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## FIRE AND ENVIRONMENTAL PROTECTION

### INTRODUCTION

In its broadest sense, the environment includes all the physical, biological and social factors which surround us. Environmental protection is required both from biological factors (for example, dieback, insects, weeds, feral animals) and from the effects of man's activities (for example; roads, firebreaks, fuel modification).

Fire Prevention activities can be undertaken with control over environmental effects. Activities can be planned based on the best information available, including consideration of alternatives, and then work can be completed in a prescribed order.

For Fire Suppression the reverse can be true - the "activity" is underway before you know what is to be done with it. The time available for planning, considering alternatives and gathering information is much less; while the pressure to suppress the fire can be overwhelming, giving greater opportunity for mistakes to occur. These can be minimised by planning prior to fires occurring.

It is important to remember that fire is a natural part of our environment. Some of the side effects of errors in planning (e.g., dieback spread, erosion) can have much greater consequences on the environment than the fire itself. However, the priorities on protection of life and property must remain uppermost.

FIRE PREVENTION AND SUPPRESSION ACTIVITIES THAN CAN AFFECT THE ENVIRONMENT

Activities Include:

- . Road construction, upgrading and maintenance. (P)
- . Firebreak construction, upgrading and maintenance. (P)
- . Water point constructions and maintenance. (P)
- . Fuel modification operations (e.g., scrub rolling, chaining). (P)
- . Prescribed burning - broadscale areas  
- narrow buffers (P,S)
- . Fireline construction. (P,S)
- . Access routes. (P,S)
- . Vehicle cleanliness. (P,S)
- . Mopping up

Potential Environmental Damages/Agents:

- . Disease (Dieback) introduction and spread. (P,S)
- . Loss of Rare/Endangered plant communities/  
Fauna habitat. (P,S)
- . Soil erosion and damage, wind erosion, dune  
movement, water quality. (P,S)
- . Scarring of landscape. (P,S)
- . Introduction of annuals, weeds, exotic plants. (P,S)
- . Timber losses due to butt damage, burning logs  
against standing timber. (P,S)

Because we can't cover all activities and effects, an example will be given, which relates to the construction and maintenance of fire-breaks.

ENVIRONMENTAL FACTORS AFFECTING CONSTRUCTION AND MAINTENANCE OF  
FIREBREAKS

Many factors go in to determine the type and design of any firebreak.

The initial choice of firebreaks will depend heavily upon several factors including:

- . the primary values of the land (on both sides of the fence);
- . the system of fuel control used;
- . the types of fuel present;
- . terrain and geology;
- . equipment and funds available.

And any of the following may be chosen:

- . minimum 3 metre wide bare earth;
- . double firebreaks;
- . low fuel buffer;
- . herbicide-created break;
- . natural firebreaks (sandy areas, exposed rocks);
- . slashed firebreak.

ENVIRONMENTAL FACTORS TO BE CONSIDERED IN DESIGNING A FIREBREAK

1. Dieback Disease

This disease is spread by the movement of infected soil and root material.

When considering constructing or maintaining a firebreak it is of great importance to minimise the risk of spreading the disease during that operation. This can be achieved by:

- 1.1 Operating when seasonal conditions are against the fungus. Wet periods of the year must generally be regarded as high risk. *Phytophthora cinnamomi* (P.C.) reproduces rapidly during the warm and moist spring and autumn, but can also survive during the winter. Even in summer moist gully environments provide suitable conditions for fungal survival.

Therefore any activity which involves the movement of moist soil represents a risk in the spread of dieback. All work should therefore be planned for dry soil conditions.

- 1.2 Obtain accurate dieback information.

Where accurate up-to-date dieback free maps exist for an area in question they should be used for planning a hygiene operation. In the absence of such maps the firebreak or its planned route must be checked, at least two months in advance. Inspection should be done by trained interpreters using indicator species (e.g., *Banksias*, blackboys, *patersonia*) with sampling as required. Laboratory processing may take some time and samples should be despatched as soon as possible.

