

fire in the pastoral country

By Brendan G. Lay, Arid Lands Ecologist.

The years 1974-75 will be remembered for the huge fires that burnt through outback areas of Australia. Four million hectares in South Australia, and even larger areas in New South Wales and Western Australia, were burnt out. These fires occurred despite timely warnings by the Emergency Fire Services, Bushfire Research Committee and other concerned bodies. This article briefly describes these fires and their effect on the vegetation of our pastoral lands.

Setting the stage: Fuel build-up

In most years large fires cannot occur in our pastoral country. Continuous areas of inflammable vegetation simply do not exist. Only in a year of exceptionally high rainfall does growth of this nature occur. 1973 was such a year. Spear grass (*Stipa nitida*) grew densely throughout the North-East of the State following consistent winter and spring rainfall. In the North-West there was prolific growth of succulent ephemeral plants, such as Mulla Mullas (*Ptilotus gaudichaudii*), and various Bindyi's (*Bassia* spp.).

Further rain through the summer of 1973-74 reduced any fire risk at that time. However, it resulted in growth of other grass and herbage species. The most abundant of these was the aptly-named kerosene grass (*Aristida contorta*). This grass grew on the sandier country where the spear-grass was less common. Thus a continuity of fuel was built-up over large areas.

The weather pattern continued throughout the State during the winter of 1974, and summer of

that year saw the accumulation of herbage which was very dry in the pastoral areas by early November.

