control was virtually dependent on B.D.I. and surprisingly independent of A.F.H. Hence:

B.D.I. Class	Total No. of Fires	No. with Suppression Problems	% of Total
0-300	6	1	16
300-500	10	5	50
500-700	16	14	87

As B.D.I. is a measure of moisture deficiency these results must be attributed to the increased intensity of the burn with drier, large wood sizes, plus drier fuel surrounding the burn. A.F.H. is a measure of fuel moisture content as well, so it is surprising that a correlation with this was not also present.

It must be remembered, however, that escapes and suppression difficulty are also dependent on factors not taken into account by B.D.I. and A.F.H.

Lighting Method

All burns were carried out using the Strip Technique, where a downwind edge is secured before the burn is stripped out into the wind. Consequently, different techniques cannot be compared and since they should affect burn quality and suppression difficulties markedly, they will have to be investigated before large-scale burning proceeds.

DISCUSSION

The investigation has revealed a conflict in that as B.D.I. and A.F.H. rise, burn quality improves, but so too does the likelihood of escapes and associated suppression difficulties. A compromise must be reached, so on the data I have indicated four sections of B.D.I. and A.F.H. (see Figure 3), which appear to have the following properties:

Section	Burn
1	Poor burn, no escape problems.
2	Good burn, little chance of escape.
3	Good to excellent burn, moderate to high escape and suppression problems.
4	Excellent burn, very high suppression problems likely.

Consequently it appears that section 2 would be the optimum compromise situation, providing for an adequate burn with minimum control problems.

The point now arises as to whether the limits of section 2 are too broad or not broad enough to accomplish the required number of burns. As an indication, data from Pemberton on the 1972-73 and 1973-74 fire season were collected. Each day was rated according to its A.F.H. and B.D.I. and plotted.

The number of days per section was then extracted:

1972-73

No. Days

Section	Spring	Prohibited	Autumn	Total
1	18	-	13	31
2	9	-	18	27
3	23	60	22	105
4	2	13	11	26
	52	73	64	189

1973-74

No. Days

Section	Spring	Prohibited	Autumn	Total
1	15	-	18	33
2	31	3	16	50
3	2	61	27	90
4	-	9	8	17
	48	73	69	190

This means that in 1972-73 there were 27 days available in section 2 and for 1973-74 there were 47. Thus, there is going to be a large variation from year to year, depending on the severity of the season. In the examples chosen it can be seen that 1972-73 was a "hotter" year than 1973-74

and this has caused an increase of days in section 3, to the detriment of section 2.

Not all days as listed, however, are going to be available for burning. For example, out of the 190 days, 55 fall on a weekend or a public holiday, whilst others are going to be unavailable because of adverse fuel moisture or climatic conditions. If we assume 60% of days will be available, that leaves us 16 days in 1972-73 and 28 in 1973-74.

The total area expected to be cut in KM forest per year is to be between 4000 and 5000 ha, which will be in 200 ha coupes. This means approximately 20-25 coupes to be burnt per year. If the coupe size is the burn size, it will mean probably at least one burn per day to get them all in. If the coupes are divided up for burning, which is more than likely, it will be necessary for several burns per day if they are to be burnt in section 2.

SUMMARY

The system of using B.D.I. and a measure of fire hazard to define suitable burning conditions has a proven record in other States and appears to relate well to karri slash disposal burns. Confidently designating the correct range will require further research, plus feedback from operational burns. Definition of a suitable range will also have to take into account the number of days likely to be available within that range, plus the number of burns to be conducted annually. Any discrepancies will have to be made up by either increasing the range by new lighting techniques, or physically widening the section. Conversely, the number of burns conducted per day could be lifted.

