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# Fire Management

## **The Effectiveness of Fuel Reduction Burning Five Case Histories**

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**Research Report No. 10**

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## **Preface**

This report was compiled with the assistance of the Dimboola, Daylesford and Stawell Forest Districts. It comprises five case histories describing the impact of fuel reduced areas on the spread and damage caused by wildfires.

The case histories in the report are a sample from the considerable number of similar fire experiences in western Victoria and other parts of the State.

Two cases describe the effect of fuel reduction burning in aiding the successful defence of settlements from wildfires in circumstances where suppression forces would otherwise have had difficulty in preventing substantial property losses.

The other three cases describe wildfires in the Grampians where control was assisted by the presence of fuel reduced areas. Direct attack on the head of these fires was not feasible because of their intensity and inaccessible locations. However, with the aid of fuel reduced areas it is believed that successful suppression of these fires was achieved at much smaller areas than would otherwise have been possible.

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## **CASE 1: DIMBOOLA FIRE NO 3 - 1980/81**

### **Introduction**

On 22 December 1980 the town of Dimboola was threatened by a fast moving wildfire (Map 1). A strategic area which had been fuel reduced four days previously, assisted in protecting the town from a potentially disastrous situation.

### **Fuel Reduction**

Approximately 100 hectares of Crown land along the Wimmera River was fuel reduced in a protective burn on 18 December 1980. The area was west of, and immediately behind, the main business area of the town.

The fuel quantity over most of the area was estimated at 8-10 t/ha and comprised fully cured grasses up to 0.5 m high with some branchwood and leaf litter. Along the Wimmera River scrubby vegetation increased fine fuel quantities to more than 20 t/ha.

### **Wildfire**

The wildfire started at 1100 hours on 22 December at Pink Lake, near the Western Highway, 8 km north-west of Dimboola.

The Fire Danger Index (FDI) was in the mid 20's and the fire spread quickly through scrubby fuels around Pink Lake. Although the fire was very intense and difficult to attack it was checked by 1245 hours. The area burnt to this stage was 200 hectares and the FDI had risen to 30.

Weather conditions deteriorated and a strong north-west wind caused sparks from a burning stump to start a breakaway on the eastern flank at 1330 hours. The FDI was now close to 40.

The fire reached the Wimmera River and burnt fiercely in the heavier fuels along the river frontage spreading at approximately 5 k/hr towards Dimboola. The situation worsened when the wind changed to the south-west at 1500 hours and the wind speed increased to 40 km/hr, giving an FDI greater than 50. The north-eastern flank of the fire moved away on a front more than 6 km long. Much of this front was burning along the river where it was inaccessible and it seemed there was little chance of preventing the fire entering the town. However the fire ceased spreading in this section when it reached the area that had been recently fuel reduced. To the north, where fuel reduction burning had not been carried out, the fire spread from the river frontage and crossed the Western Highway, threatening houses and out buildings in this part of the town.

