DISEASE MANAGEMENT

MISSION AND OBJECTIVES – 1999-1997

CALM Annual Report 1998/1999. 1999
CALM Annual Report 1997/1998. 1998
CALM Annual Report 1996/1997. 1997

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1992/1993 – SIMILAR WORDING

SILVICULTURAL GUIDELINES - 1997

Silvicultural guideline 3/97 Establishment Guidelines for Karri Forest Regeneration Following Harvesting

12. Environmental Protection
"*All establishment operations will conform to requirements to minimise the spread of dieback disease. Requirements will have been documented in hygiene evaluations for roading and harvesting operations. The same constraints are to be applied to all establishment operations.*" (p. 7)

FIRE OPERATIONS MANUAL – 1997

NOTE: FOR UPDATES ISSUED IN 1997 REFER TO THE ENTRIES UNDER THE FOLLOWING –
Fire Operations Manual : Volume 1. 1993
Fire Operations Manual : Volume 2 : Fire Protection Instructions. 1993

MISSION AND OBJECTIVES – 1996

CALM Annual Report 1995/1996. 1996

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1992/1993 – SIMILAR WORDING

TIMBER HARVESTING … 1996 ED. – 1996

Timber Harvesting in Western Australia … 1996 Ed. 1996

PART 1 : CODE OF LOGGING PRACTICE

Section 2 : General
NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

Section 4 : Extraction
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 6 : Loading and Delivery
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 7 : Environmental Protection
Dieback Disease

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)

PART TWO : MANUAL OF HARVESTING SPECIFICATIONS

Section 1 : Planning and Monitoring
Specification 1.1 : Harvesting and Regeneration Plans

1. Responsibilities

NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

2. Plan Types
2.3 Short Term Integrated Harvesting and Regeneration Plan

"*This is the tertiary level integrated harvesting plan which shows in detail proposed harvesting areas over a one or two year period. The short term plan takes into account the principles contained in 'Guidelines for Integrated Forest Harvest Planning and Design'.*" (p. 16)

"*These plans shall contain the following information as a minimum:*
[…]
(2) Predicted yield summary (where possible in 'soil movement' or 'no soil movement' categories).
(3) Predicted yield details (where possible in 'soil movement' or 'no soil movement' categories)." (p. 16)

NOTE: THE TYPES OF PLANS (THE FORMER PLANS A, B, C, D) HAVE BEEN AMENDED TO THE FOLLOWING –

"*The plans shall include:*
[…]
(3) 1:250, 000 overview plan showing, when available:
[…]
- *'with soil movement' harvesting areas.*
- *'no soil movement' harvesting areas.*

[…]
In addition to the above, Dieback Hygiene maps and Dieback Hazard plans are issued to SFRBU cell managers, enabling dieback hygiene evaluations to be prepared for each cutting area as necessary." (p. 16)

3. Plan Amendment

NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

7. Field Plans

"*In most cases it is necessary for the forest Officer in Charge of a harvesting operation to be in possession of a relatively large scale field plan. The field plan is used to record the progress of cutting and extraction, and the progress of any silvicultural treatments.* […]" (p. 17)

8. Records

"*SFRBU or District staff must maintain up-to-date field records of areas cut over and silviculturally treated. Forms for inputs into the computer system 'SILREC' will be collated every six months with assistance from Forest Management Branch.*" (p. 17)

Specification 1.2 : Dieback Hygiene Evaluations

"*1. Before the commencement of any operation that has the potential to introduce or spread Phytophthora species, the risk shall be assessed by means of a 'Dieback Hygiene Evaluation' (DHE). If the operational arrangements fail the evaluation then the operation cannot be started.*

2. *Guidelines for the preparation of DHEs are contained in the 'Dieback Hygiene Evaluation User Guidelines' manual. DHEs consider the following aspects of any proposed operation :*
   - *the proposed activity*
   - *the area of forest put at risk*
   - *the hazard of the area*
   - *the consequences of disease introduction*
   - *the hygiene prescription.*

3. *A DHE must be prepared for any proposed roadworks or timber harvesting operation. DHEs must be prepared by Business Unit or District staff in conjunction with the preparation of data for the short term integrated harvesting and regeneration plans.*

4. *The activity covered by an individual DHE should correspond to a discrete area. Such an area may correspond to a whole forest block, an individual compartment within a forest block, or a smaller area.*

5. *A DHE is prepared using form CLM781 (1994) and must include accompanying plans at scale 1:50,000 or larger.*" (p. 22)

Specification 1.3 : Quarantine Entry Permits
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 2.2 : Road Selection
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)
***EXCEPT* FOR –**

"*1. The responsibilities for planning of log haul routes is covered under Spec. 2.1. Using this information, and subject to Dieback Hygiene Evaluations, the precise alignment of proposed log haul routes is determined.*" (p. 26)

Specification 2.3 Road Construction
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

Specification 2.4 : Road Maintenance
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)
***EXCEPT* FOR –**

"*3. Road maintenance using earth moving machinery must conform with an approved Dieback Hygiene Evaluation.*" (p. 32)

Section 3 : Silviculture

Specification 3.2 : Advanced Burning
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

Section 4 : Coupe Management

Specification 4.2 : Falling (Including Tree Marking Techniques)
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.3 : Extraction
NOTE: REFER TO ENTRY UNDER 1993 EDITION

8. Split Phase Harvesting
NOTE: REFER TO ENTRIES UNDER 1993 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING-**

"*9. An alternative to split phase harvesting will be progressively implemented commencing in karri forest based on the following guidelines.*

- *identify discrete manageable areas of secure dieback free forest.*
- *cleandown all machinery and vehicles entering the area (see machinery/vehicle cleandown requirements of paragraph 5.1).*
- *restrictions on the movement of machinery or vehicles within the discrete secure dieback free area is not required.*
- *in coupe roads within the discrete area may not be low in profile if risk of transporting infested soil is further minimised.*" (p. 44)

Section 5 : Environmental Protection

Specification 5.1 : Protection from Dieback Disease

2. Knowledge

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)

3. Principles and Cross References

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE ADDITION OF A PARAGRAPH-**

"*The following protection strategies will be reviewed and amended where appropriate following the release of the report by an independent Dieback Review Panel.*" (p. 60)

4. Dieback Demarcation

NOTE: THIS SECTION HAS BEEN AMENDED TO A SINGLE SENTENCE -
"*Refer to Dieback Interpretation Procedures Manual (1994)*" (p. 61)

5. Hygiene Tactics

5.1 Machinery/vehicle Cleandown

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)
***EXCEPT* THAT THE FINAL POINT (5.1.9) IS NOT IN THIS EDITION**

5.2 Preventing the Transport of Infested Soil

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)

5.3 General Hygiene Conditions

NOTE: REFER TO ENTRY UNDER 1993 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING AMENDMENTS –**

"*5.3.1 All harvesting operations will be subjected to a Dieback Hygiene Evaluation. (See Specification 1.2.)*" (p. 63)

AND NOTE: THE WORDING ON THE FOLLOWING HAS CHANGED –

"*5.3.3 Periodic cessation of harvesting may be necessary for the maintenance of hygiene and to prevent soil damage.*" (p. 63)

"*5.3.8 Hygiene barriers (see definition) will be used on landings as described in Specification 4.3.*" (p. 63)

NOTE: 5.3.5 (OF THE 1993 EDITION) IS NOT IN THIS EDITION

5.5 Special Conditions For Harvesting With Soil Movement (see Table- below)

'*5.5.1 Harvesting with soil movement conditions can occur when the area is low hazard, or the area is south of the Preston River excluding the Donnybrook Sunklands and is moderate hazard, but not uninterpretable in jarrah forest and:*

(a) the area is accessible for harvesting without placing additional high hazard forest at risk, and

(b) the area is not upslope of high hazard sites, and

Option A
(c) the area is demarcated into self contained mini-catchments with individual fellers' blocks not exceeding 10 hectares, and
(d) landings will require a front or rear hygiene barrier log. […]

Option B
(c) identify discrete manageable areas of secure dieback free forest, and
(d) all machinery and vehicles to be cleaned down prior to entering the area of secure dieback free forest, and
(e) no further restrictions on movement of machinery or vehicles within the discrete manageable area of secure dieback free forest.

5.5.2 Dieback strategies required for planning (specifications 1.1, 1.2 and 1.3), roading (specifications 2.1, 2.2, 2.3, 2.4 and 2.5) and coupe management (specifications 4.1, 4.3 and 4.4) will be in place." (p. 64)

5.7 Stockpiling
NOTE: REFER TO 1993 EDITION (SIMILAR WORDING)

NOTE: THE FOLLOWING ATTACHMENT NOT IN 1996 EDITION -
Attachment 5.1.1 : Decision Guide for Demarcation of Boundaries Between Different Hygiene Categories in the Jarrah Forest

MISSION AND OBJECTIVES – 1995

CALM Annual Report 1994/95. 1995

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1992/93 – SIMILAR WORDING

SILVICULTURAL GUIDELINE - 1995

Silviculture Guidelines 1/95 : Silvicultural Practice in the Jarrah Forest

NOTE: SUPERSEDES SILVICULTURE SPECFICATION 2/91

"*These guidelines relate to dieback-free jarrah forest. Dieback infected forest is to be managed in accordance with Specifications 3/89 and 4/89.*" (p. 1)

5. Silvicultural Treatment
5.2 Priorities for treatment
"*ii. Only treat those areas which are either secure dieback free and uninterpretable*." (p. 6)

GUIDELINE - 1995

Guidelines For Forest Landing & Snig Track Design & Management. 1995

Planning and Design

- "*Season of logging will be considered when selecting landing sites.* […] *Landings will be located where they can withstand the required traffic.*

- *Landings will not be located in natural drainage lines or depressions.* […]

- […] *however in steeper slopes care will be taken to ensure that snig track's don't cause water to collect and lead to track erosion and ponding on landings.* […]

Drainage from the landing catchment area must be considered and provided at the lowest point of the landing. This will generally be at the front where water can be diverted into the road drainage system." (p. 1)

MISSION AND OBJECTIVES – 1994

CALM Annual Report 1993/94. 1994

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1992/93 – SIMILAR WORDING

POLICY STATEMENT - 1994

Policy Statement No. 18 : Recreation, Tourism and Visitor Services : Statement 18.2.8 Equestrian Activities. 1994

"*2.8.7 To control the spread of dieback and other diseases, horses are subject to the same restrictions as vehicles in disease risk areas (DRA), ie.*
i) Horses may use public open roads that pass through DRA, but must not leave the road surface;
ii) In dry summer months, horses may be allowed to enter DRA on road surfaces if an access permit has been issued by the local CALM office." (p. 2)

FOREST MANAGEMENT PLAN - 1994

Forest Management Plan 1994-2003. 1994

1. Forest Policy Statement
Conservation Objective
"*To maintain biological diversity at the genetic, species and ecosystem level in the forest, with special emphasis on the protection and conservation of threatened, rare and uncommon taxa and communities.*" (p. 1)

Management Objective
"*To protect and enhance identified forest values and to employ the best practices in managing forest ecosystems.*

To achieve this objective CALM will:

[…]

- *Evaluate all forest operations before they commence for their potential to introduce, spread or intensify Phytophthora dieback disease and accept, reject or modify the operation following that evaluation.*" (p. 2)

- "*Monitor the impact of pests and diseases on forests and implement control measures where economically and ecologically justifiable.*" (p. 3)

"*The above objectives will be put into effect through the following devices.*
[…]
Fifthly, through the development of departmental polices and prescriptions (e.g for disease control or silviculture) which apply on all forests managed by CALM." (p. 4)

2. The Strategies for the Sustainable Management of Native Forests
Jarrah Forest Structural Strategies
"*The structural goals for the minimal, low, moderate and high disturbance classes will be adopted and implemented as described above. All of these goals may be over-ridden in a particular area by the chance occurrence … by infection by dieback disease.*" (p. 11)

Protecting the Forest
Disease Management
"*Over the last 25 years a detailed dieback control strategy has been developed and implemented in south-west forests. It focuses on the disease impact on jarrah. The strategy is fully integrated, and involves policy, research, planning, community education and liaison, field management, silviculture, control of access through the forest and monitoring. The implementation of this strategy has significantly reduced disease spread and intensification.*" (p. 29)

"*The existing strategies for dieback management put very large efforts into preventing any artificial spread of the disease and into research. Disease management strategies need to be regularly reviewed and must consider impact on all vegetation species, the relationship between site and impact, the weighing up of site-specific risk with whole of forest risk, and the effect of disturbance on intensification and impact of the disease.*" (p. 29)

"**Dieback Disease Management Strategies**
"*2. Hygiene measures will be regularly reviewed and amended as necessary in the light of research findings and monitoring programs.*
[…]
4.. Populations of mature Banksia grandis trees will be reduced to a maximum of four mature cone-producing trees per hectare where such a reduction will reduce the spread and intensification of Phytophthora cinnamomi. Fire regimes will be implemented, where practical, to minimise the subsequent development of seed-producing trees.' (p. 30)

"*7. Jarrah growth responses in areas where Phytophthora cinnamomi is present will be monitored.*

8. Research findings on the use of phosphonate will be developed into operational prescriptions, for the protection of vulnerable species." (p. 30)

"*12. Operational-scale trials and monitoring of hygiene effectiveness will continue.*" (p. 30)

Other Disease Management Strategies
"*1.Timber harvesting and fire operations will be managed to minimise secondary damage to trees.*

2.Natural regrowth and plantations will be managed to minimise stress and physiological imbalance.

4. Stands will be monitored for signs of outbreaks." (p. 30)

Feral Animals Control
"*PRIORITY 4: Control of feral and introduced animals adjacent to private property, around areas subject to regular public use, in harnessed catchments and in Disease Risk Areas*" (p. 32)

3.Managed Forest Values
Diverse Ecotype Zones
"*Timber harvest will be excluded from all diverse ecotype zones, and road construction and vehicle access will be restricted to the absolute minimum.* […]" (p. 42)

"*Action to prevent the introduction of Phytophthora sp. to these sites will be taken.*" (p. 42)

Nature Conservation
Ecological Processes
"*This Forest Management Plan will ensure that the ecological processes continue to be maintained by:*
[…]
- *minimising the spread and intensification of Phytophthora cinnamomi, the cause of dieback.*

[…]" (p. 42)

STRATEGIC PLAN - 1994

Strategic Plan : Southern Forest Region. 1994

4.0 Vision
"*The Southern Forest Region is a place of EXTENSIVE VALUES where our PEOPLE ARE MOTIVATED, our UNIQUE ENVIRONMENT SUSTAINED, our RESOURCES are WELL MANAGED and our CUSTOMERS NEEDS are MET.*" (p. 2)

7.1 Objectives
"*Commencing immediately we plan to have achieved the following by the year 2000. (See 7.2 Action Plans for a description of how we intend achieving each of these objectives).*" (p. 4)

Environment and Operational Area
"*OBJECTIVE 2 – FOREST MANAGEMENT STRATEGY:*
We have successfully implemented the 1994 Forest Management Plan and 1987 Regional Management Plan.

OBJECTIVE 3 – DIEBACK MANAGEMENT:
We have examined and reviewed the management of Dieback Disease on CALM land and raised community awareness of its implications." (p. 5)

"*OBJECTIVE 4 – IMPLEMENTATION OF MANAGEMENT PLANS:*
We have effectively implemented the priority works defined in the:
- *Shannon D'Entrecausteaux Management Plan*
- *Walpole/Nornalup Management Plan*
- *Various Interim Management Guidelines*" (p.5)

LEGISLATION – 1993

Forest Management Regulations 1993

Part 12. Restricted Areas
Prohibition of Entry to Prohibited Areas and Temporary Control Areas

"*86. A person shall not, without the authorization of the Executive Director or a forest officer, enter any area of-*

(a) State forest;
(b) timber reserve; or
(c) land reserved under the Land Act 1933 and vested by order under that Act in the Commission, that is classified under section 62 of the Act as –
(d) a prohibited area; or
(e) a temporary control area.

Penalty: $2 000." (p. 1157)

Prohibition of entry, except on foot, to limited access areas

"*87. A person shall not, without the authorization of the Executive Director or a forest officer, enter otherwise than on foot any area of –*
(a) State forest;
(b) timber reserve; or
(c) land reserved under the Land Act 1933 and vested by order under that Act in the Commission, that is classified under section 62 of the Act as a limited access area.
Penalty: $2 000." (p. 1157)

Requirements in Part 16 not affected

"*88. The requirements in this Part are in addition to, and do not derogate from, the requirements in Part 16.*" (p. 27)

Part 14. Marking out of Mining Tenements in State Forests and Timber Reserves
Conditions upon entering State forest or timber reserve

"*95. A person who is within any State forest or timber reserve in the South West Division for the purpose of, or in connection with, marking out, shall ensure that-*
[…]

(d) any vehicle used in connection with the marking out does not take a route through the State forest or timber reserve other than a route approved by a forest officer." (p. 1160)

Part 16 not affected

"*97. The requirements in this Part are in addition to and do not derogate from the requirements in Part 16.*" (p. 1160)

Part 16 – Control and Eradication of Forest Diseases
Entry, use or movement of a potential carrier in a risk area without authorization or contrary to condition

"*108. Any person who takes a potential carrier into a risk area, or has, uses or moves a potential carrier in a risk area -*

(a) without the authorization under regulation 106 or 107 of an authorized person; or

(b)contrary to any condition specified in a written authorization,

or who causes a potential carrier to be so taken, had, used or moved without such authority or contrary to such a condition, commits an offence.

Penalty: (a) for a first offence, not less than $150 or more than$1000;
(b) for a second or subsequent offence, not less than $200 or more than $2 000." (p. 1164)

Entry, use or movement of a potential carrier in a risk area or disease area contrary to instruction or direction

"*109. Any person who takes a potential carrier into a risk area or disease area, or uses or moves a potential carrier in a risk area or disease area, contrary to any instruction or direction given by -*

(a)an authorized person in relation to that potential carrier; or

(b)the Executive Director in relation to potential carriers of that class by notice published in a newspaper circulating in that risk area or disease area,

or who causes a potential carrier to be so taken, used or moved contrary to any such direction or instruction, commits an offence.

Penalty: (a) for a first offence, not less than $150 or more than $1000;
(b)for a second or subsequent offence, not less than $200 or more than $2 000." (p. 1164)

Written Authorization to be Carried and Produced Upon Request
"*111. A person in charge of a potential carrier in a risk area shall carry any written authorization issued in respect of that potential carrier at all times when the potential carrier is being used, operated or moved in that area and shall produce that authorization when requested to do so by an authorized person.*

Penalty: (a) for a first offence, not less than $150 or more than $1 000;
(b) for a second or subsequent offence, not less than $200 or more than $2 000." (p. 1165)

Period of Treatment or Quarantine
"*118. The period for which an infected carrier or potential carrier or infected earth, soil or trees shall be treated or kept in quarantine for the purposes of this Part shall be such period as an authorized person determines.*" (p. 1166)

Cleansing and Disinfecting To Be Carried out in Accordance with Directions
"*119. Where under this Part, a person is directed to cleanse and disinfect an infected carrier or potential carrier that person shall carry out that cleansing and disinfecting –*

(a) at a time and place and in such manner as is directed by an authorized person; and
(b) to the satisfaction of the authorized person.

Penalty: (a) for a first offence, not less than $150 or more than $1 000;
(c) for a second or subsequent offence, not less than $200 or more than $2 000." (p. 1166)

MISSION AND OBJECTIVES – 1993

CALM Annual Report 1992/93. 1993

"***CALM's mission :***

We conserve and manage Western Australia's wildlife and the lands, waters and resources entrusted to the Department for the benefit of present and future generations." (p. i)

"*In keeping with our mission, the Department of Conservation and Land Management has the following objectives.*

Conservation: *To conserve indigenous plants, animals and ecological processes in natural habitats throughout the State.*

Value and Use of Resources: *To optimise the value and economic return to the community of wildlife, lands, waters and resources entrusted to the Department without compromising conservation and other management objectives.*

Tourism and Recreation: *To identify and provide opportunities and services to the community which allows them to enjoy the wildlife, lands, waters and resources entrusted to the Department without compromising conservation and other management objectives.*

Knowledge: *To seek and provide an up-to-date and sound scientific and information basis for the Department's conservation and land management activities.*
[…]" (p. i)

GUIDELINES - 1993

Dieback Hygiene Evaluation : User Guidelines. 1993

Introduction
"*In the past the 7-Way Test was the tool used to evaluate an operation and the risk it posed of spreading dieback disease. This tool has been replaced with the 'Hygiene Evaluation'. The guidelines for its use are set out in this document.*

Policy Statement No. 3 'Dieback Disease', 1991 states 'the Department will evaluate the following factors before any operation proceeds which is likely to introduce, spread or intensify the impact of Phytophthora species on land entrusted to CALM.

1. ACTIVITY:	*Whether the proposed activity needs to take place.*
2. HAZARD:	*The vegetation/landform type. The land uses for which the area is being managed.*
3. RISK:	*The risk of introducing, spreading or intensifying the disease.*
4. CONSEQUENCE:	*The consequences of infection on landuse and ecological values.*
5. HYGIENE:	*What hygiene is required to minimise the consequences.*
6. EVALUATION:	*The judgement of the manager regarding the adequacy of hygiene tactics to minimise the consequences to a level that is acceptable.*

This appraisal is the HYGIENE EVALUATION. This disease management tool is used to determine appropriate operational hygiene after balancing the risk of disease introduction and spread against the consequences of hygiene failure.

The objective of the Hygiene Evaluation is to determine the level of hygiene which is appropriate for a particular activity. The tool evaluates the relative merits of alternative strategies. This evaluation is not the sole criteria for deciding whether a particular activity should occur. It is, however, one of the most important criteria.

CALM has responsibility for disease management on all the land categories it manages. Although P. cinnamomi has been the main concern in the past, there are also other Phytophthora species causing the death of vegetation. The Hygiene Evaluation is equally relevant to prescribing hygiene measures for the management of these fungi." (p. 1)

2. Assessing the Risk of Introduction and Spread of Dieback Disease
"*One of the fundamental questions which must be addressed in determining any hygiene strategy is: 'What is the risk of this operation introducing or spreading dieback disease?'*

This question can be approached by considering three factors:

i) THE RISK OF INTRODUCING OR SPREADING DIEBACK DUE TO THE NATURE OF THE PROPOSED OPERATION.
Is the type of operation likely to move infected material around (soil, roots, water). For example are tracked or rubber tyred machines to be used; is earthmoving likely; will the operation be in muddy or sticky soils?" (p. 2)
.
"***ii) THE RISK OF INTRODUCING OR SPREADING DIEBACK DUE TO THE NATURE OF THE SITE.***
Are soil conditions such that soil is likely to stick to machinery and be moved around (moist and sticky)." (p. 2)

"***iii) THE RISK OF THE PATHOGEN SURVIVING***
Are soil conditions such that the fungus will survive if delivered to a new site (moist)." (p. 3)

3. Assessing the Dieback Disease Hazard
"*Dieback disease hazard is a term which describes the final impact of the disease on a site if the disease were introduced. The final impact of dieback disease on a site depends on:*

* *The susceptibility and abundance of plant species present.*
* *The fertility, chemical and physical properties of the soils.*
* *The lateral and vertical drainage characteristics of the site.*
* *Topography, and*
* *Climate.*

Assessing hazard allows the project manager to gauge the consequences of a hygiene breakdown on the land use values of the site. The magnitude of the consequences combined with a judgement on the level of risk associated with the operation allows the project manager to determine the level of resources that need to be committed to hygiene tactics." (p. 3)

"*Hazard ratings have been prepared from field observations of disease impact on the vegetation over many years and associated with various environmental factors such as vegetation associations and soil types.*[…] *Hazard ratings cover a range of climate, and locations and are our best available predictions of the end expression of dieback disease at present.*

Dieback hazard relates to the innate site characteristics which directly influence the development and expression of disease and is an indication of what the <u>final</u> impact will be on that site when the disease has reached its climate and can do no more damage.[…]" (p. 3)

"*There are several indices of hazard that can be used* [….] *The most applicable system for each operation must be determined locally.*" (p. 4)

Hazard Rating
"*The definitions below are those used over all CALM estate. They may not be entirely suitable for use in some situations. They will, however, give a guide to the manager compiling a Hygiene Evaluation.*

Low	*Few species are susceptible. Environmental factors are such that only a few individuals would be killed, with the dominant vegetation being largely undisturbed.*
Moderate	*Many species are susceptible, including some of the dominant species. Environmental factors are likely to lead to many plant deaths including a proportion of the overstorey.*
High	*Most dominant and many other species are susceptible. Environmental conditions will lead to the death of many individual plants, including a significant proportion of the overstorey.*

The definition for hazard rating published in 'Timber Harvesting in WA' is slightly different and should only be used in forest situations.

Low *Few susceptible plant species present. If the pathogen were introduced symptoms would be evident as a few scattered deaths in the scrub layer.*

Moderate *Some susceptible plant species present. If the pathogen were introduced most susceptible understorey plant species and less than 10 percent of the overstorey species would die. Overstorey deaths would be scattered not clumped.*

High *Many susceptible plant species present. If the disease were introduced most susceptible understorey plants and more than 10 percent of the overstorey species would die.*" (p. 4)

4. Consequences on Land Use

"*The consequences of disease on land uses may vary according to the hazard rating of the site being examined (see Appendix 1). Always err on the conservative side. e.g. low hazard & few susceptible species may indicate a low level of consequence if the area became infected, but the vegetation may support a very delicate ecosystem of dependent species which has great ecological significance.*

In general the following effects apply:

Conservation

Any disease in conservation areas will have a serious effect on the land use. Effects may include destruction of native plants, removal or degradation of fauna habitat and degraded aesthetic values." (p. 5)

5. Planning Operational Hygiene

"*There is a logical process involved in determining whether dieback disease is an issue associated with any particular operation. If it is, then practical strategies and tactics can be developed to achieve dieback disease control.*" (p. 5)

"*The appropriate level of hygiene can only be achieved by good planning well in advance of the operation. This involves scheduling of the planning process with respect to other operations that may affect, or be affected by, the operation being planned.*" (p. 6)

5.1 When and Where is a Hygiene Evaluation Required

"*Figure 1 indicates the known geographic range of Phytophthora species in W.A.. Operations within that zone must be exposed to a Hygiene Evaluation. This includes all tenures of land managed by CALM.*" (p. 6)

5.3 Who Approves the Hygiene Evaluation

"*Authorities to approve Hygiene Evaluations are indicated in table 2. Each of these officers is required to make an evaluation of the proposal or any changes to the original proposal.*" (p. 7)

5.4 Who Gets a Copy?

"*Districts must keep an up-to-date register of all Hygiene Evaluations* ***with endorsements as they occur.*** *A copy of each evaluation should be sent to the appropriate approving officer who shall return the evaluation once approved or disapproved together with any alterations or endorsements made.*" (p. 7)

5.5 Leadtimes : (a) Prescribed Burning

"[...] *If an operation is imminent burning may only occur:*

- after interpretation and permanent demarcation ***AND****,*
- with Regional Manager approval, ***OR***

- subsequent to the operation." (p. 7)

(b) Dieback Photography
"*Programmes for photography are submitted each September. Photography takes place each autumn* [...] *This equates to a lead time of 12-18 months for summer/autumn operations and 2 years for winter/spring operations.*[…]" (p. 7)

(c) Upgrading Existing Maps
Hygiene Maps
"[...] *In cases where maps are classified as inaccurate or of doubtful accuracy, upgrading or re-mapping will be classified as inaccurate or of doubtful accuracy, upgrading or re-mapping will be required.* [...]" (p. 7)

***G*round Stripping Maps**
"[…][*Ground stripping*] *maps will require field checking every time they are used.*" (p. 7)

(e) Carry out the Hygiene Evaluation and Prepare the Hygiene Prescription
"*Carry out the Hygiene Evaluation as close as possible to the operation. Ensure enough time is allowed for approvals and that the most recent/accurate information is used.*" (p. 8)

5.6 Review of Standards
"*Environmental Protection Branch will conduct regular monitoring and training with each Region/District.*" p. 8)

6. Compiling A Hygiene Evaluation
6.1 Part 1. - Activity
Evaluation Numbering.
"*The 'valid to:' date of the evaluation is the date at which the evaluation will have to be reviewed because the information on which it is based has become unreliable.*" (p. 10)

Type and Extent of the Activity:
"*Describe briefly the type of operation proposed. Describe each component part of the operation. Show the extent of the activity in quantitative terms, ie., areas, distances etc.*" (p. 10)

6.2 Part 2. & 3. Risk And Hazard
"*The Risk/Hazard Summary table is a quantitative summary of hygiene categories and hazard classes which are placed at risk by the various parts of an operation. It enables approving officers to see at a glance what areas are at risk and what the impacts on landuses may be if hygiene fails.*

TO COMPLETE THE TABLE:

- *Identify the activity and extent (distance, area etc) of each part of the operation and complete a summary for each activity.* […]

- *State the hygiene category and the area of each affected by the operation.*

- *For each hygiene category state the area put at risk. The area put at risk is that area which may be infected. The area includes the area directly affected by the operation and the area downslope of that operation.*

- *State the vegetation type or landforms of the areas put at risk (from maps supplied or field surveys).*

- *From the appropriate list in Appendix 2. state the hazard rating applied to the vegetation type or landform.*

- *Determine the area of each of these hazard ratings.*

- *From Appendix 1. under the appropriate land use nominate the soil conditions required for that part of the operation.*

The hazard class, the land uses and the estimated area (ha's) put at risk must be considered so that the appropriate hygiene constraints can be applied. The hazard class, land use and area (ha's) put at risk is the measure of the consequence of infection is hygiene fails." (p. 11)

6.3 Part 4. - Consequence of Disease Introduction
"*It is essential to indicate all values which may be put at risk on the proposal. Refer to the appropriate Regional management plans for land tenure and purpose classification.*

Indicate the designated purpose and also consider important secondary uses and other values. Show the area of land having each of the landuse values. Determine the area of each landuse that is rated as LOW, MODERATE or HIGH hazard.

Record the consequence of infection on each of these values. These judgements require an understanding of the disease and its likely impact on landuse and ecological values of the area." (p. 12)

6.4 Part 5. - Hygiene Prescription
"*Fill out the hygiene prescription using the criteria from Appendix 1. relevant to the land use values. Show all information on an accompanying map.*" (p. 12)

Dieback Maps Available
"*Specify the most up to date information available covering the area of the operation.*" (p. 12)

Map Quality
"*All methods are restricted by the recency of the information.* […]" (p. 12)

Date Prepared/Varified. [sic]
"*Record the date of preparation and verification of the hygiene information being used. This is the date at which the information was correct and reliable in the field, not the date of map compilation.*" (p. 12)

Information Valid to:
"*The older hygiene information gets the more unreliable it becomes.*[…]" (p. 13)

Demarcation Categories
"*Specify all categories to be demarcated prior to the operation starting. Table 1. sets out the hygiene categories requiring demarcation during a logging operation and is a suitable guide for other operations.*

TABLE 1. Hygiene Demarcation Categories

ADJOINING HYGIENE CATEGORY	***LPR***	***U/I***	***SUS***	***HPR***	***NEQ***	***D/B***
SDF	***yes*** *SM or old maps* ***No*** *NSM or new maps*	***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*
LOW		***yes*** *(LPR*	***yes***	***yes*** *(all ops)*	*yes (SM or*	***yes***

POTENTIAL RISK	*not below U/I* ***No*** *LPR below U/I*	*(all ops)*		*old maps)* ***No*** *(NSM) LPR below NEQ or new maps*	*(all ops)*
UNINTERP-RETABLE		***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*
SUSPECT			***yes*** *(all ops)*	***yes*** *(all ops)*	***yes*** *(all ops)*
HIGH POTENTIAL RISK				***yes*** *(all ops)* *(NSM)*	***yes*** *(SM)* ***no***
NOT EFFECTIVELY QUARANTINED					***yes*** *(all ops)*

SM**=** *Soil Movement* ***NSM*** **=** *No Soil Movement*" (p. 13)

Soil Conditions.
"*Using information from Appendix 1. determine the areas available under soil movement and no soil movement conditions. Determine areas (ha) for each and show on hygiene plan attached to test.*" (p. 14)

Access Routes
"*Show proposed moist and dry soil access routes on the hygiene plan. Describe road names and distances for dry and moist soil access.*" (p. 14)

Operational Segregation
"*Specify whether the components of the operation will be separated in time or space or both. Specify the methods to be used to implement phasing. The chosen techniques are to be supported by diagrams attached to the test.*" (p. 14)

Vehicle Cleanliness
"*All vehicles, plant and machinery (or other potential carrier) must be free of soil and plant material when crossing hygiene or subcatchment boundaries. Specify when, where and how machines must be cleaned down eg., on entry, on exit, between hygiene categories, at designated washdown points etc, cleandown points are to be shown on a supporting plan.*" (p. 14)

Working Arrangement Documents
"*List all documents and the applicable section relevant to dieback hygiene for the operation being undertaken eg., job prescription for roading Stokes Inlet National Park, Dieback Hygiene Manual Section 3, Timber Harvesting in W.A. Section 5.1, Contract documents etc.*" (p. 14)

Disease Risk Area Permit Required
"*If the operation is within a D.R.A. a permit is required.*[…]" (p. 14)

Monitoring Arrangements
"*Specify any monitoring arrangements. Specify who, when, where and how any monitoring is going to be done.*[…]" (p. 14)

6.5 Part 6. - Evaluation

"***HYGIENE EVALUATIONS - AUTHORITY TO APPROVE***

Area Involved	***Approving Officer***	***Remarks***
State Forest outside Disease Risk Area.	*District Manager*	*Separate file to be kept at District office for perusal by R/L Env. Prot. and/or Env. Prot. Branch*
State Forest Disease Risk Area	*Regional Manager (Recommendation by R/L Env Prot)*	*Separate file to be within kept at Regional office for perusal by Env Prot Branch staff or Policy Review Group*
Parks & Reserves or any area where timber production is not a priority land use.		*Kept on same Regional file as above*
Existing Programs	*District Manager*	
New Programs	*Regional Manager*"	

(p. 15)

"*A policy decision may still be required for certain Hygiene evaluations for operations without precedent or having unusual circumstances. Examples would be where other agencies are concerned, where several Districts or Regions are involved such as SEC line maintenance project, large scale mineral exploration proposals, or projects considered to pose severe hygiene risks. Such proposals will still be referred by the Regional Manager to Environmental Protection Branch. Approval will either be given by the Manager, Environmental Protection Branch or, where appropriate, referred to the appropriate Director*." (p. 15)

"*The approving officer must specify the date at which the Hygiene Evaluation will be unreliable and require review. If the Hygiene Evaluation requires an extension, the hygiene information used will require re-checking and be satisfactory to the approving officer. Regional Leaders (Environmental Protection) and Environmental Protection Branch staff will be available to provide guidance, training and as a point of referral in the first instance.*" (p. 15)

NOTE: REFER TO DOCUMENT FOR APPENDIX 1 : OPERATIONAL HYGIENE STANDARDS

TIMBER HARVESTING … 1993 ED. – 1993

Timber Harvesting in Western … 1993 Ed. 1993

PART 1 : CODE OF LOGGING PRACTICE

Section 2 : General
NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

Section 4 : Extraction
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 6 : Loading and Hauling
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 7 : Environmental Protection
Dieback Disease
NOTE: SECTION HAS BEEN AMENDED

"*7.1 Soil must not be transported from areas infected with dieback to areas free of dieback.*

7.2 The necessary hygiene logging procedures required to meet this objective involve all or any of:
- *[a] the complete separation in time of the skidding and loading phases of logging;*
- *[b] the use of stationary (heel-boom) loaders;*
- *[c] the use of a physical barrier at the front and/or rear of landings to separate the extraction and loading components of logging, the positioning of the barrier at each landing to be determined by a Forest Officer.*
- *[d] cleaning down of all harvesting machinery before movement between coupes.*

7.3 Within areas free of dieback, movement of soil during extraction may be permitted subject to:
- *[a] Paragraph 7.1 above*
- *[b] hygiene requirements contained in Specification 5.1 of the Manual of Logging Specifications, and*
- *[c] paragraph 7.35 of this Code.*" (p. 12)

NOTE: FOR 7.4 REFER TO 7.7 UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

NOTE: FOR 7.5 REFER TO 7.8 UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING

"*7.5 The contractor, and in particular his logging supervisor, must make themselves fully familiar with restrictions regarding soil movement. All or some of the employees of a contractor working in the forest areas shall be trained to a level of competence in dieback hygiene acceptable to a Forest Officer.*" (p. 12)

PART 2 : MANUAL OF LOGGING SPECIFICATIONS

Section 1 : Planning and Monitoring
Specification 1.1 Harvesting and Monitoring and Regeneration Plans
Part A : Hardwood
"*Complete details are contained in the Department's 'Provisional Manual of Hardwood Logging Planning'. The following is a summary.*" (p. 20)

1. Responsibilities
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

2. Plan Types
2.3 Short Term Integrated Harvesting and Regeneration Plan
"*This is the tertiary level integrated harvesting plan which shows in detail proposed harvesting areas over a 2 year period.*
[…]
These plans shall contain the following information as a minimum:
[…]
2) Predicted yield summary (gives a summary of the level of available resource by 'with soil movement' and 'no soil movement' categories).
3) Predicted yield details (gives level of available resource by 'with soil movement' and 'no soil movement' categories).
[…]

The plans shall show:
1) 1:250, 000 overview plan showing the approximate location of all proposed logging areas for each year of the plan.
2) *1:50, 000 block plan showing proposed harvesting boundaries and major access – also shows CALM grid.*" (p. 21)

"*1:25,000 plans showing:*

<u>Plan A</u> - operations plan
- *boundary of proposed harvesting area.*
- *'with soil movement' harvesting areas.*
- *' no soil movement' harvesting areas.*
- *CALM mapping grid.*

[…]
- *no entry areas.*

Plan B - Hygiene plan - Jarrah areas only
Based on current 230mm photography or ground stripping:
- *secure dieback free.*
- *low potential risk.*
- *uninterpretable.*
- *not effectively quarantined.*
- *high potential risk.*
- *suspect.*
- *dieback.*

<u>Plan C</u> - Hazard plan - Jarrah areas only
- *low.*
- *moderate.*
- *high.*
- *very high.*

<u>Plan D</u> - Landform/site vegetation - Jarrah areas only
- *landforms as per system 6 study.*
- *vegetation site types as per field assessment by dieback interpreters.*

Other plans may be used which show potential JSI areas, intensive inventory results." (p. 22)

3. Plan Amendment
NOTE: REFER TO ENTRY UNDER 1990 EDITION

7. Field Plans and Checklists
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

8. Monitoring and Records
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

Section 1 : Planning and Monitoring

Specification 1.2 : Seven Way Tests
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Attachment 1.2.2 : Departmental Procedures for the Approval of 7-Way Test
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Attachment 1.2.3 : Seven Way Tests : Guidelines for Assessment of Level of Consequences
NOTE: SECTION NOT INCLUDED IN THIS EDITION (SIMILAR WORDING)

Specification 1.3 Issue of Quarantine Entry Permits
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Section 2 : Roading

Specification 2.1 : Road Planning
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Specification 2.1 : Road Selection
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

Specification 2.3 : Road Construction
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

Specification 2.4 : Road Maintenance
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SAME WORDING)

Specification 2.5 : Gravel Pit Management

"*2. Contractors involved in gravel extraction, including CALM logging contractors, are required to work to the guidelines set out in the CALM booklet: 'Guidelines for Management and Rehabilitation of Gravel Pits – South West Forest Areas'. This booklet is undated but was released in 1992.*" (p. 54)

Section 3 : Silviculture

Specification 3.2 : Advanced Burning
NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)

Section 4 : Coupe Management

Specification 4.2 : Falling (Including Tree Marking Techniques)
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.3 : Extraction
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

8. Split Phase Logging

8.1 Separation of Extraction and Loading in Time
"[…] *in this technique, extraction in a sub coupe faller's block must be completed before loading and hauling commences. That is, once loading and hauling commences, a skidder must not return to the sub coupe or faller's block and all snig tracks must be blocked at the landing. If a skidder is required to return, it must be cleaned down before each trip into that sub coupe or faller's block. Prior to each entry a forest officer will require a machine to be inspected by an appropriately qualified person. (See Spec. 501, para 2) In this technique, a log barrier must be positioned at the front of the landing during skidding. When skidding is completed, this front barrier must be removed and a rear barrier established.*

Advantages:
- *very little chance of introducing disease to the sub coupe*
- *can be used under 'with soil movement' conditions*

[…]

8.2 Use of a Stationary Loading Machine
NOTE: REFER TO *ENTRY* UNDER *1990* EDITION
***EXCEPT* FOR THE FOLLOWING-**
"*Advantages:*
[…]
- *can be used under 'with soil movement' conditions.*" (p. 67)

8.3 Separation of Extraction and Loading by a Physical Barrier at the Rear of a Landing
NOTE: REFER TO ENTRY UNDER 1990 EDITION
***EXCEPT* THERE IS AN ADDITIONAL PHRASE ADDED-**
"*… such as a log not less than 400mm in diameter …*" (p. 68)

8.4 Separation of Extraction and Loading by a Physical Barrier at the Front of a Landing
NOTE: REFER TO ENTRY UNDER 1990 EDITION
***EXCEPT* THERE IS AN ADDITIONAL PHRASE ADDED-**
"*… such as a log not less than 400mm in diameter …*" (p. 68)

[**Final Points] 9-12**
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)
***EXCEPT* THAT IN PREVIOUS EDITIONS NUMBER 9 HAS INCLUDED FACTORS FOR EVALUATION *AND* A MEASUREMENT HAS BEEN ADDED TO THE PARAGRAPH ON SNIG TRACKS**
"*11. At the completion of extraction, all major snig tracks in dieback-free forest must be blocked by a physical barrier such as a log of at least 400mm in diameter*." (p. 70)

Section 4.4 : Loading and Hauling
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.5 : Logging Operation Inspections and Certifications
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection
Specification 5.1 : Protection from Jarrah Dieback Disease
2. Knowledge
"*All personnel involved in hardwood harvesting must have a working knowledge biology and management of dieback disease and be certified competent by success completing an accredited training course supplied by CALM.*" (p. 86)

3. Principles and Cross References

"*3.1The over-riding importance of jarrah dieback must be considered during all phases of every operation. The most important principle is that soil must not be transported from areas infested with dieback to areas free of dieback. In addition to this specification, dieback strategies to be followed are al contained in other sections of this Manual:*

3.1.1 Planning (specifications 1.1, 1.2 and 1.3)
3.1.2 Roading (specifications 2.1, 2.2, 2.3, 2.4 and 2.5), and
3.1.3 Coupe Management (specifications 4.1, 4.3 and 4.4)

3.2 Assessing the Risk of Introduction and Spread of Dieback Disease
"*One of the fundamental questions which must be addressed in determining any hygiene strategy is 'What is the risk of this operation introducing or spreading dieback disease?'*

This question can be approached by considering three factors:

3.2.1 Is the type of operation likely to move infected material around (soil ' roots, water)? For example are tracked or rubber-tyred machines to be used; is soil movement likely; will the operation be in muddy or sticky soils?