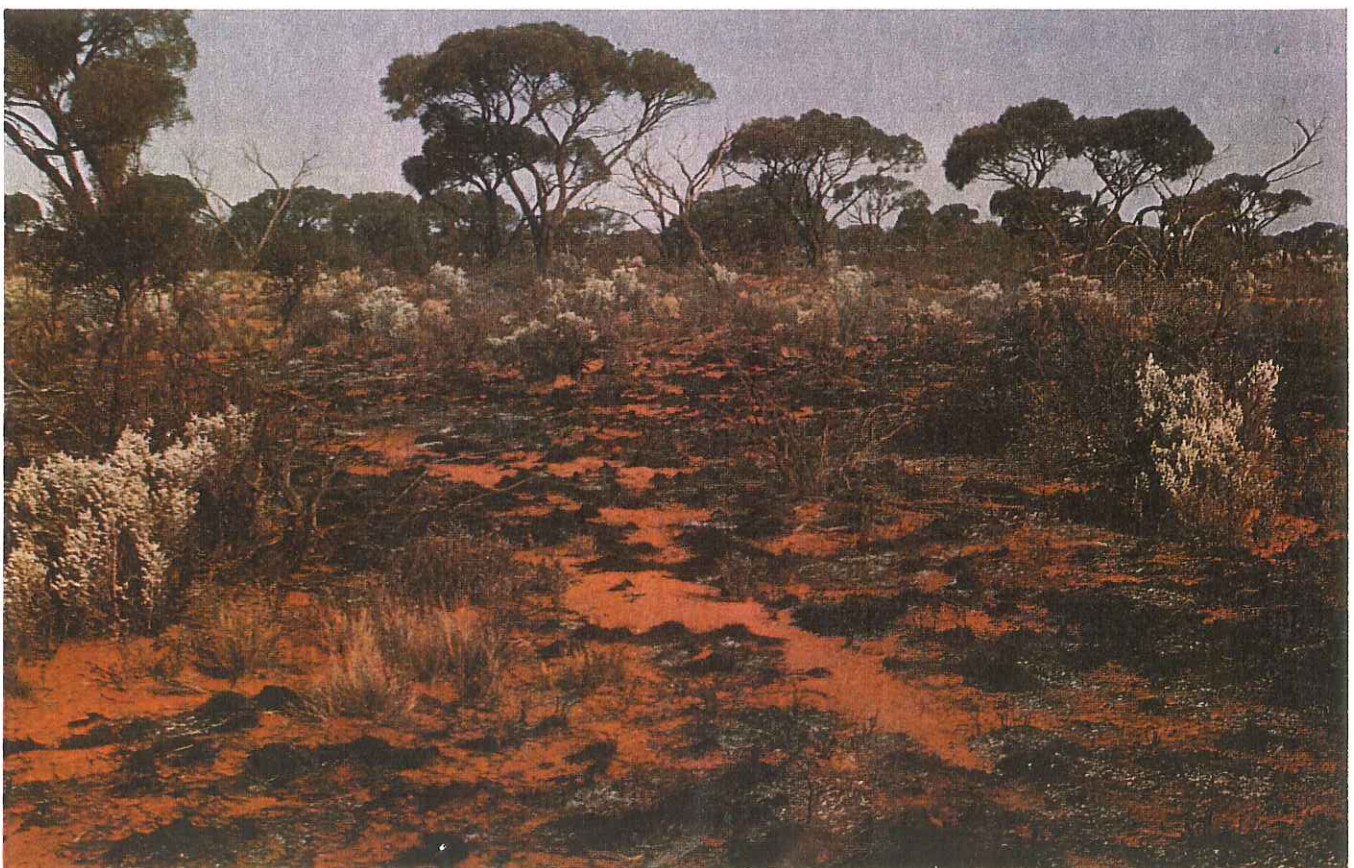
The fires

That summer the monsoonal rains did not come, the thunderstorms were often dry, and lightning struck deadly patterns across the outback. Thunderstorms were widespread on several occasions during the passage of easterly troughs in the weather systems. This pattern was repeated in 1975-76 until the torrential monsoonal down-pours of early February. In one period alone (December 1 to 2, 1975), 22 fires were reported in the pastoral zone, all of which could be attributed to thunderstorms. It is of interest to note that the Minister of Agriculture took the unprecedented action of placing bans on fires in the open throughout the pastoral areas during both these fire seasons: very few of the reported fires could be attributed to man.

The first summer thunderstorms in November, 1974 started large fires in the North-West, in the Great Victoria Desert and eastwards to Commonwealth Hill and Mabel Creek Stations. The dearth of manpower and the sandy, trackless nature of much of the country, enabled these early fires to burn virtually unhindered. The fires were only contained within graded breaks after they had burnt into station country. These huge fires in the Great Victoria Desert, and others on the Nullabor Plain burnt for many weeks before cooler weather and sporadic light rains extinguished them. Subsequent fires in the occupied station country were contained within graded breaks along existing tracks or fence lines, but this was only possible when sufficient manpower was available. About 40 fires occurred in both the 1974-75 fire season and again in 1975-76. Mr. F.L. Kerr has described the 1974-75 fires in the 1975 Emergency Fire Services manual. The location and extent of areas burnt in 1974-75 and 1975-76 is shown on Map 1 (page 12).



Low intensity fire in myall-bluebush country, Bon Bon station. This fire burnt 1000 sq km in December, 1975.



The same area as in the above photograph after the fire had passed. Note incomplete burn and lack of visible damage to the bluebushes and myalls.