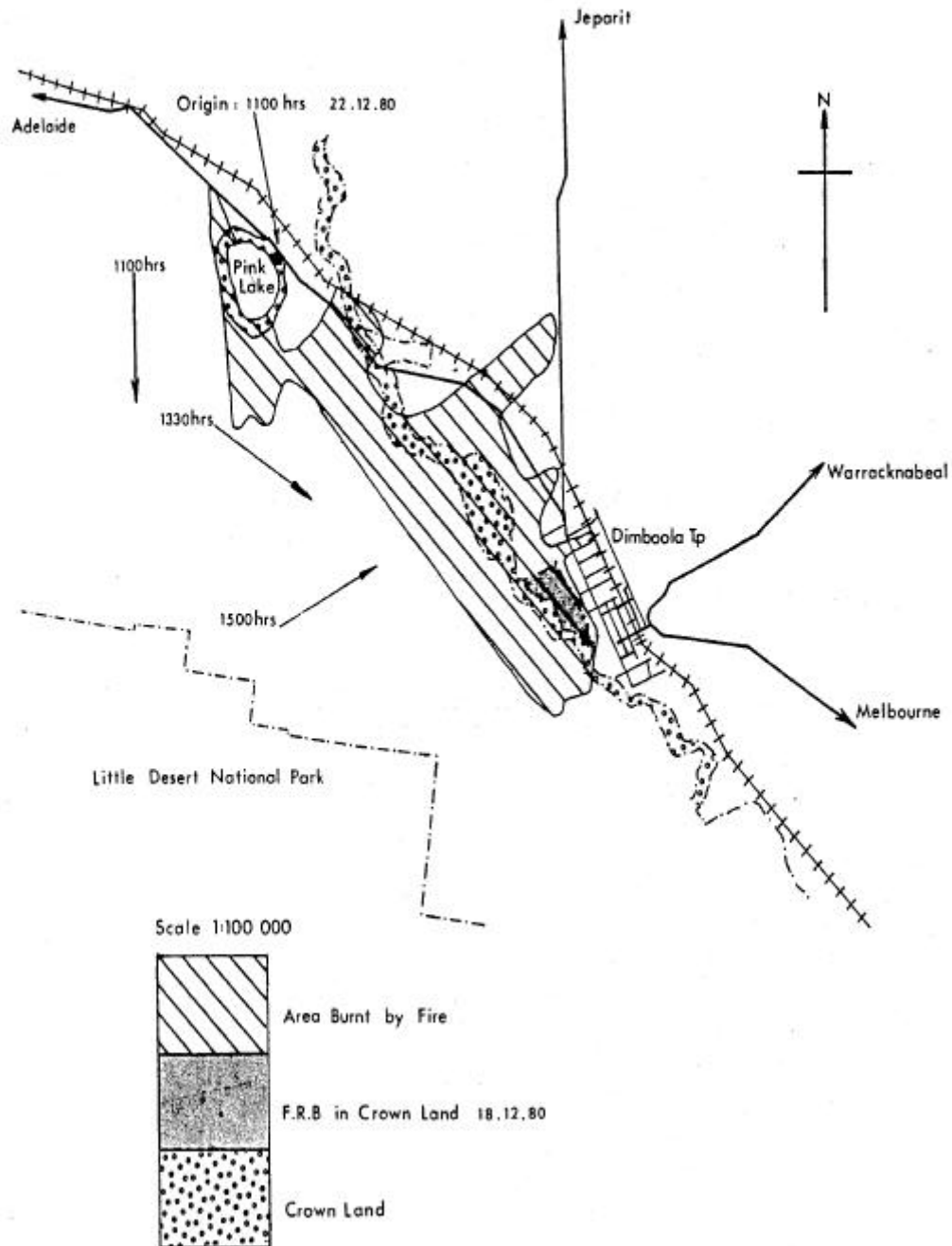
The fuel reduced area gave sufficient protection to the main town area to allow suppression forces to concentrate on protecting the more isolated dwellings under serious threat on the fringe of the town.

**Discussion**

If the fuels on a strategic area of approximately 100 hectares had not been reduced the fire would have entered Dimboola on a wide front from the south-west. An effective attack on this sector would not have been possible because of the heavy fuels and access problems along the Wimmera River frontage. With many vacant blocks within the town covered in long dry grass the fire would have continued to spread and threaten more buildings. Under those circumstances it is likely that substantial property losses would have occurred.

The fuel reduced area along the river effectively protected most of the town and relieved the pressure on suppression forces. This permitted a concentrated attack on the fire to the north of the town thereby reducing the area burnt following the south-westerly wind change. In consequence private property losses were minimised.

# MAP 1



## **CASE 2: DAYLESFORD FIRE NO 6 - 1979/80**

### **Introduction**

At 1400 hours on 17 January 1980 the faulty exhaust of a log skidder caused a fire in the Rocklyns area of the Daylesford District (Map 2). The fire threatened the settlement of Barkstead until the forward spread was stopped by a fuel reduced area.

### **Fuel Reduction**

The area was fuel reduced in November 1979 as part of the protection plan for the settlement. The total area burnt was approximately 60 hectares and varied in depth from 150-400 m.