3.2.2 Are soil conditions such that soil is likely to stick to machinery and be moved around (moist and sticky)?

3.2 3 Are soil conditions such that the fungus will survive if delivered to a new site (moist)?" (p. 86)

3.3 Assessing the Dieback Disease Hazard
"*Dieback disease hazard is a term which describes the final impact of the disease on a site if the disease were introduced. The final impact of dieback disease on a site depends on:*

* *the abundance of susceptible plant species present;*
* *the fertility, chemical and physical properties of the soils;*
* *the lateral and vertical drainage characteristics of the site;*
* *topography; and*
* *climate.*

Assessing hazard allows the manager to gauge the consequences of a hygiene breakdown on the land use values of the site. The magnitude of the consequence combined with a judgement on the level of risk associated with the operation allows the manager to determine the level of resources that need to be committed to hygiene tactics." (p. 87)

"*Assessment of hazard is an imprecise science. It involves using vegetation associations, landform classifications and soil types as indices of the potential impact of dieback disease. It requires extensive knowledge of plant associations, disease biology and aetiology and experience of disease impacts on various sites. This task is most confidently performed by an expert.*" (p. 88)

Evaluation
"*The hygiene strategies to be used will hazard. This is done by means of the 7-way test as described in Section 1.2.*" (p. 88)

4. Dieback Demarcation
4.1 Responsibility
"*The demarcation of dieback boundaries in areas of forest to be logged is the responsibility of qualified dieback interpreters.* […]" (p. 88)

4.2 Timing

"*4.2.1 Field demarcation of all management boundaries with respect to dieback must be based on current, reliable hygiene information prepared from 230mm photography or ground stripping.*

4.2.2 It will be necessary to recheck (and demarcate again if necessary) all areas of forest with a slope greater than 50 that are downslope from dieback or suspect or uninterpretable or NEQ, if harvesting will take, place after 12 months has elapsed since demarcation or the last check.

4.2.3 It will be necessary to recheck (and demarcate again if necessary) all areas of forest that have been mapped as secure dieback-free (ie, upslope from dieback, suspect, NEQ, uninterpretable) or that are relatively flat (less than 50), if harvesting will take place after a period of 24 months has elapsed since demarcation or the last check.

4.2.4 Checking by qualified personnel in spring or autumn is preferred because disease expression is most obvious at these times.

4.2.5 Demarcation must be completed before pre-harvest burning." (p. 88)

4.3 Method of Marking

"*4.3.1 The initial demarcation of dieback boundaries in the field is done by CALM specialist staff responsible for dieback interpretation by placing dayglo, orange flagging tape on trees or bushes. The knot of the marking tape will always face the 'dieback infected' bush.*" (p. 88)

4.4 Buffer Zones

"*The system of mapping disease occurrence is based on symptoms of indicator species that take varying periods of time, after infection, to become visible. The most recent indicator symptom occurs at or near the edge of the disease. It is logical to conclude that P. cinnamomi may be in the soil, or root systems of plants outside the visibly affected area, but that the susceptible plants are not affected. To avoid transporting infected soil and root material from such areas it is necessary to have a buffer zone between logging operations and disease infections.*

The demarcation of buffer widths is the sole responsibility of the specialist dieback interpreters who use their judgement and guidelines set out in the Interpreters' Manual.

Hygiene Categories

"*When there is more than one hygiene category within an operational area, it is usually necessary to separate them in order to achieve the requirements identified in the 7-Way Test.*

The hygiene categories recognised are:

* *secure dieback-free*
* *low potential risk*
* *uninterpretable*
* *NEQ (not effectively quarantined).*
* *high potential risk*
* *suspect, and*
* *dieback*

See definitions in Part 1 of this section.

Where it is necessary to separate hygiene categories District staff should be involved in the demarcation. The level of involvement will depend on the complexity of the area and the expertise of district staff. Attachment 5.1.1 gives guidelines for demarcation between hygiene categories. The most efficient method of demarcation is to use coupe or sub coupe boundaries." (p. 89)

4.6. Hazard categories

"*Dieback hazard is to be determined by trained staff (ie, interpreters, experienced district staff). Where it is necessary to separate operations in various hazard classes (as identified by the 7-Way Test) the demarcation is to be carried out by District staff.*

The most efficient method of demarcation is on the basis of coupe or sub coupe boundaries." (p. 89)

5. Hygiene Tactics

"*Hygiene minimises the risk of dieback disease being spread or introduced:*

Highest Risk	*Lowest Risk*
Contaminated equipment	*Clean equipment*
Tracked machines	*Rubber-tyred machines*
'Hot' landing	*Split phase in time*
Untrained staff	*Trained staff*
Unsupervised operators	*Supervised operators*
Multiple entries	*Single entries*
Large sub catchments	*Small fallers' block*
Disease distribution unknown	*Disease distribution known*
High in profile	*Low profile roads*
Uncontrolled access	*Area secured*
No stockpiling	*Stockpiling*
With soil movement	*No soil movement*

5.1 Machinery/vehicle Cleandown

NOTE: REFER TO ENTRY UNDER 1992 EDITION (SIMILAR WORDING)
***EXCEPT* FOR –**

"*5.1.6 A washdown site must be placed to minimise the area put at risk.* […]

5.1.7 Ramps and pads must be constructed and positioned so that vehicles do not drive through washdown effluent on entry and exit." (p. 90)

"*5.1.8 Avoid turbidity in nearby streams by leaving at least 50m of vegetation buffer, or by constructing a silt trap or sump.*" (p. 91)

5.2 Preventing the transport of infected soil

"*Propagules of P. cinnamomi survive in roots and clods of moist soil which if transported can start a new infection. It is vital therefore, that the transport of infested soil onto dieback free sites is avoided.*

The following test is to be applied before harvesting machinery moves from infested to uninfested soil:

(a) Inspect the machinery to see if soil is carried.

(b) If the soil is being carried, then the transport of infested soil may occur and the hygiene conditions of paragraphs 5.3 - 5.6 will apply.

Within those areas which are free of P. cinnamomi, the movement of soil does not carry a risk of spread of dieback. However, the requirements for protection of soil properties (see Specification 5.2) must be observed." (p. 92)

5.3 General hygiene conditions

"*5.3.1 All harvesting operations will be subjected to a 7-way test. (See Section 1.2.)*

5.3.2 Jarrah forest types will be logged using the most up to date hygiene prescriptions. Where information on dieback hazard is not available, harvesting under no soil movement conditions is required.

5.3.3 Periodic cessation of harvesting in jarrah forest types will be necessary for the maintenance of hygiene and to prevent soil damage.

5.3.4 Machinery and work methods that minimise the movement of soil are to be favoured.

5.3.5 Harvesting machinery will be cleaned down before entering or leaving a wandoo or karri coupe.

5.3.6 The same hygiene conditions are required inside and outside Disease Risk Areas (DRA).

5.3.7 Current, reliable hygiene and disease hazard plans are available and field demarcation of hygiene categories is reliable.

5.3.8 Burning before harvesting will be permitted provided field demarcation of hygiene boundaries has been completed (see Part 4. Dieback demarcation). Burning will only be approved to achieve necessary silvicultural or safety objectives. Burning must be approved by the Regional Manager. Harvesting must take place before the demarcation becomes unreliable as indicated in Parts 4.2.2 and 4.2.3.

5.3.9 A front hygiene barrier (see definition) will be used on all landings except those known to be dieback infected.

5.3.10 All hygiene barriers will be retained to ensure subsequent operations do not negate previous hygiene tactics." (p. 91)

"*5.3.11 Access to logging coupes will be made secure by closing roads adjacent to the coupes outside DRA in accordance with Forest Regulation 115(2) and CALM Act Section 134. The FOIC will implement road closure in accordance with district strategic roading plans.*" (p. 92)

5.4 Logging Under No Soil Movement. Conditions (See Table below)
Logging under no soil movement conditions can only occur in jarrah

(a) the area is high hazard or uninterpretable moderate hazard, or
(b) the area is either north of the Preston River or in the Donnybrook Sunklands and is moderate hazard,
(c) or the area cannot be accessed without placing high hazard forest at risk, or
(d) the area the including karri sites) is upslope of high hazard forest." (p. 92)

5.5 Special Conditions For Logging With Soil Movement (500 Table below)
"*5.5.1 Logging with soil movement conditions can occur when the area is low hazard, or the area is south of the Preston River excluding the Donnybrook Sunklands and is moderate hazard, but not uninterpretable and*

(a) the area is accessible for logging without placing additional high hazard forest at risk, and

(b) the area (including karri sites) is not upslope of high hazard sites, and

(c) the area is demarcated into self contained mini catchments with individual fallers blocks not exceeding 10 hectares.

5.5.2 Dieback strategies required for planning (specifications 1.1, 1.2 and 1.3), roading (specifications 2.1, 2.2, 2.3, 2.4 and 2.5) and coupe management (specifications 4.1, 4.3 and 4.4) will be in place.

5.5.3 Landings will require the minimum of a front and rear hygiene barrier log. Split phase harvesting over time may be required at the FOIC's discretion. The use of static loaders is preferred where practical.

5.6 Dieback forest may be logged under either no soil movement or with soil movement conditions." (p. 92)

"*Many areas where soil movement is acceptable will be logged under 'no soil movement' conditions to cater for stockpiling and to comply with measures to protect the soil as required under section 5.2 – Protection of Soil.*" (p. 93)

5.7 Stockpiling

"*An essential hygiene tactic is to stockpile logs during periods of lowest risk, to enable operations to periodically cease as necessary for the maintenance of hygiene and to prevent soil damage. Stockpiles, or mill intakes, are monitored regularly (refer Specification 1.1, paragraph 2.3[4]).*" (p. 93)

Attachment 5.1.1 : Decision Guide for Demarcation of Boundaries Between Different Hygiene Categories in the Jarrah Forest *SM – with soil movement, NSM – no soil movement*" (p. 94)

ADJOINING HYGIENE CATEGORIES	***LOW POTENT-IAL RISK***	***UNINTER-PRETABLE***	***SUSPECT***	***HIGH POTENT-IAL RISK***	***NOT EFFECTIV-ELY QUARAN-TINED***	***DIEBACK***
SECURE DIEBACK FREE	*Yes (SM or Old maps)* *No (NSM or new maps)*	*Yes (all ops)*	*Yes (all ops)*	*Yes (all ops)*	*Yes (all ops)*	*Yes (all ops)*
LOW POTENTIAL RISK		*Yes (LPR not below uninterpretable* *No (LPR below uninterpretable)*	*Yes (all ops)*	*Yes (all ops)*	*Yes (SM or old maps)* *No (NSM LPR below NEQ or new maps)*	*Yes (all ops)*
UNINTERP-RETABLE			*Yes (all ops)*	*Yes (all ops)*	*Yes (all ops)*	*Yes (all ops)*
SUSPECT				*Yes*	*Yes*	*Yes*

				(all ops)	*(all ops)*	*(all ops)*
HIGH POTENTIAL RISK					*Yes (all ops)*	*Yes (SM) No (NSM)*
NOT EFFCTVLY QUARAN-TINED						*Yes (all ops)*

MANUALS – 1993

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Appendix 2 : Rating System for Prescribed Burning
Other Management Values

"*Factor 2.2: Compliance with Other Departmental Objectives.*
Burn is required to meet objectives other than fire protection (eg advance burn, habitat management), or the timing of a fire protection burn affects another operation. (eg dieback photography program).

A.	*Burn is a critical prerequisite for another operation*	*40*
B.	*Burn is an important prerequisite for other objectives.*	*20*
C.	*Burn is a desirable prerequisite for other objectives.*	*10*
D.	*Burn has minor significance for other operations.*	*0*" (p. 5-6)

Fire Operations Manual : Volume 1. 1993
NOTE: INCLUDES UPDATES ISSUED 1997

1.3 Burning Plans
1.3 (iii) Fire Exclusion Areas
"*Protection will be afforded to 'No Planned Burn Areas' as specified in Management Plans, or Interim Guidelines for Necessary Operations. Other areas to be protected include:*
[…]

- *Areas photographed and ready for dieback interpretation*." (p. Chapt 1 – page 2-3) Issued 14/1/97

7.2(iv) Maintenance of Buffers
"*Operations requiring dieback photography and interpretation must be programmed and carried out so that it does not adversely affect fuel reduction burning programs.*" (p. Chapt 7 – page 2) Issued 14/1/97

7.6 Burn Preparations
"*All burn preparations (eg, access maintenance, scrub rolling, water point construction) should be conducted under dry soil conditions and where appropriate must be covered by an approved Hygiene Evaluation.* […]" (p. Chapt 7 – page 9) Issued 14/1/97

Fire Operations Manual : Volume 2 : Fire Protection Instructions
NOTE: INCLUDES UPDATES ISSUED - 20/01/99, 13/1/97, 16/09/93

Fire Protection Instruction 1 : Master Burn Plan Review Process
Regional Planning

"*It shall be the responsibility of the meeting to resolve conflict between priorities, for instance requirement for dieback photography and interpretation and protection burning, or areas designated for logging and burn buffers.*[…]" (Fire Protection 1, page 2) Issued 21/09/93

"*The Planning Steps are a series of activities that need to be addressed - considered and acted upon as necessary - to ensure the proper integration of burning with other activities. The Planning Steps are designated with a year of consideration relative to the year in which the burn is to take place rather than when action is required. For instance with dieback photography the area needs to be unburnt for 5 years before the photography can proceed. Therefore the Planning Step must be considered 5 years before action is required*." (Fire Protection Instruction 1 : Page 3) Issued 21/09/93

Appendix 1 Planning Steps

"*The following are Planning Steps that need to be considered and appropriately acted upon to properly implement the Prescribed Burning Planning Process*.

PLANNING STEP EP2

Year Relative to Burn: -8

Issue: *Areas to be logged may need dieback demarcation prior to logging. This means that 230mm photography will be required approx. 3 years prior to logging. A five year (minimum 3 year in some areas) unburnt period is desirable to allow interpretation for Phytophthora.*
Action: *Identify areas to be logged and ensure that sufficient time for expression of disease is allowed for.*
Information: *230mm photography programme. Areas required for photography year -3.*
Custodian: *Regional Planner/Inventory*
Input By: *Inventory and Fire Protection*
Received By: *Regional Fire Protection Officer*
Critical: *Yes. Cannot demarcate without photography.*
Other Options: *No*." (Fire Protection Instruction 1 : p. 11) Issued 21/09/93

"*PLANNING STEP VS1*

Year Relative to Burn: -5

Issue: *Proposed Recreational Development planning and Phytophthora interpretation.*
Action: *Areas required for development P.c. interpretation*
Information: *Proposed site developments, VRM plans for districts.*
Custodian: *Regional Recreation Planner.*
Input By: *Inventory, Fire Protection, Districts.*
Received By: *Regional Recreation Planner.*
Critical: *Important for integrated management.*
Other Options: *Not after 230mm photography. Site development planning is dependent upon interpretation, therefore if areas not identified prior to photography then this will not happen.*" (Fire Protection Instruction 1 : p. 14) Issued 21/09/93

"*PLANNING STEP EP3*

Year Relative to Burn: -1

Issue: *Dieback distribution on burn boundaries.*
Action: *Interpret and map dieback distribution.*
Information: *Dieback location, operational boundaries.*

Custodian: *District.*
Input By: *Interpreters.*
Received By: *District.*
Critical: *Yes, prevent spread by adopting hygienic operational activities.*
Other Options: *No.*" (Fire Protection Instruction 1 : p. 17) Issued 21/09/93

"*PLANNING STEP* *PL2*

Year Relative to Burn: *-1 (or 2)*

Issue: *Confirmation that interpretation has been done and that operations can proceed.*
Action: *Cell report and Hygiene Map or letter from interpreters confirming status of interpretation in area to be burnt.*
Information: *Status of interpretation, demarcation requirements.*
Custodian: *Interpreters.*
Input By: *Interpreters.*
Received By: *District.*
Critical: *Yes, burning cannot proceed ahead of interpretation, and must not occur before on ground demarcation.*
Other Options: *No.*" (Fire Protection Instruction 1 : p. 18) Issued 21/09/93

Fire Protection Instruction 24 : Mopup and Security Standards
Technique

- "*Environmental matters (preventing possible dieback spread, excessive machine activity - soil erosion, damage to trees etc) must be considered and appropriate action taken*." (Fire Protection Instruction 24 : p. 1) Issued 13/01/97

Fire Protection Instruction 40 : Edging
3.0 Pre-Planning General
"*Consider dieback precautions for each job.*" (Fire Protection Instruction 40 : p. 3) Issued 09/16/93

<u>Fire Operations Manual : Volume 3 : Fire Protection Instructions. 1993</u>

Fire Protection Instruction 46 : Slash Burning Prescription Preparation
6. Technique (Field)
"*After consulting the plan for stream reserves, research trials, and other non burn areas, drive around the slash and buffer areas observing the following and noting on the plan:*
[…]
(l) *Environmental considerations - permanent creeks, steep slopes, Phytophthora (dieback) occurrences.*
[…]
(Fire Protection Instruction 46 : p. 4) Issued 09/15/93

Fire Protection Instruction : 53 : Scrubrolling Prior to Prescribed Burning Operations
5. Timing
5.1 Preparation
"*Due to environmental considerations some preparation will need to be completed in autumn prior to the burn, when soil conditions are dry, thus minimising the chance of <u>Phytophthora cinnamomi</u> spread and maximising machinery flotation over some damp areas.*" (Fire Protection Instruction 53 : p. 2) Issued 09/16/93

6. Approval
"*Seven Way Tests are to be approved prior to scrub rolling. (Particularly D.R.A. areas, National Parks, Nature Reserves, Road, Stream and River Reserves)*" (Fire Protection Instruction 53 : p. 2) Issued 09/16/93

7. Method of Operation
"*All standard hygiene precautions to minimise the spread of Phytophthora cinnamomi will be observed.*" (Fire Protection Instruction 53 : p. 3) Issued 09/16/93

Fire Protection Instruction : 54 : Standards for Coup Preparation for Post Harvest and Regeneration Burning
3. Preplanning and Training
"*Operator Training (Contractor and CALM) in safe working practices, standards required, dieback hygiene etc. is to be conducted by the supervising CALM Officer prior to the operation commencing.*" (Fire Protection Instruction 54 : p. 2) Issued 21/09/93

Environmental Protection
4.1 Dieback Hygiene
"[…] *Water is not to be drained into dieback free forest!!*" (Fire Protection Instruction 54 : p. 2) Issued 21/09/93

Burn Prescription – CLM 873
Dieback DRA
"*Show Permit (CLM 626) number where applicable. Indicate relevant sections of Hygiene Manual to be observed. Define hygiene requirements for the burn.*" (Burn Prescription – CLM 873 : p. 5) Issued 22/09/93

MISSION AND OBJECTIVES – 1992

CALM Annual Report 1991/92. 1992

NOTE: REFER TO ANNUAL REPORT 1990/1991 – SIMILAR WORDING FOR MISSION AND OBJECTIVES

MANAGEMENT PLAN - 1992

Walpole-Nornalup National Park Management Plan 1992-2002. 1992

Management for Conservation – Protection
Objectives
- "*Prevent the introduction of dieback and other diseases into disease-free areas.*
- *Control the spread of dieback and other diseases in areas where they already exist.*" (p. 29)

Actions
"*1. Continue dieback-disease surveys of the Park to identify and then protect dieback disease-free areas.*

2. Re-develop or close any vehicle or walk track that passes through inundated, infected areas or high risk areas (based on the dieback disease survey mentioned in Action1.).

[…]
3. *In all operations follow the hygiene practices given in the CALM Dieback Hygiene Manual. Develop new procedures as necessary.*" (p. 29)

4.

Actions

Fire Prevention

"*1.* […]*All burn prescriptions will take into account the need for dieback disease control.*" (p. 35)

"*7.* *Define roads required for fire control and essential management activities. Those roads considered unsuitable for public use will remain closed to the public.* […]" (p. 36)

Fire Suppression

"*14.* *Contain all fires in or threatening the Park.* […]

15. *Minimise construction of any new firebreaks. In the case of a wildfire, limit construction to those necessary for the protection of priority values, rehabilitate any subsequent unnecessary firebreaks. Construct new firebreaks according to strict dieback disease hygiene principles.* […]" (p. 36)

Recreation Management

Objectives

- "*Ensure that dieback disease control receives the highest priority in any access considerations.*" (p. 53)

Strategies

"[…]*Maintaining existing access is a priority within the constraints of minimising dieback disease spread …*" (p. 54)

"*Substantial improvements to 4WD coastal access will be carried out. All coastal access will be progressively rationalised to minimise spread of disease. The options for achieving this are:*

(i) *Close infected tracks;*
(ii) *Close infected tracks but construct alternative ones through lower disease risk areas;*
(iii) *Build up and provide drainage for sections of tracks that become inundated;*
(iv) *Relocate sections of tracks at high risk through lower risk areas; and*
(v) *Close infected and high risk tracks after rain (times when risk of spread is high)*" (p. 54)

Actions

"[…]

3. *Verge clearing is to be carried out under dieback disease hygiene conditions and according to visual resource management principles. The preferable time is in autumn, which is after peak use and before wet conditions prevail.*

4. *Conduct a full dieback disease assessment of all areas in which track reconstruction will occur (see Section 9.0 Disease).*

5. *Carry out all construction and rehabilitation works under strict dieback disease hygiene conditions.*"

[…] (p. 55)

Recreation Areas

Actions

"2. *Base all recreation development plans on an up-to-date hygiene plan and the approved Seven Way Test (see Section 9.0 Disease). Ensure no priority flora or fauna are adversely affected.*" (p. 58)

POLICY STATEMENT - 1992

Policy Statement No. 41 : Beekeeping on Public Land. 1992

"*Prior to the formation of CALM, there were different polices regarding beekeeping on State forest, National Parks and Nature Reserves.*

> ***(i)*** *On State forest beekeeping was seen as compatible with most other land uses. A high level of management went into the allocation of sites, provision of access consis*tent *with the control of dieback, and supervision to ensure satisfactory operation and maintenance*." (p. 1)

Policy

"*The Department will:*

1. *Support and administer apiculture as a legitimate and sustainable industry on appropriate CALM managed land and other Crown Land by the issuing of permits, allocation of apiary sites and the designation of access, field supervision (including dieback hygiene), and regular management review of sites;*" (p. 4)

Strategies

"*3.* *Locate/relocate apiary sites at acceptable intervals, taking account of constraints such as the following:*
[…]
3.2 The need to avoid transference of disease, including dieback, and diseases of honeybees.
[…]" (p. 4)

"*11.* […] *CALM may also temporarily issue sites within DRA, to achieve this purpose, providing this can be managed without compromising forest hygiene.*" (p. 4)

INTERPRETERS MANUAL - 1992

Dieback Interpreters Manual. 1992

3.3 Film Interpretation

"[…] *The second interpreter to view the frame (under 8x) must ensure he/she contributes to the interpretation by marking on the areas where he differs from his/her partner eg.*

- *extra I.S.D.(s)*
- *dieback and uninterpretable boundary differences*
- *extra check sites*

On every frame viewed determine if there are sufficient indicator species visible to detect the presence of P. cinnamomi. If there are insufficient indicator species visible the area is to be labelled uninterpretable.[…]" (p. 17)

"*Identify and record any gaps in the photography coverage over the cell. If gaps exist these must be stripped out in the field.*" (p. 12)

4. Sampling

4.6 Completing Sample Information Sheets

"*The information recorded must provide the reader with a brief, but detailed insight to the forest within close proximity ...*" (p. 25)

5. Field Work

5.4.2. Mapping and Taping - Guidelines to assist in decision making

"*Where areas are significantly disturbed there is usually a requirement for intensive sampling. Senior Interpreter advice must be sought.*[…]" (p. 40)

5.4.3. Category Demarcation - Tape Colours and Guidelines
(i) Demarcation - Time limits, general
"[…] *If it is imperative that forest be burnt prior to logging, taping and blazing must be completed before burning.*

When an operation has not taken place within six months of demarcation, it will be necessary to recheck (and demarcate again) all areas of forest downslope from dieback or suspect, particularly on moderate to steep slopes (greater than 5 degrees).[…]" (p. 40)

"[…] *All demarcation must be easily seen, even where dense scrub occurs.*[…]" (p. 41)

ii) Dieback
"[…] *It is necessary therefore to have a zone which buffers forest operations from disease infections.*" (p. 41)

"[…]*Two variables must be considered in varying buffer width - slope and disease impact.*[…]" (p. 41)

iii) Suspect and Uninterpretable
b) Uninterp abutting Suspect
"[…] *Therefore, map and tape suspect into and onto the uninterpretable side of the 'boundary'. Remember that suspect vegetation is by definition, interpretable i.e. it does have sufficient indicators present.*[…]" (p. 43)

"*Uninterpretable means a lack of sufficient reliable indicators, or a site disturbed within the last 3 years.*" (p. 43)

v) NEQ Tracks
"*Are not normally taped, but can be at the special request of the District.*

The district will specify the "buffer" width to apply, but generally it will be 20m down hill and 10m uphill from the track in question." (p. 44)

6.2 Hygiene Maps - General
6.2.1. Introduction
"*Together with a 7-way test, hygiene maps provide the basis for conducting all forest operations, particularly those where soil movement will occur; such as roading, logging, drilling and mining.*

The Hygiene Map provides information that can be classified into two areas.

1. *Accurate Location of Infections of P.c.*
   It is accurately shows the location of P. cinnamomi infections at a point in time. The boundaries are precise and are easily recognised by the trained interpreter.

2. *Categories Other Than P.c.*
   It provides information about the possible presence of the disease and the risk of disease spread by natural and artificial means.

The categories are used as a guide for operations. They define areas of functional coherence. They are intellectual creations that enable us to order particular places within general frames and are mapped to assist planners in recognising, at least to some degree, what the impact of the disease might be.[…]" (p. 52)

"*The categories between are considered to have different levels or risk equated to the position within the hierarchy of categories.*" (p. 53)

6.2.2 Mapping the Categories
"*P.c. location needs to be accurately mapped - ie it must reflect the mapped position of the disease front as determined at the time of interpretation.* […]" (p. 53)

i) Dieback (D/B or Pc) : Red
"*Forest areas which show dieback symptoms and are supported by laboratory recoveries of P. cinnamomi from the soil and tissue samples.*" (p. 53)

ii) Suspect (SUS) : Dark Blue
"*Where indicators are present, but the evidence for P. cinnamomi presence or absence is inconclusive. The suspect category is a legitimate category, not a haven for indecision. Some sites will exhibit some but not all the diagnostic elements of an infection - these sites are most accurately described as suspect.*[…]" (p. 54)

iii) High Potential Risk (H.P.R.) : Orange
"*The high potential risk category is determined from local knowledge, contours and aerial photographs.*[…]" (p. 54)

iv) Not Effectively Quarantined (N.E.Q.) : Yellow
"*Roads and tracks within the cell that have had considerable use during all seasons with an unknown degree of Hygiene are shown as not effectively quarantined.*[…]" (p. 54)

v) Uninterpretable (UI) : Purple
"*This category is used to account for a number of situations.*

1. *Forest recently burnt or logged will be delineated and identified by the words burnt or logged and the date this occurred.* [...]

2. *Areas of non forest such as gravel pits, transmission lines, roads, areas of rock, areas of forest cleared.*

3. *Forest in which susceptible indicator plants are absent or too few to enable interpretation for the presence or absence of P. cinnamomi.*" (p. 56)

"*9. Other*
In addition, the following procedures should be rigorously applied by all interpreters.
1. Areas of forest that are known to be infected with P.c. and adjoining the area mapped, but are outside the existing mapping boundary, should be included and plotted to approximately 50 metres outside mapping boundary.
2. Areas of forest known to be infected with P.c. that are outside the mapping boundary and do not adjoin any part of the mapping areas, but will influence that area are not to be shown on the map. The influence zone from this infection will appear on the Hygiene map within the boundary of the mapping cell.
3. N.E.Q. roads will continue to be plotted on both sides of the road, even when this means that one half of the road will be shown as yellow colour outside the mapping boundary." (p. 58)

6.2.3 Dieback-Free and Hygiene Map Reliability Labels
(Currently Swan Region Only)
"*Hygiene maps are also labelled with reliability information ...*" (p. 59)

"*Different levels of reliability will mean different end-uses for the plan ...*" (p. 59)

6.4.1 Current Impact
"*Note that current impact information is recorded on photos. Maps are not usually required. The current situation in terms of the impact related to P. cinnamomi infections, provides information on the effect the disease is having on the forests. (That is the number of plants being killed.) It provides information relating to the area of forest being affected severely, less severely or hardly at all. This enables planning and operations staff to direct logging and roading operations to particular areas under given weather conditions. The information is an important step to identifying potential impact in areas of forest not yet affected.*" (p. 62-63)

Compiling Impact Data
"*The information is compiled from local knowledge acquired during interpretation of the cell and plant deaths visible on the film. The boundaries will be a zone rather than a distinct line.*[…]" (p. 63-64)

6.4.2 Vegetation Types and Hazard Map
"*Hazard is defined as the combination of site, vegetation and climatic factors that influence the potential damage done by disease.*[…]" (p. 65)

"*Hazard maps are used in conjunction with the hygiene map and the 7-way test to make managerial decisions about what, how and when operations are to be carried out and what hygiene constraints are most appropriate.*" (p. 66)

HYGIENE MANUAL - 1992

Dieback Disease Hygiene Manual. Rev. ed. 1992

"[…]*To reduce the risk of spreading dieback disease the community of W.A. must ensure that all operations likely to spread the disease are closely scrutinised and appropriate hygiene practices are planned and implemented.*" (p. 1)

2. Dieback Disease Management Strategies
"*There is a logical process involved in determining whether dieback disease is an issue associated with any particular operation.* […]" (p. 2)

3. Recognition and Mapping of Dieback Disease Symptoms
"*Adequate mapping is a prerequisite for implementing detailed dieback disease control procedures. However, an indication of the extent of dieback disease is often sufficient for deciding whether dieback disease is an issue at a particular site."* (p. 3)

"** The presence of dieback disease can be deduced from the death of susceptible plants (called indicator species).*

** A sound knowledge of susceptible plants and their reliability as indicators in each locality is required.*

**The time taken for a new infection to be expressed as visible symptoms is variable depending on local site and climatic factors.*
[…]
**A single dead susceptible plant (eg: a dead Banksia) could be dieback.*[…]

** Spring and Autumn or periods after heavy summer rain are the best time to map dieback disease symptoms. Soil moisture and temperature at these times favours the activity of the fungus.*

**If dieback disease is evident in a water course then it must be assumed the water course IS infected and dieback disease WILL be present downstream from the infection. Therefore it is important to identify the furtherest upstream infection in the water course.*

**If dieback disease occurs on a ridge or upper slope, then areas downslope will become infected in time.*

**Dieback disease is most likely to occur in moisture gaining sites such as gullies, creeks, drains and culverts.*" (p. 3)

"*The end result classifies areas as:*

- *dieback infected;*
- *dieback free, or*
- *uninterpretable, Suspect or not effectively quarantined which means it is not possible to say whether dieback is present or not.*
- *area at risk from natural spread downslope from disease.*" (p. 3)

4. Assessing the Risk of Introduction and Spread of Dieback Disease
"*One of the fundamental questions which must be addressed in determining any hygiene strategy is: 'What is the risk of this operation introducing or spreading dieback disease?'*" (p. 5)

5. Assessing the Dieback Disease Hazard
"[…]*This task is most confidently performed by an expert.*" (p. 6)

6.1 Ground Demarcation of Hygiene Categories
"*(1) In interpretable areas (unburnt for 4-5 years and with sufficient indicator species). Boundaries between dieback, dieback-free and uninterpretable, areas will be marked on the ground (pegs, survey tape, paint etc) before any operation involving use of machinery. Where earthmoving operations are involved boundaries will be pegged.*
[…]
(4) Pegs to be located 5 to 20 metres uphill from visible symptoms or into dieback-free in the case of uninterpretable.

(5) Where there are no evident symptoms, creeks or shallow flats are to be pegged as dieback if dieback occurs upstream from the crossing. Pegs to be located 5 to 20 metres each side of water course, or edge of flat, depending on slope." (p. 10)

6.2 Cleaning Down
"*NOTE: Use brush or compressed air rather than washing, if soil is dry and can be removed by this method.*

AT HEADQUARTERS:

"*DO*	*use designated ramps or pads to washdown vehicles. Keep the ramp or pad clean or mud.*
DON'T	*forgot to remove mud & soil from cleats and underside of protection plates on track vehicles.*
DO	*ensure run-off flows into a sump where it can be treated with fungicide.*
DON'T	*drive vehicle through washdown effluent.*
DO	*use high pressure spray to remove caked-on mud and soil. Use spade or bar to assist removal.*

IN THE FIELD

DO	*washdown at designated washdown point or on bridges, rocky crossings or hard well drained surfaces, within dieback areas. Keep the washdown point clean of mud.*

DON'T *washdown in dieback-free areas.*

DO *treat washing down water in tankers with fungicide (Sodium hypochlorite, 2lts per 3000 lt tank).*

DON'T *fail to clean any machine capable of carrying dieback disease from infected to uninfected areas.*

DO *renew NaOCI dosage every 24 hours.*

DON'T *drive vehicles through washdown effluent.*

DO *use a brush, bar or spade to help remove compacted soil where necessary.*
[…]
DO *washdown before moving to the next job.*
[…]" (p. 11)

6.3 Road and Firebreak Selection

"*DO* *assess existing road and firebreak systems for adequacy using relevant criteria (strategic effectiveness, block size, ease of hygienic, maintenance, erosion, other*.

DON'T *duplicate existing access.*

DO *determine known and suspect dieback along the intended route, using dieback plans, air photos and field check on foot, where possible.*

DON'T *use vehicles, bulldozers, tractors in initial selection of roads.*

DO *avoid crossing dieback to dieback-free boundaries.*

DO *demarcate by pegging dieback/dieback-free boundaries.*

DO *select roads low in the landscape.*" (p. 12)

6.4 Road and Firebreak Construction

"*DO* *programme earthmoving work for months when soil is dry (Usually December-March)*

DON'T *commence road or firebreak construction unless correct selection procedure has been followed.*

DO *segregate machine work, in interpretable areas, so that machines do not travel from dieback to dieback-free areas, as pegged, without cleaning down BEFORE leaving dieback.*

DON'T *assume machinery is clean. Always inspect before allowing entry, or commencement of work.*

DO *segregate machine work, in uninterpretable areas, so that machines do not cross sub-catchment boundaries, or move uphill from gullies, without cleaning down BEFORE crossing such boundaries. (See Appendix 1 for details)*

DON'T *construct turn-off drains which result in ponding.*

DO *construct roads and firebreaks to shed water and dry quickly.*

DON'T *forget to write dieback specifications into contracts.*

DO *construct deep table drains to carry run-off swiftly and directly into nearest natural water course.*

DON'T *remove infected soil and plant material resulting from clearing from site.*

DO *use slashed or mown firebreaks in heath country if possible.*

DO *use dieback-free materials on dieback-free or uninterpretable areas.*

DO *manage topsoil resources so that they are identified, separated and replaced in appropriate positions.*" (p. 13)

6.5 Road and Firebreak Maintenance

DO *design a works programme for regular maintenance of roads and firebreaks.*

DON'T *grade deeper or wider than prescribed.*

DO *peg roads before maintenance commences in interpretable areas. Check previous pegging.*

DON'T *grade or move soil from dieback into dieback-free areas as pegged in interpretable areas, or across sub-catchment boundaries or uphill from gullies in uninterpretable areas.*

DO *segregate machine work, in uninterpretable areas, so that machines do not cross subcatchment boundaries, or move uphill from gullies, without cleaning down BEFORE crossing such boundaries.*

DO *as much maintenance as possible in dry weather.*

DO *clean out table drains when soil is dry.*

DO *clean machinery before leaving dieback affected.*

DO *ensure dieback specifications are written into maintenance contracts and are strictly adhered to.*

DO *include general specification on grading method and operation of the machine (angle of blade etc) to avoid carrying infected earth long distances into dieback-free areas.*

DO *include specification applicable to the individual job.*

DO *provide tender vehicle with yard broom & small tank, pump and fungicide.*

DO *use dieback-free materials on dieback-free or uninterpretable sites.*" (p. 14)

6.6 Shoulder and Batter Grading

"*DO* *clean down the machine before it is shifted to a new area.*

DON'T *assume a machine is clean on arrival – always inspect it and clean it if necessary.*

DO *clean down machinery every time an infection or uninterpretable area is exited.*

DON'T *grade from infected areas into uninterpretable areas without cleaning down. The uninterpretable area may be uninfected.*

DO *clean down machinery before leaving a micro catchment in an area where disease location is not known.*

DON'T *grade from uninterpretable areas into dieback-free areas without cleaning down. The uninterpretable area may be infected.*

DO *work from ridge to valley in areas where disease distribution is not known as disease is more likely to occur in lower parts of the landscape.*

DON'T *grade up out of swamps, water courses, or sites prone to flooding without cleaning down the machine unless their dieback-free status is confidently known.*

DON'T *increase the surface area graded by going beyond the areas previously graded.*" (p. 15)

6.7 Gravelling

"*DO* *programme work for months when soil is dry. (Usually December-March)*

DON'T *use infected gravel on roads and firebreaks except where specified in diseased areas.*

DO *select gravel pits at least 100m away and upslope from nearest visible dieback disease symptoms, unless job is entirely in dieback.*

DON'T *allow water to pond in gravel pit.*

DO *wash incoming plant before commencement of gravelling.*

DON'T *leave dieback-free pits open. Secure them against infection and ensure their future disease free status.*

DO *plan haul routes from pit to job to avoid crossing dieback areas, unless job is entirely in dieback.*

DON'T *allow run-off to enter a dieback-free pit.*

DO *remove vegetation and stumps from gravel pit before carting commences.*

DON'T *allow any contaminated vehicle to enter a dieback-free pit, either during or after the operation*

DO *arrange for sampling & testing of gravel prior to work beginning where there is any doubt whether the disease is present.*

DO *ensure dieback hygiene specifications are included in contracts and are strictly adhered to.*

DO *use gravel 'in situ' whenever possible.*

DO *use gravel from uninterpretable areas for uninterpretable forest, provided it is used 'in situ' (within the same micro catchment).*

DO *Lay gravel from the pit out so that trucks run on a mattress of clean gravel..*

NOTE: *The above rules should be applied to other materials such as shale and sand.*" (p. 16)

6.8 Drain Construction and Cleaning

"*The same rules apply as used in grading with the addition of:*

DO *construct and maintain drains & culverts in summer when soils are dry.*

DON'T *allow drains to pond water.*

DO *work from ridge to valley.*

DO *clean down between drains or culverts.*" (p. 17)

6.9 Emergency Road Repair

"*Emergency works are dangerous because the urgency often leads to poor planning.*

Where materials must be used the following points should be considered:

DO *ensure machinery is clean before headquarters.*

DON'T *move machinery between sites without cleaning down.*

DO *use materials of appropriate disease status ie;*
- *dieback material to a dieback site;*
- *dieback-free material to a dieback-free or uninterpretable site;*
- *uninterpretable material only to uninterpretable sites in the same micro catchment or diseased sites.*

DON'T *allow untrained personnel to be uninvolved in unsupervised emergency repair work.*

DO *establish and maintain in a dieback-free status stockpiles of material at strategic locations.*" (p. 18)

6.10 Fire Management – Prescribed Burning

"*DO* *observe other sections of this manual for hygiene use & operation of machines.*

DON'T *travel through boggy creeks.*

DO *select burn boundaries on well formed hard surfaced roads.*

DON'T *move machinery from diseased to dieback-free areas without cleaning.*

DO *travel vehicles only on hard surfaced roads.*

DON'T *grade roads unless absolutely necessary.*

DO *consider alternatives to grading (ie; sweeping, slashing, handraking).*

DON'T *use bulldozers if fire can be suppressed with hand tools.*

DO *divide sectors of fire in accordance with hygiene categories.*

DON'T *mop-up with water from creeks or water points unless Sodium hypochlorite is added.*

DO *ensure all water used for mopping up is disinfected.*
DO *encourage the use of herbicides or slashing to provide breaks.*
DO *ensure plant and vehicles are clean before entry to dieback-free areas.*
DO *nominate clean down points for incoming and outgoing plant and vehicles.*" (p. 19)

6.11 Fire Management – Wildfire Suppression
"*DO* *complete Controllers Fire Suppression Guide (Dieback) CLM Form 613.*

DON'T *use bulldozers if fire can be suppressed with hand tools*

DO *despatch forces along hard-surfaced roads.*

DON'T *mop-up with water from creeks or water points unless sodium hypochlorite is added.*

DO *ensure plant and vehicles are clean before entry to dieback-free areas.*

DO *use hand tools to suppress fire where this method will succeed.*

DO *plan firelines to avoid crossing dieback boundaries if bulldozers are used.*

DO *nominate cleandown points for incoming and outgoing plant and vehicles.*

DO *ensure cleandown on fireline where vehicles are likely to move infected earth into dieback-free areas.*" (p. 20)

6.12 Uninterpretable Areas
"*In uninterpretable areas, boundaries between dieback, dieback free and uninterpretable will be marked on the ground (pegs, survey tape, paint etc.) before any operation involving use of machinery.*

[…]
Remember that uninterpretable areas may be diseased but not showing any symptoms (incipient disease).