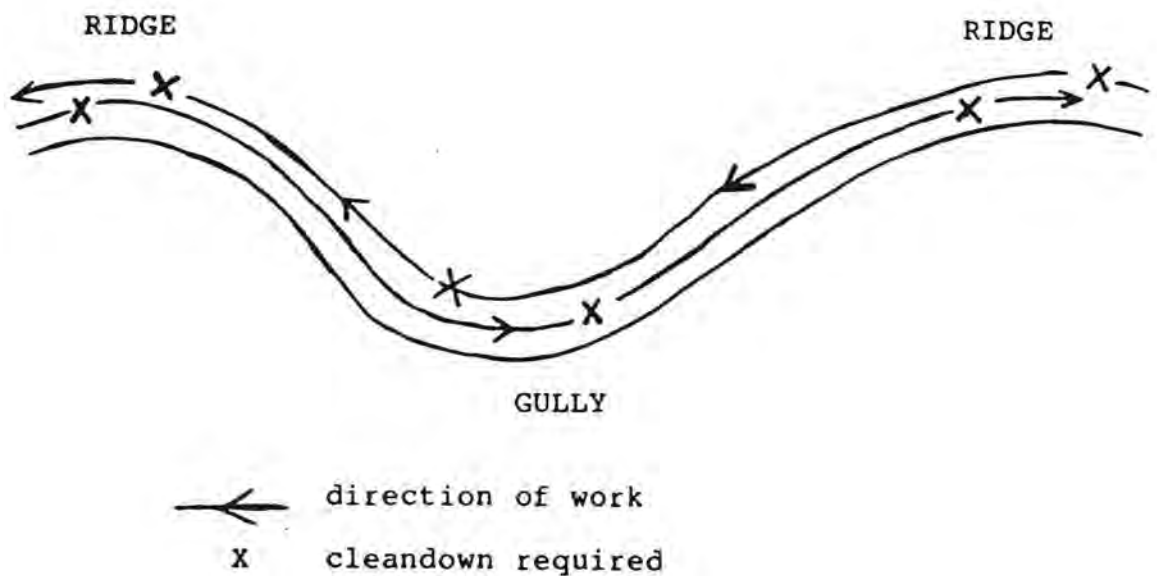
If possible the proposed site should be redirected to avoid dieback areas.

### 1.3 Hygiene

All dieback categories need to be demarcated in along the firebreak.

Operations should be confined to a single dieback category, and all equipment cleaned down when passing from suspect or known dieback infections into dieback-free areas.

Where dieback status is uncertain (e.g., absence of indicator species) activities should be confined to individual sub-catchments and all vehicles and plant cleaned down from one sub-catchment to the next and at the drainage line. (see below).



2. RARE FLORA

Rare flora are those species gazetted as rare under the provisions of the Wildlife Conservation Act 1950, and those advised as rare and in need of protection.

An Operation Circular should be issued in the near future.

In protecting rare flora during construction and maintenance of firebreaks, the following are required.

2.1 Maintain records of known rare flora occurrences. Registers are being developed and distributed to Districts. These should include maps and photographs/descriptions.

2.2 Be able to identify rare flora so that new occurrences are not accidentally disturbed in the course of operations.

New firebreaks will need to be relocated if they would damage rare flora on the proposed alignment.

2.3 If during firebreak construction/maintenance, disturbance of rare flora is proposed then direct consultation with personnel familiar with the status of those plants is recommended. (e.g., Dr Hopper, Woodvale; G. McCutcheon, Bunbury). Where the plant is gazetted as rare, Ministerial approval is required (licence obtained via Senior Clerk Flora, Como). The Minister requires full information of why the rare flora is to be disturbed and why alternatives (e.g., new firebreak) are not viable. The Minister may, of course, refuse to issue such a licence.

2.4 Avoid vegetation associations known to be poorly represented in the area.

2.5 Avoid placing firebreaks along the boundary between vegetation associations. These are often areas of increased diversity of species. A firebreak could become a barrier for movement of some species between the associations.

However, these boundaries are often a logical place for a firebreak, e.g., regeneration boundaries between jarrah and karri.

### 3. RARE FAUNA

The protection of rare fauna involves the protection of animal life and their habitat. Firebreaks can be constructed to protect the habitat from the degenerating effects of too frequent wild-fire and in some instances to allow for the safe manipulation of habitat through the use of fire as a biological tool.

Firebreaks should therefore be located and designed to minimise disturbance of the feeding, movement and breeding habitat of the rare fauna. This requires consultation with expert research staff and firebreak plans must be closely related to other aspects of the fire protection strategy for the area.

#### 4. EROSION

Erosion is a function of the slope, soil types, construction standards and the climate. In constructing firebreaks the first three factors can be altered.

It is generally best to avoid steep slopes and erodible soils wherever possible. Eroded fire tracks impede the safe movement of fire vehicles.

Where it is not possible to avoid such areas, construction and maintenance standards should be increased by:-

1. Locating roads along contours as much as possible;
2. Minimize the volume and velocity of water running along the break by - turn-offs, table drains, rock banks and other structures.

The frequency of run off structures must be increased as slope increases.

In areas required for water production for human consumption it is important to minimise the run-off of turbid water into streams.

This can be facilitated by: maintaining a stream reserve, right-angle stream crossings.



5. SAND DUNE, GRANITE ROCKS, SHALLOW SOILS AND OTHER FRAGILE SOIL SURFACES

Where possible, firebreak construction on sand dunes should be avoided as these areas are subject to severe wind erosion, and also can cause access difficulty for fire fighting vehicles. It may be necessary to install slashed low fuel firebreaks in heath vegetation, so that root systems can be retained in the soil to bind it and provide safer access. An example are firebreaks in Two Peoples Bay.