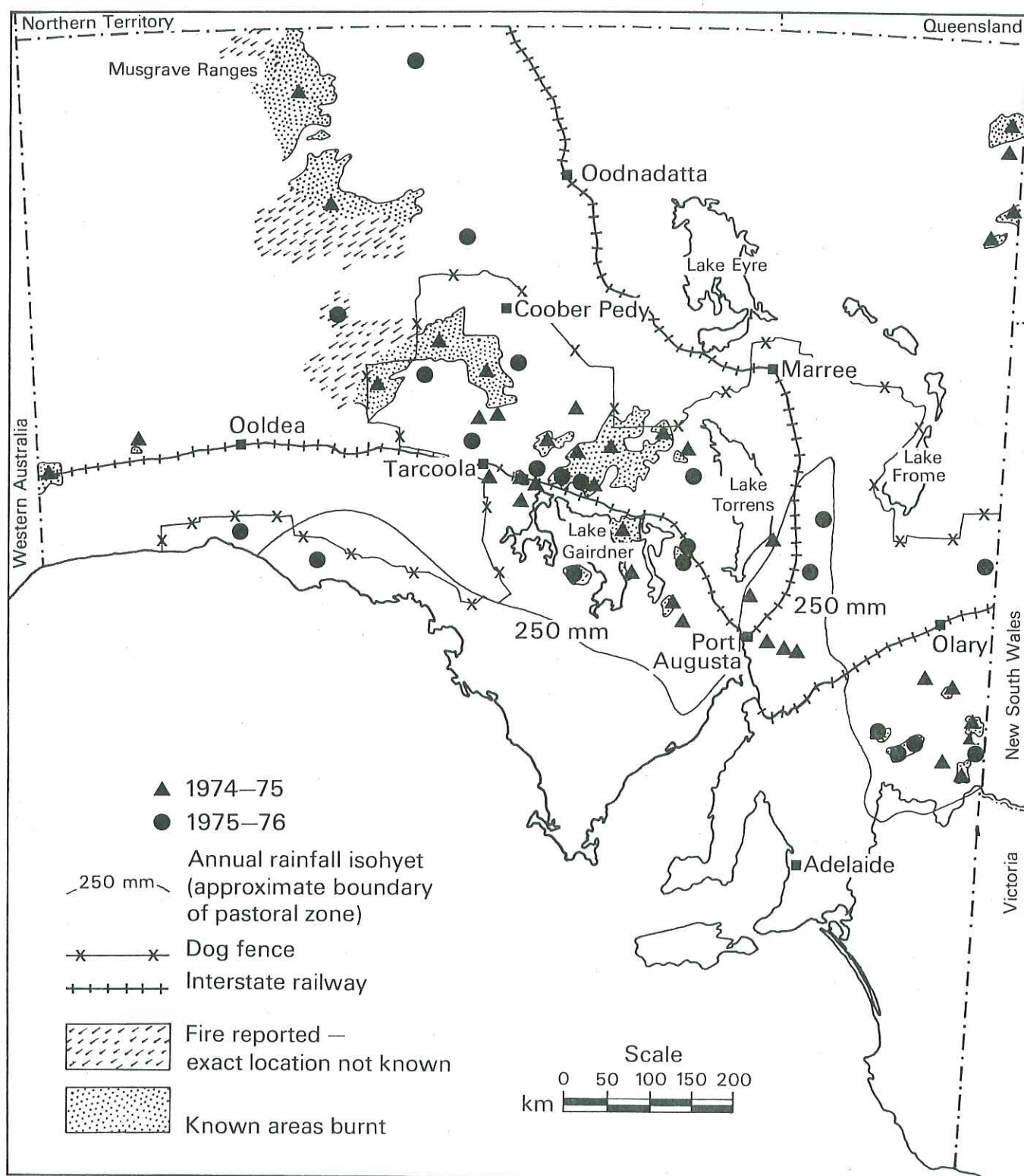


Typical destruction of a mature myall. In some areas, 70- 80 per cent of these trees have been destroyed in this way. These trees take hundreds of years to re-grow.



Growth of everlasting daisies following fire on Bulgunnia station, 1974, with kerosene grass on the unburnt area. But what of the all-important perennials?

Map 1: Location of pastoral fires in South Australia 1974-75 and 1975-76.



Effects on vegetation

Considering the extent of these fires, the loss of station improvements and stock was quite small, reflecting credit on the small number of dedicated firefighters involved. About 10 to 15,000 head of stock, almost all sheep, and 4000 km of fencing were destroyed. Loss of these tangible assets amounted to about \$1,000,000. In addition, a large quantity of forage, mostly the dried-out, ephemeral growth, was destroyed, necessitating agistment or selling of stock.

After the first fires had occurred there were reports of severe damage to the shrubs and trees in some areas. A decision was made to survey the effects of fires of varying intensity and to correlate degree of burn with subsequent survival of perennial fodder, trees and shrubs. Counts were made of all trees and shrubs along many kilometres of fence line and track in burnt country.