DO *clean machinery when it is to operate in an uninterpretable area.*

DON'T *use gravel from uninterpretable areas in areas which are secure dieback free.*

DO *clean machinery when it has completed its work and before it is transferred to other areas*" (p. 21)

6.13 Site Development
"*DO* *select sites, wherever possible, dominated by dieback tolerant tree and understorey species*

DON'T *duplicate existing access.*

DO *determine known and suspect dieback in the areas proposed for development, using dieback plans, aerial photographs, or field check on foot.*

DON'T *use any machinery or vehicles in initial site selection.*

DON'T *assume machinery is clean. Always inspect before allowing use.*

DO *avoid crossing from dieback to dieback-free boundaries.*

DON'T *construct drains which result in ponding.*

DO *select sites on free draining soils and access roads low in the landscape.*

DON'T *forget to write dieback specifications into contracts.*

DO *program earthmoving work for the months when soil is dry (usually December to March).*

DO *construct site to shed water and dry quickly.*

DO *ensure control of vehicle movement through careful siting and demarcation of parking areas and internal access tracks.*

DO *channel pedestrian traffic through the provision of walk tracks located so as to minimise the risk of disease spread.*

DO *provide the public with on-site information about dieback and the control measures being taken.*" (p. 22)

Appendix 1 Hygiene Prescription for Firebreak Construction and Maintenance in Uninterpretable Areas
"*2. All machines to be clean prior to work commencing and cleaned down as required.*" (p. 23)

Sampling Procedure for Phytophthora Species
"*Upon reaching the site and thoroughly investigating the area. Select a recently killed plant for sampling.*[…] (p. 24)

"*(c)* *chop sections of root, bark and cambium from all sides of the plant. Take samples from a variety of depths below surface soil level.* […]

Banksia species:	*Collect sections of the collar region, including lateral roots.*
Xanthorrhoea species:	*Collect small radiating brittle roots and sections of the pithy core.*
Patersonia species:	*Collect all below ground sections of the plant, including the small brittle roots.*
Persoonia longifolia:	*Collect as for banksia*
Podocarpus drouyniana:	*Collect parts of the large underground stem, lower stem and parts of the roots.*
Macrozamia riedlei:	*Collect sections of the fibrous tissue from the bole and roots.*

(d) *Collect several handfuls of soil from around the base of the plant. The mattock can be used to lift the soil into a second sample bag. This reduces the possibility of saprophytic fungi in the soil sample interfering with the tissue samples.* […]

[…]

(f) *Label the outside of the bag with a permanent marker showing the name of the person taking the sample, the sample site, sample number, the district and date.*" (p. 24)

"*(j)* […] *Phytophthoras act in a way similar to P. cinnamomi in causing high impact graveyard sites, while others are often associated with isolated plant deaths only.*

Enter: *H* *for high impact (multiple ISD).*
I f *or isolated plant death.*

This column can be left blank if the impact is unclear.[…]" (p. 25)

(k) *For full identification of all phytophthoras found in the sample, tick under 'full'. For a general identification only (results would be given as either 'CIN', 'P.sp.', 'NEG'), tick under 'P.cin &/or P.sp.'.* […]

Results will be coded as follows when the information sheet is faxed back to the interpreter

CIN	=	*P. cinnamomi*
CIT	=	*P. citricola*
CRY	=	*P. cryptogea*
DRE	=	*P. drechleri*
PMM	=	*P. megasperma var megasperma*
PMS	=	*P. megasperma var sojae*
PNN	=	*P. nicotianae var nicotianae*
P.sp.	=	*Phytophthora species – general I.D. – a sp other than CIN*
NEG	=	*Negative*

Mating type (A1 or A2) will be noted where applicable." (p. 25)

Sampling of plants suspected of being susceptible to phytophthora

"*1.* *If plant identity is unknown, collect a sample of the leaf, branch, flower and fruit. These may be identified later in the office or sent to the W.A. Herbarium if necessary.*

2. *Collect root and collar tissue plus a sample from around the plant. Where root plating is required, root and\or stem base samples should* ***always*** *be sealed in a separate bag within the soil bag.*

3. *The sample is processed in the normal manner except that:*

(a) *The detection service is to be notified of the nature of the sample ie. a plant being tested for susceptibility as an indicator or phytophthora.*

(b) *Ask for the roots to be surface sterilised and plated.*

(c) *If the root material is found to have phytophthora the species of phytophthora, the number of cuttings showing fungal growth are to be recorded.*

(d) *If a sample returns a positive result only in the cup on the first process, it must be processed again as a positive result on the plate is essential to establish if the fungus is present in the root tissue or just the surrounding soil.*

(e) *It is essential to know the disease condition of the area that the sample is taken from as this affects later calculation of the plants susceptibility rating.*

(f) *It is essential that the sampler keep clear and accurate records of all sampling down to test the reliability or the susceptibility or plants as phytophthora indicators.*" (p. 26)

TIMBER HARVESTING … 1992 ED. – 1992

<u>Timber of Harvesting in Western Australia … 1992 Ed. 1992</u>

PART 1 : CODE OF LOGGING PRACTICE

Section 2 : General

NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

Section 4 : Extraction
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 5 : Roading
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 6 : Loading and Hauling
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 7 : Environmental Protection
Jarrah Dieback
NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

PART 2 : MANUAL OF LOGGING SPECIFICATIONS

Section 1 : Planning and Monitoring
Specification 1.1 Harvesting and Monitoring and Regeneration Plans
Part A : Hardwood
"*Complete details are contained in the Department's 'Manual of Hardwood Harvesting Regeneration Planning'. The following is a summary.*" (p. 23)

1.1 Responsibilities
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

7. Field Plans and Checklists
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

8. Monitoring and Records
"*District staff must maintain up-to-date field records of areas cut over and silviculturally treated. For each coupe, a Coupe Silvicultural Report (CLM 160) must be completed as quickly as possible following the completion of harvesting. (Refer Attachment 1.1.2)*

A Post Operation Checklist (CLM 813) must be completed between 12 and 24 months following the completion of harvesting. (Refer Attachment 1.1.3)" (p. 27)

2.3 Short Term Integrated Harvesting and Regeneration Plan
Plan A : Operations Plan
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Plan B : Hygiene Plan : Jarrah Areas Only
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Plan C : Predicted Impact Plan
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Plan D : Landform/Site Vegetation – Jarrah Areas Only
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

3. Plan Amendment

NOTE: REFER TO ENTRIES UNDER 1990 EDITION

8. Monitoring and Records
"*District staff must maintain up-to-date field records of areas cut over and silviculturally treated. For each coupe, a Coupe Silvicultural Report (CLM 160) must be completed as quickly as possible following the completion of harvesting. (Refer Attachment 1.1.2)*

A Post Operation Checklist (CLM 813) must be completely between 12 and 24 months following the completion of harvesting. (Refer Attachment 1.1.3)" (p. 27)

Section 1 : Planning and Monitoring

Specification 1.2 : Seven Way Tests
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Attachment 1.2.2 : Departmental Procedures for the Approval of 7-Way Test
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Attachment 1.2.3 : Seven Way Tests : Guidelines for Assessment of Level of Consequences
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Specification 1.3 Issue of Quarantine Entry Permits
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Section 2 : Roading

Specification 2.1 : Road Planning
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Specification 2.2 : Road Selection
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Specification 2.3 : Road Construction
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING SECTIONS –**

Part A : Hardwood
"[…]2. *Road construction must be carried out in accordance with an approved 7-Way Test.*" (p. 47)

NOTE: REFER TO TABLE AND ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)
***EXCEPT* FOR-**

"*(e) Cut and Fill Slopes:*
[…]
6. *The location and use of gravel pits must be approved by the District Manager. Gravel for use on roads in dieback-free forest must be obtained from uninfected gravel pits, or as per an approved 7-Way Test.*
[…]
6. *If, during road construction in dieback-free forest, water is required to settle dust or bind the road surface, such water must be treated with sodium hypochlorite at the rate of 1:2000. (See also Specification 5.1, paragraph 3.4).*" (p. 56)

NOTE: REFER TO 1990 EDITION FOR OTHER SECTIONS OF THE ABOVE LISTING

Specification 2.4 : Road Maintenance
Part A : Hardwood
" […]

3.Road maintenance, using earth moving machinery, must conform with an approved 7 Way Test.
4.[…] *By-passes must not be constructed to avoid boggy sections of road.*
[…]
7.The edge windrow of gravel resulting from maintenance grading operations must be broken frequently to allow water entry to table drains, off-shoots, culverts intacted vegetation.
[…]" (p. 57)

Specification 2.5 : Gravel Pit Selection Working and Rehabilitation
Guidelines for the Management and Rehabilitation of Gravel Pits – South West Forest Areas

2. Site Selection

2.2 Dieback Status
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

4.1.2 Dieback Management:
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

Section 3 : Silviculture

Specification 3.2 : Advanced Burning
"*3. Advanced burning must not be carried out in areas of jarrah forest about to be cut, if interpretation for dieback has not been completed.* […]" (p. 67)

Specification 4.2 : Falling (Including Tree Marking Techniques)
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.3 : Extraction
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)
10. Split Phase Logging
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

10.1 Separation of Extraction and Loading in Time
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

10.2 Use of a Stationary Loading Machine
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

10.3 Separation of Extraction and Loading by a Physical Barrier at the Rear of a Landing
NOTE: REFER TO ENTRIES UNDER 1990 EDITION (SIMILAR WORDING)

10.4 Separation of Extraction and Loading by a Physical Barrier at the Front of a Landing
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

[Final Points] Numbers 11-14
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

Specification 4.4 : Loading and Hauling
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.5 : Logging Operation Inspections and Certifications
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 5.1 : Protection From Jarrah Dieback Disease
NOTE: REFER TO ENTRY UNDER 1990 EDITION

***EXCEPT* FOR THE FOLLOWING SECTIONS-**

3. Machinery/vehicle Cleandown

"**3. 1** *A key part of forest management with respect to dieback is the cleaning down of vehicles and machinery prior to entering dieback free forest (including 'uninterpretable' forest).*" (p. 92)

7. Decisions Regarding Soil Moisture Status and Soil Movement

"*Critically important aspects of dieback management during logging operations are (i) the judgement of soil moisture status ('dry' v. 'moist'), and (ii) the judgement of whether or not soil is being moved by logging machinery.*

There are no quantifiable measures to help Forest Officers make these judgements, therefore senior Regional officers and Environmental Protection Branch staff must monitor District operations to ensure consistency. Item 11 under Specification 4.3 provides some guidelines." (p. 93)

Attachment 5.1.1 : Operational Instructions for Dieback and Logging (formerly 'Policy Statement No. 3 : Dieback and Logging'; updated by Environmental Protection Branch, October 1990)
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SAME DOCUMENT)

Attachment 5.1.2 : Dieback Demarcation Procedures (updated by Environmental Protection Branch, October 1990)

1. Responsibility

"*The demarcation of dieback boundaries in areas of forest to be logged is the responsibility of qualified dieback interpreters.* […]" (p. 97)

2. Timing
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SAME WORDING)

3. Demarcation of Dieback Boundaries
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SAME WORDING)

4. Buffer Zones
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SAME WORDING)

5. Demarcation of Risk Categories

"*When there is more than one risk category within an operational area, it is usually necessary to separate them in order to achieve the hygiene requirements identified in the 7-Way Test.*

The various risk categories recognised are:

* *secure dieback-free*
* *dieback*
* *suspect*
* *low potential risk*
* *high potential risk*
* *uninterpretable, AND*
* *NEQ (not effectively quarantined)*

Normally, the only categories <u>not</u> requiring separation by demarcation are (a) low potential risk, and (b) secure dieback-free, and then only provided current hygiene maps are available and provided the logging is to take placed under dry soil conditions only.

Where it is necessary to separate risk categories District staff should be involved in the demarcation. The level of involvement will depend on the complexity of the area and the expertise of district staff. The most efficient method of demarcation is to use coupe or sub coupe boundaries." (p. 98)

6. Demarcation of Hazard Categories
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SAME WORDING)

GUIDELINES - 1992

Guidelines for the Management and Rehabilitation of Gravel Pits : South West Forest Areas. 1992

Site Selection
Dieback Status
"*The dieback status of the pit must be ascertained before any work commences ...*" (p. 2)

"*Dieback-free forest is a valuable resource.*

Gravel Source	***Gravel Destination***
Dieback-free Gravel	*Dieback-free* *Uninterpretable* *Suspect* *NEQ (Not Effectively Quarantined)*
Dieback gravel	*Dieback* *Immediately below dieback in high potential risk (where appropriate)*" (p. 2)

Commissioning
Dieback Management
"* *All earthmoving machinery must be clean of all dirt and root material to the satisfaction of the District Manager before entering or leaving the pit.*

* *Access to the pit must be properly formed and free draining. Drainage from access roads should not enter the pit.* […]

* *Dieback-free pits must be closed to unauthorised access whilst not in use.*" (p. 5)

* *All vehicles entering a dieback-free pit must be clean of soil and root material.* […]" (p. 5)

LEGISLATION - 1991

Conservation and Land Management Amendment Act No. 20 of 1991

"*AN ACT to amend the Conservation and Land Management Act 1984, and to consequently amend certain other Acts.*

[Assented to 25 June 1991.]" (p. 1)

Section 33 Amended
"*21. Section 33 of the principal Act is amended –*
(a) in subsection (1) –
[…]
(dc) to promote the conservation of water, as to both quantity and quality, on land referred to in paragraph (a);

(ii) in paragraph (e) by deleting subparagraphs (i) and (ii) and substituting the following subparagraphs -

‘ (i) the management of land to which this Act applies;” (p. 12)

“*(ii) the conservation and protection of flora and fauna; and*
(iii) the taxonomy of flora and introduced plants,’;
and
(iii) in paragraph (f) by inserting after ‘other person’ the following -
‘ , whether in the State or elsewhere’;

(b) in subsection (3), by deleting paragraph (b) and substituting the following paragraph –

(i) in the case of nature reserves and marine nature reserves, in such a manner that only necessary operations, within the meaning in section 33A (1) are undertaken;

(ii) in the case of national parks, conservation parks and marine parks, in such a manner that only compatible operations, within the meaning in section 33A(2), are undertaken; or

(iii) in any other case, in accordance with the provisions of section 56 applicable to the land.’.
and

(c) by deleting subsection (4).” (p. 13)

Section 33A Inserted
“*22. After section 33 of the principal Act the following section is inserted-*

Definition of ‘necessary operations’ etc.
‘ 33A. (1) In section 33 (3) (b) ‘necessary operations’ means those that are necessary for the preservation or protection of persons, property, land, flora or fauna, or for the preparation of a management plan.” (p. 13)

Section 55 Amended
“*27. Section 55 of the principal Act is amended by inserting after subsection (1) the following subsection (1) the following subsection-*

‘ (1a) A management plan for an indigenous State forest or timber reserve shall specify the purpose, or combination of purposes, for which it is reserved being one or more of the following purposes-

(a) conservation;
(b) recreation;
(c) timber production on a sustained yield basis;
(d) water catchment protection; or
(e) other purpose being a purpose prescribed by the regulations.’.” (p. 17)

Section 56 Amended
“*28. Section 56 of the principal Act is amended-*

(a) in subsection (1)-

(i) by repealing paragraph (a) and substituting the following paragraph-

‘ (a) in the case of indigenous State forests or timber reserves, to achieve the purpose, or combination of purposes, provided for in the proposed management plan under section 55 (1a);’;

(ii) in paragraph (c) by inserting after 'national parks' the following-

' and conservation parks';

and

(iii) in paragraph (d) by inserting after 'and fauna' the following-

' , and to preserve any feature of archaeological historic or scientific interest';

and

(b) by repealing subsection (2)." (p. 17)

Division 2 of Part V Repealed and a Division Substituted
"*32. Part V of the principal Act is amended by repealing Division 2 and substituting the following Division-*

' Division 2 – Classification of Land

Land may be classified
[…]
62(2) A classification of land or waters as a temporary control area under subsection (1)(d) shall only be made for the purposes of public safety or the protection of flora or fauna, or both flora and fauna, and a notice of classification –

(a) shall not have effect for a period exceeding 90 days;
but
(b) may be made more than once for the same purpose and for the same area." (p. 19)

"*(3) A classification, or amendment of classification, of any land or waters shall not be made under this section –*

(a) unless it is in conformity with the provision of section 56 which is relevant to, or any management plan for, that land or those waters; and

(b) in the case of land to which section 16 applies, unless the owner, and any person occupying the land with the consent of the owner, has given approval in writing to the classification or the amended classification.

(4)In this section 'controlling body' means the Commission or the Authority.'. " (p. 20)

STRATEGIC PLAN – 1991

CALM Annual Report 1 July 1990 to 30 June 1991. 1991

NOTE: THE STRATEGIC PLAN 1989-1993 IS REPRINTED WITH AN ADDITIONAL CLAUSE (THE FINAL ONE UNDER THE FOLLOWING HEADING) –

"*To achieve the primary objectives the Department will:*" (p. 11)

"***Prepare and implement management plans for lands and waters entrusted to the Department.***

This will involve:

- *Establishing priorities for management plan preparation according to set criteria.*
- *Preparing and implementing management plans according to agreed priorities.*
- *Developing and implementing 'Interim Guidelines for Operations', according to an approved procedure and format, where there is a need for protection of people, property, land, flora and where there is no approved management plan.*" (p. 14)

POLICY STATEMENTS – 1991

Policy Statement No. 3. Phytophthora Dieback. Rev. 1991

1. Objective
"*To prevent the introduction, spread or intensification of the plant diseases caused by Phytophthora species throughout the state, with particular emphasis on the South-West (see Figure 1), and to monitor for Phytophthora activity in the remainder of the State, especially in tropical areas.*" (p. 1)

2. Background
"*The impact of Phytophthora disease on the environment is extremely serious. It has the potential to damage rapidly entire ecosystems. Operations on or near all public lands must be planned and carried out to ensure that the introduction, spread and intensification of disease caused by Phytophthora species does not occur.*" (p. 2)

"*Since the promulgation of the CALM Act in 1984, dieback protection plans, interim guidelines, area management plans and regional management plans have been produced for land entrusted to CALM. These documents, in conjunction with other procedural manuals and checklists (such as the Dieback Hygiene Manual, Code of Logging Practice, Manual of Logging Specifications, Fire Control Checklists, Guidelines to the 7-Way Test) guide officers of the Department to plan and implement operations.*" (p. 2)

Legislation
"*Control on lands vested in the National Parks and Nature Conservation Authority and the Lands and Forest Commission is possible through Part VII (Sections 79-86) of the CALM Act. Regulations under Section 129 allow for road closure to occur.*

Part VII of the Act can also be supplied to any other Crown land with the permission of the vested authority.

There are also powers in other Acts such as the Mining Act and the Metropolitan Water Supply Act that provide for the control of access." (p. 2)

3. Policy
"*The Department will:*

(1) Evaluate the following factors before any operation proceeds which is likely to introduce, spread or intensify the impact of Phytophthora species on land entrusted to CALM:

1. Whether the proposed activity needs to take place.
2. The vegetation/landform type.
3. The land uses for which the area is being managed.
4. The disease hazard.
5. The risk of introduction, spread, intensification of disease.
6. The consequences of infection.
7. The hygiene measures required.

This procedure is referred to as 'the 7 Way Test'. All operations are to be evaluated according to these criteria.

A decision to accept, reject or modify a proposed activity will be made only after an evaluation of all seven factors.

(2) *Determine hygiene requirements before granting access to land entrusted to CALM. The degree of control exercised will relate to the risk of introducing Phytophthora species, the chance of any introduction surviving and the magnitude of the consequences.*

(3) *Minimise the construction of roads on lands entrusted to CALM. Where new roads are necessary they must be located and constructed so as to minimise the risk of introduction, spread or intensification of disease caused by Phytophthora species. All non-essential roads will be closed.*" (p. 3)

"*(4)* *Control the use of roads on lands entrusted to CALM to minimise the risk of introduction of Phytophthora species.*

(5) *Monitor representative areas and operations across the lands entrusted to CALM to:*
- determine the risk of introducing Phytophthora species;
- determine the rates of spread;
- determine the effectiveness of hygiene measures used to prevent introduction and spread.

(6) *Review the boundaries of Disease Risk Areas periodically.*

(7) *Give a high priority to determining the location and extent of Phytophthora species on public land. The highest priority will be given to those areas in which both hazard and the risk of introduction or spread by either natural or artificial means is the greatest.*

(8) *Undertake research into the diagnosis of the disease, the assessment of damage caused by the disease, disease dynamics, disease management and disease control. The research findings will be published and promoted.*

(9) *Give a high priority to collating and disseminating research and other data. These data are to be used for developing management prescriptions, training Departmental officers and promoting Phytophthora awareness in other land management organisations, land users and the public at large.*

(10) *Provide continuing training in disease biology and control to Departmental staff who carry out activities which have the potential to introduce, spread or intensify the impact of disease caused by Phytophthora species.*" (p. 4)

4. Strategies
"*To accomplish the Department objective and policies, staff will:*

(1) *Use the 7-Way Test to evaluate all operations likely to introduce, spread or intensify the impact of Phytophthora species.*

(2) Conform to the objectives and strategies contained in Dieback Protection Plans, Regional Management plans, Area Management plans and Interim Guidelines.

(3) Conform to standards and practices laid down in Departmental manuals and codes of practice. Eg: Hygiene manual, fire control checklists, guidelines to the 7-Way Test, Manual of Logging Specifications Code of logging practice.

(4) Include disease management specifications in contract documents and job prescriptions.

(5) Incorporate sufficient lead time in planning operations to allow disease location, hazard and risk mapping.

(6) Plan to execute operations in time and space so that the risk of disease introduction and spread are minimised.

(7) Plan and implement a minimum strategic roading network.

(8) Control access and operations so as to protect secure areas which are Phytophthora free.

(9) Encourage self-policing of Phytophthora hygiene by Government, local authority, industry and other user bodies.

(10) Continue to develop practical systems for monitoring the effectiveness of hygiene in operations." (p. 5)

"*(11) Continue research into site vegetation and Phytophthora impacts and apply new information appropriately.*

(12) Implement the primary objectives of Research Division's plan diseases research programme (Appendix1) by providing appropriate resources.

(13) Prepare and implement a communications plan to increase public awareness and understanding of the Phytophthora problem in Western Australia and to create public support and cooperation for initiatives to control and combat the problem.

(14) Continue to develop Phytophthora management expertise and awareness in CALM staff and in staff of other land management authorities and industry.

(15) Make available CALM policies, strategies and guidelines on disease control to other Government Departments, industry, local authorities, community groups, individuals and organisations dealing with management and use of natural lands.

(16) Assist other organisations with training.

(17) Encourage Government, local authority and industry bodies to make a formal commitment to Phytophthora management.

(18) Refer enforcement matters concerning Part VII of the CALM Act and associated regulations to the Branch Manager of Environmental Protection Branch for consideration and prosecution where appropriate." (p. 6)

Policy Statement No. 18 : Recreation, Tourism and Visitor Services. 1991

1.8 Public Access
"[…]*There are some areas restricted to the public for reasons of safety, disease control, water quality, protection of species, maintenance, etc.*" (p. 17)

2.1.5 Competitive Car Rallies and Other Motor Sports
Conditions
"*9. Hygiene requirements to minimise the risk of disease introduction and spread may be specified and must be observed.*[…]" (p. 45)

2.8 Equestrian Activities
"*Potential horse-riding impacts include; soil erosion, trampling and grazing of native vegetation, introduction and spread of plant diseases and weeds, siltation and fouling of watercourses and the potential for conflict with other visitors. Consequently, horse-riding is best suited to State forest areas where it can be dispersed or directed to non-conflicting areas. It is inappropriate for Nature Reserves, wilderness areas and other reserves and parks with fragile environments or which are highly susceptible to the spread of weeds or fungal disease, especially Dieback.*" (p. 64)

Procedures
"*2. When considering the location of a horse-trail, the following factors must be considered:*

* *presence and/or risk of dieback introduction and spread; the 'Seven Way Test' must be applied;*" (p. 66)

2.12 Orienteering/Rogaining/Cross Country Running
"*2.12.5 Any permanent course marking must have the approval of the District Manager before erection and all temporary marking must be removed after each event.*" (p. 79)

Procedures
"[…]
- *potential to spread Dieback or any other plan or animal diseases;*

[…]" (p. 80)

Policy Statement No. 40 : Road Management. 1991

Performance Indicators
"*Successful implementation of this policy will be assessed on the basis of the extent to which:*
[…]
6. *Dieback disease introduction and spread cannot be attributed to road construction and maintenance operations.*
[…]
9. *The spread of weeds by road construction or maintenance is minimised.*

10. *Road programs follow Departmental priorities as laid down by Corporate objectives in policies and plans.*" (p. 4)

SILVICULTURE SPECIFICATION – 1991

Silviculture Specification 2/91 : Treemarking and Silvicultural Treatment in the Jarrah Forest

NOTE: THIS SPECIFICATION SUPERSEDES SILVICULTURE SPECIFICATIONS 5/89 AND 7/89

"*This specification relates only to dieback-free jarrah forest designated as multiple use in the 1987 Regional Management Plans. Dieback infected forest is to be managed in accordance with Specifications 3 and 4/89.*" (p. 2)

3.2.2 Temporary Exclusion Areas (TEAS)
"[…]
DIEBACK HYGIENE
TEAS are to be accessible from current roading and wherever practicable remain within a single hygiene microcatchment.
[…]" (p. 8)
6.2 Priorities for Treatment
"*The resources required for silvicultural treatment following harvesting will not always be sufficient to complete the available work. In allocating resources the following priorities will be adopted:*
[…]
(2) Only treat those areas which are either secure dieback free or low potential risk or of low dieback hazard.
[…]" (p. 11)

MANAGEMENT PLAN – 1990

Lane Poole Reserve Management Plan 1990-2000. 1990

Resources and Land Use : Protection
"*Protection of the ecosystem is fundamental if its values are to be maintained. Major values currently recognized in the northern jarrah forest are water, timber, recreation, scientific study, educational resources, flora, fauna, geological resources, landscape, and other forest products such as honey and wildflowers.*

Appropriate management of the forest ecosystem will help conserve these important values. Management must minimise damage from wildfires, dieback disease and other pathogens, feral animals, weeds and uncontrolled recreation. Only by controlling these damaging agents will it be possible to manage the Reserve in a way that ensures conservation of its values." (p. 33)

B8.2 Dieback Disease
B8.2.1 Introduction
"*Disease management policies in State forest and the Reserve have aimed at limiting both the introduction and spread of jarrah dieback disease, and improving forest resistance. Significant areas of the Reserve have been proclaimed as a Disease Risk Area (DRA) since 1974 (Map 9).*" (p. 42)

B8.2.2 Forest Management
"*Disease management in the northern jarrah forest has been aimed at limiting both the introduction and spread of dieback disease, and the improvement in forest resistance. Three strategies have been adopted:*
- *the development of accurate disease location maps.*
- *the rigorous application of forest hygiene procedures.*
- *the management of the forest ecosystem to create conditions unfavourable for survival of the disease, and to minimise disease impact should it be accidentally introduced.*" (p. 44)

"*Forest hygiene procedures as specified for hardwood logging (Underwood and Murch 1983) are applicable as a basis for management activities. They are based on the segregation of operations both by season and location, use of disease free equipment, and control over vehicle access.*" (p. 44)

"*Considerable information exists about the biology of dieback disease, and the conditions that favour its survival and rapid spread. Management aims to adopt measures that 'tip the balance' in favour of the survival of forest ecosystems.*" (p. 44)

B10 Recreation
B10.1.1 Environmental Resources:
Murray River Valley, Scarp Pool to Stringers
"[…] *Although there is currently a low incidence of dieback disease in these areas, and the vegetation communities are less susceptible to dieback disease, planning of recreational activities must still be constrained by the need to prevent further dieback disease spread and damage to vegetation.* […]" (p. 51)

Uplands
"[…] *Other areas to the west of the Murray (ie. Samson, Federal and Keats blocks), and to the north (ie. Plavins block), contain similar landforms suitable for some high impact recreation. The spread of dieback disease and potential damage to vegetation communities of high conservation value however, limit such activities.*" (p. 51)

"*To the east of the Murray River, and in the Southern Conservation Zone, a Disease Risk Area has been established (See B.8.2).* […]" (p. 52)

B10.2 Current Management of Recreation
"[…] *Dieback quarantine provides restrictions on access to areas east of the Murray Valley and most of the conservation areas.* […]" (p. 52)

B13.1 Mining
B13.1.3 Exploration and Mining Regulations
"[…] *Drilling plans are submitted annually by Alcoa; from these, CALM specifies environmental protection controls including dieback hygiene strategies.*" (p. 59)

C3 Conservation Zone
(iii) Conservation Areas
"[…] *Vehicle access on other than designated roads will be for management or approved research purposes only.*" (p. 77)

(iv) Special Protection Conservation Area
"[…] *Management practices must be directed toward the maintenance of conservation values;*[…]" (p. 77)

C5 Vegetation and Flora
Prescriptions
"*1. Wherever possible activities are to be located where they do not affect any scarce landform, vegetation type or plant species. Protection of these areas will be given high priority in the development of dieback disease and fire protection plans.* […]" (p. 81)

C7 Protection
C7.1 Fire
"*The 10 objectives are:*
[…]

To minimise the introduction or further spread of dieback disease and weeds by fire management operations. […]" (p. 85)

Prescriptions – Overall
"*The following prescriptions will be implemented as funds permit. If sufficient funds are not available, fire protection and management will be undertaken according to the objectives for fire protection. Alterations to the fire plan will be discussed with the Northern Jarrah Forest Region Advisory Committee.*" (p. 87)

Fire Prevention
"*5. Define roads required for fire control and essential management activities. Those roads considered unsuitable for public use will be closed to the public and management vehicles will be subject to hygiene requirements when using closed roads.*" (p. 88)

C7.2 Dieback
"*The objective is to limit the spread of dieback and other diseases within the Reserve.*" (p. 90)

Background
"*Dieback disease has the potential to seriously degrade the recreation and conservation values of the Reserve. This applies particularly in broad valleys or areas of impeded drainage.*

Accurate knowledge of disease distribution can only be determined following a minimum period of 3 years free from disturbance. Prescribed burning or wildfires represent significant disturbance, masking disease symptoms for a further 3 years. The use of fire to meet recreation and conservation management objectives will require balancing against the need to obtain information on disease distribution for planning operations and activities.

Operations and some activities cannot automatically be carried out in the Reserve. […]

All operations must ultimately satisfy the 7 Way Test to assess the likelihood of operations introducing dieback. Those which fail the Test are inappropriate at that time. […]

The extent of dieback within the Reserve can be determined by a dieback interpretation program. The program will use, where appropriate, ground survey and verification, and aerial photographic interpretation methods. Photographic interpretation will be used over large areas and for those sites subject to intense visitor use. CALM will undertake ground surveys for those smaller areas not covered by aerial photography." (p. 90)

Prescriptions
"*1.CALM will interpret dieback within the Lane Poole Reserve to a standard sufficient to meet the provisions of Dieback Policy 1982. In particular it will:*

- *evaluate the activities proposed within this plan, using the objective 7 Way Test.*
- *apply the existing forest hygiene principles contained in Underwood and Murch (1981), where vehicle access to the forest is permitted (see Section C9)*
- *review all roads in the Reserve to determine their association with dieback disease and assess their need for retention or relocation (see also Section C9)*
- *review the boundaries of existing Disease Risk Areas, with the view to including all conservation zones.*
- *allow future access to resources only where 70 or 230 mm photography and interpretation have been undertaken and when the operation has passed the 7 Way Test*
- *ensure all dieback boundary demarcation is consistent with standards set by the Environmental and Inventory Branches, Department of Conservation and Land Management.*

2. Within the Recreation Zone, CALM will:

- *exclude private vehicle access adjacent to the eastern side of the Murray River, from Yarragil southwards.*
- *direct primary access to centres of high recreation use in the Facility Area.*

- *link centres of high recreation use with a secondary access system parallel with the River.*
- *restrict four wheel drive and other off road vehicles to roads only.* […]
- *limit all off road access to pedestrians only.*
- *ensure any logging and regeneration conforms to CALM's policy No 3 on Dieback and Logging.*

"*3. Within the Conservation Zone, CALM will:*
- *minimise public vehicle access.*

[…]
- *rehabilitate all closed roads.*

[…]" (p. 91-92)

C9 Access
Prescriptions
"*10. The Department will strictly enforce regulations controlling vehicle access. The powers of the forest diseases legislation (where applicable) and Section 16 of the Control of Vehicles (off road areas) Act (1978) will be employed.*" (p. 101)

C10.6 Domestic Animals
"*The 2 objectives are:*

To ensure user activities do not compromise other values of the Reserve.
[…]" (p. 109)

Background
Equestrian Activities
"*Horseriding within the Reserve is only acceptable if it is confined to pre-determined tracks, paths and staging points, and the issues of spread of weeds and erosion (with associated risk of dieback spread) are addressed.*" (p. 109)

Prescriptions
"*If a demand develops for equestrian activities, these will be limited to public access roads, and a small number of clearly defined trails and staging points in the Recreation Facility Area. The impact of these activities will be monitored. If environmental or social problems develop, horses will be prohibited.*" (p. 109)

Bauxite Mining and Exploration
"*Exploration, under strict environmental safeguards, in the Recreation Zone will be necessary to delineate individual bauxite deposits.* […]

Any mining operations conducted within the Reserve will accord with the following guidelines. […] *Stringent environmental procedures must be undertaken to minimise dieback spread and protect water quality.*" (p. 117)

C13.2 Timber Utilization
"*The objective is to ensure any logging operations remove forest produce in a way which minimises damage to landscape, soil and water values and protects against impacts from dieback disease.*" (p. 119)

Background
"*Timber cutting in the Recreation Zone will involve the temporary unavailability of some areas for recreational use. This is due to the reduction in conservation and recreation values, the need to protect regeneration areas from wildfires and the increased risk of environmental degradation (ie. dieback spread, soil erosion and stream turbidity) following logging and regeneration.*" (p. 119)

Prescriptions
"*2.CALM will undertake a comprehensive inventory of resources and values within the Recreation Zone. This will include:*
[…]

- "*dieback photography and interpretation. Disease distribution and impact maps are required. In dieback free areas, plans are also required which predict possible introduction routes and impact should the disease be accidentally introduced.*" (p. 120)

"*7. CALM will ensure that any logging and regeneration plans for the Recreation Zone include the following goals:*
[…]

- *minimum spread of Phytophthora cinnamomi.*

[…]" (p. 121)

"*9. All operations will be planned to minimise the spread and impact of dieback disease, and follow the guidelines provided in the Dieback manual (1982) and the document 'Dieback Hygiene Manual' (Anon 1986).*" (p. 121)

"*11. Environmental standards will be defined for timber utlization based on:*
[…]

- *hygienic logging practices (Underwood and Murch 1981).*" (p. 121)

MANAGEMENT PLAN – 1990

Waroona Reservoir and Catchment Area Management Plan 1990-2000. 1990

Resource Management
8.4.5 Gravel Extraction
Objective
"*To minimise the effect of the extraction of gravel on conservation values, landscape values, water quality and rehabilitation potential.*" (p. 40)

Prescription
"*The extraction of gravel will not be allowed within the viewshed from the foreshore or the reservoir surface when the dam is full. Gravel extraction will only be considered from the banks between low water and full water levels in special circumstances under strict conditions approved by the Consultative Committee and by CALM. Strict attention must be paid to timing of the operation, rehabilitation and the prevention of spread of dieback disease.*" (p. 41)

Forest Resource Protection
8.5.2 Dieback
Objective
"*To minimise the damage caused by dieback disease.*" (p. 42)

Rationale
"*Although jarrah dieback disease occurs throughout the catchment there are still several areas that are apparently healthy, dieback free and hence protectable.*" (p. 42)

Prescription
- "*The apparently healthy, protectable areas in the catchment will be accurately mapped.*

- *Ensure that activities in the catchment do not spread dieback to these areas.*" (p. 42)

MANUAL OF LOGGING … 3RD ED. – 1990

Manual of Logging Specifications … 3rd Ed. 1990

Section 1 : Planning
Specification 1.1 : Logging Plans
1. Responsibilities
"*In all cases, planners must produce fully integrated plans and consult with Regional staff, District staff, Specialist Branch staff and where relevant Timber Industry Representatives during plan preparation.*" (p. 1)

2. Plan Types
2.3 Short Term Integrated Logging Plan
"*This is the tertiary level integrated logging plan which shows in detail proposed logging areas over a 2 year period.*

One plan per supply area is produced and issued during the first week of September in the Northern and CFR and the first week of January in the SFR.

Primary users of the plan are District staff, Regional staff, Timber Production Branch and Contractors.

These plans shall contain the following information as a minimum:

[…]
2) Predicted yield summary (gives a summary of the level of available resource by moist and dry soil categories and dieback).
3)Predicted yield details (gives level of available resource by moist and dry soil categories and dieback).
[…]

The plans shall show:

1) 1:250,000 overview plan showing the approximate location of all proposed logging areas for each year of the plan.
2) 1:50,000 block plan showing proposed logging boundaries and major access - also show CALM grid.
3) 1:25,000 plans showing:

Plan A - Operations plan
- *boundary of proposed logging.*
- *moist soil logging areas (dieback - Jarrah areas).*
- *moist soil - no soil movement logging areas (Jarrah areas).*
- *dry soil logging areas.*
- *CALM mapping grid.*
- *at least one major cross road.*" (p. 2)

- "*stream buffers if known; if not, streams to be highlighted and FOIC to determine stream order in field.*

[…]

- *contours.*
- *areas previously cut over.*
- *no entry areas.*

Plan B - Hygiene plan - Jarrah areas only

- *secure dieback free.*
- *high potential risk.*
- *uninterpretable.*
- *not effectively quarantined.*
- *low potential risk.*
- *suspect.*
- *dieback.*

Plan C - Predicted impact plan (formerly current impact) - Jarrah areas only

- *low.*
- *moderate.*
- *high.*
- *very high.*

Plan D - Landform/site vegetation - Jarrah areas only

- *landforms as per system 6 study*
- *vegetation site types as per field assessment by dieback interpreters..*

3.Plan Amendment

Logging plans can only be amended by the logging plan officer. Amendments must be approved in writing by the Regional Manager.

4. Monitoring and Records

"*Logging cannot commence until an approved logging plan has been issued and CLM 109 has been signed by the Regional Manager (ref Part 6 of this specification).*

District staff must maintain up-to-date field records of areas cut over and silviculturally treated. This information must be ready when inventory officers visit Districts within one month of the close of the logging season (refer to revamped HOCS issued from SOHQ on 14/8/90 and CLM 160 - Coupe silviculture report - Jarrah refer Attachment 1.1.2)." (p. 3)

8. Field Plans and Checklists

"*In most operations it is necessary for the Forest Officer in Charge of the operation to prepare a checklist of work required in the field before and during logging, and to prepare a sketch diagram of the coupe (commonly referred to as a 'blown-up HOCS sheet'). The sketch diagram is drawn sufficiently large to show the following information:*

** individually numbered sub-coupes and/or faller's blocks.*
** all access roads.*
** all watercourses.*
** all areas reserved from cutting.*" (p. 4)
"** dieback hygiene boundaries.*
** ridgelines.*
** location of landings.*

** major snig tracks.*
** any other information considered necessary.*

These sketch diagrams or plans are used to record the progress of cutting and extraction, and silvicultural treatment. […]" (p. 5)

Specification 1.2 : Seven Way Tests
"*1. The document 'Operational Instructions for Dieback and Logging' (formerly Policy Statement No. 3, see Attachment 5.1.1) requires that, before the commencement of any operation in jarrah forest that has the potential to introduce or spread Phytophthora species, the risk is assessed by means of a 'Seven Way Test'. If the operational arrangements fail the Test then the operation cannot be started.*

2. Guidelines for the preparation of Seven Way Tests are contained in 'The Seven Test and Guidelines to its Use' (1990). The Seven Way Test evaluates the following seven factors of a proposed operation.

- *proposed activity*
- *vegetation/landform type*
- *land use*
- *risk of introduction, spread, intensification*
- *hazard*
- *consequence of infection*
- *hygiene required.*

3. Seven Way Tests must be prepared for any proposed roadworks or logging operation.

Seven Way Tests must be prepared by Districts in conjunction with the preparation of data for the first two years of the five year (or four year) logging plan.
[…]
5. A Seven Way Test is prepared using form CLM781 and must include accompanying plans at scale 1:50,000 or larger. Attachment 1.2.1 is an example of a completed Seven Way Test on form CLM781 (excluding the maps that would accompany this test).

6. The levels of authority required to approve Seven Way Tests on different areas of forest are detailed in Administrative Instruction No. 46 (24/9/90). (See Attachment 1.2.2)

7. Attachment 1.2.3 is a guide to assist in assessing the level of consequences in a Seven Way Test." (p. 14)

Attachment 1.2.2 : Departmental Procedures for the Approval of 7-Way Tests
"*The table below sets out the Approving Officer for the 7-Way Tests applicable to the various tenures of land managed by the Department of Conservation and Land Management.*

A Policy decision may still be required for certain 7 way tests for operations without precedent or having unusual circumstances. Examples would be where other agencies are concerned, where several districts or regions are involved such as SEC line maintenance projects, large scale mineral exploration proposals, or projects considered to pose severe hygiene risks.

