

FLIGHT LINE ONE

A new 28-minute colour film titled *Flight Line One*, produced by the C.S.I.R.O. Film Unit, has recently been released.

Early Australian fire history, background research into forest fires by the Bushfire Research Section, C.S.I.R.O., and forest wildfire and prescribed burning research by the Forests Department of Western Australia are briefly explained in the film.

Viewers are also taken through the sequences of the stringently controlled operations employed by the W.A. Forests Department in prescribed burning programmes.

The film is available on short-term loan to organised groups from Forests Department, Institute of Forest Research and Protection, Como; and the Audio Visual Branch, Education Department.

The following article provides some background material on the subject.

PRESCRIBED BURNING IN W.A. FORESTS

by Fire Research Officer GEORGE PEET

A recent Fire Protection Association of U.K. survey put Australia ahead of 13 other countries for fire losses expressed as a percentage of gross national product.

Early W.A. records indicate that fires were common in, or near the forest areas prior to European settlement. Aborigines were acquainted with its use and moved continuously over the forest area in search of food. Under these conditions it is inconceivable that accidental fires did not occur, to which must be added fires starting from lightning strikes.

These early fires were probably periodic, and undoubtedly covered large areas, but it is doubtful if they achieved the intensity of fires resulting from forest and land utilisation following European settlement. As masses of debris resulting from utilisation and clearing increased, so conflagrations increased in intensity. These led to severe and widespread forest damage, affecting about one million acres in the 90 years pre-

ceding the passing of the Forests Act in 1918.

Alarmed by the extent of this damage, early foresters attempted to implement a policy which almost entirely excluded fire from cut-over forest. This could not be sustained and after 15 to 20 years, accumulated fuel on the forest floor was such that even heavy expenditure on men and equipment failed to contain fires burning under the worst summer weather conditions.

These problems were highlighted by the disastrous Dwellingup fires in 1961, which blackened 361,000 acres of forest and practically obliterated three small townships.

A new policy introduced in 1954 aimed at systematically checking the fuel build-up by rotational burning over the whole forest, except in recently cut-over areas where small saplings were regenerating.

Prescribed burning would be carried out in the mild weather of spring and autumn when damage to the forest trees was negligible. Summer fires starting in, or burning into these fuel-reduced areas are relatively easy to control and burn at a lower intensity with less damage to the forest environment.

This policy called for prescribed burning over half to three-quarters of a million acres annually.

At this time, personnel with sufficient experience to tackle this immense task was very limited and consequently the programme fell behind for several years. Difficulties had been experienced for many years in the southern forest in particular, where dense scrub and limited roading prevented access by teams of men to carry out the burning. It became obvious that different methods allowing faster work and coverage of larger areas would have to be adopted, and for this to be done safely a major research effort on fire behaviour was required.

Fire research over the past 10 years has concentrated on providing reliable guides for prescribed burning and on developing lighting techniques which allow larger areas to be covered. Much of this work is now in operational use, permitting most of the forest areas to be rotationally treated every four to six years.

There can be little doubt that increases in prescribed burning over the past decade have effectively

◀ *Random clips from the film, indicating the disastrous effect of wildfires on the forest; research and development to help overcome this ever-present threat; aerial prescribed burning operation; and forest after a prescription burn.*

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reduced the incidence and spread of summer wildfires.

It is difficult to foresee a practical alternative for prescribed burning in maintaining effective control over summer fires in these forests. A large and well-equipped force of fire-fighters is insufficient to contain very intense fires burning in heavy fuels during the worst summer days.

Considerable research effort has been expended to ensure prescribed fires are lit under conditions when damage to flora and fauna of the forest is negligible, while significantly reducing the fuels (see "Birds of the Jarrah Forest", this issue).

There are reasonably clear indications that prescribed burning in spring is considerably less damaging to the forest environment than burning in autumn. There is also the suggestion that the abundance of ground flora suffers if fire is excluded from the forest altogether.