### **Wildfire**

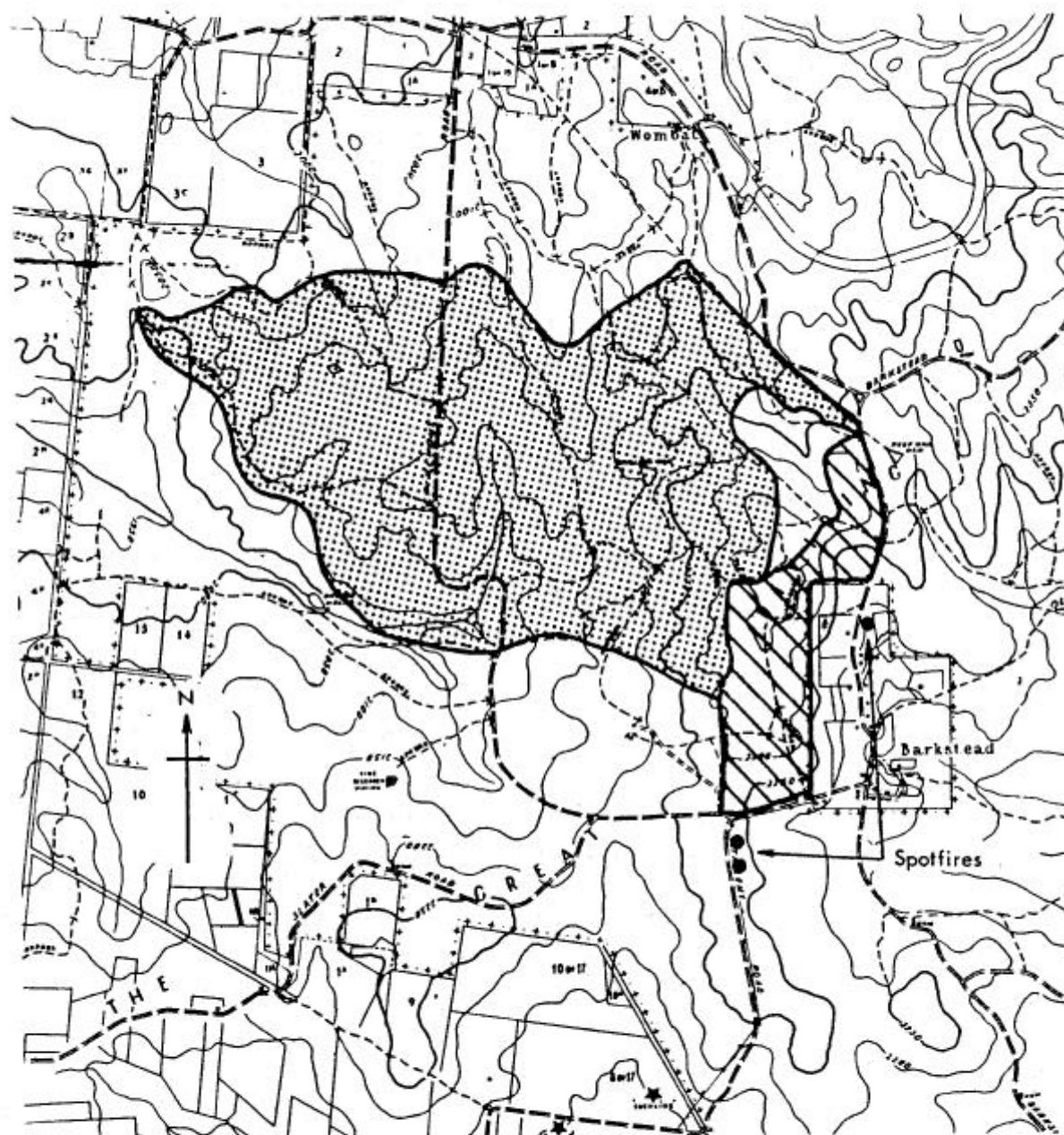
The fire originated at 1400 hours in an area containing logging slash. The FDI at Daylesford at 1500 hours was 16 ( $T = 28^{\circ}\text{C}$ ,  $\text{RH} = 33\%$ , wind = WNW 10-20 k/hr). The front reached the fuel reduced area at 1730 hours and over the previous  $3\frac{1}{2}$  hours had an average rate of forward spread of 800-900 m/hr.