Such proposals will still be referred by the Regional Manager to Environmental Protection Branch. Approval will either be given by the Manager, Environmental Protection Branch or, where appropriate, referred to the Corporate Executive.

District Managers should encourage staff to consider the 7-WAY TEST as a check list for all forest operations involving a hygiene risk. This does not mean that a written 7-WAY TEST is necessary in every case where established hygiene guidelines and prescriptions are available for routine operations.[…].

"*Regional Leaders (Environmental Protection) and Environmental Protection Branch staff will still be available to provide guidance, training and as a point of referral in the first instance.*

This decision to delegate authority must not be taken to imply any relaxation of hygiene standards for operations on CALM land.

(Administrative Instruction No. 46 24 Sept. 1990).

Area Involved	***Approving Officer***	***Remarks***
1. State Forest Outside	*District Manager*	*Separate file to be kept at District officer for perusal by R/L Environment Protection and/or Environment Protection Branch Staff.*
2. State Forest within Disease Risk Area.	*Regional Manager (Recommendation by R/L Environmental Protection)*	*Separate file to be kept at Regional office for perusal by Environmental Protection staff or Policy Review Group*
3. Parks and Reserves or any area where timber production is not a priority land use:		
3.1 Existing programs	*Regional Manager*	*Kept on same file as 2 above.*
3.2 New programs	*District Manager*" (p. 21)	

Attachment 1.2.3 : Seven Way Tests : Guidelines for Assessment of Level of Consequences
"*Three factors need to be taken into account when making an assessment of levels consequence for a Seven Way Test. They are:*

1. *Risk of introduction/spread.*
2. *Hazard*
3. *Land use.*

They can be expressed as a factorial equation,
ie: level of consequences = f (risk) (hazard) (land use)
(Acceptable/Unacceptable)

Assessment of Factors
1. <u>Risk</u>: rate as - very low, low, high, very high.

Very Low:	*dry soil, 230mm maps, hygiene*
Low:	*moist soil, 230mm maps, hygiene*
High:	*moist soil, no 230mm maps, hygiene*
Very High:	*moist soil, no 230mm maps, no hygiene.*

2. <u>Hazard</u>: rate as low, moderate, or high, on vegetation types or landforms. Refer to 7-Way Test Guidelines for categories.

Low:	*few species susceptible, some individuals killed*
Moderate:	*most species susceptible, some individuals killed*
High:	*most species susceptible, most individuals killed.*
	(see Seven Way Test Guidelines - Impact)

3. Landuse: rated as low, moderate, high.

Low: *water production*
Moderate: *timber production, recreation*
High: *catchment protection*

Secondary landuses must also be considered.

Examples of Acceptable Factorial Equations are:

Case 1: dry soil, all vegetation types, any land use.
L of C. = (very low) (low-high) (low-high)

Case 2: moist soil, lower impacting vegetation, any land use. L of C. = (low) (low-moderate) (low-high)

NOTE: for moist soil operations in forest not infected with dieback, good maps and maximum hygiene are required." (p. 22)

"*Summary*
Whenever a Seven Way Test is drawn up it is recommended that this method of assessment is attempted. A rough guideline is:

i) *when risks are rated as very low or low, levels of consequence are only acceptable if hazard is rated as low or moderate, and*

ii) *when risks are rated as moderate or high, levels of consequence are only acceptable if hazard is rated as low, eg. in Karri forest types.*

Specification 5.1 will help to determine acceptable operation constraints." (p. 23)

Specification 1.3 Issue of Quarantine Entry Permits
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SIMILAR WORDING)

Section 1 : Planning
Specification 1.4 : Roading Plans

Responsibilities for Logging Roads

"Task	***Responsibility of***	***Actual Work Done By***	***Ideal Timing***
1. Planning	*Regional Manager*	*Regional Roading Officer, after discussion with relevant District, Timber Production Branch, Environmental Protection Branch and logging/haulage contractor*	*Logging Year minus 2*
1.1 Nomination of strategic road alignments, after considering other roading requirements (eg. recreation, fire control, disease)			
[…]			
1.3 Nomination of class of roads (ie, major of minor) and whether roads are	*Regional Manager liaising with District Manager*	*As in 1.1.1*	*Logging Year minus 2*

for (i) dry soil haulage only or (ii) all weather haulage, during consideration of overall logging plans		*and logging/haulage Contractor*	
2. Writing of standard roading specifications, ie, … drainage, hygiene, etc	*Regional Manager*	*Regional Roading Officer, after consultation with logging contractors and experienced CALM staff*"	*Logging Year minus 2*
[…]			
4. Nomination of gravel sources	*District Manager*	*Road Contractor with assistance from District staff*" (p. 25)	*Logging Year minus 1*

Section 2 : Road Construction and Maintenance
Specification 2.1 : Selection of Log Haul Routes

NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Specification 2.3 : Road Maintenance
Part A : Hardwood
" […]
3. Road maintenance, using earth moving machinery, must conform with an approved 7 Way Test. Only dieback-free gravel may be used, in dieback-free forest.
4. […] *By-passes must not be constructed to avoid boggy sections of road.*
[…]
7. All roads must be pegged for dieback before any maintenance operation begins.
8. The edge windrow of gravel resulting from maintenance grading operations must broken frequently to allow water entry to table drains, off-shoots, culverts intacted vegetation.
[…]" (p. 34)

Specification 2.4 : Gravel Pit : Selection Working and Rehabilitation
2. Site Selection
2.2 Dieback Status
"- *The dieback status of the pit must be ascertained before any work commences and a 7 Way Test completed.*
- **Dieback-free forest is a valuable resource.**

Gravel	*Gravel Destination*
Dieback-free gravel	*Dieback-free* *Uninterpretable* *Suspect* *NEQ*
Dieback gravel	*Dieback* *Immediately below dieback in high potential risk (where appropriate)*" (p. 36)

Section 3 : Silviculture
Specification 3.2 : Advanced Burning
NOTE: REFER TO 1989 EDITION (SIMILAR ENTRY)
***EXCEPT* FOR FLOW CHART (REFER TO ACTUAL DOCUMENT)**

4.1.2 Dieback Management:
"*- All earthmoving machinery must be clean of all dirt and root material to the satisfaction of the District Manager before entering or leaving the pit.*

- Access to the pit must be properly formed and free draining Drainage from access roads should not enter the pit.

- Dieback-free pits must be closed to unauthorised access whilst not in use. […]

- All vehicles entering the pit must be clean of soil material. […]" (p. 38)

Specification 4.2 : Falling (Including Tree Marking Techniques)
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.3 : Extraction
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING EXPANDED PARAGRAPH–**

"*3.* *When applicable the location of landings must be planned and marked at the time of road construction. This allows road drainage to be diverted and the avoidance of large table drains and batters which make loading away from landing sites difficult. It allows the landing to be located away from any disturbance caused by roading activity and so avoids cross contamination from road to landing of dieback.*" (p. 59)

10. Split Phase Logging:
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

10.1 Separation of Extraction and Loading in Time
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE ADDITION OF ADVANTAGES AND DISADVANTAGES –**

"Advantages:
- very little chance of introducing disease to the coupe
- can be used under moist soil conditions
[…]" (p. 60)

10.2 Use of Stationary Loading Machine
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE ADDITION OF ADVANTAGES AND DISADVANTAGES –**

"Advantages:
- no chance of cross contamination from road to landing or landing to coupe.
[…]" (p. 61)

10.3 Separation of Extraction and Loading by a Physical Barrier at the Rear of a Landing
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
EXCEPT FOR THE ADDITION OF ADVANTAGES AND DISADVANTAGES –

"*Advantages:*
- no chance of contaminating the coupe from the landing.
[…]
- can be used under moist soil conditions.
[…]" (p. 62)

10.4 Separation of Extraction and Loading by a Physical Barrier at the Front of a Landing
NOTE: REFER TO ENTRY UNDER 1989 EDITION (SIMILAR WORDING)

Numbers 11-14 (6-9 in 1987 Edition):
REFER T0 1987 EDITION (SIMILAR WORDING)
***EXCEPT* THE FOLLOWING SECTION HAS BEEN *EXPANDED* SINCE THE 1987 EDITION WITH THE ADDITION OF TWO PARAGRAPHS–**

"***11.*** *In anything other than dieback infected jarrah forest, extraction can take place only when the machinery used does not transport or move soil or vegetable matter. This means that the tyres of skidders must not pick up and move any soil or vegetable matter. If soil becomes wet following rain, and begins to stick to machinery tyres, the skidding operation must cease until the soil dries sufficiently. The decision as to when skidding ceases and recommences is the responsibility of the Forest Officer in Charge.*

In most cases the FOIC will delegate this responsibility to the forest representative or the Forest Officer in Charge of the particular operation. […]

The decision, whoever makes it, is a subjective one. However, to ensure reasonable objectivity, the following factors must be evaluated:

** amount of recent rainfall at the site.*
** soil types.*
** soil drying characteristics.*
** previous and current soil moisture profile.*
**ability or otherwise of logging machinery to spread soil. Note that grains of sand adhering to machinery tyres is not considered to be soil movement in this context.*" (p. 64)

Specification 4.4 : Loading and Hauling
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.5 : Logging Operation Inspections and Certifications
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection

Specification 5.1 : Protection from Jarrah Dieback Disease
NOTE: REFER TO ENTRY UNDER 1989 EDITION (SIMILAR WORDING)
EXCEPT* FOR THE FOLLOWING WHICH HAS *CHANGED* TO LESS DEFINITE WORDING - *"may"

3.Machinery/vehicle Cleandown

"*3.4 If water is used, then the fungicide sodium hypchlorite may be added to the washdown water at the rate of 1:2000.* […]" (p. 81)

Attachment 5 : OPERATIONAL INSTRUCTIONS FOR DIEBACK AND LOGGING
(formerly "Policy Statement No. 3 - Dieback and Logging"; updated by Environmental Protection Branch, October 1990)

Introduction

"*Although our dieback knowledge is incomplete (eg, the terminal impact of the disease on all forest types is not yet clear) these Instructions and 7-Way Tests are a appropriate.*

Operations on all Departmental lands must consider protection from dieback spread. However, the remainder of these instructions will focus on HARDWOOD LOGGING operations in State Forests." (p. 82)

Implementation

"*Guidelines for the implementation of CALM's dieback policies and 7-Way Tests LOGGING different areas of hardwood forest are as follows:*

1. Forests South of the Preston River (see attached map - area 3)
"*1.1 Logging equipment will be cleaned down before entering and leaving a Karri dominant coupe. Current arrangements with respect to soil damage will continue, as prescribed in the Departmental Code of Logging Practice and Manual of Logging Specifications.*

1.2 Jarrah types will be logged using the most up-to-date hygiene prescriptions. On sites where disease hazard is rated as low to moderate skidding under moist soil conditions with soil movement will be permitted. With respect to soil damage the criteria prescribed in the Manual Logging Specifications must be met.

On jarrah sites, dry soil logging only is permitted where :

i) the disease hazard is high
ii) the forest is uninterpretable
iii) the consequences on the designated land uses are high

On karri sites upslope of areas of high disease hazard dry soil logging only is permitted.

These sites will be automatically identified in the evaluation of the 7-Way Test, and appropriate conditions laid down before the 7-Way Test approved." (p. 82)

Comment
"*This decision is based on the fact that few areas in the Southern fores show signs of high impact, though some deaths in the understorey and jarrah trees have occurred on some sites.*" (p. 82)

"*2) Forests in the Sunklands - (see map - area 2)*
Jarrah types will be logged using the most up-to-date hygiene prescriptions. <u>On the low to moderate impact sites</u> skidding under moist soil conditions with soil movement will be permitted. Arrangements with respect to soil damage will continue as prescribed in the Departmental Code of Logging Practice and Manual of Logging Specifications.

Comment
This decision recognizes that many areas of the Sunklands forest are dieback-free and that some are of high quality. Dieback hygiene, including dieback-free and hazard mapping is required. Logging with no soil movement is preferred." (p. 83)

3)Forests North of the Preston River (see map - area 1)
"*3.1 Logging machinery will be cleaned down before entering and leaving a wandoo dominant coupe. Current arrangements with respect to other environmental factors are prescribed in the Departmental Code of Logging Practice and Manual of Logging Specifications.*

3.2 Jarrah types will be logged using the most up-to-date hygiene prescriptions. While the information on dieback hazard is imprecise, logging under dry soil conditions will be maximised.
[…]
Logging of dieback areas in moist soil conditions <u>with soil movement</u> is approved.

In dieback free areas, logging of low and moderate impact types (including most S types) in moist soil conditions, <u>without soil movement</u> is approved, provided that:

i) the area is interpretable;
ii) the area is accessible without placing high hazard sites at risk;
iii) the area is not upslope of high hazard sites.

Moist soil logging will be directed to areas where dieback-free and hygiene maps are available, and where landform or site vegetation mapping has been completed. This applies both within and outside the Disease Risk Area.

Current arrangements with respect to other environmental factors are prescribed in the Departmental Code of Logging Practice and Manual of Logging Specifications.

Comment : These decisions recognize the sensitivity and importance of these forests, especially those on catchments in the zone of high salinity. Sensitive areas will be identified by the 7-Way Test and appropriate conditions laid down before the 7-Way Test is approved." (p. 83)

Attachment 5.1.2 : Dieback Demarcation Procedures (updated by Environmental Protection Branch, October 1990)

2. Timing

"*All forest classified as Dieback, or Suspect should be demarcated as close to the time of logging as possible. If it is imperative that forest be burnt prior to logging, demarcation must be completed before burning.*

When an operation has not taken place within six months of demarcation, it will be necessary to recheck (and demarcate again) all areas of forest downslope from dieback or suspect, particularly on moderate to steep slopes (greater that 50). […]

3. Demarcation

"*Field demarcation of dieback or suspect is best achieved by blazing and painting non merchantable trees that occur at or near the boundary. All demarcation must be easily seen, even where dense scrub occurs.* […]

4. Buffer Zones

The system of mapping disease occurrence is based on visible symptoms that take varying periods of time, after infection, to manifest. As the most recent indicator plant deaths occur at or near the edge of disease infections, it is logical to conclude that P. cinnomomi may be in the soil, or root systems of both susceptible and resistant plants outside the visibly affected area, but that the susceptible plants may not have died. That is to say there may be some risk of transporting infected soil and root material from within a zone outside of but in close proximity to the infection. It is necessary therefore to have a zone which buffers forest operations from disease infections.

[…]. *Two variables must be considered in varying buffer width - slope and disease impact. Where disease impact is low, it is often difficult to detect and interpret symptoms of the disease and the risk of incipient disease is greatest in this situation. The following table sets out the downslope buffer width under different slopes and impact situations.*" (p. 85)

"*Downslope Buffer Width (m)*

SLOPES (Degrees)			
16-20	*50M*	*50M*	*40M*
11-15	*50M*	*40M*	*30M*
6-10	*40M*	*20M*	*20M*
0-5	*30M*	*20M*	*20M*
	LOW	*MOD*	*HIGH*

Impact (Current)" (p. 86)

Risk Categories

"*When there is more than one risk category within an operational area, it is often necessary to separate them in order to achieve the hygiene requirements identified in the 7-Way Test.*

It is necessary to firstly determine if the different risk categories need to be separated and then the most efficient method of demarcation.

The attached Table shows when adjoining risk categories require separation. For example, a moist soil coupe contains the following risk categories: Dieback, NEQ and Low Potential Risk, with the Dieback adjoining the NEQ and LPR, and the LPR adjoining the NEQ category. From the table Dieback (row 2) must be separated from both LPR and NEQ (columns 4 and 7 respectively). Similarly NEQ (row 7) and LPR (column 4) must be separated under moist soil conditions.

[…] *The level of involvement will depend on the complexity of the area and the expertise of district staff. The most, efficient method of demarcation is to use coupe or sub coupe boundaries. In the example above fallers block boundaries can be used rather than an additional blaze or tape line.*" (p. 86)

Hazard Categories
"*Coupe or sub coupe boundaries are the most efficient method of demarcation.*

These guidelines give the minimum level of demarcation which is required. In many cases however, these lines can be integrated with other management lines such as faller's block, or subcoupe boundaries.

REFER TO ORIGINAL DOCUMENT FOR TABLE – DECISION GUIDE FOR DEMARCATION OF BOUNDARIES BETWEEN RISK CATEGORIES

Section 5 : Environmental Protection
Specification 5.2 : Protection of Soil (Including Rehabilitation Measures)

3. Rehabilitation of Landings
NOTE: REFER TO ENTRY UNDER 1987 (SIMILAR WORDING)

CODE OF LOGGING … - 1990

Code of Logging Practice. 1990

Section 2 : General
NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

Section 4 : Extraction
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 5 : Roading
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 6 : Loading and Hauling
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 7 : Environmental Protection
Jarrah Dieback

NOTE: REFER TO ENTRY UNDER 1988 EDITION (SIMILAR WORDING)

STRATEGIC PLAN – 1989-1993

Strategic Plan For the Period 1989-1993. 1988

General Principles/Philosophy
"*The Department is committed to the principle that it is managing public land and natural resources, and conserving indigenous wildlife on behalf of the public of Western Australia. Consequently, particular importance is placed on informing the public of the Department's activities and wherever possible involving the public.*

The regional system of management as adopted by the Department ensures that its officers develop a detailed knowledge of the area of their operations, are available to interact with local communities and resolve problems associated with local conservation and land management operations. […]" (p. 10)

5. Mission
"*Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits. The natural environment is an essential component of the quality of life for West Australians. The statement of mission for the Department of Conservation and Land Management is therefore:-*

> *TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.*" (p. 11)

6. Primary Objectives
"*Five primary objectives have been established:-*

- *MANAGEMENT*
  To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

[…]

- *PRODUCTION*
  To provide and regulate the supply of those renewable resources that Government decides should be used, on a sustained yield basis for the satisfaction of long term social and economic needs, and in a manner that minimises impact on other values.

- *RECREATION*
  To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

- *KNOWLEDGE*
  To seek a better understanding of the natural environment and to promote awareness and appreciation of its values." (p. 12)

7. Broad and Sub Strategies
"*To achieve the Primary Objectives the Department will:-*

"***7.2 Establish and maintenance a system of secure reserves which protect viable representative samples of all the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas suitable for recreation and the production of renewable natural resources.***

This will involve:

[…]

7.2.4 Protecting ecosystems, landscape and the cultural heritage on lands and waters entrusted to the Department from damage by fire, disease, chemicals, grazing, feral animals and people.

7.2.5 Developing prescriptions for control of disturbance and for rehabilitation of damaged forests, parks and reserves." (p. 14)

10. The Organisation
10.3 Planning

"*Detailed planning of conservation and land management activities is a key function in the Department.*

Under the Conservation and Land Management Act, there is a responsibility to prepare management plans for all land and water vested in either the Lands and Forest Commission or the National Parks and Nature Conservation Authority. Such plans must be available to the public for comment for a period of at least two months. They apply for a maximum period of ten years.

Two levels of this planning are undertaken. These are regional and area management plans.

Regional management plans are to be prepared for each CALM administrative region. They will cover all categories of land and water entrusted to the Department. Each plan will described the management objectives to be achieved over the life of the plan and the strategies for implementation which are to be adopted.

Area management plans will apply to specific areas such as a national park, marine park, nature reserve, marine nature reserve. State forest, or other reserve. These are more detailed than regional management plans. Area management plans will be prepared only where there are requirements that cannot be adequately considered by a regional management plan. Each area management plan will also describe management objectives and strategies for implementation." (p. 31)

"*Other major plans prepared by the Department are issue plans that are either a follow up to an approved management plan, or consist of interim guidelines for necessary operations where there is not yet an approved management plan. Issue plans cover all relevant topics, such as site plans, fire plans, dieback plans, recreation plans, resource allocation plans and wildlife management programs. Issue plans are generally prepared by district or regional staff in conjunction with research and other specialist branches within the Department.*
[…]

In addition, the Department prepares operational guidelines, manuals and prescriptions. These draw on the results of research and experience and are used to implement the works and activity programmes derived from the planning process." (p. 32)

10.4 Regionalisation

"*The Department is extensively regionalised in a way which provides the benefits of small autonomous organisations in close proximity to their area of operations while providing access to services that are best provided by a larger integrated organisation. Regions are responsible for the management of all departmental lands and waters and for conservation of flora and fauna within their boundaries. According to the intensity of activity regions are subdivided into districts.*" (p. 32)

"*The general responsibilities allocated to regions are to:*

- "[…]
- *supervise and regulate industry (e.g. wildflower pickers, apiarists, timber and mining operations) on departmental and some other land;*
- *preserve or restore the natural environment on departmental land and water;*

- *provide information and advice on land management and conservation to people in the region; promote conservation and good land and marine area management;*" (p. 33)

10.5 Specialist and Support Services
"*Functions of the Branches within each of these Division are as follows:*
[…]

- *Environmental Protection Branch – prepares guidelines and procedures for protection from dieback, weeds and vermin, evaluates mining proposals, and advises on implementation of guidelines and rehabilitation of CALM land.*" (p. 35)

Forest Resources Division
- "*Timber Production Branch – controls and monitors the harvesting of timber and collection of royalties; advises on timber quality, wood technology and related matters.*

- *Silviculture Branch – develops silvicultural guidelines and practices, advises on their implementation, and manages nurseries and seed supplies.*

- *Inventory Branch – services management operations of the Department with resource information and plans for forest production, disease protection; develops relevant computer systems.*" (p. 35)

STRATEGIC PLAN (SOUTHERN REGION) – 1989

<u>Strategic Plan : Southern Forest Region. 1989</u>

3. Regional Strategic Goals
"*The goals listed below are broad statements largely drawn from goals set by the amalgamating agencies before CALM. These goals are not specific, quantifiable or measurable but provide the basis for formulating KEY RESULT OBJECTIVES which is the next stage of the Strategic Planning process.*" (p. 7)

3.2 Commercial Resources
"[…]
Logging

To minimize the impact of logging operations on environmental values. To maximize the Department's control of roading and logging operations through contractural arrangements incorporating Codes of logging practice. […]

Apiary

To sustain the present level of beekeeping in appropriate land use areas. Relocate sites to prevent disease spread or land use conflict, in consultation with apiarists.
[…]" (p. 8)
3.3 Protection - Fire
[…]
To minimize environmental disturbance such as erosion, disease spread or impairment of water quality by appropriate fire regimes." (p.9)

Key Result Objectives
Honey Production
"*<u>Objective</u>*

1. To sustain the current level of beekeeping in appropriate land use areas. Relocate sites to prevent disease spread or land use conflict." (p. 48)

Basic Raw Materials
"*Measure of Performance*
'Priority'
[…]
2. […]*To ensure all B.R.M. leases granted contain adequate provisions for rehabilitation, access and disease hygiene*." (p. 49)

Disease Hygiene
"*(non logging issues)*
1. *Ensure all activities on CALM land by CALM or related groups (and to the extent possible for non CALM groups) are planned and implemented to minimise the risk of spreading existing, or incurring new dieback infections.*

Measure of Performance
'Priority'
1. Every activity involving earthmoving in susceptible land form and vegetation types) is to be the subject of a 7 Way Test approved at the relevant level.
2. *Wherever possible activities on CALM land will be concentrated in dry soil conditions.*
3. *Dieback mapping service to be concentrated in logging areas with necessary coupes to be mapped at least 6 months in advance of logging.*" (p. 49)

Environmental Control
Disease Protection
"*Objectives*
1. Apply prescriptions for dieback hygiene according to current Codes of Logging Practise.
2.Ensure adequacy of disease logging location maps for all jarrah logging operations.
Measure of Performance
'Priority'
1. Conduct evaluation (7 Way Test) for all logging operations in jarrah forest. Establish quicker and more efficient method of baiting soil samples for dieback. Investigate possibility of Regional baiting facility." (p. 59)

SILVICULTURE SPECIFICATION - 1989

Silviculture Specification 4/89 : Regeneration in Forest Affected by Phytophthora cinnamomi.

1. Preamble
"*The silvicultural objectives and system described in 'Treemarking and Silvicultural in the Jarrah Forest' (1987) and silvicultural specification 7/89 are not appropriate in dieback - affected jarrah forest which requires regeneration. Specification 3/89 details treemarking requirements.*

Many long-affected dieback areas, formerly of a high impact, have naturally regenerated predominantly with marri. Poor regeneration appears most likely on sites where jarrah seed is not available, on sites which are difficult to establish (e.g. caprock), where scrub competition is vigorous and on seasonally waterlogged areas. Planting dieback sites has been successful where site potential is high, but where conditions have been more difficult success has been limited. These results suggest that intensive establishment practices are only appropriate where growth potential is high – i.e., on fertile, well drained sites.

Encouraging evidence of jarrah resistance to Phytophthora cinnamomi provides hope for maintaining or re-establishing jarrah in dieback – affected areas.

State forest is dedicated to multiple use and dieback – affected jarrah forest can best meet multiple values if it is restored to a stable, sustainable forest ecosystem. It is not expected that dieback – affected forest which requires artificial regeneration will have a high value for timber production in the medium term." (p. 1)

2. Objective
"*To regenerate, protect and sustain the multiple values of the jarrah/marri forest on dieback affected areas*." (p. 1)

3. Silvicultural Strategies
"*3.1 To protect existing natural regeneration and retained growing stock from damaging agencies and enhance its growth so that a forest cover is restored.*

3.2 To establish regeneration in understocked areas.

3.3 Maintain fauna habitat (refer to Specification 5/89)" (p. 1)

4. Suitable Growing Stock for Retention
"*Healthy trees are of high value on areas with a high impact from dieback. They continue to provide the forests' values, albeit at a much reduced level, and play a role in the regeneration process through seeding and site amelioration.* […]" (p. 1)

5. Stands Requiring Regeneration
"*Regeneration is required where there is an insufficient crop tree stocking to provide the desired forest values. Dieback - affected areas with a basal area of less than 5m ^{2}/ha or gaps of greater than 50 metres in diameter are to regenerated*." (p. 2)

6. Establishment of Regeneration
"*6.1 Mark to retain crop trees (Specification 3/89) and harvest produce. Remove tops and debris 5 metres from retained trees.*" (p. 2)

6.2 Burning
"*Separate the area from surrounding forest with an adequate firebreak. Allow logging tops to dry for at least one summer and burn in autumn to create ashbeds and stimulate seed fall.*" (p. 2)

6.3 Seeding
"*During July/August scarify the soil surface, seed and fertilise. Prepare and treat in 2-3 metre swathes, with swathes not being more than 5 metres apart. Do not treat within 5 metres of retained trees. Best results are obtained if seed is sown on freshly disturbed ground*." (p. 2)

6.4 Establishment Survey
"[…] *The minimum acceptable stocking is 750 s.p.ha.*" (p. 2)

6.5 Infill
"*Excluding harsh sites (eg shallow caprock), where the establishment survey reveals 0.5 ha of understocked regeneration, infill by planting with marri (and blackbutt) to bring the stocking up to 750 s.p.ha. Plant after opening rains in June and fertilise each seedling with 200g of DAP*." (p. 2)

8. Protection
"*Once advanced growth is established and dynamically growing it needs to be protected from all forms of disturbance, including fire. Prescribed burning can be conducted once regrowth reaches 6 metres in height.*

Harvesting operations are to be excluded from sapling stands." (p. 3)

SILVICULTURE SPECIFICATION - 1989

Silviculture Specification 7/89 : Treemarking and Silvicultural Treatment in Multiple Use Jarrah Forest

NOTE: THIS SPECIFICATION SUPERSEDES SILVICULTURE SPECIFICATION 1/87

Preamble
"*The CALM leaflet 'Treemarking and Silviculture in the Forest' (1987) provides the foundation for this specification and should be read concurrently.*
[…]

This specification is to be applied in areas of jarrah forest which are dieback free and where timber production is a major objective." (p. 1)

2. Objectives
2.1 Silvicultural Objectives
"[…]
c. In any group only one silvicultural objective will be pursued at any one time.
d. Fragile, unproductive and environmentally-sensitive areas. No trees will be harvested from these areas." (p. 1)

3.Assessment Prior To Cutting
"*A broad appraisal of each coupe is required to forearm the forester with the objectives to be applied. This can be achieved by aerial photographic interpretation, site-type maps and field reconnaissance.* […]" (p. 2)

3.2 Areas To Be Left As Uncut Strips
"*Where cutting is confined to a portion of a coupe due to landscape, water or other requirements and must be separated by uncut strips, the site-types in 3.1* … [….]" (p. 2)

3.5 Coupe Plan
"*Prepare a broad coupe plan showing:*
- *limitations on extent of cutting*
- *areas excluded from cutting*
- *preferred areas for uncut strips*
- *likely shelterwood areas*" (p. 2)

MANUAL - 1989

Manual of the Forest Priority System and Developmental Prescriptions for Dieback Control in Good Quality Forest during Bauxite Mining. 1989

Document 1, A Forest Priority System for Bauxite Mining
"*A high standard of dieback control will be required where mining occurs in vulnerable, Good Quality Forest (QGF). The methods used need to effectively control dieback while being appropriate for mining and efficient to implement.*" (p. 3)

"*A Forest Priority System has been proposed which requires the highest priority areas to be treated under the driest seasonal conditions.*[…]" (p. 3)

"*The priority system will be applied to all Alcoa's mechanised surface operations, from grade control drilling onwards, which occur in designated areas of vulnerable, Good Quality Forest ... Exploration drilling and survey will continue to be subject to the existing hygiene prescription, in line with other more extensive forest operations such as logging.*" (p. 3)

Aims

"*The aims of priority setting and dieback control during mining will be to:*

[…]

- *effectively control dieback while maintaining an efficient mining operations.*
- *prevent the development of dieback disease on dieback free areas which are mined.*
- *protect vulnerable adjacent forest from dieback introduction and intensification.*" (p. 3-5)

Definitions

"*This Priority System will be applied to substantial areas designated as Good Quality Forest by CALM in consultation with Alcoa during the development of Alcoa's Twenty Five Year Mining Plans, and shown on the Five Year Plans approved by the Minister for Resources Development.*

Good Quality Forest will be designated where the forest is substantially dieback free, in large contiguous areas, and where access can reasonably be controlled. The intent is for Good Quality Forest to be designated where most of a ridge is free of dieback, regardless of infections in the surrounding stream-zones or at isolated spots on the ridge (Figure 1). The Urbrae Ridge is a typical example.

Vulnerable forest is that which is not mapped as dieback and which contains jarrah or a significant proportion of other species which are susceptible to the disease. […]

Hygiene is the basic principle of maintaining equipment cleanliness, designed to prevent the transport of fungal inoculum from an infected area to an uninfected area. e.g. cleandown of vehicles, restricting operations to dry conditions where appropriate.

Containment refers to principles used to confine infection to the operating site by controlling the movement of fungal inoculum from a given area. e.g. use of a blasted slot or impervious drains to contain runoff, confining vehicles to a single dieback category." (p. 5)

The Priority System

"*Forest will be allocated on a case by case basis to one of three priorities as shown in Table 2 below:*

TABLE 2: Forest Priority Rating

	Pit Status	
Downslope Status	*Dieback-free/Uncertain*	*Dieback*
Vulnerable to Dieback	*Priority 1*	*Priority 2**
Not Vulnerable	*Priority 2*	*Priority 3*

** Generally small areas*

The status and significance of downslope forest will also be considered on a case by case basis. The areas and priorities will be proposed by Alcoa for approval by CALM." (p. 6)

Operating Conditions

"*Operations will be carried out according to the Developmental Prescriptions for Dieback Control in Good Quality Forest, as summarised in Table 3 below.*[…]" (p. 6)

"*TABLE 3*
OPERATING CONDITIONS

Operations	*Priority*	*Soil Moisture Description*	*Conditions*	*Hygiene*
Extensive (eg. exploration drilling, survey)	**Dieback-free/ Uncertain*	*Dry/Moist#*	*No soil movement*	*As per existing prescription.*
	** Dieback*	*Wet*	*No restrictions*	*As per existing prescription.*
Intermediate (eg. grade drilling)	*1*	*Dry to moist*	*Doesn't stick, dusty to moist.*	*Strict hygiene and cleandown before entry and between holes, no soil transfer.*
	2	*Damp, but not saturated*	*Soil may stick, damp but no water pressed out.*	*Strict hygiene and cleandown before entry and between holes, no soil transfer.*
	3	*Wet, but not boggy*	*Sticky, wet, water pressed*	*No restrictions on entry. Strict cleandown on exit from dieback.*
Intensive (eg. clearing, stripping, rehabilitation)	*1*	*Dry to moist*	*Doesn't stick, dusty to moist.*	*As per developmental prescription.*
	2	*Damp, but not saturated*	*Soil may stick, damp but no water pressed out.*	*As per developmental prescription.*
	3	*Wet, but not boggy*	*Sticky, wet, water pressed out.*	*No restriction on entry, cleandown before exit from dieback.*

** Priority system not used for exploration and survey.*

 # Dry/moist - operations will only occur under dry soil or moist soil / no soil movement conditions. As a guide this is usually under 5 mm of rainfall." (p. 7)

Extensive, Low-Intensity Operations (natural soil surface)
"[…] *The aim is to prevent the transfer of potentially infected soil, with a very high degree of certainty. All dieback-free areas are therefore treated under dry or moist, no soil movement, conditions. This is in line with all other extensive forest operations such as logging.*" p. 8)

Intermediate Intensity Operations (natural soil surface)
"[…]*The key to dieback control is no fungal transfer, regardless of what the soil moisture conditions are. Provided no soil is transferred, between drill holes for example, no dieback spread can occur. Hygiene is therefore achieved by operating under dry conditions, by very strict cleandown between holes, or both.* […]" (p. 8)

Intensive Operations (movement or exposure of topsoil)
"[…]*Dieback control is therefore achieved by confining operations to single dieback categories under soil moisture conditions which are not conducive to the proliferation of the fungus or to its spread in drainage water to adjacent dieback free areas.*" (p. 8)

Document 2, Developmental Prescriptions for Dieback Control in Good Quality Forest During Bauxite Mining Operations
"*These prescriptions have been developed for dieback control during bauxite mining operations in Good Quality Forest (GQF) ... areas largely free of dieback disease, both inside and outside Disease Risk Areas (DRA). The prescriptions will be applied according to the principles outlined under the Forest Priority System for Bauxite Mining Operations. The prescriptions will be subject to review annually.*

Dieback control in bauxite mining operations will be in accordance with CALM Policy Statement 3 (Revised) of 1988, 'Dieback and Logging' which requires evaluation of operations on CALM lands using the Seven-Way Test. Under Policy 3, access to resources in disease risk areas is allowed under permit subject to the most up to date dieback control conditions." (p. 17)

General Objectives
"*The general objectives of dieback control during bauxite mining are as follows:*

- *effectively control dieback while maintaining an efficient mining operation.*
- *prevent the development of dieback disease on dieback-free areas which are mined.*
- *protect vulnerable adjacent forest from dieback introduction and intensification.*" (p. 17)

Planning and Control Principles
"*Dieback control in mining is achieved for:*

(a) Surface operations, in contact with the soil, by hygiene and containment, and for

(b) Subsurface operations, at or below caprock level, by containment." (p. 18)

Procedure
"*Dieback is mapped in the field by CALM. Coupes will be used for dieback control up to and including the logging stage.*[…] *Priorities are assigned to each DMU depending on the dieback status of the pit and the forest downslope. A Dieback Management Plan is then produced.*

[…]*Each Dieback Management Plan must be approved under a Seven-Way Test.*

A major jarrah component will be returned to well drained, dieback-free sites. Other resistant species will predominate on dieback and high risk sites.

The aim will be to conduct operations on all approved areas under the conditions specified in the prescriptions." (p. 18)

Surface Operations
"*Surface operations in Good Quality Forest will be permitted according to a Priority System for mining operations ...* […]

Prescriptions will apply to each operation, depending on the dieback status of the site. Hygiene measures will apply as follows:

- *Equipment must be clean before entering or transferring between dieback-free areas.*
- *Equipment must be clean before leaving dieback areas.*
- *Uncertain areas will be treated separately under the same conditions as Dieback-free, with equipment also cleaned down before leaving unless entering a dieback area.*" (p. 19)

Subsurface Operations
"[...] *Haul routes are to be good quality, crowned and drained roads, either low in the profile or within pits wherever possible.*" (p. 20)

"*All Alcoa and CALM staff involved in the conduct or supervision of mining operations will be trained in vehicle cleanliness inspection, cleandown procedures, classification of dieback hazard categories and dieback control principles.*' (p. 20)

Control and Monitoring
"*Active monitoring of dieback control operations will be undertaken by CALM and Alcoa.*" (p. 21)

Part I - Guidelines and Procedures
1. 0 Introduction
"[…]*The prescriptions will be applied according to the principles outlined under the Forest Priority System for Bauxite Mining Operations.*" (p. 24)

[…]*The designation of good quality forest generally refers to substantial areas of forest which are free of dieback disease or where the disease has had a low impact. These areas will be identified by CALM in consultation with Alcoa and shown on Twenty-five Year Mine Plans.*

These prescriptions comply with the <u>intent</u> of currently approved CALM polices for dieback control. They represent substantial modification to current <u>practice</u> in DRA because mining is quite different to other forest operations." (p. 24)

2.0 Interpretation
"*Dieback control in bauxite mining operations will be in accordance with the intent of CALM Policy Statement 3 (Revised) of 1988, 'Dieback and Logging'*". (p. 24)

"[…] *Prescriptions prepared for bauxite mining are to be interpreted consistent with the intent of the above Policy Statement 3.*" (p. 25)

3.0 General Objectives

"*The general objectives of dieback control during bauxite mining are to:*
[...]
- *prevent the development of dieback disease on dieback-free areas which are mined.*
- *protect vulnerable adjacent forest from dieback introduction and intensification.*" (p. 25)

5.0 Differences between Mining and Other Forest Operations
"*3. Mining is limited in extent at any one time and has the capacity for substantial earthworks to contain drainage and soil movement. Hence dieback containment is a feasible alternative to the strategies which rely on the prevention of soil movement to control dieback.*" (p. 30)

6.0 Planning and control principles
"*The overall principles guiding the assessment and control of dieback risks presented by mining are as follows:*

1. The distribution of dieback, its risk of spread and the hazard rating of pit and downslope areas is assessed.

2. The species for rehabilitation planting are selected on the basis of the dieback status and drainage conditions likely to prevail following rehabilitation. A major jarrah component will be returned to well drained sites with a low dieback risk. Other resistant species will predominate on dieback and high risk sites, but some jarrah will be included in case the disease does not develop." (p. 30)

"*3. The consequences of dieback spread on downslope and replanted vegetation are assessed to determine the control measures required.*

4. During rehabilitation, dieback soil will be relocated to minimise the area of surrounding native forest put at risk of the disease." (p. 31)

7.0 Prescription Guidelines and Procedures
7.1 Assessment
"*Alcoa will produce Dieback Management Plans annually for mining areas within Good Quality Forest shown on the Five Year Plan.* [...] *Each Dieback Management Plan will be assessed by Alcoa applying and CALM approving a Seven-Way Test.*[…]" (p. 31)

NOTE: REFER TO DOCUMENT FOR TABLE 1: CONTROL PROCEDURES APPLIED TO STAGES OF BAUXITE MINING OPERATIONS

"*The aim will be to conduct operations in all designated Good Quality Forest under the conditions specified in the prescriptions.*" (p. 33)

"*Assessment of these problem areas will be according to the principles of the Seven-Way Test. A decision on appropriate soil handling conditions will take into account the likely risks, hazard and consequences on the area downslope and on the species proposed for rehabilitation. Priorities will be set for these areas so that the most sensitive ones are treated under the best conditions for dieback control.*" (p. 33)

7.2 Mapping
"[…] *It is crucial to remember that mapping can only delineate areas where the vegetation shows symptoms of the disease.*[…]

Since mining operations require the movement and mixing of topsoil it is very important that the Operational categories are adhered to. Areas such as 'high potential risk' are handled conservatively.[…] *During operations they are treated as dieback, even though they show no disease symptoms, to ensure that secure*

dieback-free soil is not inadvertently contaminated by undetected infections. [...] *A buffer zone adjoining the dieback will be allocated to 'Dieback'.*

Dieback is mapped in the field by CALM. [...] *The DMU boundaries are to be approved by CALM.*" (p. 35)

7.3.1 The Priority System
"*Forest will be allocated on a case by case basis to one of three priorities as shown in Table 3 below:*

TABLE 3: FOREST PRIORITY RATING

		Pit Status	
Downslope Conditions	*Downslope Status*	*Dieback-free or Uncertain*	*Dieback*
Dieback-free OR Uncertain AND Susceptible	*Vulnerable to Dieback*	*Priority 1*	*Priority 2**
Dieback OR Resistant	*Not Vulnerable*	*Priority 2*	*Priority 3*

** Generally small areas*" (p. 37)

7.4 Operating Conditions
"*Operations will be carried out according to the Developmental Prescriptions for Dieback Control in Good Quality Forest, as summarised in Table 4 below.*[…]" (p. 39)

7.4.1 Surface Operations
Extensive Low Intensity Operations (natural soil surface)
"[…]*The aim is to prevent the transfer of potentially infected soil, with a very high degree of certainity. All non-dieback areas are therefore treated under dry or moist, no soil movement conditions.*[…]" (p. 40)

Intermediate Intensity Operations (natural soil surface)
"[…]*Hygiene is therefore achieved by operating under dry conditions, by very strict cleandown between holds, or both.*[…]" (p. 40)

"*TABLE 4: OPERATING PROCEDURES*

Operations	*Priority*	*Soil Moisture*	*Conditions*	*Hygiene*
Extensive (eg exploration drilling and survey)	**Dieback-free/ Uncertain*	*Dry to Moist#*	*No soil movement*	*As per existing prescription*
	**Dieback*	*Wet*	*No restrictions*	*As per existing prescription*
Intermediate (eg grade	*1*	*Dry to Moist*	*Doesn't stick dusty to moist*	*Strict hygiene and cleandown before*

control				*entry and between holes, no soil transfer.*
	2	*Damp, but not saturated*	*Soil may stick, damp but no water pressed out*	*Strict hygiene and cleandown before entry entry and between holes, no soil transfer.*
	3	*Wet, but not boggy*	*Sticky, wet, water pressed out.*	*No restrictions on entry. Strict cleandown on exit from Priority 3.*
	1	*Dry to Moist*	*Doesn't stick dusty to moist.*	*As per developmtl prescription.*
Intensive (eg clearing, stripping, rehabilitation	*2*	*Damp, but not saturated*	*Soil may stick, damp but no water pressed out.*	*As per developmtl prescription*
	3	*Wet, but not boggy*	*Sticky, wet, water pressed out.*	*No restriction on entry, clean-down before exit from dieback.*

** Priority system not used for exploration.*
 # Dry to Moist - operations will only occur under dry soil or moist soil, no soil movement conditions. As a guide this is usually under 5mm of rainfall." (p. 41)

Intensive Operations (movement or exposure of topsoil)
"[…]*Dieback control is therefore achieved by confining operations to single dieback categories under soil moisture conditions which are not conducive to the proliferation of the fungus or its spread in drainage water to adjacent dieback-free areas.*[…]" (p. 42)

"*Uncertain areas will be treated as separate units under the same conditions as Dieback-free with additional cleandown before leaving. Equipment will be cleaned down before entering or moving from an uncertain area, unless moving into a dieback area. Uncertain areas are to be rechecked for any change in disease status if more than 12 months passes between operations.*" (p. 43)

8.0 Control and Monitoring
"*Active monitoring of dieback control operations will be undertaken by CALM and Alcoa.*" (p. 44)

Part 2 Developmental Prescriptions
2.0 Planning for Drilling Operations
2.1 Five Year Drilling Plan
"*Each July Alcoa will submit a Five Year Drilling Plan (1:25, 000 scale) to the local office of the Department of Conservation and Land Management.*

[…]*Without such a plan there may be:*

- Destruction of dieback symptoms and the creation of false symptoms resulting in greater difficulty in disease interpretation.