FIG. 1. B.D.I. AND A.F.H. Vs. BURN QUALITY

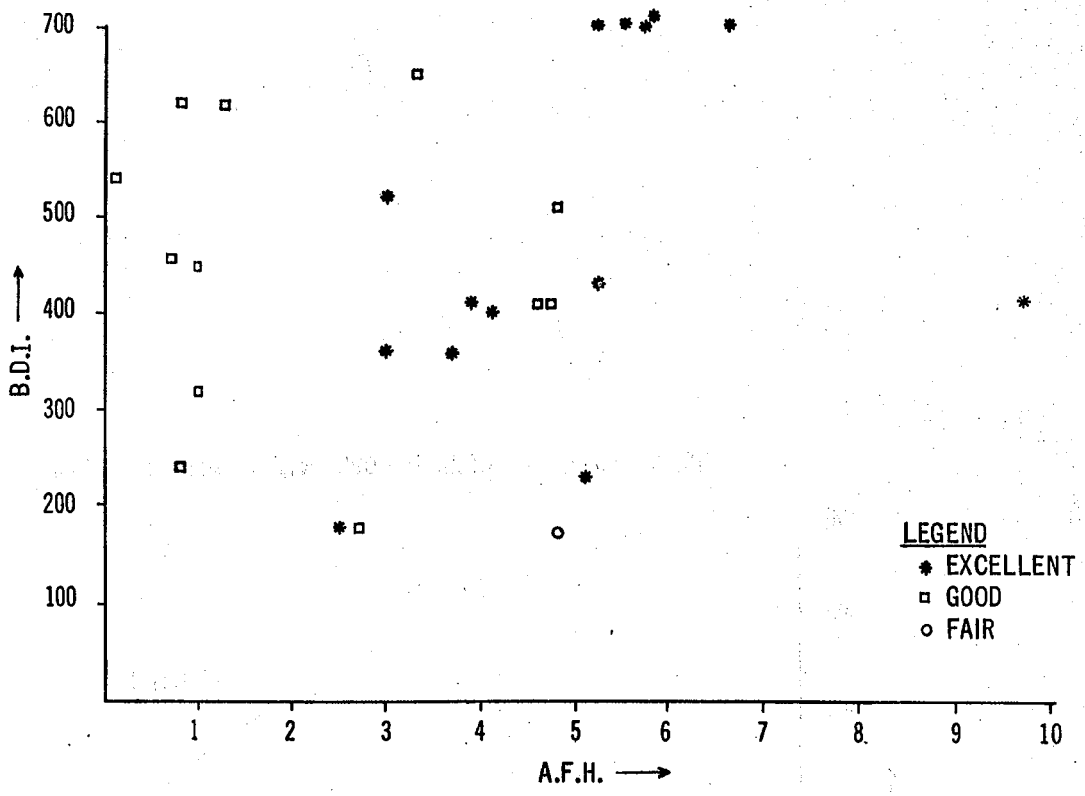

FIG. 2. B.D.I. AND A.F.H. Vs. SUPPRESSION PROBLEMS

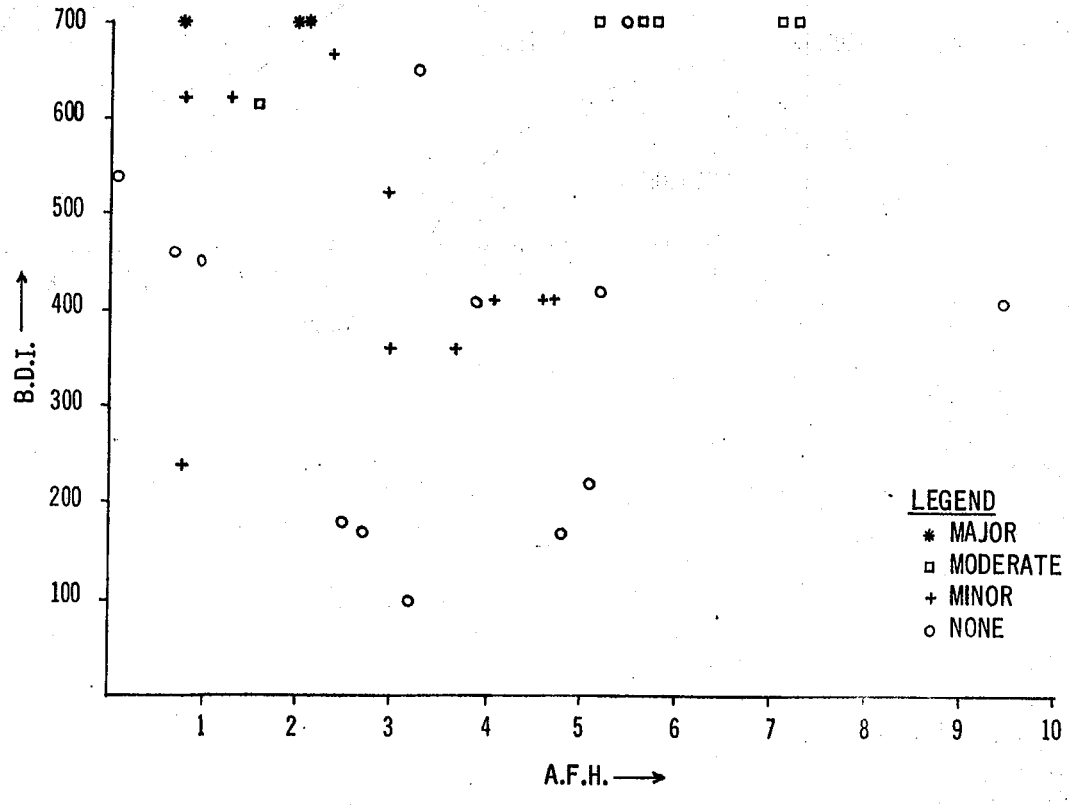

FIG. 3. B.D.I. Vs. A.F.H. DIVIDED INTO BURNING SECTIONS