The fire was spotting a significant distance at some stages as shown by the two spot fires which occurred at 1625 hours to the south-west of Barkstead. However, the fuel reduced area was wide enough to catch all spotting activity from the main front except for one spot which occurred in Barkstead at 1730 hours.

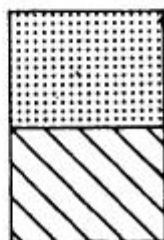
### **Discussion**

A major suppression effort would have been required to hold the wildfire on the western edge of Barkstead. It is doubtful whether a strong enough suppression force could have been mounted to contain the front of the fire. In those circumstances properties in the Barkstead settlement would have been under severe threat and losses may have occurred. The fuel reduced area stopped the forward spread and no suppression action was required on 1.2 km of fire edge.

# MAP 2



Scale 1:31680



Fire Area

Fuel Reduced : Nov 1979

## **CASE 3: STAWELL FIRE NO 1 - 1978/79**

### **Introduction**

On 9 October 1978 a fast spreading wildfire threatened the Mt Difficult Plantation (Map 3). The fire was controlled after burning into a recently fuel reduced area.

### **Fuel Reduction**

An area of 80 hectares was burnt by low intensity fire during August 1978 as part of the protection plan for the Mt Difficult Plantation. The area was north of the plantation and scheduled for fuel reduction every 5 years. An adjoining area of 20 hectares had been fuel reduced in 1976 (Map 3).

Fuels in the area consisted of a dense open heath up to 1 m high with scattered brown stringybarks (*Eucalyptus baxteri*) 15-20 m tall. Fine fuel quantities were generally 15-20 t/ha although quantities of more than 25 t/ha occurred in a nearby area which had not been burnt for many years.

### **Wildfire**

The fire was reported at 1530 hours after it escaped from windrows on private property and spread into dense heaths in the Grampians State Forest. A strong north wind spread the fire at approximately 1 km/hr (FDI ~ 10) and produced intense short distance spotting. The fire was too hot for a direct attack and much of the area was inaccessible due to wet ground conditions. The fire spread into the recently fuel reduced area and this sector of the fire required no further action. Suppression forces were unable to prevent the western flank crossing the Roses Gap Road in several places because of the high fire intensity and intense short distance spotting. With the onset of cooler evening conditions the western edge was controlled and a direct attack to secure the south-western flank was successful.

The area burnt was 348 hectares.