- Exposure of the soil (by burning) causing hygiene difficulties under moist soil conditions.

- Disturbance of pegs which have been accurately surveyed.

In addition, this plan permits commencement of CALM hygiene planning well in advance of the operations." (p. 50-51)

2.2 Annual Drilling Plans
"*3. CALM officers will examine the dieback status and other forest values of the proposed drilling areas. From these considerations a hygiene strategy will be developed (Guidelines in section 4.2).*

All exploration drilling in Good Quality Forest including DRA will be subject to a Seven-way test, for approval by CALM.

Operations in Dieback-free forest will be scheduled for dry or moist soil, no soil movement conditions." (p. 51)

3.0 Schedule of Operations
3.3 Dieback Hygiene Requirements
"*Prior to drilling two copies of the layout will be sent to the District CALM office. Officers there will mark the dieback management lines, access routes and points for vehicle cleandown on the layout and forward one copy to the appropriate Alcoa personnel.*" (p. 53)

4.0 Hygiene Operations
4.1 Objective
"*To prevent the spread of dieback disease into dieback-free forest.*" (p. 53)

4.2 Dieback Categories
"*Areas of forest in which field operations are to take place will be categorised as Dieback, Dieback-Free or Uncertain based on the hygiene map.*" (p. 53)

4.2.1 Access
"*Access to each category will be designated and checked by a CALM officer.*

Field Operations will be confined separately to each category. Transfer from one category to another requires specific hygiene conditions." (p. 53)

4.2.2 Standards
"*Vehicle and plant cleanliness is the basis for controlling dieback spread in the field operation.*[…]" (p. 53)

4.3 Operating Conditions for Exploration and Survey
4.3. 1 Exploration Operations
"*Permitted in Uncertain and Dieback-Free forest only under dry or moist soil, no soil movement conditions.*[…]" p. 54)

4.3.2 Field Hygiene Practice
Uncertain and Dieback-Free Forest
"*(i) Every vehicle is to be inspected prior to entry into the area to ensure that no soil has been picked up in transit. A cleandown is required at the dieback boundary or nominated cleandown point, if the vehicle is not clean.*[…]" (p. 54)

"*(ii) Each vehicle traversing an area must be continually checked to ensure that soil is not being picked up. If soil conditions deteriorate the operation must transfer to Dieback forest via an approved access road.*

(iii)After drilling each hole and prior to departure for the next hole, the drill rig must be inspected by the operator for cleanliness. If the rig is not clean of soil, cleandown is required. […]

(iv) Cleandown must take place at least once per day as a safety measure. […]

(v) Prior to leaving Uncertain or Dieback forest, vehicles are to be free of soil." (p. 55)

Dieback Forest
"[…]
**Do not cross moist low-flying flats or creeks.*

**Prior to leaving Dieback forest, vehicles are to be thoroughly clean and free of soil.*" (p. 55)

4.4 Training
"*Vehicle operators must be trained in hygiene principles, techniques of inspection for vehicle cleanliness and vehicle cleandown. All training will be subject to an annual update and current prescription review.*

Prior to departure from the base depot all vehicles must be in a clean condition." (p. 56)

4. Grade Control Survey and Drilling Prescription
2.1 Five Year Drilling Plan
"*Each July Alcoa will submit a Five Year Drilling Plan (1: 25, 000 scale) to the local office of the Department of Conservation and Land Management.*" (p. 58)

"*In addition, this plan permits commencement of CALM hygiene planning well in advance of the operations.*" (p. 59)

2.2 Annual Drilling Plans
"*By the first week of July each year Alcoa will submit proposals for the next 12 months' drilling operations to the District CALM office.*[…]" (p. 59)

"*3.CALM officers will examine the dieback status and other forest values of the proposed drilling areas. Priorities will be allocated ... based on the dieback distribution. Soil moisture conditions ... will be specified based on the allocated Priorities.*" (p. 59)

3.0 Schedule of Operations
3.3 Drilling Hygiene Requirements
"*Prior to drilling two copies of the layout will be sent to the District CALM office. Officers there will mark the dieback management lines, access routes and points for vehicle cleandown. Forest Priorities will also be shown on this map and one copy forwarded to the appropriate personnel.*" (p. 60)

4. 0 Hygiene Operations
4.1 Objective
"*To prevent the spread of dieback disease into Dieback-Free forest.*" (p. 61)

4.2 Dieback Categories
"*Areas of forest in which field operations are to take place will be categorised as Dieback, Dieback-Free or Uncertain.*" (p. 61)

4.2.1 Access
"*Access to each category will be designated and checked by a CALM officer.*

Field Operations will be confined separately to each category. Transfer from one category to another requires specific hygiene conditions.' (p. 61)

4.2.2 Standards
"*Vehicle and plant cleanliness is the basis for controlling dieback spread in the field operation.* […]" (p. 62)

4.3 Operating Conditions for Grade Control and Survey
4.3.1 Grade Control Operations
"*Operations are permitted in Uncertain and Dieback-Free forest under soil moisture conditions appropriate to the Priority allocated to the site.*

(i) Conventional support vehicles ... are to remain outside the Dieback-Free boundary or on nominated hard surfaced roads when moist soil conditions exist.

(ii) Drill rigs must not pick up and transfer soil while operating in the drill area or travelling on access roads." (p. 62)

4.3.2 Field Hygiene Practice
Uncertain and Dieback-Free Forest
"*(i) Every vehicle is to be inspected prior to entry into the area to ensure that no soil has been picked up in transit. A cleandown is required at the dieback boundary or nominated cleandown point, if the vehicle is not clean.*" (p. 63)

"*(ii) Each vehicle traversing an area must be continually checked to ensure that soil is not being picked up. If soil conditions deteriorate the operation must transfer to Dieback forest via an approved access road.*

(iii) After drilling each hole and prior to departure for the next hole, the drill rig must be inspected by the operator for cleanliness. If the rig is not clean of soil, cleandown is required.

(iv) Cleandown must take place at least once per day as a safety measure.[…]" (p. 63)

"*(v) Prior to leaving Uncertain or Dieback forest vehicles are to be free of soil.*" (p. 64)

4.4 Training
"*Vehicle operators must be trained in hygiene principles, techniques of inspection for vehicle cleanliness and vehicle cleandown.*[…]

Prior to departure from the base depot all vehicles must be in a clean condition." (p. 64)

3. Access Prescription
"*This prescription specifies the agreed procedures for access to Good Quality Forest both within and outside designated Disease Risk Areas (DRA).*" (p. 66)

1.1 Scope
"*The prescription has been designed to control general access to State Forest, prior to, during and after mining operations. It refers specifically to normal forest access tracks. Haul Road access will be reviewed and agreed under the Five Year Mining Plan and the Dieback Management Plans.*" (p. 66)

1.2 Control of Access
"*The control of access will enable the mining operation to meet the dieback objectives, specifically during survey, exploration drilling, ore development work, haul road construction, blasting operations and forest environmental monitoring.*" (p. 66)

2.0 Objectives
"*The objectives of this prescription are to define procedures for the controlled access of vehicles to and from forests adjacent to bauxite mining operations and for haul road construction while effectively*:-" (p. 66)

"*2.1.1 Preventing the introduction of dieback fungus to the surrounding forest.*

2.1.2 Preventing the intensification of dieback disease in the surrounding forest;

2.1.3 Preventing the introduction of disease from the forest onto haul roads and other operational mining areas;

2.1.4 Allowing the continuation of efficient mining operations." (p. 67)

3.0 Access Sequence
3.1 Pre-Mining Access
"*3.1.5 A Five year access plan will be developed in line with the current mining operation. Dieback control requirements are identified and the Access Plan approved by the District CALM office.*" (p. 67)

"*3.1.6 Access tracks required will be identified on the Five Year Plan and upgraded where necessary to improve dieback control.*[…]

3.1.7 Each access track will be designated as either all-weather access or limited access ('no soil movement' conditions only).[…]" (p. 68)

"*3.1.11 Additional cleandown points will be identified for all forest users operating within the Clearing Access Plan area.*[…]

3.1.12 An access plan for minesite personnel will be drawn up, based on the Five and Ten Year Mine Plans.[…]" (p. 69)

3.2 Post Mining Access
"*3.2.1*[...] *Long term access will be selected with regard for the dieback status of the area and the need for protection of Good Quality Forest.*

3.2.2 Long term access will be incorporated into the local land use management plan prepared for the region by CALM." (p. 69)

4.0 Dieback Control Strategies
4.1 General
"*The basic strategy governing dieback control during forest access to and from the minesite will be forest hygiene. During haul road construction the strategies will be hygiene and containment.*" (p. 69)

4.2 Access Designation
"*4.2.1 Forest tracks will be designated as 'all-weather access', suitable for use by vehicles all year round, or as 'limited access' tracks, which are suitable for access under dry, no soil movement conditions only.*[…]" (p. 70)

4.3 Standards
"*4.3.1 Vehicle cleanliness will be the basis for controlling dieback spread along forest tracks.*" (p. 70)

4.4 Tracks Upgrading
"*4.4.3 Except in Dieback, earthmoving work will only occur when the soil is dry.*

4.4.4 All-weather roads will be constructed to shed water and dry quickly.
[…]
4.4.6 Road upgrading equipment must be clean before entering Dieback-free or Uncertain forest." (p. 71)

4.6 Haul Road Construction
"*4.6.1 Soil moisture conditions for construction of haul roads above Dieback-Free or Uncertain forest will be specified by the District CALM office based on the extent and dieback vulnerability of downslope forest.*
[…]
4.6.3 Haul roads will be compacted to control the movement of dieback fungus into or out of the road base.

4.6.4 Haul roads with adjacent Dieback-Free and Uncertain forest will have suitable containment structures to prevent the spread of dieback disease." (p. 72)

"*4.6.5 All roadside drains adjacent to Dieback-Free and low existing dieback impact forest will be compacted to control the spread of dieback fungus travelling through the drain to the native forest.*

4.6.6 ... Where dieback gravel must be used it will be appropriately contained by drainage." (p. 73)

4. Clearing and Burning Prescription
1.1.2 Clearing and Burning
"*This prescription specifies the agreed procedures for clearing and burning prior to bauxite mining operations.*[…]" (p. 75)

1.2 Preamble
"*The prescription is based on the Seven-Way Test with additional control strategies provided. The strategies applied are based on the distribution of dieback existing across the ridge to be mined.*

The area to be treated is broken up into Dieback Management Units (DMUs) for field operations." (p. 75)

"*Dieback Management Units (DMUs) are used to control mining operations.*[…]" (p. 76)

2.0 Objectives
"*2.1 The objectives of this prescription are to define procedures for efficient clearing and burning, while effectively:-*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest.

2.1.2 preventing the intensification of dieback disease in the surrounding forest.

2.1.3 preventing the spread and development of disease within the cleared area.

[…]" (p. 77)

Clearing and Burning Sequence
"*3.4 The two year clearing plan is assessed by CALM District office staff and the Mining Operations Group (MOG). A recommendation is made to the Executive Director from the regional office.* […]" (p. 78)

"*3.7 Districts/Inventory check area for dieback and demarcate dieback categories in the field. A dieback plan is given to Alcoa.*" (p. 78)

"*3.8 A detailed Dieback Management Plan, incorporating a Drainage Plan, is developed by Alcoa showing DMUs for each pit and approved by the District CALM office.*" (p. 79)

4.0 Dieback Control Stategies
"*4.1 General*

Any prescription for dieback control in mining operations will meet the requirement of the CALM Department's Policy Statement 3 (Revised). To ensure a proper level of control is maintained the Dieback Management Plan for each operation will be assessed to ensure it meets the intended requirements of the Seven-Way test.

4.1.1 The basic strategies governing dieback control during clearing and burning will be by containment and hygiene. Control of disease introduction to surrounding forest will be by:-

- dieback mapping and categorisation
- access designation and control
- drainage control
- appropriate equipment cleanliness" (p. 79)

"*Disease intensification will be controlled by:-*

draining roads and cleared areas to designated points using the network approved in the Dieback Management Plan.

Rapid discharge of water is desirable provided Water Authority objectives can be met.

4.1.2 Disease control between DMUs will be by hygiene and control of access and drainage." (p. 80)

4.2 Dieback and Priority Demarcation
"*4.2.1 CALM will assign all forest to various dieback categories.* […] *For operational purpose the forest will be designated as Dieback, Dieback-Free or Uncertain.*[…]

4.2.2 Operations will occur according to the Priority arrangements outlined in Part 1, Sections 7.3 and 7.4. Priority areas will be shown on maps, by the District CALM office and demarcated in the field by Alcoa." (p. 80)

4.3 Access Control
"*4.3.1 Access will be in accordance with the Access Plan prepared by Alcoa and approved by the District CALM office.*" (p. 80)

"*4.3.2 Dieback control on access tracks will be according to the standard requirements outlined in the Access Prescription.*

4.3.3 Field operations will be confined to a single disease category. Transfer from one to another requires specific hygiene measures. […]

4.3.4 Access will comply with the requirements of the Priority System." (p. 81)

4.4 Soil Conditions and Cleandown
"*4.4.1 All equipment must be clean on entry to Dieback-Free or Uncertain areas.*

4.4.2 All equipment must be clean on leaving Dieback or Uncertain areas <u>except</u> when travelling through Dieback to another Dieback DMU.

4.4.3 Soil moisture operating conditions will be defined according to the Priority System as set out in Table 4, Part 1, Section 7.4.

[…]

4.4.5 The appropriate Priority for each operation in Dieback-Free or Uncertain DMUs will be determined by CALM as outlined in Part1, Section 7.3." (p. 81)

"*4.4.6 Operations will be conducted according to the approved Priorities for the area, as shown on the Dieback Management Plan.*

4.4.7 Alcoa can only plan to clear Dieback-Free or Uncertain DMUs in soil moisture conditions which comply with the allocated priority. In addition, run-off onto downslope forest is to be comprehensively controlled.

District CALM office staff will decide whether operations in Dieback-Free or Uncertain forest are complying with the allocated Priority. Approval to proceed or continue will be based on meeting the intent and requirements of Policy Statement 3 (Revised) of 1988 and the conditions applicable to the allocated Priority (See Part 1, Section 7.4, Table 4)." (p. 82)

5.0 Planning

5.1 General Planning

"*5.1.1 An Access Plan will be prepared by Alcoa as part of the Dieback Management Plan for approval by CALM District Office.*

5.1.2 DMU designation will be ... as approved by the CALM District Office on the Two Year Clearing Schedule. The District Manager will approve any alterations caused by significant changes in dieback boundaries evident just before clearing. Subsequent changes must be approved by CALM District Office. Any major queries will be directed to CALM Regional Office for a decision." (p. 82)

"*5.1.3 Dieback management requirements will be evaluated for each DMU individually and shown on the Dieback Management Plan. A schedule of priorities for pits to be treated under appropriate conditions will be developed as part of the Dieback Management Plan, for approval by CALM District Office.*

5.1.5 Clearing will be planned so that each type of DMU is treated separately." (p. 83)

5.2 DMU Designation and Scheduling

"*For the purposes of this prescription DMU boundaries will be marked in the field, based on dieback lines and catchment boundaries, for operations prior to blasting.*

5.2.1 DMU designations proposed by Alcoa will be agreed with CALM District office and approved on the Two Year Clearing Schedule. The District Manager will approve any alterations caused by significant changes in dieback boundaries evident just prior to clearing or by the need to rationalise boundaries for operational reasons. Any major queries will be directed to Regional Office for a decision." (p. 83)

"*5.2.2 DMUs will be delineated according to the following criteria:-*
- single dieback category,
- catchment and micro-catchment divides, and
-preferred size two to fifteen hectares.

DMUs will be designated as Dieback, Dieback-Free or Uncertain and operations conducted separately in each." (p. 84)

"*5.2.3 All pre-mining operations will occur <u>within</u> DMU boundaries.*

5.2.4 Dieback management requirements will be evaluated for each DMU individually and shown on the Dieback Management Plan produced by Alcoa and approved by CALM District Office.

5.2.5 If any Dieback-free DMUs are scheduled for clearing under wet soil conditions they must be designated on the Two Year Clearing Schedule and approved." (p. 84)

"[...] *No wet soil operation will be approved without a specific Seven-Way test to assess impacts and consequence, on the topsoil to be used for rehabilitation as well as on the surrounding forest.*

5.2.6 DMU boundaries will be clearly delineated and adhered to. Mobile equipment must cleandown before crossing DMU boundaries during pre-ops." (p. 85)

6.0 Field Operations

6.1 General

"*6.1.1 All light vehicles, including CALM and Water Authority light vehicles must be cleaned-down before leaving or entering limited access roads and other designated areas. All light vehicles including CALM and Water Authority vehicles will comply with the designated access plan for dieback control.*" (p. 85)

"*6.1.4 Touchup clean-down points established will be at DMU boundaries in locations as designated on the approved Access Plan.*

6.1.5 All equipment operators must be trained in hygiene principles and the techniques of vehicle inspection and clean-down ..." (p. 86)

"*6.1.6 Equipment is to be cleaned in accordance with the following:-*

- *earth moving equipment is cleaned down thoroughly at the workshop before entry to the forest,*
- *touchup clean-down is to be performed at the DMU boundary following transport of equipment from the workshop,*
- *equipment will be thoroughly cleaned at a designated cleandown point before transfer from a job handling Dieback-infected or Uncertain soil to a job handling Dieback-free or Uncertain soil,*
- *equipment is to operate in a single DMU.*" (p. 86)

"*6.1.8 Drainage control to prevent runoff to the surrounding forest is to be established with any discharge directed to approved points.*" (p. 87)

6.2 Dieback-Free Areas

"*6.2.1 Soil moisture conditions required for clearing Dieback-Free areas are designated in the approved Dieback Management Plan.*

6.2.2 Prior to entry into Dieback-Free DMUs, every vehicle is to be inspected by the operator to ensure no soil has been picked up in-transit.[…]" (p. 87)

6.3 Dieback Areas

"*6.3.1 Prior to leaving Dieback areas, vehicles are to be free of soil. If they are not, they must be cleaned down.*

6.4 Uncertain Areas

"*6.4.1 Uncertain areas will be handled separately. Equipment must be clean on entry and cleaned down prior to leaving uncertain areas.*" (p. 87)

6.6 Forest Produce Removal

"*6.6.2 A similar level of hygiene will apply to timber removal operations as will be applied to clearing operations.*

6.6.3 CALM is responsible for ensuring that timber removal operator's equipment is cleaned down when required.

6.6.4 CALM is responsible for clear definition of dieback and coupe boundaries during the forest produce removal phase." (p. 88)

6.7 Clearing Methods

"*6.7.3* [...] *If material is to be moved from a Dieback or Uncertain DMU it must go to a Dieback area.*

6.7.5 All clearing machinery entering State Forest, must be clean and this will be monitored by Alcoa and CALM.

6.7.6 Any machine which is to clear Dieback-Free forest must be clean upon entry. [...]

"*6.7.7 Where an approved mining area contains more than one dieback category, the categories are to be cleared separately with appropriate cleandown between categories.*" (p. 89)

5. Topsoil and Overburden Handling Prescription

"*1.1.1 This prescription specifies the agreed procedures for the removal, or stripping, of topsoil and overburden prior to bauxite mining operations and their return afterwards ... The prescription applies specifically to operations in Good Quality Forest designated either inside or outside Disease Risk Areas (DRA).*

1.1.2 The prescription is based on satisfying the intent of the Seven Way Test with additional control strategies provided. The strategies applied are based on the distribution of dieback existing across the ridge to be mined.

1.1.3 The area to be treated is broken up into Dieback Management Units (DMUs) for field operations.

1.1.4 Areas are designated as Dieback, Dieback-free or Uncertain and the soil handled separately." (p. 93)

2.0 Objectives

"*2.1 The objectives of this prescription are to define procedures for the removal and return of topsoil and overburden efficiently, while effectively:-*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest,

2.1.2 preventing the intensification of dieback disease in the surrounding forest,

2.1.3 preventing the spread and development of disease within the stripped soil to the extent necessary to enable the production of potable water and merchantable timber, preferably jarrah, ..." (p. 95)

3.0 Soil Stripping Seasonal Priorities

"*3.1.2 Priorities are delineated conceptually on the Five Year Plan. The seasonal Priorities are planned according to the criteria in Part 1, Section 7.3 and shown on the Two Year Clearing Schedule. The Two Year Clearing Schedule is approved by the MOG group. Variations to the seasonal Priorities must be approved by CALM District office.*

3.1.3 A detailed Dieback Management Plan, incorporating a Drainage Plan, is developed by Alcoa for each pit and approved by the District CALM office.

[…]

3.1.5 Earthmoving equipment is cleaned down thoroughly before entry to a DMU and before transfer from a job handling Dieback-infected or Uncertain soil to a job handling Dieback-Free or Uncertain soil." (p. 96)

3.1.6 DMUs are stripped separately according to dieback category. [...] *The appropriate conditions for soil movement in accordance with the designated priorities will be determined by CALM District Office.*" (p. 96)

"*3.1.7 Topsoil to 5cm depth is removed and directly re-spread or stockpiled in a like area as shown on the Dieback Management Plan.*

3.1.8 Overburden is removed and stockpiled on-site in an area of the same dieback category." (p. 97)

4.0 Soil Return Sequence

"*4.1.2 Earthmoving equipment is cleaned down thoroughly before entry to a Dieback-Free or Uncertain DMU.* [...] *Regardless of the status of previously handled soil, all equipment is also thoroughly cleaned down at every service.*" (p. 97)

"*4.1.3 Soil is returned to DMUs separately according to the new dieback categories.* [...]

4.1.4 Overburden is returned from stockpiles to a DMU of the same dieback category.

4.1.5 Topsoil is returned either directly ... or from short-term stockpiles to a DMU of the same dieback category." (p. 98)

5.0 Dieback Control Strategies

5.1 General

"*5.1.1 The basic strategies governing dieback control during topsoil and overburden stripping will be by containment and hygiene. Control of disease introduction to surrounding forest will be by:-*

- dieback mapping and categorisation
- access designation and control
- drainage control
-appropriate equipment cleanliness

Disease intensification will be controlled by:-
- draining roads and stripped areas to designated points using the network established at the clearing stage.

5.1.2 Disease control within and between DMUs will be by hygiene, limiting access and by permitting direct soil transfers between DMUs only under strict soil moisture conditions consistent with the approved Priorities." (p. 98)

5.2 Access Control

"*5.2.1 Access will be in accordance with the Dieback Management Plan prepared by Aloca and approved by the District CALM office.*

5.2.2 Topsoil haulage will only be within the same DMU or on formed road to which minimal water is applied to avoid soil pick up.

5.2.3 Dieback control on access tracks will be according to the standard requirements outlined in the Access Prescription.

5.2.4 Field operations will be confined to a single disease category.

5.2.5 Access will comply with the requirements of the Priority System." (p. 99)

5.3 Soil Conditions and Cleandown

"*5.3.1 All equipment must be clean on entry to Dieback-Free or Uncertain areas.*

5.3.2 All equipment must be clean on leaving Dieback or Uncertain areas ...

5.3.3 Soil moisture conditions are defined according to the Priority System as detailed in Table 4, Part 1, Section 7.4." (p. 99)

"*5.3.5 CALM will approve the appropriate Priority for each operation in Dieback-Free or Uncertain DMUs as outlined in Part 1, Section 7.3.*

5.3.6 Operations will be conducted according to the approved Priorities for the area, as shown on the Dieback Management Plan.

5.3.7 Alcoa can only plan to strip Dieback-Free or Uncertain DMUs in soil moisture conditions which comply with the allocated priority. In addition, run-off onto downslope forest is to be comprehensively controlled. District CALM office will decide whether operations are complying with the allocated Priority in Dieback-Free or Uncertain forest. Approval to proceed or continue will be based on meeting the intent and requirements of Policy Statement 3 (Revised), 1988 and the conditions applicable to the allocated priority (see Part 1, Section 7.4, Table 4)." (p. 100)

6.0 Planning

6.1 Planning Sequence

"*6.1.1 An Access Plan will be prepared by Alcoa as part of the Dieback Management Plan for approval by CALM District office.*

6.1.2 DMUs will have been established prior to clearing and these will be maintained during topsoil and overburden handling. The CALM District Manager will approve any alterations necessary because of significant changes in dieback boundaries.

6.1.3 Dieback management requirements will be evaluated for each pit individually and shown on the Dieback Management Plan. [...]

6.1.5 Stripping and return will be planned so that each DMU is treated separately." (p. 101)

"*6.1.6 The Dieback Management Plan will show the approved locations for stockpiles an for inter-pit transfer of topsoil. This transfer will be closely monitored by Alcoa staff and CALM as required.*" (p. 102)

7.0 Field Operations for Dieback Control in Stripping

7.1 General

"*7.1.1 All light vehicles, including CALM and Water Authority light vehicles must be cleaned-down before leaving or entering limited access roads and other designated areas.*[…]" (p. 102)

"*7.1.5 Any topsoil and all overburden stockpile locations will be marked by Alcoa in accordance with the Dieback Management Plan. Criteria for stockpile site selection will be as follows:-*" (p. 103)

"- *site to have the same dieback category as the soil to be stockpiled,*
- *topsoil is to be stockpiled for the minimum possible time in the smallest practicable stockpiles,*
- *area used is to be kept to a minimum.*

7.1.6 Equipment to be cleaned in accordance with Section 3.1.5 above as well as the following:-
- *touchup clean-down to be performed at the DMU boundary following transport of equipment from the workshop,*
- *equipment is to operate in a single dieback category,*
- *minimal water is to be used on haul roads to avoid soil pick-up.*" (p. 103)

"*7.1.8 Drainage control sufficient to prevent runoff to the surrounding forest is to be established.*[…]" (p. 103)

7.3 Overburden and Gravel

"*Overburden is to be stockpiled on an area designated on the Dieback Management Plan within the same DMU. The minimum area is to be used. Dieback-free gravel is to be conserved and utilised on Dieback-Free sites as required.* […]" (p. 105)

8.0 Field Operations for Dieback Control During Soil Return

"*8.1.1 The general provisions listed under Section 7 above will also apply to soil return after mining.*
[…]
8.1.3 Designated access will be as per the Dieback Management Plan. Inter-pit transfer of topsoil must also comply with this plan.

8.1.4 Equipment is to be cleaned in accordance with 3.1.5 above as well as the following:-

- *equipment to be clean before entering DMU following transport of equipment from workshop,*
- *equipment to operate in a single DMU,*
- *minimal water to be used on haul roads to avoid soil pick-up on tyres.*" (p. 105)

8.2 Overburden

"*Overburden is to be returned from stockpiles to the same DMU.*" (p. 106)

8.3 Dieback-free Topsoil

"*Dieback-free topsoil to be returned to a designated dieback-free DMU, via designated access, as per the Dieback Management Plan. Timing and priority to be designated in the Dieback Management Plan. Minimal water is to be used on haul roads to avoid soil pick up.*" (p. 106)

8.4 Dieback and Uncertain Topsoil

"*Dieback and Uncertain topsoil is to be returned from stockpiles to appropriate new Dieback areas within the same pit.*" (p. 106)

6. Drilling and Blasting Prescription
Introduction
1.1 General
"[…]*After blasting, future drainage is confined naturally within the pit boundaries and directed downwards into the soil profile.*" (p. 108)

1.2 Access and DMU Boundaries

"*1.2.1 DMU boundaries are maintained and observed until such time as all drainage from a pit is either contained wholly within that pit or flows only into Dieback forest.*

[…]

1.2.3 Because there are still residual pockets of soil in the caprock during drilling and blasting there must be strict hygiene between the pit and surrounding forest and between the pit and any roads or tracks. Equipment is to be cleaned down before leaving Dieback or Uncertain areas. This applies particularly to service vehicles." (p. 109)

2.0 Objectives

"*2.1 The objectives of this prescription are to define procedures for efficient drilling and blasting while effectively:-*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest,
2.1.2 preventing the intensification of dieback disease in the surrounding forest,
2.1.3 preventing the spread of the disease between the pit and the haul road of other pits." (p. 109)

4.0 Dieback Control Strategies
4.1 General

"*4.1.1 The basic strategies governing dieback control during drilling and blasting will be by containment and hygiene. Control of disease introduction to the surrounding forest will be:-*

- *dieback mapping and categorisation*
- *access designation and control*
- *drainage control (to be wholly within pit or into Dieback)*
- *appropriate equipment cleanliness*

Disease intensification will be controlled by draining roads and stripped areas to designated points.

4.1.2 DMU boundaries established at clearing will be maintained until such time as all drainage from a pit is either contained wholly within a pit or flows only into Dieback forest at approved points.

Where a pit is upslope from Dieback-Free or Uncertain forest then this conditions is not satisfied until the bottom portion of the pit is blasted

4.1.3 When the drainage condition in 4.1.2 is satisfied a pit comprising <u>several DMUs can become one DMU</u>. For hygiene between the pit and all other areas the classification of this new DMU is dieback unless it is comprised of only Dieback-Free DMUs, in which case it is a Dieback-Free DMU." (p. 111)

4.2 Access Control

"*4.2.1 Access to and from the pit will be on haul roads or access tracks as designated in the Dieback Management Plan and prescribed in the Access Prescription.*

4.2.2 Until a slot is blasted downslope all vehicles or equipment entering a Dieback-Free or Uncertain DMU during drilling and blasting must be clean.

4.2.3 All vehicles leaving Dieback or Uncertain DMUs during drilling and blasting must be clean unless entering a Dieback site.

4.2.4 All drilling equipment leaving a DMU during drilling and blasting must be clean on leaving Dieback or Uncertain or be transported to a cleandown point or a Dieback area in such a way that no soil falls onto the road." (p. 112)

4.3 Drainage Control

"*4.3.1 Prior to blasting of the lower edge of the pit ensure that drainage will be consistent with the approved drainage plan.*

4.3.2 Once the lower edge of the pit is blasted any drainage reaching that lower edge should infiltrate below the caprock." (p. 112)

7. Bauxite Ore Extraction Prescription

1.0 Introduction

"*1.1 This prescription specifies the agreed framework for the extraction of bauxite ore from Good Quality Forest within and outside designated Disease Risk Areas (DRA).*" (p. 114)

"*1.2 The Dieback Management Units (DMUs) applied to earlier operations are abolished during ore extraction and replaced by a system based on the containment of dieback and run-off within the pit and haul road system.*" (p. 114)

2.0 Objectives

"*2.1 The objectives of this prescription are to extract bauxite efficiently while:-*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest,
2.1.2 preventing the intensification of dieback disease in the surrounding forest, and
2.1.3 preventing the development or spread of dieback disease within the mined areas." (p. 114)

4.0 Dieback Control Strategies

4.1 General Controls

"*4.1.1 The main strategy for controlling dieback during ore extraction is planned drainage so that water is controlled within the haul road and pit system and discharged at designated points so as not to infect new areas of forest or intensify existing dieback.*

4.1.2 [...] *Hygiene is replaced by a strategy of minimising transfer of organic soil and amplifying conditions hostile to the fungus.*" (p. 116)

4.2 Specific Controls

"*The following specific methods are used:-*

4.2.1 Water will not be allowed to flow freely into surrounding forest but will be drained to designated discharge points or to places where it will infiltrate below the caprock layer." (p. 117)

"*4.2.2 Access between the haul road/pit system and the surrounding forest will be controlled according to the Access Prescription.*

4.2.3 Transfer and survival of dieback within the haul road/pit system is to be minimised by:-

- *preventing the introduction of diseased soil into the haul road/pit system*
- *maximising the use of dry conditions for the movement of vehicles and equipment*
- *limiting road watering so that surface water does not accumulate*
- *using water free of inoculum for dust suppression*
- *manipulating the site prior to rehabilitation to kill off or disfavour any fungal infections which may have been introduced, ...*" (p. 117)

5.0 Planning

5.1 Haul Roads and Access Planning

"*5.1.1 Haul routes from pits will be as agreed by the MOG group on the Two Year Clearing Schedule. Specific usage of access around the site is defined as part of the Dieback Management Plan prepared by Alcoa and approved by CALM District Office.* […]" (p. 117)

"*5.1.2 Haul roads are to be within pits wherever possible. Where haul roads are outside pits they are to be as low in the profile as possible.*" (p. 118)

5.2 Mine Planning

"*5.2.1 Dieback management requirements will be evaluated for each pit individually and shown on the Dieback Management Plan produced by Alcoa and approved by CALM District Office.*" (p. 118)

6.0 Field Operations for Ore Extraction

6.1 Supervision

"*CALM District Office will be responsible for periodic checking and general supervision.*" (p. 118)

6.2 Access

"*Access is to be confined to routes approved by CALM and the Water Authority via the Five Year Plans, the Dieback Management Plan and the Clearing Schedule.*" (p. 118)

6.3 Equipment Design and Cleandown

"*6.3.1 All vehicles must be cleaned periodically and in any case at least every service. Areas where additional cleandown may also be required will be designated in the Dieback Management Plan.*" (p. 119)

"*6.3.3 All light vehicles, including CALM light vehicles, must be cleaned down before leaving or entering limited access roads and other designated areas. All light vehicles including CALM vehicles will comply with the designated access plan for dieback control.*

6.4 Pit Drainage

"*6.4.2 In shallow bauxite areas, in-pit drainage will be according to the drainage plan approved by CALM District and the Water Authority.*

6.4.3 Water will be discharged to a sump or filter as low in the profile as possible, provided all Water Authority guidelines can be met.

6.4.4 Areas of infiltration will be located where conditions downslope are not conducive to transfer of infiltrated water to surface soils in forest which is vulnerable to dieback (ie dieback-free or where the existing dieback impact is low)." (p. 119)

6.5 Haul Road Watering and Drainage

"*6.5.1 All haul roads requiring watering will be crowned up and internally drained to designated points approved by CALM and the Water Authority.*

6.5.2 Pit drainage will be collected within the pit for infiltration in-situ or discharge to a point approved by the District CALM office and the Water Authority.

[...]

6.5.5 It is intended that disinfection or in-pit haul roads and pit floors will be achieved by allowing the soil to dry out to a designated moisture content for a specified period. [...]

6.5.6 All water used for construction and dust suppression will be free of inoculum to a standard to be agreed between CALM and Alcoa.

6.5.7 Road watering will be limited to a level such that surface water does not accumulate while controlling dust to a safe level." (p. 120)

6.6 Field Controls

"*6.6.1 A downslope barrier will be established where a pit is above Dieback-Free or low existing dieback impact forest. Pit drainage water will be diverted away from areas above these forest types or infiltrated below the caprock layer consistent with 6.4.4. Where this is not possible water will be discharged directly to a point designated by the Minesite Environmental Scientist in consultation with CALM District Office.*

6.6.2 All road building material brought into a pit will not contain any overburden or topsoil as designated by the Minesite Environmental Scientist.

7.0 Field Monitoring

7.1 Presence of the Fungus

"*7.1.1 During the first two years of operations using this prescription a monitoring programme will be undertaken to sample for dieback in:*

(i) sites within active pits where the fungus may survive, ie. haul road entries, unformed tracks used by haul trucks, infiltration sites, sump sites,
(ii) roadside drains,
(iii) sumps within pits and on roadsides," (p. 121)
"*(iv) dieback-free forest below mining.*
(v) water used for dust suppression,
(vi) water in shallow aquifers below mining,
(v) permitted forest tracks which enter haul roads,
(vi) surface soils (0-1.5m depth) of haul roads and minepits prior to landscaping and rehabilitation operations.

7.1.2 Sampling procedures will be designed by Alcoa and CALM. The methods selected will cover a range of techniques including soil, water and plant sampling, and in situ baiting techniques." (p. 122)

7.2 Shallow Aquifers

"*A network of shallow boreholes will be established in the forest downslope of mined areas. The presence of water and the duration of aquifer flow will be monitored.*" (p. 122)

8. Landscaping Prescription

2.0 Objectives

"*2.1 The objectives of this prescription are to provide for efficient landscaping while effectively:-*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest,
2.1.2 preventing the intensification of dieback disease in the surrounding forest, and
2.1.3 preventing the development or spread of the disease within the pit." (p. 125)

"*3.3 Earthworks are carried out according to the rehabilitation plan as follows:*

3.3.1 Vertical faces are re-shaped to achieve acceptable grades.
3.3.2 Sumps are constructed in clay floor material.
3.3.3 Contour banks and drains are constructed as required.
3.3.4 Heavy equipment leaves the pit via the haul road system.
3.3.5 Service and supervisory vehicles access the pit, via the haul road system, to service the heavy equipment.' (p. 125)

Dieback Control Strategies
4.1 Containment

"*4.1.1 All run-off is contained within the pit, approved drainage routes and the haul road drainage system.*
4.1.2 No topsoil is moved into or out of the pit at this stage." (p. 125)

4.2 Hygiene

"*4.2.1 Where dieback infected forest abuts the pit, equipment must not drive over the infected surface.*" (p. 125)
"*4.2.2 To avoid pushing infected material into the pit, earth is pushed up to the vertical faces from within the pit where the pit abuts infected forest.*" (p. 126)

4.4 Access

"*4.4.2 Any equipment leaving the pit via the forest is subject to the provisions of the Access Prescription. In addition equipment must be cleaned down before leaving the pit for Dieback-free or Uncertain forest.*

4.4.3 Equipment must be cleaned down before entering the pit from Dieback or Uncertain forest." (p. 126)

9. Ripping Prescription
1.0 Introduction
"*Ripping occurs on the new surface after soil has been returned to the pit. Dieback control strategies appropriate to surface operations are therefore required.* [...] *A high degree of runoff control will be provided by the pit drainage structures.*

Ripping is carried out to break up subsoil compaction to permit tree root penetration, assist infiltration, assist surface water detention and key the surface soils into the clay subsoil." (p. 128)

2.0 Objectives
"*2.1 The objectives of this prescription are to provide for efficient ripping while effectively;*
2.1.1 preventing the introduction of dieback fungus to the surrounding forest
2.1.2 preventing the intensification of dieback disease in the surrounding forest, and
2.1.3 preventing the development of spread of disease within the pit." (p. 128/129)

3.0 Dieback Control Strategies
"*3.2 Dozers are cleaned down before entry to Dieback-free DMUs and before exit from Dieback or Uncertain DMUs unless entering a Dieback area.*" (p. 129)

"*3.5 Dieback, Uncertain and Dieback-free DMUs are ripped separately [sic] with clean down as in 3.2 above.*
3.6 All DMUs are ripped under conditions consistent with the allocated Priorities. [...]
3.7 Drainage is contained within the pit." (p. 129)

10. Rehabilitation Dieback Control Prescription
Erosion Control, Seeding, Planting and Fertilisation
1.0 Introduction
"[…]*The operations all occur on the new soil surface, with drainage control provided by the pit structure.*" (p. 131)

2.0 Objectives
"*2.1 The objectives of this prescription are to provide for efficient rehabilitation operations while effectively;*

2.1.1 preventing the introduction of dieback fungus to the surrounding forest;
2.1.2 preventing the intensification of dieback disease in surrounding forest, and
2.1.3 preventing the development or spread of the disease within the pit." (p. 131-132)

4.0 Dieback Control Strategies
4.2 Broadcast Seeding and Fertilising
"*4.2.1 Broadcasting under dry soil conditions will minimise dieback spread.*[…]" (p. 133)

4.3 Hand Planting and Fertilisation
"*4.3.3 The opportunity for dieback spread by planters working on foot will be limited.*[…]
[…]
4.3.6 The use of dieback-free nursery stock will prevent dieback introduction from this source." (p. 134)

Appendix 1. Dieback Interpretation Prescription
3.0 Field Interpretation for Film Work
"*All dieback and uninterpretable boundaries are checked in the field.* […]" (p. 137)

"*Suspect, uninterpretable areas and ISDs are checked for the presence of <u>P. cinnamomi</u> and sampled if necessary. The boundaries are then transferred to a 1:25, 000 scale map by Mapping Branch, Como. Hygiene categories are then added by the Interpreters. These categories are:-*

- *High Potential Risk*
- *Low Potential Risk*
- *Not Effectively quarantined*

The end product is a <u>Hygiene Map</u>." (p. 137)

4.0 Ground Stripping
"*1.* [...] *A field check of the area to be stripped is made to ensure all access tracks are open and if not, to find alternative routes*
[…].
3. 1:20, 000 photographs of the area are used to locate large areas of dieback indicated by a change in vegetation quality on the photos.
[…]
8. A hygiene map is produced using the dieback-free map and 1:20, 000 photographs for topography." (p. 138)

5.0 Sampling
"*This section is based on the Interpreters' Manual (1986).*

5.1 Aim

"*Sampling is initially to ensure P. cinnamomi can be recovered by the laboratory from certain species and to establish the reliability of indicator plants.* […]" (p. 139)

"*Interpreters use soil and root tissue samples to set and then to verify interpretation standards.*" (p. 139)

7.0 Demarcation
"*Any previously blazed boundaries encountered will be checked and if necessary changed by the interpreters, removing old blazings and establishing a new boundary*." (p. 143)

MANUAL OF HARDWOOD … 2ND ED. – 1989

Manual of Hardwood Logging Specifications … 2nd. 1989

Section 1 : Planning
Specification 1.1 Logging Plans
NOTE: *REFER* TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR –**
1. Responsibilities
"*The preparation and distribution of logging plans is the responsibility of the Regional Inventory Branch Offices. These plans are prepared for each Supply Area and include:*
i) a one or two year logging plan (short-term)
ii) a four or five year logging plan (medium term)
and
iii) a long term (eg. 15 years) logging plan (long term).