Table 1: Mortality of trees and shrubs after fire

These values were obtained by counting the live and fire-killed plants and all shrubs and trees seen while travelling by vehicle through eight km of burnt country on Wirraminna and Wirraminna South Stations. All vegetation within five m of the track was included in the count. The Wirraminna fire was of low intensity (scorch height one to three metres) while the Wirraminna South fire was of medium intensity (scorch height often above canopy of trees).

Species		Wirraminna		Wirraminna South	
Botanical name	Common name	No. counted	Mortality	No. counted	Mortality
<i>Acacia aneura</i>	mulga	181	63	203	67
<i>Acacia linophylla</i>	sand mulga, bowgada	509	340	149	121
<i>Acacia sowdenii</i>	western myall	24	2	71	50
<i>Acacia burkittii</i>		9	4	17	8
<i>Acacia colletioides</i>	wait-a-while	—	—	3	0
<i>Acacia cristata</i>	blackoak	115	37	90	34
<i>Eucalyptus socialis</i>	mallee	17	0	1	0
<i>Heterodendrum oleaefolium</i>	bullock bush	29	0	6	0
<i>Myoporum platycarpum</i>	sugarwood	4	0	10	2
<i>Cassia</i> spp.	cassias	—	—	18	8
<i>Grevillea nematophylla</i>	waterbush	1	1	—	—
<i>Santalum acuminatum</i>	quandong	—	—	3	0
<i>Santalum spicatum</i>	sandalwood	—	—	1	1

Burnt country examined to date has all been in the North-West of the State, where the biggest fires occurred. Work has been carried out on Wirraminna, Wirraminna South, Yalymboo, Bon Bon, Parakylia, and Bulgunnia stations. These studies are continuing, but already the following can be said:

- many widespread and important trees are very susceptible to fire. With a reasonably intense and complete burn, more than 70 per cent of mulga (*Acacia aneura*), sand mulga (*A. linophylla*) and myall (*A. sowdenii*) have been killed (see Table 1).
- myalls and sand mulgas were killed by complete destruction of the trunk, even if the fire was of low intensity.

■ mulga, native pine, cassias and salt bushes in particular are killed when complete scorch of the canopy occurs, even if no part of the plant is actually burnt.

■ bluebush (*Kochia sedifolia*, *K. pyramidata* and *K. astrotricha*) is susceptible to fire. In one survey on Bulgunnia station, after a low intensity burn, about 50 per cent had failed to re-sprout.

■ some species have shown remarkable tolerance to fire. In particular, the bullockbush (*Heterodendrum oleaefolium*), weeping Pittosporum (*Pittosporum phylliraeoides*), quandong (*Santalum acuminatum*) and the mallees (*Eucalyptus* spp.) have shown 100 per cent survival. Most perennial grasses can re-sprout from the base.

- fanned by strong winds, these fires were destructively severe, with average flame heights of seven to ten metres being observed. Fortunately, such winds were rare during the fire period. Under moderate conditions, the burnt area included many islands of unburnt fuel.

- burning affects the composition of ephemerals appearing after the next rains. In addition, wide-spread regeneration of mulgas from seed is now occurring in some areas. This regeneration should be protected where possible until established. Small areas are being fenced-off to see if stock or rabbits affect survival of the seedlings.

Conclusions

Fires of similar proportions probably occurred as natural events at irregular intervals before European settlement. In addition, the aborigines are known to have occasionally caused fires. Because the average life span of the trees readily killed by fire, for example myall, is in the order of 100 to 300 years or more, it can be assumed that there is an interval of several generations between fires of this magnitude. Furthermore, regeneration of these trees has been seldom seen since European settlement, and their continued existence is dependent on regeneration such as that now occurring. With the grazing pressure of rabbits, goats and domestic stock, these seedlings may not survive. In the meantime, it would be foolish to suggest that because such fires are natural events, they be allowed to burn. The stakes, perennial plants for drought fodder and soil stabilization, are too high.

Acknowledgments

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