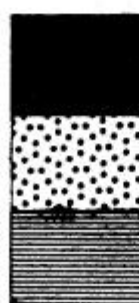
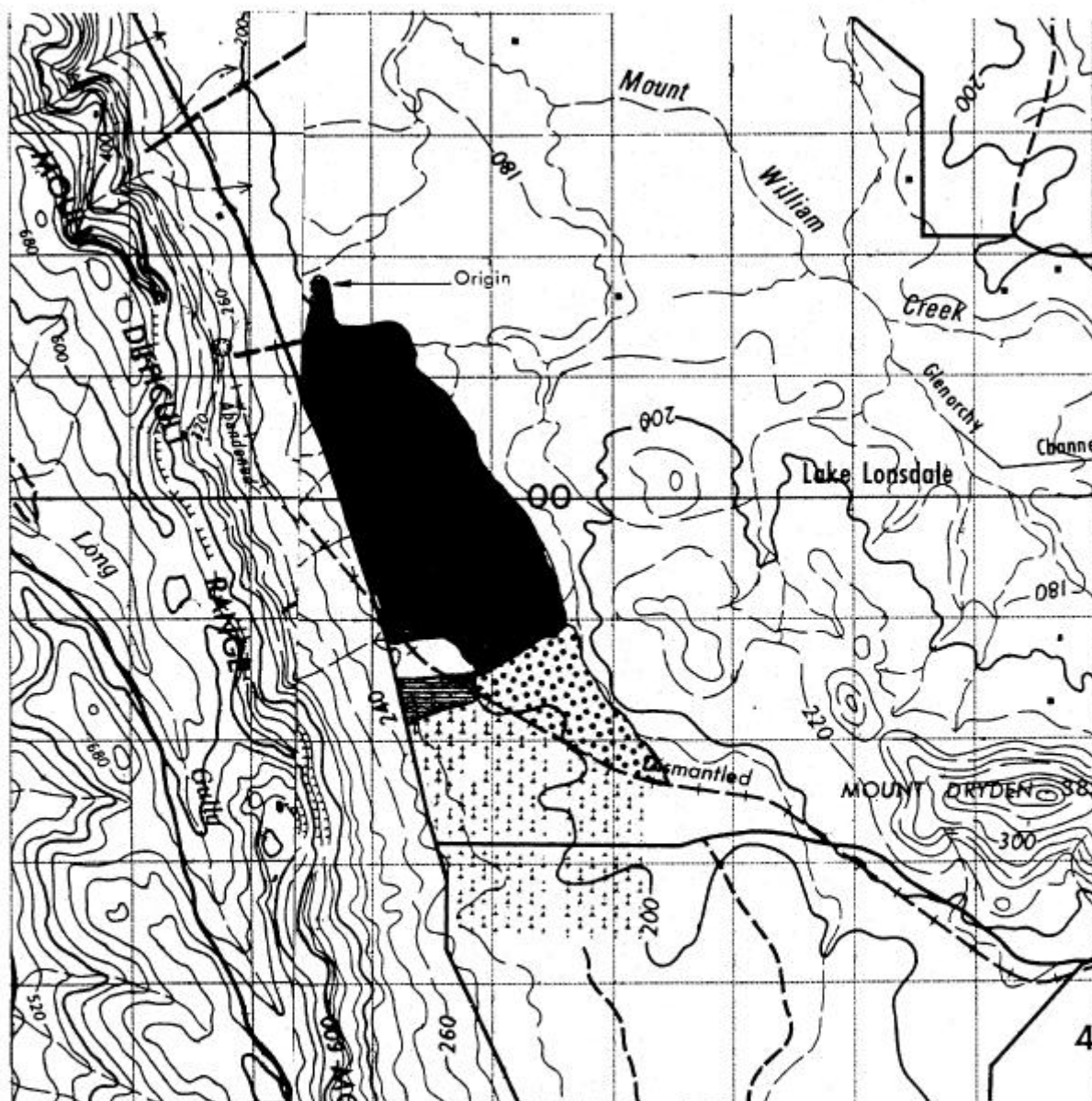
### **Discussion**

Under a moderate FDI this fire burnt with a high intensity and spread rapidly. Poor access, caused by wet ground conditions, hampered suppression efforts and for much of the time this fire was too hot and moving too quickly to be controlled using direct attack methods.

Without the extensive northern break created by fuel reduction burning, this fire would have almost certainly burnt the Mt Difficult Plantation.



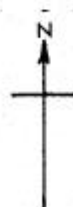
MAP 3



Wildfire : Sept 1978

Fuel Reduction Burn : Aug 1978

Fuel Reduction Burn : 1976



Scale 1:50 000

## **CASE 4: STAWELL FIRE NO 2 - 1980/81**

### **Introduction**

On 26 October 1980 a fire started 1 km west of Mirranatwa Gap in the Grampians State Forest (Map 4). A strong northerly wind spread the fire across the Serra Range and into the Wannon Valley. A fuel reduced area prevented the fire spreading to the Mt William Range.

### **Fuel Reduction**

In May 1979 an area of approximately 40 hectares along the eastern edge of the Halls Gap-Dunkeld Road was fuel reduced. The area had not been burnt for more than 20 years and the fuels consisted of a dense heath understorey up to 1 m high with scattered brown stringybarks up to 15 m high. Fine fuel quantities on the area ranged between 20-25 t/ha. No problems were encountered during the operation with the fire intensity remaining relatively low throughout with most of the fine fuels being burnt.