These plans are produced after consultation with District staff, Regional staff and specialist branch staff, and timber industry representatives where necessary. The plans must be integrated with all other operational plans including plans for roading, silviculture, mining, fire control and visual resource management." (p. 1)

6. Monitoring and Records
"*Logging must not commence until plans are issued. If during a year additional areas of forest are to be cut, additional or amended plans must be issued by the relevant Inventory Office. Districts supervising logging must keep accurate records of areas cutover and quantities of log products removed and forward such information to the relevant Inventory office as required*. […]" (p. 2)

Specification 1.2 : Seven Way Tests
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Attachment 1.2.2 : 7 Way Tests – Authority to Approve
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Attachment 1.2.3 : Seven Way Tests
Guidelines for Assessment of Level of Consequences
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Specification 1.3 Issue of Quarantine Entry Permits
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Section 2 - Roading
Specification 2.1 : Selection of Log Haul Routes
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Section 2 : Road Construction and Maintenance

Specification 2.2 : Road Construction
NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME WORDING)

Specification 2.3 Road Maintenance
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 2.4 Gravel Pit Selection Working and Rehabilitation
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Section 3 : Silviculture

Specification 3.2 : Advanced Burning

"*3. In normal circumstances, advanced burning must not be carried out in areas of jarrah forest due to be cut within the next three years. This ensures dieback indicator plants are available for interpretation.* […]" (p. 27)

NOTE: REFER TO FLOW CHART UNDER 1987 EDITION (SAME DIAGRAM)

4. Coupe Management

Specification 4.1 : Coupe Demarcation
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.2 : Falling (Including Tree Marking Techniques)
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Specification 4.3 : Extraction
5. Split Phase Logging
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING SECTION, 5.4 (WHICH IS 5.3 IN 1987 EDITION)**

"*5.4 Separation of extraction and loading by a physical barrier at the front of a landing: in this technique, a physical barrier such as a log placed at the front of a landing, adjacent to where log trucks are parked for loading. This barrier separates the loader and the skidder from the path of the log trucks, thus avoiding the risk of transfer of soil, brought in by the log trucks, into the sub coupe. Skidding and loading can take place concurrently. The front barrier technique is the least preferred of all split-phase logging techniques. When it is used, the barrier must not be allowed to shift from the landing onto the road or road batters and soil must not move over or around the barrier.*" (p. 40)

Specification 4.4 : Loading and Hauling

Specification 4.5 : Logging Operation Inspections and Certifications

Specification 4.6 : Bush Stockpiling

NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection
Specification 5.1 : Protection from Jarrah Dieback Disease

NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING-**

4. Dieback Sampling

"*Dieback sampling is an integral part of the job of dieback interpretation, and is not normally a task of CALM hardwood logging operations staff.* […]" (p. 55)

ATTACHMENT 5.1.1 IS POLICY STATEMENT NO. 3 DIEBACK AND LOGGING. REV. 1988 (INCLUDED BELOW)

Attachment 5.1.2 : Dieback Demarcation Procedures

NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SAME DOCUMENT)

Specification 5.2 Protection of Soil (Including Rehabilitation Measures)
3. Rehabilitation of Landings

NOTE: REFER TO ENTRIES UNDER 1987 EDITION (SIMILAR WORDING)

SILVICULTURE SPECIFICATION – 1989

Silviculture Specification 3/89 : Treemarking in Jarrah Forest Affected by Phytophthora Cinnamomi in the Central and Northern Forest Regions. 1989

NOTE: THIS SUPERSEDES SILVICULTURE SPECIFICATION 2/87

"*The silvicultural objectives and system described in 'Treemarking and Silviculture in Jarrah Forest' (1987) and Specification 7/89, are not appropriate in northern jarrah forest affected by jarrah dieback.*

This specification applies to those jarrah forest areas infected by P. cinnamomi in areas to be logged. It is applicable to stands with dieback impact ranging from low to high. For the time being Specifications 7/89 may still be applied to dieback affected southern jarrah forest except for areas requiring regeneration where specification 4/89 is more appropriate." (p. 1)

2. Trees to Retain

"*2.1 Mark for retention a basal area of 15m^2/ha of healthy trees with good crown development if they are available. Aim for uniform distribution.*

[…]

2.4 Retain any healthy jarrah which have survived for a long period in high impact sites.

2.5 Habitat trees and logs (see Specification 5/89)." (p. 1)

3. Protection of Existing Regeneration

"*3.1 Stands which contain <5m^2/ha of retained trees but with adequate sapling regeneration (>500sph) are to be protected from potential damaging agencies. Prescribed burning and logging may only be undertaken if regeneration will not be damaged.*

3.2 Stands which contain <5m^2/ha of retained trees with adequate lignotuber stocking do not require special protection until lignotubers begin to grow dynamically… [text missing]

3.3 However, wherever possible minimise site disturbance and the risk of increasing disease impact.

3.4 *Management of regeneration in dieback-affected forest is dealt with in Specification 4/89.*" (p. 2)

MINING ON C.A.L.M. – 1989

Mining on C.A.L.M. Lands Guidelines. 1989

Exploration Approvals
"*Applications for Exploration licences are generally referred to District offices to ensure any sensitive areas/issues are identified and that adequate conditions are prepared. The conditions in Section 8, recently agreed to with the Department of Mines, have adopted a 'staged approval' concept. Each phase of a programme has to be submitted to and discussed with the local CALM manager and agreement reached as to procedures and techniques.* […]" (p. 2)

Mining Management
"*It is essential mining plans and some form of working arrangements for any ongoing mining project (including gravel) so as to clearly spell out procedures and obligations. Mining plans for new operations can be prepared as part of a Notice of Intent (NOI) subsequent to the grant of the tenement. The plan must be approved before operations are allowed to proceed. This stage is generally managed by CALM's Environmental Protection Branch in consultation with Regions and the Environmental and Rehabilitation Branch of the Department of Mines.*" (p. 2)

Guidelines for Approval : Costeans, Trenches, Pits, Drill Holes
"*1. Topsoil to be stockpiled.*

2. Where possible pits to be progressively refilled to original contour as sampling proceeds.

3. All drill holes to be capped or filled in (water bore holes to be capped)." (p. 21)

"*4. All exploration sites (drill pads, camps etc) to be left clean and rehabilitated.*

5. Any bulk sampling programme requires special approval." (p. 3)

Schedule 'B' Department of Conservation and Land Management : The Mining Act 1978 : Conditions for Prospecting and Exploration Licences on State Forest and Timber Reserves (South West)

Access and Dieback Hygiene
"*5. The licensee informing the District Manager CALM of the whereabouts of the operations on the licence areas by providing a works programme or weekly advise of work location.*

6. Access to and from and the movement of vehicles within State Forest and Timber Reserves being restricted to roads and tracks approved under the programme or otherwise agreed by the District Manager CALM.

7. The licensee complying with the instructions of the Executive Director or his nominee in respect of the forests disease Phytophthora cinnamomi (or 'Jarrah Dieback'), the prevention and spread of that disease and general forest hygiene.

8. Entry into a Forest Disease Risk Area (D.R.A.) will only be undertaken by the licensee when the licensee's proposals meet the requirements of the Dieback Policy 1982 and a permit for vehicle access has been issued to the licensee. Access to these areas being restricted to dry soil conditions. In the event of rain all operations ceasing and personnel leaving the Disease Risk Area immediately by the route specified on the entry permit." (p. 2)

"*9. The licensee washing down and cleaning all rigs, vehicles, tools and other equipment to the standard required by the District Manager, CALM, prior to and on each occasion any such equipment, rig, vehicle or*

tool is brought onto or taken from the licence area. All sampling equipment to be cleaned between samples to the standard required by the District Manager CALM." (p. 3)

POLICY STATEMENT – 1988

Implementing the Timber Strategy. 1988

Forest Management
Jarrah Silviculture Prescriptions
"*A new and improved system of managing the jarrah forest to ensure regeneration, increased productivity and protection from disease has been devised and is being implemented.*" (p. 5)

CORPORATE MISSION AND OBJECTIVES - 1988

CALM Annual Report 1st July 1987 to 30th June 1988. 1988

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT FOR 1986/87 AND 1985/86, ENTRY IS SIMILAR EXCEPTING THAT THE MISSION STATEMENT HAS CHANGED (THE SCOPE HAS BECOME THE STATEMENT OF MISSION)
"*TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS*." (p. 6)

POLICY STATEMENT - 1988

Policy Statement No. 3. Dieback and Logging. Rev. 1988

Introduction
"*The Policy Directorate is continuing to develop policies for the protection of National Parks, Nature Reserves and State Forests from dieback.*

As a further step in this process, the directorate has reviewed its Policy Statement No 3 which deals with logging in State forests." (p. 1)

Policy
"*(1) CALM WILL CONTINUE TO IMPLEMENT THE FORMER FOREST DEPARTMENT'S DIEBACK POLICY 1982, IN ALL HARDWOOD LOGGING OPERATIONS IN STATE FORESTS.*
(2) CALM WILL CONTINUE WITH THE EVALUATION OF OPERATIONAL PROPOSALS ON ALL ITS LANDS, USING THE 7-WAY TEST." (p. 1)

Comment
"*These decisions recognise that although our dieback knowledge is incomplete (eg. the terminal impact of the disease on all vegetation types is not yet clear) the Dieback Policy and the 7-Way Tests are still appropriate.*" (p. 1)

Implementation of Policy
"*Guidelines for the implementation of the Dieback Policy and 7-Way Tests for LOGGING different areas of hardwood forest are as follows:*

(1) *Forests South of the Preston River ...*

1.1 *Logging equipment will be cleaned down before entering and leaving a karri dominant coupe. Current arrangements with respect to soil damage will continue, as prescribed in the departmental Code of Logging Practice and Manual of Hardwood Logging Specifications.*" (p. 1)

"*(1.2)* *Jarrah types will be logged using the most up-to-date hygiene prescriptions.* [...] *With respect to soil damage the criteria prescribed in the Manual of Hardwood Logging Specifications must be met.*

On sites where disease hazard is rated as high or the consequences on the designated landuse are high (eg. areas around Kirup, or where karri is upslope of high hazard sites) logging under no soil movement conditions only, may be required. These areas will be automatically identified in the evaluation of the 7-Way Test, and appropriate conditions laid down before the 7-Way Test is approved.

Comment

This decision is based on the fact that few areas in the Southern Forest show signs of high impact when the disease is introduced, though some deaths in the understorey and of jarrah trees have occurred on some sites." (p. 2)

"*(2) Forests in the Sunklands ...*

Jarrah types will be logged using the most up-to-date hygiene prescriptions.[…]*Arrangements with respect to soil damage will continue as prescribed in the departmental Code of Logging Practice and Manual of Hardwood Logging Specifications.*

Comment

This decision recognizes that many areas of the Sunklands forest are dieback-free and that some are of high quality. Dieback hygiene, including dieback-free and hazard mapping is required." (p. 2)

"*Forests North of the Preston River ...*

3.1 *Logging machinery will be cleaned down before entering and leaving a wandoo dominant coupe. Current arrangements with respect to other environmental factors are prescribed in the departmental Code of Logging Practice and Manual of Hardwood Logging Specifications.*" (p. 2)

"*3.2* *Jarrah types will be logged using the most up-to-date hygiene prescriptions. While the information on dieback hazard is imprecise, logging under dry soil conditions will be maximised.*" (p. 3)

"*In dieback free areas in moist soil conditions, without soil movement is approved, provided that:*

(i) *the area is uninterpretable;*
(ii) *the area is accessible without placing high hazard sites at risk;*
(iii) *the area is not upslope of high hazard sites.*

Moist soil logging will be directed to areas where dieback-free and hygiene maps are available, and where landform or site vegetation mapping has been completed. This applies both within and outside the Disease Risk Area.

Current arrangements with respect to other environmental factors are prescribed in the departmental Code of Logging Practice and Manual of Hardwood Logging Specifications.

Comment

These decisions recognize the sensitivity and importance of these forests, especially those on catchments in the zone of high salinity. Sensitive areas will be identified by the 7-Way Test and appropriate conditions laid down before the 7-Way Test is approved." (p. 3)

ADMIN. INSTRUCTION – 1988

Administrative Instruction No. 39 : Fire break Construction. 1988

"*Admin Instruction 39 currently requires the approval of the Divisional Manager Operations for necessary operations involving new fire break construction.*

For the purposes of this instruction the activity – Fire Break Construction can be considered in two parts.

1. Perimeter Fire Break construction.
2. Internal Fire Break construction.

The Level of approval for Part 1, perimeter fire break construction, is hereby devolved to the Regional Manager.

The level for approval for Part 2, internal fire break construction, remains with the Divisional Manager Operations." (p. 1)

Levels For Approval For Necessary Operations In National Parks, Nature Reserves and Conservation Parks : November 1988

Activities	**Person To Approve**
"*Disease Protection:*	
existing programmes	*DM*
new programmes	*RM*

[…] " (p. 2)

STRATEGIC PLAN – N.D. - 1988?

Central Forest Region Strategic Plan. N.D. 1988?

Industry Control – (Mining) (Function)
Objective
"*1. Ensure all exploration and mining is carried out in an environmentally sound manner.*"(p. 43)

Strategy
"*ii) Ensure that exploration on CALM land is conducted in strict adherence to conditions stipulated by the relevant departments.*
[…]" (p. 43)

Measure of Performance
"*3.Exploration work meets 7 way test guidelines and no degradation of forest values occurs.*
[…]" (p. 43)

Industry Control – Timber (Function)

Hardwood
Objective
"*3. Minimise environmental impact of logging operation.*" (p. 54)

Strategy
"*i)* *Carry out all hardwood logging operations in accordance with the Code of Hardwood Logging Practice and the Manual of Specifications for the Control of Hardwood Logging Operations.*

ii) *All logging operations to be covered by an approved 7 way test.*" (p. 54)

Measure of Performance
"*1. No dieback is introduced or spread by logging.*
2. Areas damaged by logging are rehabilitated.
3.Soil damage is minimised." (p. 54)

Industry Control & Regulation (Apiarists) (Function)
Objective
"*To facilitate beekeeping subject to minimising conflict with other land use objectives.*" (p. 57)

Strategy
"[…]
ii) Need to avoid transference of disease, including dieback.
[…]" (p. 57)

Recreation
Strategy
"*iii)* *Restrict access to areas where vehicles are unwanted, e.g. recreation sites, dieback areas, sites with fragile vegetation or soil*." (p. 76)

Environmental Protection
Objective
"*To protect CALM lands from environmental degradation caused by natural agencies and human activities.*" (p. 97)

Strategy
"*v)* *Direct operations to areas where dieback mapping has been undertaken.*
vi) *Assess all operations by a 7 way test (see Dieback Policy 1982).*
vii) *Undertake a ground survey over areas without air photo dieback maps.*" (p. 97)

"[…]
xiii) *Plan and implement all operations within the guidelines of dieback Policy 82.*
[…]" (p. 98)

"*xvi)* *Regular quarantine patrols to pin point problem areas and implement a program of boundary upgrade.*

[…]" (p. 99)

Measure of Performance
"*1. Environmental protection guidelines are included, (e.g. 7 way tests) in all management prescriptions.*

[…]" (p. 97)

GUIDELINES – N.D. - 1988?

Interim Guidelines for Necessary Operations : Big Brook Nature Reserve. N.D. 1988?

2.4 Environmental Protection Objectives
"*2.4.1 Minimize the risk of introduction and spread of Dieback.*
[…]
2.4.3 Maintain existing drainage patterns." (p. 3)

4. Dieback Protection
"*No proven Phytophthora cinnamomi infections occur in the Reserve.*" (p. 6)

4.2 Management Objectives
"*4.2.1 Minimize the spread and/or introduction of Phytophthora cinnamomi on the Reserve.*

4.2.2 All approved operations on the Reserve will be subject to the hygiene controls identified under 7 way test analysis.

4.2.3 Accurately map and survey the Reserve for Dieback occurrence." (p. 6)

4.3 Policies & Strategies for Dieback Protection
"*4.3.1 Dieback hygiene precautions will be implemented for all fire suppression and fire prevention activities.*
4.3.2 Dieback hygiene precautions will be implemented for all other necessary operations on the Reserve.

[…]" (p. 7)

4.4 Actions for Dieback Protection
"*4.4.1 All machinery will be clean prior to entry into the Reserve.*

4.4.2 Any approved operations involving the movement of earth will be done under dry soil conditions.

4.4.3 All roads not necessary for management of the Reserve will be closed." (p. 7)

OPERATIONS GUIDELINES – 1988

Guidelines for Slash Burning in the Karri Forest. 1988

Slash Burn Preparation
4.4 Perimeter Tracks
"[…] *Attention must be paid to all requirements for dieback pegging and hygiene and to erosion control and stream protection when selecting and constructing perimeter tracks.*" (p. 9)

4.8 Installation of Buffer Strips
"*In all track construction or maintenance, strict adherence to dieback hygiene and erosion control rules must be observed.*" (p. 11)

CODE OF LOGGING PRACTICE – 1988

Code of Logging Practice. 1988

Section 2 : General

NOTE: REFER TO ENTRY UNDER 1987 EDITION – *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

***EXCEPT* FOR AN ADDITIONAL PARAGRAPH UNDER 2.2 –**

"*The 'Forest Regulations' made under the Forests Act will continue to apply to all operations by virtue of Section 149 of the Conservation and Land Management Act 1984 until such time as new regulations are made under that Act.*" (p. 5)

Section 4 : Extraction

NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 5 : Roading

NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 6 : Loading and Hauling

NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

Section 7 : Environmental Protection

Jarrah Dieback

NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

***EXCEPT* FOR DIFFERENT WORDING IN THE FOLLOWING PARAGRAPH-**

"*7.2 Hygiene logging involves either:*

(a) the complete separation in time of the skidding and loading phases of logging.

(b) the use of stationary (heel-boom) loaders; or

(c) the use of a physical barrier at either the front or rear of landings to separate the extraction and loading components of logging, the positioning of the barrier at each landing to be determined by a Forest Officer" (p. 21)

CONSERVATION POLICY - 1987

<u>Strategies for Conservation and Recreation on CALM Lands in Western Australia. 1987</u>

The Objectives and Principles in the State Conservation Strategy (SCS)

"*The SCS for W.A. sets out five key objectives for conservation. These are:*

to maintain essential ecological processes and life-support systems;
to preserve genetic diversity;
to ensure the sustainable utilisation of species and ecosystems;
to maintain and enhance the environmental qualities;
[...]" (p. 4)

"*CALM is committed to the objectives and principles listed in the SCS and uses them as the basis for all conservation planning and operations.*" (p. 4)

The Legislative Base

"CALM operates under two legislative acts : the CALM Act and the Wildlife Conservation Act.

These Acts place a number of statutory requirements on the way in which CALM manages land and wildlife. The major requirements are:

(1) Management must be in accord with a published management plan and all management plans must be made available for public review and comment in the draft phase.

(2) All lands are vested in two controlling bodies (not the Department). The controlling bodies (National Parks and Nature Conservation Authority and Lands and Forest Commission) are comprised mainly of members of the public representative of conservation and land management interests.

(3) The Department must perform the following functions:
manage land vested in the NPNCA and LFC;
provide the NPNCA and LFC with assistance;
[...]
be responsible for conservation of flora and fauna throughout the State;
[...]" (p. 4)

"*(5) National parks and marine parks must be managed to provide public recreation, consistent with conservation of flora, fauna, landscape and other features.*" (p. 5)

The Corporate Plan : the CALM Mission and Key Objectives
General Principles and Philosophy

"*CALM is committed to the principle that it manages public land and natural resources and conserves native wildlife on behalf of the public of W.A. Emphasis is placed, then, on informing the public of the Department's activities and, wherever possible, involving the public in planning and management.*" (p. 5)

Statement of Mission

"*In recognising that Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits and that the natural environment is an essential component of the quality of life for Western Australians, a statement of mission adopted for the Department of CALM is:*

TO PROVIDE FOR THE USE OF THE NATURAL ENVIRONMENT WITHOUT DETRACTING FROM POSSIBLE FUTURE USE." (p. 5)

Charter

"*The scope of the Department's responsibilities is represented by its charter which is:*

TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE PUBLIC LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.

Primary Objectives

Five primary objectives have been established:

Management

To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

Conservation

To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

Production

To provide and regulate the supply of renewable resources on a sustained yield basis for the satisfaction of long-term social and economic needs, and in a manner that minimises impact on other values.

Recreation

To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

Knowledge

To seed a better understanding of the natural environment, and to promote awareness and appreciation of its values. (p. 5)

"*Subsequent sections of the Department's corporate plan elaborate on these objectives, particularly those relating to conservation. The strategies used to meet these objectives are:*

ESTABLISH AND MAINTAIN A SYSTEM OF SECURE RESERVES WHICH PROTECT VIABLE REPRESENTATIVE SAMPLES OF ALL THE STATES NATURAL ECOSYSTEMS AND SPECIES, BOTH TERRESTRIAL AND AQUATIC, AS WELL AS AREAS SUITABLE FOR RECREATION AND THE PRODUCTION OF RENEWABLE NATURAL RESOURCES.

This will involve:

The development and maintenance, in conjunction with other government instrumentalities and the public, of a comprehensive data base on the occurrence and conservation status of the State's ecosystems and species.
[...]
Protecting ecosystems, landscape and the cultural heritage on the lands and waters entrusted to the Department from damage by fire, disease, grazing, feral animals and people.

Developing prescriptions for control of disturbance and for rehabilitation of damaged forests, parks and reserves.

Opposing the incompatible use of lands and waters entrusted to the Department and opposing the release of such lands and waters for other purposes." (p. 6)

"*ENSURE THAT CONSERVATION AND LAND MANAGEMENT IS CARRIED OUT ACCORDING TO SOUND, WELL-RESEARCHED SCIENTIFIC PRINCIPLES.*" (p. 6)

"*PREPARE AND IMPLEMENT MANAGEMENT PLANS FOR LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT*

This will involve:

The establishment of priorities for management plan preparation according to set criteria.

Restricting procedures to necessary operations to maintain public safety and the status quo of area management where no management plan exists." (p. 7)

"*MANAGE EXPLOITATION OF RENEWABLE NATURAL RESOURCES ACCORDING TO THE FOLLOWING PRINCIPLES:*
resources are managed to ensure their long-term conservation;

[...]" (p. 7)

CORPORATE MISSION AND OBJECTIVES - 1987

CALM Annual Report 1st July 1986 to 30th June 1987. 1987

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT FOR 1985/1986. ENTRY IS SIMILAR

POLICY STATEMENT - 1987

Policy Statement No. 18 : Recreation. 1987

1.8 Public Access
"*1.8.1 Lands and waters entrusted to the Department are generally open to public use. There are some areas restricted to the public for reasons of safety, disease control, water quality, protection of species, maintenance, etc.*" (p. 17)

"*1.12.7 Horses* […] *are generally prohibited in Nature Reserves (see specific policy on horseriding) and quarantine areas within State forest.*" (p. 27)

MANAGEMENT PLANS - 1987

Timber Production in Western Australia : a Strategy to take W.A.'s South-West Forests into the 21st Century. 1987

"*A sophisticated system of disease detection and management has been developed and is in operation.*" (p. 31)

"*It is proposed that integrated logging systems be extended progressively throughout the hardwood forest over the next five years.Independent logging operators will be contracted by CALM to harvest all logs from Crown land. In addition, it is proposed that these contractors be trained in fire control and forest hygiene to contribute to the control of fire and disease in the forest.* […]" (p. 32)

Northern Forest Region Regional Management Plan 1987-1997. 1987
Central Forest Region Regional Management Plan 1987-1997. 1987
Southern Forest Region Regional Management Plan 1987-1997. 1987

Part 3. Land Use Classification and Management
Disease
"*Control measures therefore concentrate on preventing the disease from establishing or spreading.*

The principal methods involved have included:

proclamation of Disease Risk Areas (DRA) ... ;

a sophisticated photography and survey program for disease recognition and mapping;
a major research program;
devising and implementing disease hygiene measures;
training of staff, and forest and park users in disease management;
[…]" (p. 36 of the *Northern Forest Region Regional Management Plan 1987-1997*)

NOTE: THE NORTHERN AND CENTRAL PLANS INCLUDE AN ADDITIONAL PRINCIPAL METHOD -

"*trials of operations (eg. logging) in DRA to enable impact to be determined*." (p. 36 of the *Northern Forest Region Regional Management Plan 1987-1997*)

Motorised Recreation

"*Licensed vehicles are permitted on public roads on CALM lands and normal road traffic rules apply. Exceptions are restricted access roads in Disease Risk Areas ... There are numerous 'management' tracks on CALM lands ...*" (p. 39 of the *Northern Forest Region Regional Management Plan 1987-1997*)

<u>Northern Forest Region Regional Management Plan 1987-1997. 1987</u>

Disease
Regional Strategies

"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*

(i) *control access and operations so as to protect secure dieback-free areas;*

(ii) *improve road access on CALM lands (inside and outside DRA), following a review of the need for access, and routes to be used);*

(iii) *direct operations to areas where dieback mapping has been undertaken;*

(iv) *assess all operations with a 7-Way test (Dieback Policy 1982);*

(v) *for those areas without air photo dieback maps, undertake ground survey of the disease;*
[…]
(viii) *continue to develop practical hygiene monitoring systems for logging, bauxite mining and other operations;*
[...]" (p. 36)

<u>Central Forest Region Regional Management Plan 1987-1997. 1987</u>

Disease
Regional Strategies

"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*

(i) *direct operations to areas where dieback mapping has been undertaken;*

(ii) *assess all operations by a 7-Way Test (see Dieback Policy 1982);*

(iii) *undertake a ground survey over areas without air photo dieback maps;*

[…]
(vi) continue to develop practical hygiene monitoring systems for all operations;
[...]" (p. 37)

Motorised Recreation
Regional Strategy
"*(iii) restrict access to areas where vehicles are unwanted. e.g. recreation sites, dieback areas, sites with fragile vegetation or soil*" (p. 41)

Southern Forest Region Regional Management Plan 1987-1997. 1987

Disease
Regional Strategies
"*In addition to implementing Departmental policies and guidelines ... during the period of this plan CALM staff in the region will:*

(i) minimise the artificial spread of dieback disease;

(ii) assess all operations with a 7-way test;
[…]
(v) continue to develop practical hygiene monitoring systems for all operations;

(vi) improve public understanding of the dieback problem on CALM land." (p. 36)

Mining
"*Exploration activity on Crown land is subject to environmental protection conditions including dieback hygiene prescriptions.*" (p. 48)

Northern Forest Region Regional Management Plan 1987-1997. 1987
Central Forest Region Regional Management Plan 1987-1997. 1987

Hardwood Timber
Regional Strategies
"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*
[...]
(ii) minimise artificial introduction, spread and impact of jarrah dieback disease ..." (p. 48 of the *Northern Forest Region Regional Management Plan 1987-1997*)

Shannon Park and D'Entrecasteaux National Park Management Plan 1987-1999. 1987

10.0 Conservation Opportunities
"*Protection of the natural values of the Parks is a fundamental concern of this plan. Thus, management and sustained use must not cause irreversible environmental damage or impairment of scenic beauty.*

Certain areas of the Parks are more susceptible to damage than others. This susceptibility is based on key features such as delicate and unusual geological formations, degree of risk or infection or existing infection by dieback (Map 8), rare plant and fragile plant communities (Map 8), extreme susceptibility to soil erosion and

degradation (Map 6), and least disturbed areas (based on leased for grazing for less than 20 years [Map 9] not logged [Map 10], and burnt twice or less in the last 45 years [Map 11]).

Map 12 is a compilation of the above features, and thus provides a summary of the key conservation opportunities in the Parks. Such areas include the most important and fragile biological and physical features of the Parks." (p. 43)

1.0 Management Objectives For National Parks
"*The following management objectives for national parks are derived from the Conservation and Land Management Act (1984) and departmental polices for management. The objectives are to:*

1. *Protect and conserve native plants and animals and their habitats.*
2. *Protect and conserve physical, cultural and scenic resources.*
3. *Provide opportunities and facilities for appropriate public recreation.*
4. *Regulate use to be consistent with the maintenance and protection of natural resource values and to minimise conflict between uses.*

[…]" (p. 47)

2.0 Management Objectives For the Shannon Park and D'Entrecasteaux National Park
"*Management objectives specific to the two Parks were derived from: the above general objectives; the dual purpose of 'national park and water'; and the information provided in B. Description of the Parks. The following background information is most relevant to the determination of specific objectives –*
[…]

- *Several areas contain important biological and physical features.*

- *Some areas have been disturbed by human activities and this disturbance is likely to spread unless the areas are actively managed and rehabilitated.*

- *Many areas in the Park are capable of sustaining very little public use without irreparable environmental damage.*

[…]" (p. 48)

"*The specific management objectives for the Parks are to:*

1. *Protect the biological and physical environment and the cultural and scientific features of the Parks.*

[…]" (p. 48)

2.4 Shire Reserves
Prescriptions
"*5. Work on the Windy Harbour road will take into account the risk of introducing or spreading dieback and the landscape amenity of the road.*" (p. 61)

4.4 Flora
Objectives
"[…]
2. To prevent the introduction and spread of dieback, other plant diseases, weeds and other non-native plants.
[…]" (p. 71)

Background
"*The Parks contain a number of plant species that are gazetted rare or have a restricted distribution. There are also several plant communities within the Parks which are not well represented in other parks or reserves. A*

number of fragile plant communities (those extremely susceptible to disturbance) can also be identified. Map 9 gives the general location of these fragile communities and many of the rare plants." (p. 72)

"*Many of the plant communities in the Parks are susceptible to dieback, particularly species found in the coastal wetlands of the D'Entrecasteaux (6.2 Dieback and Disease).*" (p. 72)

Prescriptions
"*1.Areas where rare or restricted plants or fragile communities are known to occur, that have communities highly susceptible to dieback or have communities that are poorly represented on other conservation reserves (Map 9) will be protected from infection by dieback, and from introduced plant species or other impacts (besides those arising from natural processes). Management actions, public use and general access, where permitted, will be managed so that soil disturbance and transport, and spread of seeds are minimal.*" (p. 72)

[…]

"*3. In all other areas, natural processes will be left alone, except for the management requirements of public use areas, visitor safety and the control of pests, weeds and disease.* […]

[…]" (p. 73)

6.0 Protection
6.1 Fire
Objectives
"*The Parks are to be managed primarily to conserve their natural ecosystems and landscapes, whilst ensuring the Park visitors have the opportunity to enjoy the Parks without detrimentally affecting them. In setting the specific fire management objectives to achieve the management objectives for the Parks, the protection of life and property within and near the Parks must be of high importance.*

Consistent with this principle, the following objectives will apply in order of priority:

[…]
2. To protect community and environmental values in or near the Parks including settlements, private property, recreation facilities, forest regeneration and public utilities." (p. 75)

[…]

Prescriptions
"*8. To minimize the introduction and spread of disease through the application of appropriate hygiene measures, road restrictions and suitable fire regimes.*" (p. 76)

6.2 Dieback and Disease
Objectives
"*1. To prevent the introduction of dieback into disease-free areas.*

2. *To minimise the spread of dieback in areas where the disease already occurs.*" (p. 81)

Background
"*Dieback is the most significant disease threat to the Parks.* […]" (p. 81)

"*A recent broadscale survey of the D'Entrecasteaux (in 1984) found that the jarrah forest and woodlands, flats and swamps not only had a high risk of infection, but were also highly susceptible. In comparison, the karri forest, yate and bullich woodlands, stabilised dunes and coastal dunes had a lower risk of infection and were*

less susceptible. Map 8 indicates those areas affected or at risk. No detailed dieback mapping has been carried out in either Park." (p. 82)

Prescriptions
"*All management activities in the Parks will be carried out according to the Dieback Hygiene Manual (CALM 1986). In addition, the following prescriptions also apply.*

1. *A basic road and firebreak network will be defined, based where possible on existing roads and firebreaks. All other roads and tracks will be closed to public vehicles. Management vehicles will be subject to hygiene requirements when using closed roads and tracks.*

2. *New roads and firebreaks will only be created if absolutely necessary. They will be constructed in a way that will minimise the risk of disease introduction and additional spread.*

3. *Off road vehicle use will be prohibited (9.2 Vehicles Off-road). Off-road access for management purposes (eg. fire control, search and rescue) will be strictly controlled and will be subject to hygiene requirements.*

"*4. Earthmoving during road construction or maintenance, facility development or other activities will only take place following a detailed evaluation, using the Seven Way Test (Forests Department 1982), of the activity proposed and the subsequent determination that the risk is acceptable.*" (p. 82-83)

"*5. Hygiene practices, including regular cleandowns, will be implemented for vehicles and plant travelling within the Parks.*

6.Accurate disease location maps will be compiled before proposed activities are undertaken. […]
7. Park rangers will be trained in dieback recognition, sampling and hygiene procedures.

[…]" (p. 83)

7.0 Access
7.1 General Access
"*CALM has developed the following principles for road location:*

[…]

ii.[…] *In particular, roads must not jeopardise park values by the introduction or spread of disease.*" (p. 88)

7.3 Access for Management
Prescriptions
"[…]
2. Only roads designated for public access and those considered essential for management purposes, such as the strategic control of fire, disease and exotic species, will be maintained in a trafficable condition.

[…]

"*8. All road maintenance and off-road use of management vehicles will be subject to strict dieback hygiene measures (Dieback Hygiene Manual, CALM 1986).*" (p. 95)

9.2 Vehicles Off-Road
Objective
"*1. To protect the biological and physical environment of the Parks from damage, by directing all vehicle traffic along nominated roads and tracks.*" (p. 99)

Background
"*Off-road vehicles can have many impacts, especially on poorly consolidated soils where even a single pass by a vehicle can damage vegetation and provide a focus for erosion. In waterlogged areas vehicles can cause extensive soil degradation, including compaction or rutting, leaving long-lasting effects on vegetation growth. Vehicles are a major factor in the spread of dieback. Other impacts include vehicle tracks and noise.* […]" (p. 100)

"*In national parks all vehicles used must comply with the Road Traffic Act. Non-complying recreational vehicles can be registered under the Vehicles (Off-road) Act, but their use in a national park requires a special permit, endorsed by CALM, from the relevant local government authority. Such a permit is generally only granted in extenuating circumstances.*" (p. 100)

Prescription
"*1. No vehicle activity off road will be permitted in the Parks. All public vehicle use will be restricted to the access routes designated on Map 15.*" (p. 100)

9.3 Horse-Riding
Objectives
"*1. To provide opportunities for access by horse-back in the Parks, while ensuring that adverse impacts on the natural environment and other Park users are contained.*

2. To monitor the impacts of horse-riding and review the provision of horse-riding opportunities in the Parks when this plan expires or beforehand if undue conflicts arise." (p. 101)

Prescriptions
"*2. Public use will be permitted along a 1 km wide corridor centred on Jasper Beach Road and Deeside Coast Road (Map 15).*

[…]
4.An approved tour operator will be allowed to use the Parks on a permit basis. The permit will be issued for a three year period. Prior to issue, registration of interest will be requested in State and local newspapers. Prior to the end of the three year period this arrangement will be reviewed and altered as necessary. The permit will be suspended if any breach of the National Park Regulations or permit conditions occurs." (p. 102)

"*5. Use by the tour operator will be permitted in the area shown on Map 15 between the Gardner River and Broke Inlet and along a 1 km wide corridor centred on Deeside Coast Road.*

[…]
8. A program to monitor the effects of horse use on the environment will be established. The information gained through this program will be used to amend these prescriptions as appropriate during the period of the plan. An annual progress will be produced to assist review." (p. 103)

GUIDELINES - 1987

Northern Forest Region Regional Management Plan 1987-1997. 1987
Central Forest Region Regional Management Plan 1987-1997. 1987
Southern Forest Region Regional Management Plan 1987-1997. 1987
Strategies for Conservation and Recreation on CALM Lands in Western Australia. 1987

Departmental Management Guidelines
Environmental Protection
Objective

"*To protect CALM lands from environmental degradation by natural agencies (e.g. insects, fungi, dieback), exotic agencies (e.g. weeds, feral animals) and human activities (e.g. mining, pollution, litter, roading).*

Specifically, the aim is to:

manage land, wherever possible, to avoid disturbance that degrades natural ecosystems;

develop appropriate environmental controls for all CALM activities;

monitor the extent and severity of physical disturbances and infestations on CALM lands;

classify CALM land on the basis of sensitivity to disturbances and pollution;

develop appropriate environmental and legal controls to minimise environment damage by other agencies and private individuals;

[…]" (p. 81 of of the *Northern Forest Region Regional Management Plan 1987-1997*)

Strategies

(i) Include environmental guidelines and controls in all management proposals and prescriptions.
(ii) Ensure that landscape management and rehabilitation procedures are considered in planning all operations that can cause disturbance.
(iii) Ensure that all staff are adequately informed and trained in aspects of environmental management

[...]" (p. 81 of the *Northern Forest Region Regional Management Plan 1987-1997*)

Apiculture
Strategies

"*(i) Locate apiary sites at acceptable intervals taking account of constraints such as:*
[...]
need to avoid transference of disease, including dieback;
[...]" (p. 91)

MANUAL OF HARDWOOD – 1987

Manual of Hardwood Logging Specifications … 1987

Specification 1.1 Logging Plans

"*3. Plans covering the first year, or first two years, of the five (or four) year plan (Annual, or Two year, Logging Plan) shall, when applicable, include the following individual plans:-*
i) Logging plan - highlighting the following information -
(a) moist soil (dieback) logging areas;
(b) moist soil (low potential risk) logging areas
(c) moist soil (secure dieback-free) logging areas
(d) dry soil logging areas
(e) stream, amenity and road reserves
(f) location of existing moist and dry soil roads
[…]

ii) Hygiene Plan - highlighting the following information -
(a) secure dieback-free areas
(b) dieback areas

(c) low potential risk areas
(d) high potential risk areas
(e) not-effectively quarantined areas
(f) uninterpretable areas

iii) Impact Plan - highlighting the following information -
(a) low impact areas
(b) moderate impact areas
(c) high impact areas

iv) Landform/Site Vegetation Plan - highlighting the following information -
(a) landforms as per the System 6 study
(b) vegetation site types as assessed by field assessment" (p. 1-2)

Section 1 - Planning
"*1. The document 'Dieback Policy 1982' requires that, before the commencement of any operation in jarrah forest that has the potential to introduce or spread Phytophthora cinnamomi, the risk is assessed by means of a 'Seven Way Test'. If the operational arrangements fail the Test then the operation cannot be started.*

2. Guidelines for the preparation of Seven Way Tests are contained in 'Dieback Review 1982' (1983). The Seven way Test evaluates the following seven factors of a proposed operation in jarrah forest:

* *type of operation*
* *degree of hygiene*
* *risk of introducing P. cinnamomi*
* *forest type*
* *likely impact*
* *land use*
* *consequences of impact on land use.*

3 *Seven Way Tests must be prepared for any proposed roadworks or logging operation in jarrah forest. Seven Way Tests must be prepared by Districts in conjunction with the preparation of data for the first two years of the five year (or four year) logging plan.*" (p. 5)

Attachment 1.2.2 7 : Way Tests – Authority to Approve

"*7 Way Tests – Authority to Approve*

Area Involved	*Approving Officer*	*Remarks*
1. State forest outside Disease Risk Area.	*District Manager*	*Separate file to be kept at District office for perusal by R/L Environment Protection and/or Environment Protection Branch Staff.*
2. State Forest within Disease Risk Area.	*Regional Manager (Recommendation by R/L Environmental Protection)*	*Separate file to be kept at Regional office for perusal by Environmental Protection staff or Policy Review Group*
3. Parks and Reserves or any area where	*Manager, Environmental Protection*	*Kept on same file as 2 above.*

timber production is not a priority land use.	*Branch (Recommendation by Regional Manager) See also Note below.*

"*This decision to delegate authority must not be taken to imply any relaxation of hygiene standards for operations on CALM land*." (p. 11)

Attachment 1.2.3 : Seven Way Tests
Guidelines for Assessment of Level of Consequences
"*Three factors need to be taken into account when making an assessment of levels of consequence for a Seven Way Test. They are:*
1. Risk of introduction/spread.
2. Impact.
3. Land use.

