# THE PRESENT AIMS OF THE FIRE ECOLOGY PROGRAMME IN THE LOWER SOUTH WEST



by

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## INTRODUCTION

The general aims of the fire ecology programme have not been outlined as yet. Since it is difficult, if not impossible, to plan worthwhile investigations without having a proper objective, an attempt at defining the aims of the programme has to be made. This is, of course, difficult with the limited information available at present. Nevertheless certain observations allow us to develop some hypotheses which can be used as a basis on which to formulate the present aims of the programme.

## THE PROBLEM

There are essentially three main dominant scrub species in and around karri forest areas. These listed in order of importance are:

(i) Bossiaea aquifolium (netic)

(ii) Acacia pentadenia (karri wattle)

(iii) Trymalium spathulatum (hazel)

Other dominant species, but ones of lesser importance are:

Acacia urophylla, Acacia strigosa, Acacia pulchella and Acacia descipiens.

They are all species which germinate prolifically after fire if seed is present. Undoubtedly they have always been important constituents of the understorey,

but it seems unlikely that they have always been quite so widespread or prolific as they are at present. Five to six years after burning a community dominated by either of the three major species, the area will be covered by a dense almost impenetrable stand of that species. Apart from the fire hazard that such stands represent, these very dense communities dominated by one or two major species exclude many minor plant species. Recent studies indicate that whereas a netic dominated community at age 3 contained some 50 plant species, the same community at age 8-9 years contained approximately 30 plant species. In some stands that have remained unburnt for 25 years or more the netic remains only as scattered large bushes, and the site is dominated by scattered large hazel. Although this community is more open there is still little development of the minor species due mainly to the heavy accumulation of litter. Such communities contain only about 20 scrub species, but the birds and smaller animals appear especially abundant.

Thus it appears that we are dealing with scrub communities of 50 or more plant species, which after fire undergo a rapid succession. If one of the major species is present it rapidly assumes total dominance resulting in the exclusion of many minor species. Later the stand may open up but many species still cannot survive in the heavy litter which has accumulated. Fire then is necessary to 'release' these minor species from time to time before the reproductive capacity of their seeds, bulbs, rootstocks etc. is depleted.

It has often been demonstrated that many types of Australian scrub communities are able to withstand fire treatment. It is clear that not only is this the case with the communities in question but they actually need to be burnt at intervals in order to realize their full potential. However, what is not clear is <u>how</u> they should be burned.

The present system of controlled burning prescribes systematic mild burns at 5-7 year intervals. It has been clearly demonstrated that control burning is necessary in order to prevent a dangerous build-up of litter. That

this is essential for the safety of both public and our timber resources is not in doubt. However, the present system of burning appears to result in vast areas of dense scrub dominated by a few major species. This is a situation which poses problems for controlled burning, may endanger other scrub species and is also uninteresting to drive through. We have then a situation which can be improved both from the safety and conservation angle, and at the same time made more aesthetically pleasing.

What then should be considered the ideal situation and how is this achieved? In considering the first problem it is obvious that opinions will vary greatly depending largely on a persons special interests. It is necessary however, to try to take as many factors as possible into account so that the resulting forest can truly be said to represent the ultimate in application of our maxim, multiple use.

To describe such a situation in detail is impossible considering our present very limited knowledge of fire ecology. However, some attempt should be made in order that we may have some objective on which to base future research.

The ideal forest is one in which the understory scrub is composed of a mixed community of low growing species representing a maximum development of the flora and a minimum fire hazard. This community should be stable under a practical burning routine, i.e. one that is similar if not identical to that in current use. Isolated large scrubs could be scattered about but these should not be so numerous that they can spread and cover large areas with impenetrable bush leading to the present situation. Further, since frequent regular burning appears to be detrimental to much of the bird life and other small fauna of the karri forest especially, patches of unburned forest should be left at intervals throughout the entire forest area. This situation already exists to a degree, as the scrub adjacent to streams and watercourses often survives several burns due to the moistness of these sites. These areas should be enlarged so that small 'reserves' or islands of unburnt forest exists in places along many of the major watercourses. These

refuges will serve as protection for small birds and animals and from which they can radiate to occupy burnt country. It is appreciated that from time to time one or more of these refuges will burn, and since the great accumulation of litter will result in very hot fires these areas would be best located in areas of poor timber potential.

To achieve this ideal situation two main lines of research are necessary.

1. Investigation of major scrub communities with a view to discovering some way in which the major problem species can be eliminated or greatly reduced. This has to be done by manipulation of fire intensity, frequency and season of burning. It seems reasonable to assume that some sort of 'formula' can be worked out which will enable elimination of the problem species over a number of years, then allowing a return to the normal routine. It may of course be necessary to repeat the 'formula' from time to time to ensure that the species in question do not build up to problem proportions again.

   One of the major problems facing such a programme is that because frequent burning will probably be necessary enough fuel to carry out the burns may not have had time to accumulate. Studies will have to include investigations of the effects of fire intensity, frequency and season of burning on major scrub communities. Such studies should include all the species present if possible so that if a 'formula' for the elimination of the problem species is found then we also know its effects on other scrub species. Information on the seeding habits of many of the major scrub and wildflower species will also be needed and experiments involving the effect of fire on their seed would also be necessary.

2. Regarding the second line of research, this would mainly involve fauna and would entail a smaller programme. First of all we need to determine whether in fact control burning has the detrimental effect on small mammals and birds that it appears to have. If results indicate that it is detrimental then we need to investigate more precisely the nature of such effects. Precise knowledge of the species involved, their occurrence, habits, habitat etc. is also required in order to be able to specify the areas to be set aside as refuges. We have to be able to specify the sort of habitats to be preserved, their size and location. This work would involve investigations of the effects of burning on an area that has not been burnt for a long time. The small mammals inhabiting the area would need identifying, estimates of numbers made, and information regarding their habits and requirements collected. The same should be done for the birds in the area.

Apart from these two major avenues of research there will always be isolated special cases which require individual treatment, e.g. certain wildflower species and rarer animals of restricted habitats. Some species of Boronia and the numbat are examples of this.

CONCLUSION

This is a large programme which may well enlarge as we get down to detailed planning. However, if we are to investigate fire ecology then there must be some purpose other than pure publicity. We must have some ideal capable of partial or complete realization in practice, on completion of the work. It is also realized that our conception of the ideal may, and indeed must alter with time, but this should not deter us from attempting to formulate it even at this early stage. Progress in research is made by formulating hypotheses which are subsequently substantiated or refuted by the results of further investigations. Such hypotheses are constantly altered to conform with new information or rejected altogether and new ones are formulated to take their place.