### **Wildfire**

The wildfire was reported at 1300 hours and was believed to have been lit by persons unknown in a gully near the CRB quarry at Mirranatwa Gap at about 1230 hours under an FDI of approximately 20. The fire spread quickly upslope fanned by a strong northerly wind, burnt into inaccessible country along the Serra Range, and then crossed into the Wannon Valley. The spread rate was about 0.8 km/hr. When it reached the Halls Gap-Dunkeld Road south of Mirranatwa Gap the fuel reduced area prevented spread into the dense heaths and swamps around the Wannon River, even though the fire was spotting more than 100 m across the road.

When suppression crews arrived the fire was burning fiercely in a southerly direction along the road and subsequent back-burning kept the fire on the western side of the road. As conditions moderated the head fire was attacked and a wind change at 0400 hours on the following morning helped to control the fire. The area burnt was 750 hectares.

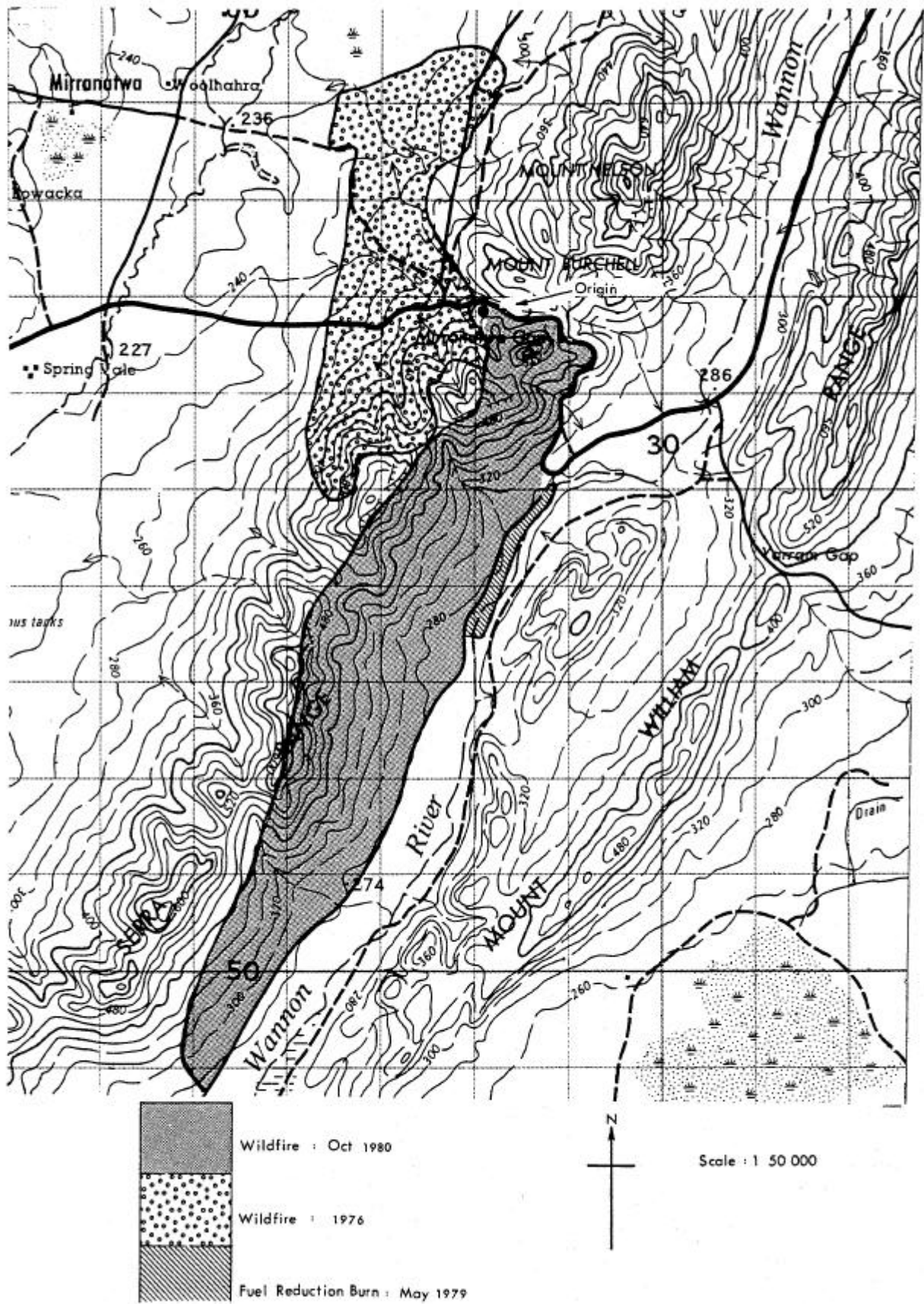
### **Discussion**

Had the strip of 40 hectares not been fuel reduced the previous year this wildfire would have certainly crossed the road and spread rapidly through very flammable heaths and swamps around the Wannon River. It is likely that had this occurred the fire would then have burnt across the Mt William Range and threatened private property south of Yarram Gap.

Because of the saturated ground conditions tankers and dozers were unable to operate in the heath areas and a direct attack was therefore impossible. As the fuel reduced area stopped the fire spreading into inaccessible and highly flammable fuel types, suppression forces were able to work very effectively from the road and keep the area burnt to a minimum.