They can be expressed as a factorial equation,
i.e.: level of consequences = f (risk) (impact) (landuse)
(Acceptable/Unacceptable)

Assessment of Factors

1. *Risk: rate as - very low, low, moderate, high.*

Very Low:	*dry soil, 230mm maps, hygiene*
Low:	*moist soil, 230mm maps, hygiene*
Moderate:	*moist soil, no 230mm maps, hygiene*
High:	*moist soil, no 230mm maps, no hygiene*

2. *Impact: rated as low, types or landforms, moderate, or high, on vegetation*

Low:.	*few species susceptible, some individuals killed*
Moderate:	*most species susceptible, some individuals killed*
High:	*most species susceptible, most individuals killed*

(see Seven Way Test Guidelines - Impact)

3. *Landuse: rated as low, moderate, high.*

Low:	*water production*
Moderate:	*timber production, recreation*
High:	*catchment protection*

Examples of Acceptable Factorial Equations are:
Case 1: *dry soil, all vegetation types, any land use. L. of C. = (very low) (low-high) (low-high)*

Case 2: *moist soil, lower impacting vegetation, any land use. L. of C. = (low) (low-moderate) (low-high)*

NOTE: *for moist soil operations in forest not infected with dieback, good maps and maximum hygiene are required.*" (p. 12)

Specification 1.3 : Issue of Quarantine Entry Permits
"[…] *2. All vehicles/machines operating inside a quarantine area must carry a quarantine entry permit at all times, and be prepared to show the permit to a Forest Officer on demand.*
[…]

4 *The driver or operator of every vehicle/machine entering quarantine under permit must be familiar with the conditions printed on the permit document.*" (p. 13)

Section 2 - Roading
Specification 2.1 : Selection of Log Haul Routes
"*1.Conceptual plans of log haul routes must be obtained by Districts from (a) relevant Industry representatives or (b) contractors operating under Contracts to Supply, at least two years in advance of cutting. Using this information, and subject to Seven Way Tests, the precise alignment of proposed logging routes is determined and included in the Two Year (or One Year) Logging Plan.*

2.Guidelines to be followed in selecting logging routes include:-

* *use low profile roads*
* *avoid stream reserves, except for stream crossings*
* *avoid new roading unless required to protect dieback-free forest*
* *use roads in dieback-affected forest in preference to roads in dieback-free forest. Where roads in dieback-free forest must be used, minimise the crossing of dieback categories and minimise the areas of forest placed at risk.*
* *where consistent with dieback hygiene practices, and economics, use systems of one-way roads.*

3.The exact alignment of proposed new roads must be approved by the District Manager. In instances where proposed new roads intersect Shire or M.R.D. roads, Shire or M.R.D. engineers must be consulted." (p. 18)

Section 2 : Roading
Specification 2.2 : Road Construction
"[…]*2. Specifications for new roads and upgrading of existing roads.*

	Major Haul Rds		*Other, Including In-Coupe, Rds*	
	For dry soil use	*For wet soil use*	*For dry soil use*	*For wet soil use*

Clearing Width	*10m*	*10m*	*5m*	*5m*
Road formation Width	*8m*	*8m*	*4m*	*4m*
Gravel Thickness	*Nil or as Req.*	*min 15 cm*	*Nil or as Req.*	*min 15 cm*
Culvert Spacing	*See (a) below*	*See (a) below*	*See (a) below*	*See (a) below*
Culvert Size	*See (b) below*	*See (b) below*	*See (b) below*	*See (b) below*
Table drain Depth	*20cm*	*20 cm*	*10 cm*	*20 cm*
Major stream Crossings	*See (c) below*	*See (c) below*	*To be avoided*	*To be avoided*
Off-shoots	*See (d) below*	*See (d) below*	*See (d) below*	*See (d) below*
Maximum grade	*7 degrees*	*5 degrees*	*10 degrees*	*8 degrees*

(a) Culvert Spacing:

* *Culvert spacing depends on the grade of the road and the amount of water which reaches the road from the hillside.*
* *A culvert must be installed at the bottom of every grade.*
* *The number of culverts required per km will generally vary from 2 to 12.*" (p. 19)

(b) Culvert size:

* *The size of culvert required depends on the catchment area, the run-off conditions, and the maximum incidence of rainfall. The following table is a guide show maximum watersheds for a range of pipe sizes:*

Pipe Diameter	*Maximum Catchment Size*
30 cm	*36ha*
37.5 cm	*56ha*
45 cm	*80ha*
60cm	*144ha*
75 cm	*244ha*
90 cm	*324ha*

(c) Major Stream Crossing:

* *Must be contracted with pipes or a bridge – full earth/log fills are not permitted.*

* *Approach must be as close to but not at right angles contours, keeping in mind road alignment and safety.*
* *Borrow areas must be > 20m from watercourse.*
* *Water from borrow areas must be directed into silt trap or vegetative filter.*
* *Off-shoots must be constructed at regular intervals to turn water into silt traps of natural vegetation.*
* *Fill must be consolidated to minimise erosion of loose soil and risk of slumping.*
* *Embankments must be left rough surfaced or corrugated.*
* *Machine - activity in the watercourse and disturbance of stream vegetation must be minimised.*
* *No heaps of debris to be created within 40m watercourse.*
* *A compacted, gravel pavement must be cleared on both sides of a stream crossing (In some specific instances this may have to be sealed.*" (p. 20)

(d) Off-Shoots:
* *Off-shoots must be sufficient in number to prevent table drain erosion.*
* *Off-shoots into dieback-free forest must be approved by the FOIC.* […]
* *Off-shoots carrying water from dieback-infected forest must not discharge into dieback-free forest. If necessary the water must be carried in the table drains until it can be discharged into sumps or vegetation filters close to a watercourse.*
* *Off-shoots must have a flared outlet into a vegetation filter strip or silt sump, so that water is not directed immediately into a stream.*
* *Care must be taken when locating off-shoots near stream zones, to ensure adequate vegetation filter to prevent stream siltation.*

3.The location and use of gravel pits must be approved by the FOIC. Gravel for use on roads in dieback-free forest must be obtained from uninfected gravel pits.[…].*"* (p. 21)

Specification 2.3 : Road Maintenance
"*1.The cost of road maintenance will be borne by the road user, as decided and directed by the Forest Officer in Charge.*

1.Maintenance, using earth moving machinery, of roads located inside dieback-free forest must be restricted to dry soil conditions only. […]
3.Maintenance grading must aim to shape the road profile, and to clean table drains, to improve drainage off and away from the road surface.
4.[…] *Bypasses must not be constructed to avoid boggy sections of road.*
[…]" (p. 22)

Specification 2.4 : Gravel Pit Selection Working and Rehabilitation
Note: The term 'gravel' also applies to other basic raw materials such as sand, limestone and quartz.

1.The use of existing or new gravel pits for logging road construction and/or maintenance must be approved by the Forest Officer in Charge, and must confirm with Policy Statement Number 2 (January, 1986) a summary of which is attached (Attachment 2.4.1).

2.The pit selection must be carried out in conjunction with the planning of log haul routes. This implies a two year lead time. Selection of pits must take into account the following:
[…]
* *No pit shall be located within road, amenity or stream reserves.*
[…]
3. The dieback status of pits must be decided by C.A.L.M., with sampling and laboratory testing if necessary." (p. 23)

4. Operation of pits

"* *If the pit is classed as dieback-free, then removal of gravel resource must be strictly in accordance with split phase standards; that is:*

(a) a log barrier must be strategically positioned on the perimeter of the pit entrance to prevent entry of gravel trucks onto the pit floor occupied by the loader,

(b) loading facilities will be designed to prevent ground contact between the loader and gravel trucks, and

(c) loaders entering or re-entering the pit must be thoroughly cleaned down.

(d) the flow of water into the pit, from dieback-infected forest or roads, must be prevented.

* *Pits developed specifically for logging roads must be physically closed when logging is complete*." (p. 24)

3. Silviculture

NOTE: REFER TO DOCUMENT FOR FLOW CHART ON GUIDELINES FOR BURNING AREAS OF HEAVY FULES, INCLUDING SCRUB IN ASSOCIATION WITH LOGGING OPERATIONS IN THE JARRAH FOREST

Section 4 : Coupe Control
Specification 4.1 : Coupe Demarcation
"*2. Sub coupes must be identified prior to cutting using red flagging tape, increasing to three red tapes on corners and defined junction points. Sub coupe boundaries must correspond to boundaries of individual, self-draining 'Micro catchments' within a coupe, and/or dieback hygiene plan boundaries.*" (p. 40)

"*<u>Split phase logging</u>:*
In dieback-free forest, extraction of logs must conform to the techniques of 'split-phase logging'. This separates the snigging phase of logging from the loading and hauling phase. This is done to minimise the risk of introducing dieback fungus into a sub coupe from material that may be dropped at a landing by log trucks. There are four different techniques in 'split-phase logging':" (p. 47)

"5.1 *Separation of extraction and loading in time: in this technique, extraction in a sub coupe or faller's block must be completed before loading and hauling commence, That is, once loading and hauling commences, a skidder must not return to the sub coupe or faller's block. If a skidder is required to return, it must be cleaned down before each trip into that sub coupe or faller's block. The number of times a machine is permitted to enter a sub-coupe of faller's block must be kept to a minimum.* […]

5.2 Separation of extraction and loading by a physical barrier at the rear of a landing: in this technique, a physical barrier such as a log is situated at the rear of the landing, and logs skidded to this landing are pushed, or preferably lifted over the barrier onto the landing proper. The skidder and loader are thus physically separated, avoiding the risk of transfer of soil, brought in by log trucks, into the sub coupe. Skidding and loading can take place concurrently. There must be no contact between the loader and the truck. Turnarounds must be constructed in order to avoid the need for the loader to lift or pull trucks closer to the loading position.

5.3 Separation of extraction and loading by a physical barrier at the front of a landing: in this technique, a physical barrier such as a log is placed at the front of a landing, adjacent to where log trucks are parked for loading. This barrier separates the loader and skidder from the path of the log trucks, thus avoiding the risk of transfer of soil, brought in by the log trucks, into the sub coupe. Skidding and loading can take place concurrently. In this technique the barrier must not be allowed to shift from the landing onto the road. This can occur when large volumes are loaded out during moist soil conditions." (p. 48)

"*5.4 Use of a stationary loading machine: in this technique, a stationary machine, such as a 'heel-boom loader' is used to load trucks. Such machines are set up on the roadside below a landing, thus avoiding the*

transfer of any soil onto the landing. Skidding and loading can take place concurrently. A barrier to separate the area on which trucks can travel from the area on which the skidder works is required.

6. In dieback-free forest, extraction can take place only when the machinery used does not transport or move soil or vegetable matter. This means that the tyres of skidders must not pick up and move any soil or vegetable matter. If soil becomes wet following rain, and begins to stick to machinery tyres, the skidding operation must cease until the soil dries sufficiently. The decision as to when skidding ceases and recommences is the responsibility of the Forest Officer in Charge.

7.In dieback-infected forest, the extraction operation is subject to the rules detailed in Specification 5.2 (Protection of Soil).

8.At the completion of extraction, all major snig tracks in dieback-free forest must be blocked by a physical barrier such as a log.

9. No extraction machine may enter a road, stream or amenity reserve without the specific approval of a Forest Officer." (p. 49)

Specification 4.2 : Falling (Including Tree Marking Techniques)
3.Scrub Rolling
"[…] *Dieback hygiene requirements must be observed during scrub rolling.*" (p. 65)

Specification 4.3 : Extraction
5. Split phase Logging:
"*In dieback-free forest, extraction of logs must conform to the techniques of 'split-phase logging'. This separates the snigging phase of logging from the loading and hauling phase. This is done to minimise the risk of introducing dieback fungus into a sub coupe from material that may be dropped at a landing by log trucks. There are four different techniques in 'split-phase logging':*" (p. 47)

"*5.1Separation of extraction and loading in time: in this technique, extraction in a sub coupe or faller's block must be completed before loading and hauling commence. That is, once loading and hauling commences, a skidder must not return to the sub coupe or faller's block. If a skidder is required to return, it must be cleaned down before each trip into that sub coupe or faller's block. The number of times a machine is permitted to enter a sub-coupe of faller's block must be kept to a minimum.* […]

5.2 Separation of extraction and loading by a physical barrier at the rear of a landing: in this technique, a physical barrier such as a log is situated at the rear of the landing, and logs skidded to this landing are pushed, or preferably lifted over the barrier onto the landing proper. The skidder and loader are thus physically separated, avoiding the risk of transfer of soil, brought in by log trucks, into the sub coupe. Skidding and loading can take place concurrently. There must be no contact between the loader and the truck. Turnarounds must be constructed in order to avoid the need for the loader to lift or pull trucks closer to the loading position.

5.3 Separation of extraction and loading by a physical barrier at the front of a landing: in this technique, a physical barrier such as a log is placed at the front of a landing, adjacent to where log trucks are parked for loading. This barrier separates the loader and skidder from the path of the log trucks, thus avoiding the risk of transfer of soil, brought in by the trucks, into the sub coupe. Skidding and loading take place concurrently. In this technique the barrier must not be allowed to shift from the landing onto the road. This can occur when large volumes are loaded out during moist soil conditions." (p. 48)

"*5.4 Use of a stationary loading machine: in this technique, a stationary machine, such as 'heel-boom loader' is used to load trucks. Such machines are set up on the roadside below a landing, thus avoiding the transfer of*

any soil onto the landing. Skidding and loading can take place concurrently. A barrier to separate the area on which trucks can travel from area on which the skidder works is required.

7. *In dieback-free forest, extraction can take place only when the machinery used does not transport or move soil or vegetable matter. This means that the tyres of skidders must not pick up and move any soil or vegetable matter. If soil becomes wet following rain, and begins to stick to machinery tyres, the skidding operation must cease until the soil dries sufficiently. The decision as to when skidding ceases and recommences is the responsibility of the Forest Officer in Charge.*

8. *In dieback-infected forest, the extraction operation is subject to the rules detailed in Specification 5.2 (Protection of Soil).*

9. *A t the completion of extraction, all major snig tracks in dieback-free forest must be blocked by a physical barrier such as a log.*

10. *No extraction machine may enter a road, stream or amenity reserve without the specific approval of a Forest Officer.*" (p. 49)

Specification 4.4 : Loading and Hauling
"*1. In dieback-free forest, the loading operation must confirm with the techniques of 'split-phase logging', described in Specification 4.3.*" (p. 41)

Specification 4.5 : Logging Operation Inspections and Certifications
"*1. The contractor's foreman or supervisor must check logging standards periodically on a faller's block by faller's block (or sub-coupe by sub-coupe) basis to ensure falling and extraction standards are maintained. CALM's Forest Representative will periodically accompany the contractor's foreman or supervisor on these inspections to monitor standards.*

Aspects of logging to be inspected include:
[…]
- *dieback hygiene*

[…]" (p. 42)

Specification 4.6 : Bush Stockpiling
"*3. The location of bush stockpiles must be approved by the Forest Officer in Charge. Bush stockpiles must be located in areas accessible in all weather conditions.*" (p. 58)

Section 5 : Environmental Protection
Specification 5.1 : Protection from Jarrah Dieback Disease
"*All CALM staff involved in hardwood logging must have a sound working knowledge of the biology and management of the dieback fungus, Phythophthora cinnamomi.*" (p. 68)

"*2.The implications of jarrah dieback must be considered during all phases of a logging operation, in particular during:*
(a) Planning (specifications 1.1, 1.2, 1.3 and 1.4)
(b) Roading (specifications 2.1, 2.2, 2.3 and 2.4) and
(c) Coupe Control (specifications 4.1, 4.3 and 4.4)

3.Machinery/vehicle cleandown

3.1 A key part of forest management with respect to dieback is the cleaning down of vehicles and machinery prior to entering dieback free forest.

3.2 The aim is to clean the vehicle or machine of all soil, mud, dust and vegetable matter, especially from wheels or tracks, and from underneath the chassis." (p. 68)

3.[…] *When conditions are dry, compressed air is the preferred cleaning down technique, provided a machine or vehicle can be cleaned by such technique.*

3.4 If water is used, then the fungicide sodium hypochlorite must be added to the washdown water at the rate of 1:2000. […]*Sodium hypochlorite, when added to water, has an effective life of only 24 hours. A new dosage must therefore be added to washdown water in a tank as soon as any additional water is put in the tank.*

3.5 Washdown sites in the field (that is sites involving water) must be approved by the Forest Officer in Charge. A washdown site must be on a well drained ramp or pad in dieback forest immediately adjacent to dieback-free forest. Such sites must be identified by a or pad in dieback forest immediately adjacent to CALM Department 'Washdown Site' sign.

3.6 All vehicle/machine drivers /operators must ensure that their vehicle/machine is clean prior to entering dieback-free forest. Forest Officers must regularly check the standard of vehicle/machinery cleanliness." (p. 69)

4. Dieback Sampling
"*Dieback sampling is an integral part of the job of dieback interpretation, and is not normally a task of CALM hardwood logging operations staff.* […]" (p. 69)

5. Dieback Demarcation
"*5.1 The initial marking of dieback is done by CALM specialist dieback interpretation using boundaries in the field staff responsible for large photography. These officers will mark dieback boundaries using large scale photography. These officers will mark dieback boundaries using dayglo orange flagging tape on trees or bushes. d The Forest officer in Charge is then responsible for the permanent marking of the dieback boundaries using yellow painted blazes on three sides of trees. The FOIC must follow the dayglo orange marking, but may use his discretion to 'smooth off' corners for practical purposes, provided the dieback line is shifted into dieback-free forest only. More detail on dieback demarcation procedures are contained in Attachment 5.1.2."* (p. 70)

NOTE: ATTACHMENT 5.1.1 IS POLICY STATEMENT NO. 3 DIEBACK AND LOGGING. REV. 1986 (INCLUDED BELOW)
Attachment 5.1.2 : Demarcation Procedures
Timing
"[…]*If it is imperative that forest be burnt prior to logging, demarcation must be completed before burning.*

When an operation has not taken place within six months of demarcation, it will be necessary to recheck (and demarcate again) all areas of forest downslope from dieback or suspect, particularly on moderate to steep slopes (greater than 5 0). […]" (p. 75)

Demarcation
"*Field demarcation of dieback or suspect is best achieved by blazing and painting non merchantable trees that occur at or near the boundary. All demarcation must be easily seen, even where dense scrub occurs.*
[…]" (p. 75)

4. Buffer Zones
"*The system of mapping disease occurrence is based on visible symptoms that take varying periods of time, after infection, to manifest. As the most recent indicator plant deaths occur at or near the edge of disease infections, it is logical to conclude that P. cinnomomi may be in the soil, or root systems of both susceptible*

and resistant plants outside the visibly affected area, but that the susceptible plants may not have died. That is to say there may be some risk of transporting infected soil and root material from within a zone outside of but in close proximity to the infection. It is necessary therefore to have a zone which buffers forest operations from disease infections.

[…] *Two variables must be considered in varying buffer width – slope and disease impact. Where disease impact is low, it is often difficult to detect and interpret symptoms of the disease and the risk of incipient disease is greatest in this situation. The following table sets out the downslope buffer width under different slopes and impact situations.*" (p. 59)

"*DOWNSLOPE BUFFER WIDTH (M)*

16-20	*50 M*	*50M*	*40M*
11-15	*50M*	*40M*	*30M*
8-10	*40M*	*30M*	*20M*
0-5	*30M*	*20M*	*20M*
	LOW	*MOD*	*HIGH*

(p. 76)

5.Risk Categories

"*When there is more than one risk category within an operational area, it is often necessary to separate them in order to achieve the hygiene requirements identified in the 7-Way Test.*" (p. 76)

"*It is necessary to firstly determine if the different risk categories need to be separated and then the most efficient method of demarcation.*" (p. 76)

"*The attached Table shows when adjoining risk categories require separation. For example, a moist soil coupe contains the following risk categories:- Dieback, NEQ and Low Potential Risk. With the Dieback adjoining the NEQ and LPR, and the LPR adjoining the NEQ category. From the table Dieback (row 2) must be separated from both LPR and NEQ (columns 4 and 7 respectively). Similary NEQ (row 7) and LPR (column 4) must be separated under moist soil conditions.*

[…]*The most efficient method of demarcation is to use coupe or sub coupe boundaries. In the example above fallers block boundaries can be used rather than an additional blaze or tape line.*" (p. 77)

6. Predicted Impact Categories (Dieback Hazard Classes)

"*Predicted impact (dieback hazard) is to be determined by trained staff (i.e. interpreters, research, experienced district staff). Where it is necessary to separate operations in various impact (hazard) classes (as identified by the 7-Way Test) the demarcation is to be carried out by district staff only under interpreter /research supervision or after training by the interpreters/research.*

Coupe or sub coupe boundaries are the most efficient method of demarcation.

7.These guidelines give the minimum level of demarcation which is required. In many cases however these lines can be integrated with other management lines such as faller's block, or subcoupe boundaries.

(Reference: 'Environmental Guidelines – Dieback No. 1, 23.5.86, updated August 1987)" (p. 77)

NOTE: REFER TO DOCUMENT FOR TABLE – RISK CATEGORY

Section 5 : Environmental Protection
Specification 5.2 Protection of Soil (Including Rehabilitation Measures)
3. Rehabilitation of Landings
"*3.5 All rehabilitation must be carried out in strict accordance with dieback hygiene principles, as directed by the FOIC.*" (p. 83)

CODE OF HARDWOOD – 1987

Code of Hardwood Logging Practice. 1987

"*Where specifications for the performance of the rules and instructions in this Code are required they are to be found in the Manual of Specifications covering the forest area in which logging operations are taking place*." (p. i)

Section 2 : General
"*2.1 The Instructions contained in this Code shall be observed by all persons participating in any hardwood forest logging operation on land managed by the Department of Conservation and Land Management.* […]

2.2 An Operator shall observe all Acts of the State of Western Australia, and in particular, the Bush Fires Act 1954, the Conservation and Land Management Act 1984, the Inspection of Machinery Act 1921, the Machinery Safety Act 1974, the Road Traffic Act 1975, the Timber Industry Regulation Act 1926, the Workers Compensation Act 1912, the Wildlife Conservation Act 1950-79, the Agriculture and Related Resources Protection Act 1976-83, the Country Areas Water Supply Act 1947-76, and the Water Authority Act 1986, including all amendments to those Acts for the time being in force and any Act passed in substitution or in lieu thereof and all Regulations for the time being in force thereunder as well as this Code of Logging Practice." (p. 4)

"*2.17 An Operator shall observe any instruction by a Forest Officer and comply with any procedures laid down to restrict the spread of jarrah dieback. In particular an Operator shall ensure that equipment is provided to remove soil from logging machinery during the period of the Operation.*" (p. 7)

Section 4 : Extraction
"*4.2 The Forest Officer in Charge may determine the priority of extraction of produce from time to time. An Operator shall comply with the Forest Officer's expressed priority of extraction. This priority maybe expressed in type of log, point of removal, dieback hygiene requirements and deadline for delivery of all four together.*" (p. 12)

"*4.7 An Operator shall not carry on extraction at such times or places, or by methods or equipment which a Forest Officer has prohibited until such prohibition has been revoked by the Forest Officer.*" (p. 13)

Section 5 : Roading
"*5.5 Whilst carrying out road construction and maintenance an Operator shall observe any instruction and comply with any procedures laid down to restrict the spread of jarrah dieback (See Section 7).*" (p. 14)

Section 6 : Loading and Hauling
"*6.5 A contractor shall observe any instruction and comply with any procedures laid down to restrict the spread of jarrah dieback (See Section 7).*" (p. 16)

Section 7 : Environmental Protection
Jarrah Dieback

"*7.2 Hygiene logging involves either:*

(i) the use of a physical barrier at landings to separate the skidding and loading components of logging, the positioning of the barrier at each landing to be determined by a Forest Officer; or

(ii) the complete separation in time of the skidding and loading phases of logging." (p. 20)

"*7.4 In certain areas of the jarrah forest, extraction during moist soil conditions is permitted provided no soil is moved during the extraction process. The decision as to whether or not soil movement is taking place is the responsibility of the Forest Officer in Charge. The Operator, and in particular his Bush Foreman, must make themselves totally familiar with the restrictions regarding soil movement.*" (p. 20)

"*7.5 In areas of jarrah forest infected with dieback, and in karri forest, extraction during moist soil conditions, including soil movement, is permitted. The constraints with respect to the environmental protection of soil (Instructions 7.23 to 7.28 inclusive) will however apply.*

7.6 Machinery for hauling and extraction, when working in:

(a) uninfected jarrah forest, must be cleaned down when entering a coupe or sub-coupe,

(b) infected forest, must be cleaned down before moving into uninfected jarrah forest.

7.7 An Operator will comply with instructions from a Forest Officer concerning inspections and cleaning down of machinery or equipment. During dry soil conditions cleaning down equipment is an air compressor with hoses of adequate length and appropriate nozzles or an acceptable alternative to remove soil from machinery. During moist soil conditions a portable pumper unit and a portable washdown ramp constructed to the specifications of a Forest Officer may be required. Water used for cleaning down must be treated with chemical as specified by the Forest Officer in Charge.

7.8 *To restrict the spread of dieback an Operator shall observe any instruction applying to the movement of light vehicles, logging equipment, road haulage equipment, road construction equipment and the winning and carting of road materials, such as gravel and shale.*" (p. 21)

SILVICULTURE SPECIFICATION – 1987

<u>Silviculture Specification 2/87 : Jarrah Silviculture in the Presence of Phytophthora cinnamomi</u>

"*The silvicultural objectives and system described in 'Treemarking and Silviculture in the Jarrah Forest' (1987) and Specification 1/87, are not appropriate in forest affected by jarrah dieback.*

This specification is applicable to those jarrah forest areas infected by <u>P. cinnamomi</u> that are to be logged and which are relatively small in area." (p. 1)

"*The silvicultural guidelines for the tree marking and treatment of each assessed impact category are:*" (p. 1)

1. **Low to Moderate Impact Site**

"***(Regardless of forest structures)***

1.1 Mark for retention (and protection) all stems of dieback tolerant species, eg, marri and blackbutt." (p. 1)

"*1.2 In addition, mark for retention (and protection) approximately 10 sq.m/ha of crop trees. This 10 sq.m/ha will include those stems of dieback tolerant species of crop tree standard.*

1.3 Where the total basal area retained would be less than 15 sq.m/ha, retain non crop trees to ensure a minimum forest density of 15 sq.m/ha.

1.4 Harvest all marketable produce from trees not marked for retention. Marked trees to protected from falling and snigging damage.

1.5 Carry out tops disposal burning of the logging slash (preferably a spring burn).

1.6 No other post logging silvicultural treatment is justified until the progression of the disease is more clearly exhibited." (p. 2)

2. **High and Very High Impact Site**

"*2.1 Mark for retention (and protection) all stems of dieback tolerant species (eg, marri, blackbutt), as well as other non-marketable small jarrah crop trees that otherwise may be damaged in falling and snigging operations.*

2.2 Harvest all marketable produce from trees not marked for retention (and protection). Marked trees to be protected from falling and snigging damage.

2.3 Carry out:

- *Tops disposal burning after 1 summers drying of the logging slash.*

- *Assess adequacy of dieback tolerant regeneration where less than 10 sq.m/ha of forest cover remains. If insufficient, (less than 1, 000 spha) infill with seed or plantings of indigenous dieback tolerant species.* […]

2.4 Protect from fire until regeneration can withstand a prescribed fuel reduction burn.
[…]" (p. 2)

SILVICULTURE SPECIFICATION – 1987

Silviculture Specification 1/87 : Jarrah Thinning and Regeneration

NOTE: REPLACES SPECIFICATION 1/86

"*These specifications are to be read in conjunction with 'Treemarking and Silviculture in the Jarrah Forest' 1987. They are applicable to areas that are classed as dieback free.*" (p. 1)

OPERATIONS MANUAL - 1987

Southern Forest Region Operations Manual. 1987

Policy for Scrubrolling Prior to Prescribed Burning Operations

Timing

"*5.1.2 Because of environmental considerations some preparation will need to be done in autumn prior to the burn, when soil conditions are dry, thus minimising the chance of Phytophthora cinnamomi spread and maximising machinery flotation over some damp areas.*" (p. 65)

6. Approval

"*6.1 Seven Way Tests will need to be approved prior to scrub rolling in D.R.A. areas, National Parks, Nature Reserves, M.P.A.'s, and Road, Stream and River Reserves.*" (p. 66)

5. Method of Operation
"*7.1 All standard hygiene precautions to minimise the spread of Phytophthora cinnamomi will be observed.*" (p. 66)

Fungicide in Fire Tanker Water
Scope
"*This prescription covers the useage of SODIUM HYPOCHLORITE and COPPER SULPHATE in water tankers for the control of water borne PHYOTPHTHORA CINNAMOMI during fire protection activities.*" (p. 76)

Objective
"*To safely and effectively use these chemicals during fire protection operations so as to eliminate Phytophthora cinnamomi as may be found in various forest water sources from being transferred to uninfected forest.*" (p. 76)

Technique
"*4.7 Useage Observe environmental precautions. Do not spray near rivers, streams, dams etc. Dispose of container correctly.*" (p. 76)

Top Disposal in Jarrah Regrowth Stands
5. Hygiene
"*Depending upon Dieback status of the area to be treated, hygiene requirements shall be a part of the prescription.*" (p. 122)

Standards for Coupe Preparation for Karri Regeneration
6.6 Buffer Burns
"*Dieback hygiene and erosion control rules must be observed during all track construction.*" (p. 125)

Gravel Pit Rehabilitation Preparation
3. Prescription
"*3.2 Consider Dieback status downslope from pit area. This will determine hygiene requirements for rehabilitation. Also refer to section 1, 3, and 7 of Hygiene Manual.*" (p. 128)

Landing and Snig Track Rehabilitation for Planting
Operation
5.2 Machinery will be free of mud and soil before commencing the operation and will be washed down between coupes or as required." (p. 130)

"*5.8 Specific instructions for the use of machinery in Disease Risk Areas will be covered in the appropriate seven way test.*" (p. 130)

Maintenance of Access for Fire Control
3.1 Scrub Control
"*3.1.7 Standard hygiene practices to avoid dieback spread will be followed, and excessive soil movement is to be avoided. Any steeper sections on which soil erosion may occur are also to be avoided or treated with the utmost care to prevent this occurring (see Item 7.3).*" (p. 170)

Road Construction Specifications
Supervision

"*5.4 Attention to hygiene and the prevention of possible spread of Phytophthora is also most important.*" (p. 175)

Appendix : Item 7.2 : Vehicle Washdown Procedure
Scope
"*This prescription covers the removal of soil/mud/root material from vehicles to ensure dieback hygiene.*" (p. 185)

2. Objective
"*To remove all soil material from a vehicle to minimise the risk of artificial spread of the jarrah dieback disease.*" (p. 185)

3. Equipment Required
"*3.1 Wet soil conditions.*
a) High pressure low volume washdown unit.
b) The chemical copper sulphate to be mixed at the rate of one teaspoon to 4kl (200 gls).
c) Iron bar.

3.2 Dry soil conditions
a) Stiff broom or
b) An air compressor." (p. 185)

4. Procedure
"*4.1 Wet soil conditions.*
[…]
c) Water used for washing down, from a tank, must contain copper sulphate.
d) Soil or caked material which cannot be removed by water must be thoroughly saturated with copper sulphate solution.
[…]
4.2 Dry soil conditions.
a) Use the stiff broom to brush soil material off.
[…]" (p. 2)

5. Washdown Locations
"*a) Vehicles must be washed down before they enter forest free from dieback symptoms. Washing down must occur immediately on the dieback transition line.*

b) The location for wash down must be:-
- At a designated wash down point.
- On a hard, well drained surface, positioned, as low in the landscape as possible.
c) Where considerable material is washed to the ground this must be physically removed to one side to avoid pick-up, as the vehicle moves away.
c) *Fixed wash down installations occur at Divisional Headquarters and outstations.*" (p. 2)

Appendix : 7.3 Hygiene in Road Maintenance
1.Scope
"*This prescription covers the principles of dieback hygiene to be applied in road maintenance.*" (p. 188)

2. Objective
"*To ensure road maintenance work minimises the spread of dieback.*" (p. 188)

3. Job Description
"*3.1 Road surface grading – an operation which involves the use of grader to form and grade a road surface.*

5.4 Road surface maintenance – an operation to prevent water accumulation or flow on the road surface without the use of a grader.

3.3 Patch gravelling – an operation where large sections of road are built up with gravel spread by a grader." (p. 188)

4. Planning For All Jobs
"*4.1 All roads to be mapped for dieback using the best available technique.*
4.2 A 7 Way Test (to be approved by District Manager) is to be prepared for each operation." (p. 188)

5.Hygiene in Operations
5.1 Road Surface Grading
"*a) All grading to be done under dry soil conditions unless the road meets the specifications in Dieback Policy 1982 No. 9 when moist soil grading is acceptable.*
b) Peg road for dieback occurrence using prepared map.
c)Grade all pegged areas independently.
d)Grade all Dieback free categories first.
e)Wash/Brush machine down before moving into a separate pegged area.
f) Follow this sequence in grading:-
- batter road banks to remove vegetation
- grade all table drains and side run off drains
- grade up road to a high crown to maximise road drainage
- clean out all culverts and sumps
- ensure free water flow through pipes
- repair or replace guide posts
[…]" (p. 188)

5.2 Road Surface Maintenance
"*b) Peg road for dieback according to the prepared map.*
c) Pot hole sections of the road surface where the road is breaking through to clay or where ponding occurs.
d) use clean gravel in all sections.
e) Clean out culverts and sumps from sand, logging tops and rocks etc.
f) Ensure table drains are cleaned out at the entrance to the sump.
g) Repair any damage to culverts.
h) Create side drains if there are any gully erosion trails on road surface, to direct water run off into table drains and bush." (p. 188)

5.3 Hygiene in Patch Gravelling
"*a) Road to be pegged according to the prepared map.*
b) To be done in dry soil conditions only.
c) Only clean gravel to be use on dieback free areas.
d) Gravel pit to be worked according to Industry Control Manual Item No. 10.
e) Dieback free sections to be done first.
f)Grader to be cleaned down prior to a shift between pegged sections." (p. 188)

Appendix : 7.4 : Procedure for Sampling Sites Possibly Infected with P. cinnamomi
Scope
"*This prescription applies where the sampling of root tissue or soil material is required to test for the presence of Phytophthora cinnamomi on all CALM lands in the Southern Region.*" (p. 190)

Objective

"*The objective of this job is to provide, from the field, the best possible type of root tissue or soil sample for testing for Phytophthora cinnamomi under laboratory conditions.*" (p. 190)

POLICY - 1986

Policy Statement No. 3 Dieback and Logging. Rev. 1986

Introduction
"*The Policy Directorate is developing policies for the protection of National Parks, Nature Reserves and State Forests from dieback.*

As the first step in this process, the Directorate has reviewed the former Forests Department's Dieback Policy 1982 and its application to logging in State forests. Decisions arising from this review are spelt out in this Policy statement, together with guidelines for implementation." (p. 1)

Policy
"*(1) CALM WILL CONTINUE TO IMPLEMENT DIEBACK POLICY 1982, IN ALL HARDWOOD LOGGING OPERATIONS IN STATE FORESTS.*

(2) CALM WILL CONTINUE WITH THE EVALUATION OF OPERATIONAL PROPOSALS ON ALL ITS LANDS, USING THE 7-WAY TEST.

(3) CALM WILL CONTINUE WITH THE IMPLEMENTATION OF 'POLICY 12'." (p. 1)

Comment
"*These decisions recognise that although our dieback knowledge is incomplete (eg. the terminal impact of the disease on all forest types is not yet clear) the Dieback Policy and the 7-Way Tests are still appropriate management tools. This decision will stand until an integrated departmental Dieback Policy for all CALM lands is developed, or until new research findings which affect the policy become available.*" (p. 1)

ADMIN. INSTRUCTION - 1986

Administrative Instruction No. 23 : Interim Guidelines For Operations. 1986

Introduction
"For substantial areas of land under the control of the Department of Conservation and Land Management it will be many years before approved Management Plans will be developed. In the meantime the CALM Act provides in Section 33 (3) (b) that certain operations can be carried out when there is no management plan." (p. 1)

"*For indigenous State forest the operations are defined as those actions that ensure the multiple use and sustained yield of that resource for the satisfaction of long term social and economic needs.*

In accordance with the Departmental Planning Policy (Policy 1, January 1986) the necessary operations must be carried out in a planned manner through the development and implementation of INTERIM GUIDELINES FOR OPERATIONS.

The Interim Guidelines will consist of:

(1) a brief description and brief guidelines for major potential activities;

(2) a map showing the locality and area of proposed management activities;

(3) an indication of who must give approval before particular operations can be carried out.

This paper shows how the Interim Guidelines are intended to work." (p. 1)

Aim
"*The aims of the Interim Guidelines are:*

(i) to provide an adequate safeguard against natural and operational calamities on lands administered by CALM in the absence of an approved Management Plan;

(ii) to ensure that critical 'necessary operations' are identified and properly prescribed;

(iii) to ensure that the impacts of necessary operations are fully considered and effectively incorporated within existing management and control systems;

(iv) to provide a simple, efficient and attainable means of gaining approval for necessary operations." (p. 2)

Identification
"*The first step is to identify all the necessary operations within each of the areas concerned. Use can be made of a checklist showing all the possible necessary activities – see Appendix 1. Only those operations that are essential for safeguarding the area in question should be considered. These must be consistent with the objectives for the area concerned as described in the CALM Act.*" (p. 2)

"*The development of suitable strategies and prescriptions* ***will*** *necessitate consultation and collaboration between CALM Operations, Planning and Specialist groups*. […]" (p. 3)

Duration of Interim Guidelines
"*Most Interim Guidelines should have an approval duration of at least 3 years with a maximum of 5 years. […] However, the works programme that emanates from these Interim Guidelines must be reviewed and updated annually*." (p. 4)

Approval
"*A system of approval for the Interim Guidelines and the methods of implementing these is to be adopted which recognises and utilises the established hierarchy of authority and control, i.e. District Manager to Regional Manager to Divisional Manager (or Branch Manager) to Directorate (Director National Parks or Director Nature Reserves or both, or entire Policy Directorate depending on the range of necessary activities). It is expected that once the pattern of the development of these Interim Guidelines have been universally accepted, that the final approval will be delegated to Divisional or Regional Managers.*" (p. 4)

CORPORATE MISSION AND OBJECTIVES - 1986

<u>CALM Annual Report 1st July 1985 to 30th June 1986. 1986</u>

Corporate Objectives
"*Under a corporate plan formulated in 1985/86 the statement of mission for the Department of Conservation and Land Management is:*

TO PROVIDE FOR THE USE OF THE NATURAL ENVIRONMENT WITHOUT DETRACTING FROM POSSIBLE FUTURE USE.

The scope of the Department's responsibilities is represented by its charter which is:

TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE PUBLIC LANDS AND WATERS ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.

Primary objectives are:

Management

To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

[…]" (p. 8)

"*Production*

To provide and regulate the supply of renewable resources on a sustained yield basis in a manner that minimises impact on other values.

[…]" (p. 9)

"*To achieve the primary objectives the Department will:*

[…]

"*Establish and maintain a system of secure reserves which protect viable representative samples of all the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas suitable for recreation and the production of renewable natural resources*.

This will involve:

[…]

- "*Protecting ecosystems, landscape and the cultural heritage on lands and waters entrusted to the Department from damage by fire, disease, grazing, feral animals and people.*
- *Developing prescriptions for control of disturbance and for rehabilitation of damaged forests, parks and reserves.*
- *Opposing the incompatible use of lands and waters entrusted to the Department and opposing the release of such lands and waters for other purposes.*" (p. 11)

MANUAL - 1986

Dieback Hygiene Manual. Rev. 1986

"*This booklet contains the rules which must be followed to minimize the spread of dieback.*" (p. 1)

"*2. The presence of dieback can be detected from the death of susceptible plants.*

3. [...] *It can take several years from infection before visible symptoms (i.e., plant deaths) occur.*" (p. 3)

"*9. If dieback is evident in a watercourse then it must be assumed the water course IS infected and dieback WILL be present downstream from the infection. Therefore it is important to identify the furthest upstream infection in the water course.*

10. If dieback occurs on a ridge or upper slope, then areas downhill will be infected in time.

[…]" (p. 3)

2. Ground Demarcation of Dieback Areas

"*1. In interpretable areas (unburnt for 4-5 years and with sufficient indicator species) boundaries between dieback and dieback-free areas wills be marked on the ground (pegs, survey tape, paint etc) before any operation involving use of machinery. Where earthmoving operations are involved boundaries will be pegged.*

2. Pegs will indicate to machine operators where dieback patches start and finish.

[…]

5. Where there are no evident symptoms, creeks or shallow flats are to be pegged if dieback occurs upstream from the crossing. " (p. 5)

NOTE: REFER TO ACTUAL DOCUMENT FOR Sections 3 : Cleaning Down – 10. Fire Suppression

Uninterpretable Areas

"*1. In uninterpretable areas, boundaries between dieback, dieback-free and uninterpretable will be marked on the ground (pegs, survey tape, paint etc.) before any operation involving use of machinery. Where earthmoving operations are involved the boundaries will be pegged.*" (p. 14)

"*DO clean machinery when it is to operate in an uninterpretable area.*

DONT use gravel from uninterpretable areas in areas which are secure dieback-free.

DO clean machinery when it has completed its work and before it is transferred to other areas." (p. 14)

Additional Notes : 4. Completing Sample Information Sheets

"*The information recorded must provide the reader with a brief but detailed insight to the forest within close proximity, i.e., the site characteristics – the factors that determined why the sample was taken; perhaps a comment about what the disease might do in the future, i.e., R.O.S., impacts; and what type of activity has taken place in the past – where this can be determined.*" (p. 17)

Appendix II. Hygiene Prescription for Firebreak Construction and Maintenance in Uninterpretable Areas

"*2. All machines to be clean prior to work commencing and cleaned down as required.*[…]" (p. 23)

STRATEGIC PLAN - 1986

<u>Strategic Plan : Southern Forest Region. 1986</u>

3. Regional Strategic Objectives

3.3 Protection : Pests and Diseases
"*To protect CALM lands from disease, insects and other harmful agencies, and to improve the health and vigour of forested areas.*" (p. 6?)