Other fragile areas should be avoided during break construction.

6. LANDSCAPE CONSIDERATION

Firebreaks and tracks within reserves, particularly on undulating and hilly country can be unsightly and show up as obvious scars on the landscape. It is important that these be located where they blend in with the surrounds, either by following contours or by concealment.

Methods of concealing the entrances to firebreaks may take a number of forms. Concealment should not be so complete that it would hinder the access of firefighters desiring to use the break to fight fires.

The initial stage of the firebreak may be taken off at any angle on a "dog-leg" to the line of access by which the public approach the reserve.

Access to firebreaks by conventional vehicles that might be used for activities that could be detrimental to the reserve can be limited in a number of ways. One way is closing the entrance with fallen timber. Another is to use signs indicating restricted access.

These techniques need to be accompanied by public education as to the purpose of the reserve or park, and by patrols to deter the public from detrimental activities.

#### 7. WEED INVASION

Weed invasion may occur by introduction of vehicles, by wind-borne seed and by management practices, creating a more suitable environment for weeds to develop (for example very frequent fires). The Department has a responsibility to control weeds declared under the A.R.R.P. Act. Control of non-declared but ecologically damaging weeds may also be required.

#### 8. TIMBER LOSSES

When constructing or widening firebreaks it is sometimes necessary to heap vegetation removed from the break.

These heaps can be a significant fire hazard and cause great difficulty in mopping up any fire in the area. They should be burnt as soon as practical.

Protection of existing vegetation is important. Heaps wherever possible should be located in natural gaps, several metres away from the existing overstorey. Timber values can be lost by scarring the butt of the tree.

#### ENVIRONMENTAL PROTECTION IN PRESCRIBED BURNING

(SEE FORMS = CALM 32, 763)

#### ENVIRONMENTAL PROTECTION IN FIRE SUPPRESSION

The functions of individuals in the fire situation are spelled out in the L.F.O. Booklet. They are interpreted from the perspective of environmental protection:

(a) Controller/Intelligence Officer

The Controller is responsible for the organisation and direction of the fire suppression operation. The Intelligence Officer provides the Controller with information upon which to make control decisions.

The suppression of the fire with minimal effect on all values is of immediate concern.

One of the Controllers first functions is to assess the fires rate of spread, the values which it is likely to threaten and how the fire is to be controlled.

Of the values threatened, environmental values are important, but subsidiary to life and property. Environmental values are threatened by (1) the fire and (2) the suppression operation.

Although unplanned wildfire is damaging, most vegetation is adapted to it. Fire may be important when:

- (1) specific rare species may be fire sensitive;
- (2) small reserves and specific habitats can be degraded if burnt out at one time.

In the actual suppression of the fire, more damage is likely to occur. The controller should consider in determining the fire suppression strategy.

- (1) What is the dieback status of land likely to be traversed?  
DIEBACK/DIEBACK-FREE/UNKNOWN
- (2) What is the risk of spreading dieback by direct/indirect attack?
- (3) Is handtool attack feasible/safe/effective? Machinery attack?
- (4) If machinery attack is necessary what risk to:
  - (i) dieback spread;
  - (ii) permanent damage to rare/endangered species;
  - (iii) unacceptable soil damage/erosion;
  - (iv) unacceptable damage to landscape values.
- (5) How should fire be broken into sectors to minimise hygiene risk?
- (6) Is washdown required? Where?

It is important for the Controller, in considering the extent of environmental damage, to appreciate that some can be repaired following fire suppression. For example it may be better to construct a fireline on a steep slope to control the fire before it gets out of hand, and at a later date, erosion control devices constructed and rehabilitation undertaken.

It is important to weigh up the relative costs of an undefined risk of environmental damage against the cost of allowing the fire to be larger, a greater risk to life and property, and incur greater monetary cost.

(b) At the Fire

The Fire Boss is assisted by an Environmental Advisor who provides advice on the objectives, strategies and requirements of the environmental and ecological aspects of the area Fire Management Plan (See L.F.O. Booklet).

The Controller and Intelligence Officer are limited in fire strategy by the information at hand in the office. The Environmental Advisor can provide more accurate, on-the-ground interpretation of environmental needs in particular disease and rare species location, and should nominate the best location for firelines.

All individuals on the fire face can also assist in environmental protection by:

- (1) Wherever possible minimise major disturbance to vegetation;
- (2) Ensuring all water used on the fire is sterilized. In particular water picked up from water points must be regarded as infected;
- (3) Keeping vehicles clean.

(c) **Post Fire Rehabilitation**

Where environmental damage has occurred in the fire suppression operations, it may be necessary for the Controller/Fire Boss to make provision for suitable rehabilitation. This could include closure of unwanted tracks, or rehabilitation and erosion control on steep slopes.