In comparison a wildfire at Cassidy Gap (15 km further south) in September 1980, in very similar fuels and under almost identical weather conditions, burnt 2325 hectares including 25 hectares of private property and some fences.

MAP 4



## **CASE 5: STAWELL FIRE NO 20 - 1980/81**

### **Introduction**

This fire started on 18 January 1981 on the Henty Highway east of Mt Bepcha (Map 5). A strong westerly wind spread it across open country and into the Grampians State Forest. A fuel reduced strip along Red Rock was in the path of the fire and although the fire eventually spread across this barrier in several places, the head fire became fragmented and the spread rate and fire intensity were reduced. As a result, a large section of this fire was prevented from burning into inaccessible terrain in the Victoria Range.

### **Fuel Reduction**

During a fuel reduction operation in spring 1976, a strip of 130 hectares between Red Rock Road and the Victoria Range escarpment was burnt with a low intensity fire. The area was last burnt during a wildfire in 1962. The fuels were quite variable largely due to changes in vegetation type. There was a light cover of leaf litter and the heath understorey was generally scattered. The overstorey was predominantly brown stringybark and yellow box (*Eucalyptus melliodora*) up to 15 m high. On average, fine fuel quantities ranged from 10-15 t/ha although where the vegetation was denser fuel quantities were up to 25 t/ha.

### **Wildfire**

The fire originated from a car accident on the Henty Highway at 1415 hours and was reported by the Mt Bepcha Lookout at 1422 hours. The FDI was close to 30 and the fire spread across open grassland under the influence of a strong westerly wind at about 4 km/hr, reaching the forest boundary at Red Rock in one hour.