Damage can only be avoided if prescribed burning is done with mild fires which consume only the lighter "flashy" fuels such as litter and dead scrub. This type of burning must be done when heavy fuels such as logs and branchwood are too damp to burn, thereby providing one of the

main refuges for small forest fauna such as insects, reptiles and small animals.

Heavy fuels are damp for many weeks after winter rains, giving sufficient time to carry out a major prescribed burning programme. There is insufficient suitable weather in autumn *after the first soaking rains*. In dry autumn conditions logs catch alight easily, destroying the refuge and—in all possibility—the sheltering fauna.

New leaves form in the crowns of jarrah and karri trees each summer. If part of the crown is scorched during a spring burn (a limited amount of scorching is inevitable) new leaves will replace the scorched ones within a month or two. After an autumn burn this replacement must wait until the following summer.

Understorey scrub in these forests is easily killed by even the most mild fires. About 75 per cent of scrub species regenerate after fire from subterranean rootstocks. In this way they are well adapted to a fire environment.

Most forest scrub species produce a flush of new foliage in spring. After a spring burn new shoots appear within several weeks. However, after an autumn burn, shoot development is delayed until the next spring, and therefore the ground is quite bare during winter.

New shoots are attractive food for large animals such as kangaroos and wallabies, and surveys have shown these animals congregate, during the evening, on recently burnt areas. Spring burning regenerates this food supply in as short a time as possible.

In spring the soil and lower parts of the litter layer are damp. In these moist conditions rarely does more than 70 per cent of the forest area burn out from prescribed fire. The remaining unburnt islands help create the diverse habitat so necessary for abundant fauna. This patchy burn-

ing is by no means as easy to achieve in the dry conditions of autumn when fires will continue to spread until the whole area is burnt out.

In the main forest there is evidence to suggest mild burning in spring will promote the greatest abundance of scrub species. Most of these re-seed within four years of the fire and providing prescribed burning is not too frequent, the species will be maintained.


Scrub which regenerates after a summer fire is quite commonly dominated by dense fireweeds—principally acacias. In areas long protected from fire the scrub has a moribund appearance and species are less abundant.

The subject of fire ecology is extremely complex and cannot be covered adequately in a few paragraphs. It cannot be denied there is considerable further research to be

done before full and comprehensive answers are found.

Once the Forests Department had done the basic research on proper weather conditions and lighting techniques, a joint project with the Bushfire Research Section of C.S.I.R.O. yielded an entirely new technique for using aircraft to light prescribed burning. This involved dropping small incendiaries from the aircraft at pre-determined intervals. The spacing is controlled by mobile radio beacons which guide the flight-path of the aircraft.

The aircraft method lights at a very fast rate, requiring a high degree of training and co-ordination between ground and air crews.

Forests Department personnel are now well experienced and burning with aerial methods grew from 50,000 acres to 600,000 acres in the five-year period from 1965 to 1970. 

Back cover

Forestscapes

Christmas Tree Well, 45 miles from Perth along the Brookton Highway, is a spot not many people would see during the summer blossom time of Christmas trees (*Nuytsia floribunda*).

An interesting point here is the number of tree species represented within a very small area.

Included on a forest recreation map for the Kelmscott and Mundaring Forest Divisions, Christmas Tree Well is normally visited during the cooler months of late autumn, winter and early spring.

Because of the general search for a better quality of life, the present day insistence on conservation of the environment and the expected increases in demand for wood and wood pulp products, the role of forestry in modern society will become more and more important.

Recreation needs of the future are

likely to rise steeply and these requirements have to be gauged with great care. The forests, hills and coasts are the areas most suited for recreation purposes. State Forests near the metropolitan area in particular, have always provided recreation facilities, and some are managed partially to this end.

Today's management problems involve not only a need for more accurate and detailed estimates of future recreation needs, but also an evaluation of the potential offered by different types of forest. Account must be taken of the need to safeguard the surroundings and avoid having forest areas spoilt by a concentrated heavy influx of visitors.

Too great a recreational pressure on the forest leads to even more problems, not the least being unfortunate changes in the habitat. 