

## BALLAN BLOCK WILDFIRES

P. Jones

On 20 December 1974, an escape from N20 resulted in two wild-fires which ran freely for at least thirty-six hours before suppression action could be taken.

This gave a rare opportunity to examine the progress of a free-running fire, and compare it with the predicted position as calculated from the jarrah fire danger tables.

### HOPOVER 1

This fire was detected at 1410 hours on 20/12/74. Its position was given as G029 34; however, due to commitments it could not be attacked until the morning of 22/12/74. During this time it travelled approximately 3000 metres, causing total scorch and occasional defoliation to jarrah marri forest of approximately 25-30m height.

There is no doubt that the bulk of the fire's run occurred during the afternoon and night, probably until 0600 hours on 21/12/74, when a cool change brought S-SW winds and light rain with a correspondingly low hazard. Consequently, for the purpose of comparison, only this period will be used to calculate the predicted rate of spread.

### Comparison with Jarrah Fire Danger Tables

An examination of the area led to the use of the following variables:

Rainfall correction factor	=	1
Wind ratio	=	5:1 (60% canopy, ridge tower 30m above canopy)
Fuel correction factor	=	1

Results (see figure)

HOPOVER 1 BALLAN BLOCK NF3 START 1400 hours 20/12/74

Time	Temp °C	RH%	BFH	Wind V km/hr	ROSI FCF	Actual ROS m/hr	Distance Travelled m
1400-1500	39	22	9.4	30	1	211	211
1500-1600	38	18	9.7	40		388	388
1600-1700	38	17	9.7	40		388	388
1700-1800	37	19	9.3	35		233	233
1800-1900	37	23	9.1	30		173	173
1900-2000	35	28	8.6	19		87	87
2000-2200	35	28	8.6	19		87	175
2200-2400	35	36	8.2	12*		62	124
2400-0200	32	42	7.4	12*		47	94
0200-0600	26	63	5.2	12*		17	68
							<u>1941</u>

\* No figures, estimate only

### Discussion

As can be seen, the tables have underpredicted quite considerably, for out of the 3000 metres the fire travelled, the tables only predict 2000 metres.

The basic reason for this, I feel, could be the intense spotting that was reported, and which in fact was responsible for the second fire, a throw of 4000 metres. The tables do not take this effect into account when in fact it must have been quite substantial, although there is no way of assessing just how much it did increase the rate of spread.

### HOPOVER 2

This fire started at approximately 1530 hours from a spot thrown from Hopover 1. It burnt a narrow strip through low-quality jarrah and scrub for approximately 2500 metres before stopping, basically due to the cool change.

As with Hopover 1, the period of calculation used was up to 0600 hours on 21/12/74.

Comparison with Jarrah Fire Danger Tables

Table variables used were:

Rainfall correction factor = 1  
Wind ratio = 4:1  
Fuel correction factor = 0.88

Results (see figure)

HOPOVER 2 BALLAN BLOCK NF3 START 1530 hours 20/12/74

Time	Temp °C	RH%	BFH	Wind V km/hr	ROSI	FCF	Actual ROS m/hr	Distance Travelled m
1530-1600	38	18	9.7	40	905	0.88	895	895
1600-1700	38	17	9.7	40	905	0.88	895	895
1700-1800	37	19	9.3	35	384		338	338
1800-1900	37	23	9.1	30	261		230	230
1900-2000	35	28	8.6	19	97		85	85
2000-2200	35	28	8.6	19	97		85	170
2200-2400	35	36	8.2	12*	62		54	108
2400-0200	32	42	7.4	12*	47		41	82
0200-0600	26	63	5.2	12*	19		16	64
								<u>2867</u>

\* No figures, estimate only

Discussion

The actual and predicted progress of the fire agree very well. The reason may lie in the lower quality forest type, hence the use of the 4:1 wind ratio for calculations. The more open nature and lower height of the forest would also have lessened

spotting somewhat, again keeping the actual rate of spread down.

It can be seen, however, that, allowing for the extra hour and a half that Hopover 1 ran, both fires travelled approximately the same distance. This suggests that their rates of spread must have been very similar; consequently the variables affecting rate of spread, namely wind velocity, fuel quantity and moisture content, must have been similar. The problem arising now is whether the use of different wind ratios and fuel correction factors is justified, or should these variables have been the same for each fire? Moisture content would have been similar for both sites. However, an inspection of the areas involved showed the area of Hopover 1 had a distinctly better quality in terms of basal area, crown cover and height than that of Hopover 2.

If the 5:1 wind ratio had been used, both fires would have underpredicted, whereas if the 4:1 ratio was used both fires would have overpredicted but been considerably closer to the actualities.

	Actual distance travelled by fire (metres)	Distance travelled 4:1 W/R (metres)	Distance travelled 5:1 W/R (metres)
Hopover 1	3000	3491	1941
Hopover 2	2500	2867	1350

All that can be done is to accept the variables as they appear in the field, and thus conclude that the Fire Danger Tables underpredicted in the denser fuel (probably due to intense spotting), but showed up well in the more open situation with lighter fuels.