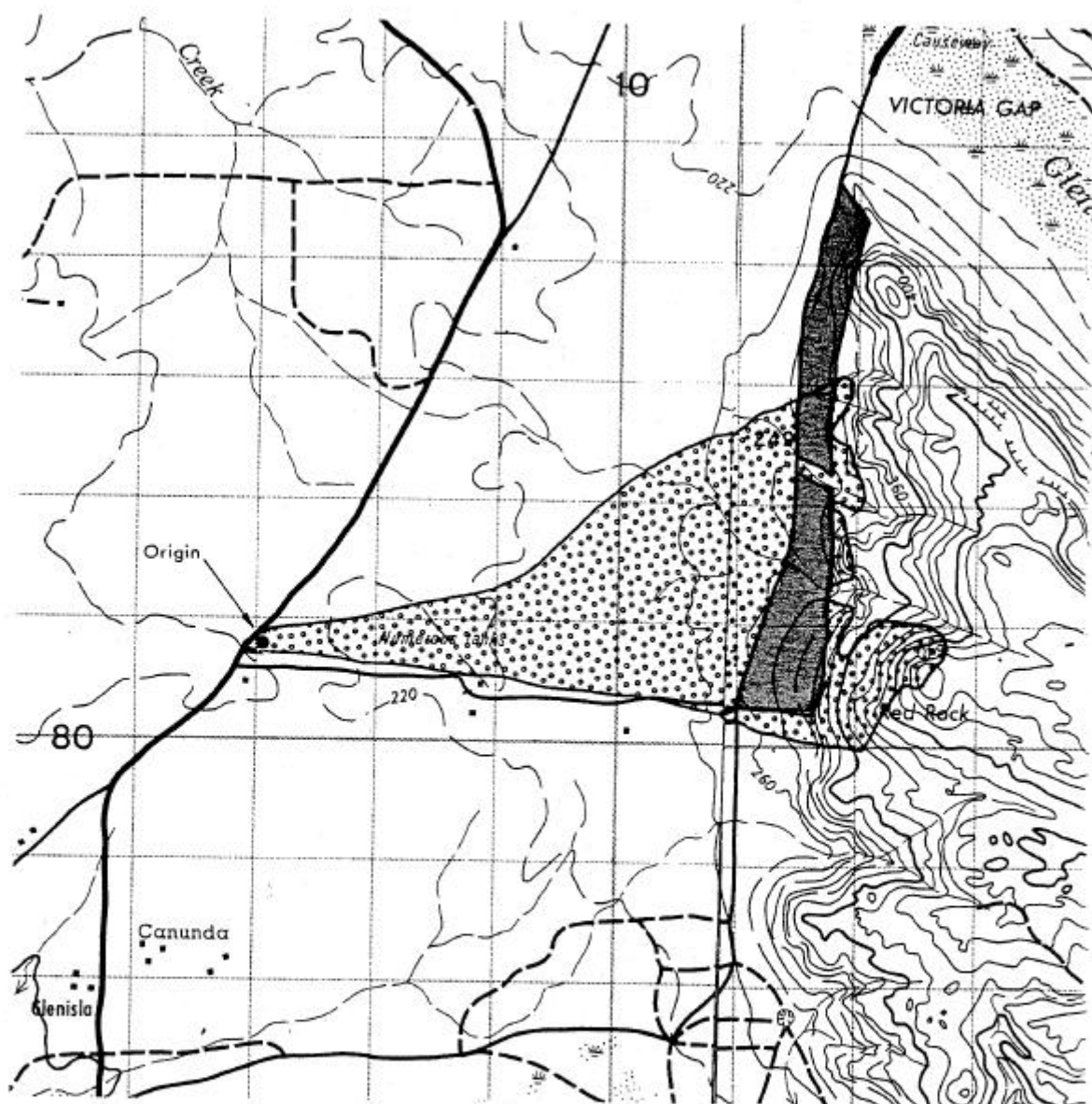
The fire had a front of 700 m when it reached forest and was too intense for direct attack. The fuel reduced area temporarily held the fire, but the southern flank eventually spread round the bottom section and upslope towards Red Rock. The fire also spotted across the fuel reduced area in several places at distances of more than 200 m.

A wind change to the south and moderating conditions reduced the fire intensity and the accessible edges of the fire were quickly controlled. Access to the fire edge around the Red Rock escarpment was difficult, and the following day this section was controlled by hand trail crews and firebombing. The area burnt was 600 hectares.

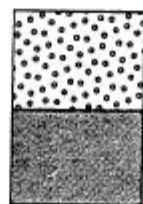
### **Discussion**

The four year old fuel reduced area along Red Rock Road slowed the fire spread. As conditions moderated the more accessible edges of the fire were quickly controlled while the sector in the steep broken terrain around Red Rock proved much more difficult. The fire was prevented from spreading on a broad front onto the inaccessible Victoria Range, which significantly reduced the area burnt and the suppression cost.

# MAP 5



Scale 1 : 50 000



Wildfire : Jan 1981

Fuel Reduction Burn : 20.8.76