Key Area : Disease Hygiene (non logging issues)
Objective
"*1. Ensure all activities on CALM land by CALM or related groups (and to the extent possible for non CALM groups) are planned and implemented to minimise the risk of spreading existing, or incurring new dieback infections.*" (p. 17?)
Measure of Performance
"*1. Every activity involving earthmoving in susceptible land form and vegetation types) is to be the subject of a 7 Way Test approved at the relevant level.*
2. Wherever possible activities on CALM land will be concentrated in dry soil conditions.
3. Dieback mapping service to be concentrated in logging areas, with necessary coupes to be mapped at least 6 months in advance of logging." (p. 17?)

Hardwood Timber Production
Key Area : Disease Protection
Objective
"*1. Apply prescriptions for dieback hygiene according to current Codes of Logging Practise.*
6. *Ensure adequacy of disease location maps for all jarrah logging operations.*" (p. 25?)
Measure of Performance
"*1. Conduct evaluation (7 Way Test) for all logging operations in jarrah forest. Establish quicker and more efficient method of bating soil samples for dieback.* […]" (p. 25?)

Key Area : Wood Production
Objective
"*3. To minimise environmental damage.*" (p. 55?)
Measure of Performance
"*1. Establish environmental controls as per ICM.*
2. Complete 7 Way Test prior to any operations.
3. Supervising officer to discuss detailed requirement of 7 Way Test and permit with each bush supervisor involved in an operation.
4. Enforce hygiene requirements." (p. 55?)

Key Area : Protection - Disease
Objective
"*1. Restrict the spread of disease on CALM lands eg. P. cinnamomi*" (p. 60?)
Measure of Performance
"*1. Prepare of 7-way test prior to any operation.*
2. Control all entries into D.R.A. under permit." (p. 60?)

Key Area : Nursery
Objective
"*1. Produce high quality, disease free eucalypt seedlings.*" (p. 61?)

Key Area : Protection - Disease
Objective
"*1. Maintain hygiene in DRA's*" (p. 69?)
Measure of Performance
"*1. All entries to DRA to be under permit.*
2. Investigate all suspected illegal entries into DRA's.
3. Gates and locks to be kept in good condition." (p. 69?)

Key Area : Wood Production
Objective
"*3. To plan all harvesting operations well in advance*" (p. 73?)
Measure of Performance
"*3. Advance plan the whole roading network in DRA to ensure continuity of hygiene standards. Conceptual plans for all unroaded forest blocks to be completed by June 1987.*
[…]" (p. 73?)

Key Result Objectives - Walpole District
Objective
"*6. Ensure Dieback hygiene is maximized in all forest operations - including roading and boundary maintenance.*
[…]" (p. 85?)
Measure of Performance
"*1. Part of all prescriptions and contracts – field checks to ensure compliance*." (p. 85?)
Key Area : Honey Production
Objective
"*1. To sustain the current level of beekeeping in appropriate land use areas.*
Relocate sites to prevent disease spread or land use conflict." (p. 90?)
Measure of Performance
"*2. Every site proposal for transfer of ownership to be studied with a view to land use compatibility, access, fire and disease risk.*
[…]" (p. 90?)

MANUAL - 1986

Manual of Specifications for Control of Hardwood Logging Operations in the Northern Jarrah Forest. 1986

Specification 1.1 Logging Plans
"*i) Logging plan – highlighting the following information –*

- *(a) moist soil (dieback) logging areas;*
- *(b) moist soil (low potential risk) logging areas*
- *(c) moist soil (secure dieback-free) logging areas*
- *(d) dry soil logging areas*
- *(e) stream, amenity and road reserves*
- *(f) location of existing moist and dry soil roads*
- *(g) coupe boundaries and numbers*
- *(h) research plots (no logging)*
- *(i) special care zones*
- *(j) areas previously cut over*

ii) Hygiene Plan – highlighting the following information –

- *(a) secure dieback-free areas*
- *(b) dieback areas*
- *(c) low potential risk areas*
- *(d) high potential risk areas*
- *(e) not-effectively quarantined areas*
- *(f) uninterpretable areas*

iii) Impact Plan – highlighting the following information –

(a) low impact areas
(b) moderate impact areas
(c) high impact areas

iv) Landform/Site Vegetation Plan – highlighting the following information –

(a) landforms as per the System 6 study
(b) vegetation site types as assessed by field assessment

[…]" (p. 4)

Section 1 : Planning
Specification 1.2 Seven Way Tests
"*1. The document 'Dieback Policy 1982' requires that before any operation in jarrah forest that has the potential to introduce or spread Phytophthora cinnamomi is started the risk is assessed by means of a 'Seven Way Test'. If the operational arrangements fail the Test then it cannot be started.*

2. Guidelines for the preparation of Seven Way Tests are contained in 'Dieback Review 1982' (1983). The Seven Way Test evaluates the following seven factors of a proposed operation in jarrah forest:-

* *type of operation*
* *degree of hygiene*
* *risk of introducing P. cinnamomi*
* *forest type*
* *likely impact*
* *land use*
* *consequences of impact on land use.*

3. Seven Way Tests must be prepared for any proposed roadworks or logging operation in the Northern Jarrah Forest. Seven Way Tests must be prepared by Districts in conjunction with the preparation of data for the first two years of the five year logging plan.
[…]" (p. 7)

Attachment 1.2.3
Seven Way Tests
Guidelines for Assessment of Level of Consequences
"*Three factors need to be taken into account when making an assessment of level of consequence for a Seven Way Test. They are:*
1. Risk of Introduction/spread
2. Impact.
3. Land use.

They can be expressed as a factorial equation,
i.e.: level of consequences = f(risk) (impact) (landuse)
(Acceptable/Unacceptable)
Assessment of Factors
"*1. Risk: rate as – very low, low, moderate, high.*
Very Low: dry soil, 230mm maps, hygiene
Low: moist soil, 230mm maps, hygiene
Moderate: moist soil, no 230mm maps, hygiene
High: moist soil, no 230mm maps, no hygiene

2. Impact: rated as low, moderate, or high, on vegetation types or landforms.

Low: *few species susceptible, some individuals killed*
Moderate: *most species susceptible, some individuals killed*
High: *most species susceptible, most individuals killed*
(see Seven Way Test Guidelines – Impact)

3. *Landuse: rated as low, moderate, high.*
Low: *water production*
Moderate: *timber production, recreation*
High: *catchment protection*

[…]

Summary

Whenever a Seven Way Test is drawn up it is recommended that this method of assessment is attempted. A rough guideline is (i) when risks are rated as very low or low, levels of consequence are only acceptable if impact is rated as low or moderate, and (ii) when risks are rated as moderate or high, levels of consequence are only acceptable if impact is rated as low, eg. in Karri forest types." (p. 18)

Section 1 : Planning

Specification 1.4 Renewal of Sawmilling Licences

"[…] *Most sawmilling licences for the Northern Jarrah Forest are issued for 1 November to 31 October. This covers as closely as possible the onset of dry soil logging conditions to enable immediate entry to the bush and if required concentrated operations to build stockpiles for winter milling when the bush may be closed.*
[…]" (p. 22)

Specification 2.1 Selection of Log Haul Routes

"*2. Guidelines to be followed in selecting logging routes include:-*

* *use low profile roads*
* *avoid stream reserves, except for stream crossings*

[…]

* *avoid new roading unless required to protect dieback-free forest*
* *use roads in dieback-affected forest in preference to roads in dieback-free forest. Where roads in dieback-free forest. Where roads in dieback-free forest must be used, minimise the crossing of dieback categories and minimise the areas of forest placed at risk.*
* *where consistent with dieback hygiene practices, and economics, use systems of one-way roads.*

3.The exact alignment of proposed new roads must be approved by the District Manager. […]" (p. 24)

Specification 2.2 : Road Construction

"*1. Road construction must take place in dry soil conditions only.*

3. *Specifications for new roads and upgrading of existing roads.*
4.

	Major Haul Rds		*Other, Including In-Coupe, Rds*	
	For dry soil use	*For wet soil use*	*For dry soil use*	*For wet soil use*
Clearing width	*10m*	*10m*	*5m*	*5m*
Road formation width	*8 m*	*8 m*	*4m*	*4m*
Gravel thickness	*Nil or as Req.*	*15 cm*	*Nil or as Req.*	*15 cm*
Culvert spacing	*See (a) below*	*See (a) below*	*See (a) below*	*See (a) below*
Culvert size	*See (b) below*	*See (b) below*	*See (b) below*	*See (b) below*

Table drain depth	*20cm*	*20 cm*	*10cm*	*20cm*
Major stream crossings	*See (c) below*	*See (c) below*	*To be avoided*	*To be avoided*
Off-shoots	*See (d) below*	*See (d) below*	*See (d) below*	*See (d) below*
Maximum grade	*7 degrees*	*5 degrees*	*10 degrees*	*8 degrees*"

(p. 25)

"*(d) Off-Shoots:*

* *Off-shoots must be sufficient in number to prevent table drain erosion.*
* *Off-shoots into dieback-free forest must be kept to a minimum. Wherever possible these off-shoots should be at the lowest point in the topography.*
* *Off-shoots carrying water from dieback-infected forest must not discharge into dieback-free forest. If necessary the water must be carried in the table drains until it can be discharged into sumps or vegetation filters close to a watercourse.*
* *Off-shoots must have a flared outlet into a vegetation filter strip or silt sump.*

[…]" (p. 27)

"*3. The location and use of gravel pits must be approved by the FOIC. Gravel for use on roads in dieback-free forest must be obtained from infected gravel pits.* […]" (p. 27)

Specification 2.3 Road Maintenance

"*2. Maintenance, using earth moving machinery, of roads located inside dieback-free forest must be restricted to dry soil conditions only.* […]" (p. 28)

Specification 2.4 Gravel Pit Selection Working and Rehabilitation

"*1. The use of existing or new gravel pits for logging road construction and/or maintenance must be approved by the Forest Officer in Charge, and must confirm with Policy Statement Number 2 (January, 1986) a summary of which is attached (Attachment 2.4.1).*

1. The Pit selection must be carried out in conjunction with the planning of log haul routes. This implies a two year lead time. Selection of pits must take into account the following

[…]

* *No pit shall be located within road, amenity or stream reserves.*

[…]

* *Pits must not be located in areas likely to create severe drainage and/or erosion problems particularly if rehabilitation is likely to be delayed.*
* *Access tracks into pits must be located to avoid direct line of sight into the pits.*
* *Access tracks into pits must be constructed to allow vehicular use under all weather conditions.*

3. The dieback status of pits must be decided by C.A.L.M., with sampling and laboratory testing if necessary." (p. 29)

"*5.Rehabilitation of pits:*
An exhausted pit, or exhausted parts of a large pit, must be rehabilitated by the user when, and as directed by, the Forest Officer in Charge, using the following guidelines:" (p. 30)

"[…]

* *Indigenous, dieback resistant tree species, and nitrogenous understorey species must be planted on the rehabilitated pit and access road during the first winter period following preparation for rehabilitation.*" (p. 31)

"*(d) Off-Shoots:*

* *Off-shoots must be sufficient in number to prevent table drain erosion.*
* *Off-shoots into dieback-free forest must be kept to a minimum. Wherever possible these off-shoots should be at the lowest point in the topography.*

* *Off-shoots carrying water from dieback-infected forest must not discharge into dieback-free forest. If necessary the water must be carried in the table drains until it can be discharged into sumps or vegetation filters close to a watercourse.*
* *Off-shoots must have a flared outlet into a vegetation filter strip or silt sump.*
* *Care must be taken when locating off-shoots near stream zones, to ensure adequate vegetation filter to prevent stream siltation.*" (p. 27)

Specification 2.3 Road Maintenance

"*3. Maintenance grading must aim to shape the road profile, and to clean table drains, to improve drainage off and away from the road surface.*

4. […] *Bypasses must not be constructed to avoid boggy sections of road.*
[…]" (p. 28)

Section 4 : Coupe Control

Specification 4.1 Coupe Demarcation

"*1. Coupe boundaries must be identified prior to commencement of cutting using white painted crosses facing into the coupe.* […]
2. Sub coupes must be identified prior to cutting using red flagging tape, increasing to three red tapes on corners and defined junction points. Sub coupe boundaries must correspond to boundaries of individual, self-draining 'Micro catchments' within a coupe, and/or dieback hygiene plan boundaries. Sub coupe boundaries must be marked by the Forest Officer and Industry Bush Boss together.
[…]
4. Stream reserve, road reserve and amenity reserve boundaries must be identified prior to cutting in the same way as coupe boundaries, that is with white painted crosses facing the cutting area. The exact location of boundaries of stream, road and amenity reserves is as decided by the Forest Officer in Charge, using the following guidelines:-
4.1 Stream Reserves
- Width of stream reserves is dependent of vegetation type, slope and susceptibility of the soil to erosion.
- A stream reserve is measured from the outside edge of the stream zone vegetation." (p. 36)

"*- For all second or third order watercourse within 3 km of a catchment reservoir, the width of the stream reserve must be a minimum of 100m on each side of the watercourse, and a minimum of 50m for other streams.*
- For watercourse outside the 3km zone, but within harnessed catchments, the respective minimum widths must be 50m and 25m.
- For watercourses in non-harnessed catchments, stream reserve widths will be at the discretion of the Forest Officer in Charge." (p. 37)

Specification 4.3 Extraction

"*<u>Split phase logging</u>:*
In dieback-free forest, extraction of logs must conform to the techniques of 'split-phase logging'. This separates the snigging phase of logging from the loading and hauling phase. This is done to minimise the risk of introducing dieback fungus into a sub coupe from material that may be dropped at a landing by log trucks. There are four different techniques in 'split-phase logging':" (p. 41)

"*5.1 Separation of extraction and loading in time: in this technique, extraction in a sub coupe or faller's block must be competed before loading and hauling commence. That is, once loading and hauling commences, a skidder must not return to the sub coupe or faller's block. If a skidder is required to return, it must be cleaned down before each trip into that sub coupe or faller's block.*

5.2 Separation of extraction and loading by a physical barrier at the rear of a landing: in this technique, a physical barrier such as a log is situated at the rear of the landing, and logs skidded to this landing are pushed, or preferably lifted over the barrier onto the landing proper. The skidder and loader are thus

physically separated, avoiding the risk of transfer or soil, brought in by log trucks, into the sub coupe. Skidding and logging can take place concurrently.

5.3 Separation of extraction and loading by a physical barrier at the front of a landing: in this technique, a physical barrier such as a log is placed at the front of a landing, adjacent to where log trucks are parked for loading. This barrier separates the loader and skidder from the path of the log trucks, thus avoiding the risk of transfer of soil, brought in by the log trucks, into the sub coupe. Skidding and loading can take place concurrently.

5.4 Use of a stationary loading machine: in this technique, a stationary machine, such as a 'heel-boom loader' is used to load trucks. Such machines are set up on the roadside below a landing, thus avoiding the transfer of any soil onto the landing. Skidding and loading can take place concurrently." (p. 42)

"*6. In dieback-free forest, extraction can take place only when the machinery used does not transport or move soil or vegetable matter. This means that the types of skidders must not pick up and move any soil or vegetable matter. If soil becomes wet following rain, and begins to stick to machinery tyres, the skidding operation must cease until the soil dries sufficiently. The decision as to when skidding ceases and recommences is the responsibility of the Forest Officer in charge.*

7. In dieback-infected forest, the extraction operation is subject to the rules detailed in Specification 5.3 (Protection of Soil)

8. At the completion of extraction, all major snig tracks in dieback-free forest must be blocked by a physical barrier such as a log.

9. No extraction machine may enter a road, stream or amenity reserve without the specific approval of a Forest Officer." (p. 43)

Specification 4.4 Loading and Hauling
"*1. In dieback-free forest, the loading operation must conform with the techniques of 'split-phase logging', described in Specification 4.3.*

2. The log hauling route or routes must be approved by the Forest Officer in Charge. […]" (p. 44)

Section 5 : Environmental Protection
Specification 5.1 Protection from Jarrah Dieback Disease
"*1. All CALM staff involved in hardwood logging in the Northern Jarrah Forest must have a sound working knowledge of the biology and management of the dieback fungus, Phytophthora cinnamomi.*" (p. 54)

"*2. The implications of jarrah dieback must be considered during all phases of a logging operation in the Northern Jarrah Forest, in particular during:*
(a) Planning (specifications 1.1, 1.2 and 1.3)
(b) Roading (specifications 2.1, 2.2, 2.3 and 2.4)
(c) Coupe Control (specifications 4.1, 4.3 and 4.4)" (p. 54)

2. Machinery/vehicle cleandown
"*3.1 A key part of forest management with respect to dieback is the cleaning down of vehicles and machinery prior to entering dieback free forest.*

The aim is to clean the vehicle or machine of all soil, mud, dust and vegetable matter, especially from wheels of tracks, and from underneath the chassis." (p. 54)

"*3.4. If water is used, then the fungicide sodium hypchlorite must be added to the washdown water at the rate of 1:2000. Sodium hypochlorite is corrosive and must not be added to drinking water, nor used in excessive quantities. Sodium hypochlorite, when added to water, has an effective life of only 24 hours. A new dosage must therefore be added to washdown water in a tank as soon as any additional water is put in the tank.*

3.5 Washdown sites (that is sites involving water) in the field must be approved by the Forest Officer in Charge. A washdown site must be on a well drained ramp or pad in dieback forest immediately adjacent to dieback-free forest. Such sites must be identified by a CALM Department 'Washdown Site' sign.

3.6 All vehicle/machine drivers/operators must ensure that their vehicle/machine is clean prior to entering dieback-free forest. Forest Officers must regularly check the standard of vehicle/machinery cleanliness." (p. 55)

5. Dieback Demarcation
"*5.1 The initial marking of dieback boundaries in the field is done by CALM specialist staff responsible for dieback interpretation using large scale aerial photography. These officers will mark dieback boundaries using yellow flagging tape on trees or bushes.* […]" (p. 56)

Specification 5.2 Protection of Soil (Including Rehabilitation Measures)
"*(d) Dispersal of water from interceptor drains:*
The interceptor banks/drain must be constructed so that water is directed into vegetation or silt traps without ponding. Water must not be diverted into another drainage line. Water must not be diverted into dieback free forest." (p. 67)

Specification 7.8 Issue of Quarantine Entry Permits
"*1. No vehicle, truck or logging machine may enter a quarantine area (Disease Risk Area) without a permit signed by a Forest Officer.*
5. All vehicles/machine operating inside a quarantine area must carry a quarantine entry permit at all times, and be prepared to show the permit to a Forest Officer on demand." (p. 58)

POLICY – 1985

Policy Statement No. 3 : Dieback and Logging. 1985

Dieback and Logging Policy – CALM Department
"*The Policy Directorate is developing policies for the protection of National Parks, Nature Reserves and State Forests from dieback.*

As the first step in this process, the Directorate has reviewed the former Forests Department's Dieback policy 1982 and its application to logging in State forests. Decisions arising from this review are spelt out in this Policy Statement, together with guidelines for implementation." (p. 1)

Policy
"*(1) CALM WILL CONTINUE TO IMPLEMENT DIEBACK POLICY 1982, IN ALL HARDWOOD LOGGING OPERATIONS IN STATE FORESTS.*

(2) CALM WILL CONTINUE WITH THE EVALUATION OF OPERATIONAL PROPOSALS ON ALL ITS LANDS, USING THE 7-WAY TEST.

(3) CALM WILL CONTINUE WITH THE IMPLEMENTATION OF 'POLICY 12'." (p. 1)

Comment
"*These decisions recognise that although our dieback knowledge is incomplete (e.g., the terminal impact of the disease on all forest types is not yet clear) the Dieback Policy and the 7-Way Tests are still appropriate management tools. This decision will stand until an integrated Departmental Dieback Policy for all CALM lands is developed, or until new research findings which affect the policy become available.*" (p. 1)

Implementation of Policy
"*Guidelines for the implementation of the Dieback Policy and 7-Way Tests for LOGGING different areas of hardwood forest are as follows:*

(1) *Forests South of the Preston River (see attached map – area 3)*

1.1 *Logging equipment will be cleaned down before entering and leaving a Karri coupe. Current arrangements with respect to soil damage will continue, as prescribed in the Industry Control Manual (ICM) used in the Chipwood Licence Area.*

1.2 *Jarrah types will be logged using the most up-to-date hygiene prescriptions. On low to moderate impact sites skidding under moist soil conditions will be permitted. Current arrangements with respect to soil damage will continue, as prescribed in the (ICM).*

1.3 *On sites where high impact is anticipated or the consequences are high (e.g., areas around Kirup, or where karri is upslope of high impact sites) logging under dry soil conditions only may be required. These areas will be automatically identified in the evaluation of the 7-Way Test, and appropriate conditions laid down before the 7-Way Test is approved.*

Comment
This decision is based on the fact that few areas in the Southern forest show signs of high impact, though some deaths in the under-storey and of jarrah trees have occurred on some sites." (p. 2)

"*(2)* *Forests in the Sunklands - (see map – area 2)*
Jarrah types will be logged using the most up-to-date hygiene prescriptions. On low to moderate impact sites skidding under moist soil conditions will be permitted. Arrangements with respect to soil damage will continue as prescribed in the ICM." (p. 3)

Comment
This decision recognises that many areas of the Sunklands forest are dieback-free and that some are of high quality. Dieback hygiene, including dieback-free and impact mapping is required. Dry soil logging is preferred.

[…]

Moist soil logging will not be permitted in dieback-free areas outside quarantine which have been recently burnt, or where there is no vegetation survey and adequate dieback-free plans.

(3) Forests North of the Preston River (see map – area 1)

3.1 *Logging machinery will be washed down before entering and leaving a wandoo coupe. Current arrangements with respect to other environmental factors are prescribed in the Departmental Working Arrangements.*

3.2 *Jarrah types will be logged using the most up-to-date hygiene prescriptions. On low impact sites, skidding under moist soil conditions may be approved. On moderate to high impact*

sites, in areas of dieback-free or uninterpretable forest, hauling and skidding operations which move wet, sticky soil are not permitted.

Current arrangements with respect to other environmental factors are prescribed in the Departmental Working Arrangements.

3.3 It is acknowledged that definition of impacts is still imprecise. While research on definition of impact is proceeding, with the approval of the Executive Director, moist soil operations in dieback-free and uninterpretable areas may be permitted, under strict hygiene.

Comments
These decisions recognise the sensitivity and importance of these forests, especially those on catchments in the zone of high salinity. Sensitive areas will be identified by the 7-Way Test and appropriate conditions laid down before the 7-Way Test is approved." (p. 3)

"*Moist soil logging will not be permitted in dieback-free areas outside quarantine which have been recently burnt or where there is no vegetation survey and adequate dieback-free plans.*

With the approval of the approval of the Executive Director some areas may be logged in moist soil conditions when the risk of fungal spread and survival is higher. These operations will be directed to areas where dieback-free and hygiene maps are available and where vegetation and landform mapping has been done." (p. 4)

POLICY STATEMENT - 1985

Forests Department Annual Report 1 July 1984 to 21 March 1985. 1985

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1982, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

MANAGEMENT PLAN (NORTHERN) – 1985

Northern Forest Region : Working Arrangements and Management Program. 1985

5. Land Management
State Forest and Timber Reserves
"*Within State forests, Timber Reserves and other Crown lands vested in the Conservator of Forests, to conserve the full range of forest values. This involves:*

[…]
- *Forest Protection: To maintain and add to the area of permanently reserved forests; to protect these forests from fire, insects and other harmful agencies, and to maintain and improve the health and vigour of the forest area.*" (p. 23)

Dieback Control (Including N.P. & N.R.)
"*Large areas of the Northern Jarrah Forest are susceptible to severe impact from dieback disease.*

Significant improvements in containment of the disease have been achieved through legislation (e.g. D.R.A.) hygiene and research.

Constant vigilance is required to ensure standards are applied effectively and latest research findings are incorporated into prescriptions and strategies for forest management." (p. 28)

Objectives

- "*Department G.W.P. 87. Classify the forest for disease management, apply hygiene, rehabilitate infected area, implement operational trials in hygiene, disseminate information on hygiene, disseminate information on disease and liaise with other organizations on control.*

- *Region. Obtain dieback plans for all C.A.L.M. Lands and decide appropriate hygiene strategies.*

  Reinforce working group approach to implementation of dieback hygiene by industry e.g. 'Working Arrangement' for Alcoa and Bunnings. Expand public education on dieback hygiene requirements through recreation information programme and other venues.

  Implement 7-Way Test for all operations in susceptible forest outside D.R.A. and full dieback 82 policies for D.R.A." (p. 28)

Strategies

- "*Provide training in dieback hygiene for all C.A.L.M. Staff in Districts.*" (p. 28)

- "*Develop 'disease containment' prescription for N.P. and N.R. using road closure and other controls available under legislation.*

- *Develop priorities for disease control by developing forest zone based on site susceptibility and risk of infection.*

- *Review change of demands for access into D.R.A. to determine what can be accommodated under dieback 82 policies.*

- *Assess effectiveness of current control procedures e.g. boundary patrols and re design where necessary.*" (p. 29)

6. Industry
Hardwood Logging
Objectives
"[…] *Develop integrated logging for maximum range of saleable products with minimum risk of dieback spread.* […]" (p. 33)

Strategies

- "*Implement 7-Way-Test for all logging in susceptible forest outside D.R.A. and full dieback policies 82 within D.R.A.*

- *Update 5-Year strategic plans and 2 year detailed plans and discuss with industry to provide opportunity for maximum environmental control preparations e.g. roading in summer for dieback.*

- *Encourage and assist with stockpiling and other hygiene.*

- *Tailor environmental control prescriptions to site susceptibility and risk of dieback spread as well as other requirements.*

[…]" (p. 33)

MANUAL – N.D. –1985?

Dieback Interpretation Procedures Manual. N.D. 1985?

Introduction
"*This procedure manual has been prepared as a guide for all interpreters.*[…]" (p. 4)

"*Interpreters are required to be thoroughly familiar with the procedures in this manual. These procedures are the benchmark of the dieback mapping work and must be rigorously adhered to.*

The highest standard of work is required at all times from interpretation staff, anything less is not acceptable." (p. 4)

1. Preparing for Interpretation
1.1 Film:
"*The 230mm film will be sent to the interpreters. This will consist of one set of colour transparencies and one set of colour prints.*

Ensure all frames have arrived. Record fact in photo records book. Check film quality on arrival and advise OIC Interpretation Standards immediately if you have any queries regarding the film." (p. 5)

1.2 Flight Line Maps:
"*Six flight line maps will be sent to the interpreters by Mapping Branch:*
- *office copy*
- *field copy*
- *Armillaria map*
- *sample location map*
- *two spare copies*" (p. 5)

1.3 API Type Map:
"*These give a broad indication of forest types and distribution.*" (p. 5)

1.4 Cutting and Burning Records:
"*These give the interpreter an overview of activities that have taken place in the forest. Provide background information on why the forest has a particular appearance at the time of photography.*" (p. 5)

1.5 Aerial Photographs:
"*Obtain a copy of the latest Lands Dept. photography over the cell.* […]

The photography is useful for
- *general topography*
- *forest types*
- *preparing Hygiene Maps*" (p. 5)

1.7 Priority Areas
"*Liaise with R/L Operations, R/L Planning and Section Manage with regard to priorities placed on parts of cells ie.*" (p. 5)

1.8 DRA Permits
"*If the Cell is within the Disease Risk Area (D.R.A.)*

- *determine the D.R.A. boundary.*
- *obtain a permit to enter and ensure all conditions are observed.*
- *obtain a list of current permit holders in the Cell Area and the locations of illegal entries, if known.*" (p. 6)

1.9 Cell Reconnaissance:
"*Traverse the cell boundaries and internal access roads. Note any irregularities such as burning, recent falling, road works. D.R.A. entries, disease infections and expressions, topography and gravel pits.*" (p. 6)

Indicator Species Distribution
"*Obtain an overview of Indicator Species Distribution (I.S.D.) throughout the cell, note any uninterpretable areas. It is useful to note the different forest types, landforms and vegetation complexes present, in relation to the density and the species present.*" (p. 6)

1.11 Previous Dieback Mapping:
"*Check with Inventory to see if any high standard dieback mapping has been done in the area previously. This is relevant as it shows extent of disease distribution and areas of disease for checking impact on during reconnaissance.*" (p. 6)

2. Interpretation
2.1 Office
"*Each interpreter must closely scan the 230mm frames. The second interpreter to view the frames must ensure he contributes to the interpretation by marking on the areas where he differs from his partner eg.*

- *extra I.S.D.*
- *dieback and uninterpretable boundary differences*
- *extra check sites*

On every frame viewed determine if there are sufficient indicator species visible to detect the presence of P. cinnamomi. If there are insufficient indicator species visible the area is to be called uninterpretable. All indicator species deaths (I.S.D's) are to be marked on the film using the following symbols." (p. 7)

"*Due to the large area covered by each frame, great care is to be exercised when scanning for I.S.D's and Check Sites. A grid (50 x 50mm) is to be marked on the office light source and a system of scanning these squares be adopted by each interpreter. All frames are to be scanned by both interpreters.* […]" (p. 7)

2.2 I.S.D. Map
"*The principle point of each photo that has any I.S.D, check sites or uninterpretable information, is highlighted on the 230 mm principle point map.*

This map is used along with the film as the basis for all field checking." (p. 7)

2.3 Field Checking
"*All dieback and suspect boundaries will be checked and plotted onto the color transparencies in the field*." (p. 8)

"*The boundaries are to be plotted onto the transparencies using distinct features such as logs, tracks, stags etc.*" (p. 8)

"*The color transparencies are to be retained by the interpreters at all times. They are the record of I.S.D's found, boundaries plotted, sites visited, checked and sampled, for the interpreters. All this information is to be retained on the transparencies at the completion of interpretation for future reference and enquiries.*" (p. 8)

3.Sampling
3.1 Aim
"*Sampling is used initially to ensure P.cinnamomi can be recovered by the laboratory from certain species and to establish the reliability of indicator plants in a particular cell. […]In most cases sampling isolated dead plants is the only way of determining if P.cinnamomi present.*[…]" (p. 9)

3.3 Procedure

" - *Navigate to the dead plant or plants using the 230mm film. Once the plant has been located, thoroughly investigate the site.*

- *Identify the sample with cell, run, frame No. and frame sample number.*

- *Sample a recent dead plant. This procedure is detailed in Appendix 5.*

- *Complete a field sheet. This procedure detailed in Appendix 6.*" (p. 9)

3.6 Office Procedure

Sampling Records Sheet

"*For each sample collected, the following details are entered on the Sampling-Records Sheet, Appendix 7, prior to despatch to the Research Section at Dwellingup*.

1)Frame and sample number.
2)Date the sample was taken.
3)The topographical location class.
4)The symptom class the sample was taken from eg. Isolated, Multiple.

- One of these sheets will be used per run (if 230mm) or roll (if 70mm).

- Samples and the photocopies of the Sampling Records Sheet will then be despatched together to Dwellingup Research.

- The processing results will be sent on a photocopy sheet from Dwellingup to the interpreters.

- For subsequent samples on the same run, rule off under the previous samples, enter the new details, photocopy the sheet and send this with the samples." (p. 10)

3.7 Sample Location Map

"*A flight line diagram will be provided by Mapping Branch and details of samples taken will be recorded as follows by the interpreters:*

1.For each frame, record the sample number and beside this, record the relevant sample information by use of a symbol. […]" (p. 11)

Hygiene Data

"*4.1 The Hygiene Map provides information that can be classified into two areas.*

1. *It accurately show the location of <u>P.cinnamorni</u> infections at a point in time. The boundaries are precise and are easily recognized by the trained interpreter.*

2. *It provides information about the possible presence of the disease (Uninterpretable, N.E.Q.) and the risk.of disease spread by natural and artificial means.*

The categories that are used do not have precise, easily recognized boundaries, as do area of Dieback. They are zones with an accuracy of around 50m. The [sic] *define areas of functional co-herance. They are intellectual creations that enable us to order particular places within general frames and are mapped to assist planners in recognizing (at least to some degree) what the of the disease might be. Operations personnel cannot place an exact boundary on these conceptual categories, and probably need a good deal of training in understanding the concepts and limitations of such maps.*

The map categories are listed in a particular order. This was done with the intention of assigning a priority to each category that is relative to disease presence. The category considered to have the least likelihood of Dieback presence and is not considered at risk from natural spread is at one end of the scale of priorities, while at the other end is the Dieback category. Relating this to operations then, it is considered there is little or no risk of spreading Dieback from secure Dieback-free forest, but there is certain risk of spreading disease from Dieback areas. The categories between are considered to have different levels or risk equated to the Position within the hierarchy of categories.

In working with the low and high potential risk categories the Interpreter is stretching his knowledge of disease behaviour to the limit. What he is predicting may in fact not occur, relative to degree or place.

Though the definitions of the categories set down guidelines for the determination of particular risk, they must be considered guidelines only, and not as institutionalizes laws. The interpreter is the judge and jury alone. What he determines to be the risk is final. No one else has the local knowledge and insight to disease behaviour to do anything different." (p. 12-13)

4.2 Legend

"*Secure Dieback-Free: Forest apparently free of Dieback and upslope from Dieback, Suspect, Uninterpretable, and N.E.Q. roads.*

Low Potential Risk: Forest apparently free of Dieback but downslope from Dieback, Suspect, Uninterpretable or N.E.Q. Considered to have a low potential for infection by P. cinnamomi by natural spread.

Uninterpretable: Forest in which susceptible plants are absent or too few to enable the interpretation of P. cinnamomi presence or absence.

N.E.Q: Forest adjacent to roads in which there is a potential for incipient disease.

High Potential Risk: Forest apparently free of Dieback or uninterpretable, but downslope from or 1 . n the same swamp as dieback or suspect. Considered to have a high potential for infection by P. cinnamomi by natural spread, in free water.

Suspect: Forest in which the evidence for P. cinnamomi presence or absence is inconclusive.

Dieback: Forest areas which show current Dieback symptoms and are supported by laboratory recoveries of P. cinnamomi from soil and tissue samples.

N.B. N.E.Q. Not Effectively Quarantine - Roads, tracks within the disease risk area that have had considerable use throughout all seasons with an unknown degree of Hygiene.

Incipient Disease - Forest in which P. cinnamomi may be present but symptoms are yet to appear." (p. 13)

Mapping Categories

"1.*Dieback:*

Forest areas which show dieback symptoms and are supported by laboratory recoveries of P. cinnamomi from the soil and tissue samples.

- *P. citricola infections are shown on the Hygiene plan as the same color as P. cinnamomi infections with a notation identifying the infection as P. citricola.*

2. Suspect:

Forest in which the evidence for P. cinnamomi presence or absence is inconclusive. (Blue on dieback-free forest maps). The suspect category is a legitimate category, not a haven for indecision. Some sites will exhibit some but not all the diagnostic elements of an infection - these sites are most accurately described as suspect. Intensive sampling can often be used to determine if P.cinnamomi is present in these areas.

3. High Potential Risk (H.P.R):

The high potential risk category is determined from local knowledge and 1:25,000 Black and White aerial photographs. That forest downslope from or in the same swamp as Dieback or Suspect. Considered to have a high potential for infection by P. cinnamomi by natural spread, in free water. The water can be above or below ground flow.

4.N. E.Q:

Roads and tracks within the cell that have had considerable use during all seasons with an unknown degree of Hygiene are shown as not effectively quarantined. The forest adjacent to these roads is shown as N.E.Q. on the map. All open access roads (purple on coloured 1:50,000 scale maps) fall into this category plus roads and tracks where breaches of quarantine have occurred. The N.E.Q. Zone is approximately 50 metres wide on both sides of N.E.Q. roads and tracks.

5.Uninterpretable:

This category is used to account for a number of situations.

1. *Forest recently burnt or logged will be delineated and identified by the words burnt or logged and the date this occurred. Such areas are considered to be temporarily uninterpretable and may require further interpretation some time after burning or logging.*" (p. 14)

"*2. Areas of non forest such as gravel pits, transmission lines, roads, areas of rock, areas of forest cleared.*

3. Forest in which susceptible indicator plants are absent or too few to enable interpretation for the presence or absence of P. cinnamomi.

Within all categories, areas less than 1 hectare are not considered, but are mapped in conjunction with the forest around the area. To map such small areas would require a change in the map scale.

It is the third category (above) which requires considerable investigation. Interpreters must interpret dieback-free forest on the basis of the live indicator plants present. It is not.possible in some forest types to detect indicator plants due to their absence (as in karri, wandoo forests, swamps), scattered nature (as in some eastern forest types), or by the fact that they may be obscured by dense canopy or scrub. Field investigations are necessary in some of these forest types. Within some of these forest types ie. within dense karri, karri-marri or dense swamps, it is not possible to detect indicator plants, indeed they often do not occur in such situations.

In situations where field investigations are to be carried out it is necessary to consider the distribution, reliability and the stature of the indicator plants present. It is necessary to use the 'strip line' approach with the parallel lines about 15-20m apart. Where there is any doubt about the reliability of decision relative to disease presence or absence, the area should be classified as uninterpretable.

Over larger areas it may be possible to classify the forest using photo-interpretation with field checks to verify the interpreted decisions. Field checks should be made within all the different landform/vegetation segments

that are being mapped. Where film interpretation cannot be verified, considerable work will be necessary to adjust interpretation standards, or begin detailed 'strip line' surveys.

The boundaries of uninterpretable forest are often difficult to determine. In such situations boundaries should be shown at a point where interpreters are absolutely sure that it is possible to detect, interpret and map disease occurrence." (p. 15)

"*This mapping category must be used with the same degree of reliability as any other. This will mean considerable time must be expended in accurately determining the degree of interpretability and the boundaries of such areas.*

Uninterpretable will have a hatch over it. Where it is covered by a category that is higher in priority relative to disease presence (H.P.R. or N.E.Q.) the hatch and the boundary will continue.

This will ensure that all uninterpretable areas can be located on the map by the users." (p. 16)

6. Low Potential Risk
Areas of forest downslope from Dieback and Suspect but considered to have a low potential for infection by P. cinnamomi by natural spread. Areas downslope from uninterpretable and N.E.Q. are also included in this category.

7. Secure Dieback-free
The area of forest apparently free of Dieback, and upsIope from Dieback, Suspect, Uninterpretable and N.E.Q." (p. 16)

4.4 Compiling Hygiene Data
"*1:25,000 scale Black and White aerial photograph are available from Mapping Branch*. […]" (p. 16)

"*1. Areas of forest that are known to be infected with P.c. <u>and adjoining</u> the area mapped, but are outside -the existing mapping boundary, should be included and plotted to approximately 50 metres outside mapping boundary. Mapping Branch staff will then amend the boundary to include such areas*." (p. 16)

"*2. Areas of forest known to be infected with P.c. that are <u>outside</u> the mapping boundary and do not adjoin any part of the mapping areas, but will influence that area are not to be shown on the map. The influence zone from this infection will appear on the Hygiene map within the boundary of the mapping cell.*

2. *N.E.Q. roads will continue to be plotted on both sides of the road, even when this means that one half of the road will be shown as yellow colour outside the mapping boundary*." (p. 17)

Impact Data
"*5.1. … A map showing the current situation in terms of overstorey impact related to <u>P. cinnamomi</u> infections provides information on the effect the disease is having on the forest. (That is the number of plants being killed). Also provides information relating to the area of forest being affected severely, less severely or hardly at all. Provides planning and operations staff with an accurate graphical representation of areas of forest that are affected to varying degrees, enabling logging, and road operations to be directed to particular areas of forest. This information is an important step to providing potential impact in areas of forest not yet affected.*" (p. 18)

5.2 Legend
"*<u>No Impact:</u> This includes areas of Dieback-free, Uninterpretable, Suspect P. citricola and Armillaria affected forest.*
<u>Low Impact</u>: Some susceptible plants in the understorey killed by Phytophthora cinnamomi.

Moderate Impact: Many susceptible plants in the understorey killed by P. cinnamomi with less than 10 percent of overstorey dead or dying.
High Impact: Many susceptible plants in the understorey killed by P. cinnamomi with greater than 10 percent but less than 5- percent of the overstorey dead or dying.
Very High Impact: Many susceptible plants in the understorey killed by P. cinnamomi with greater than 50 percent of the overstorey dead or dying. […]" (p. 18)

5.3 Compiling Impact Data
"*The information is compiled from local knowledge acquired during interpretation of the cell and plant deaths visible on the film. The boundaries will be a zone rather than a distinct line.*" (p. 18)

Vegetation Data
"*Interpreters are required to provide vegetation distribution data for the purpose of predicting disease impact, both within and outside State Forest.* […]" (p. 19)

"*- Check with State Headquarters and other Sections within the Department to see if any detailed vegetation work has been done in the area previously. If so check with the relevant supervisors to see if the information is sufficient. (eg. R/L Operations, Section Manager Inventory, Forester - Standards A.P. & I.)*

- If more is required then a vegetation assessment is to be done." (p. 19)

6.2 Vegetation Assessment Method 1
6.2.1. Preliminary Office Procedure
"*- Use vegetation information above (if available) to indicate possible trends and classifications of vegetation to be expected in the area.*

- Use 1:25,000 (or 1:12,500) scale plan of area to record and direct assessment work.

- Plan and draw in intended assessment lines at 200m intervals. […]

- Topography changes can be detected using large scale aerial photography (1:25,000, 1:50,000) or contour plans where available.

- If area is DRA ensure that a current permit for entry has been issued.

Cheek which rainfall zone the area is in as this will affect the present or absence of certain vegetation segments."(p. 19)

6.2.2 Preliminary Field Procedure
"*- Do a reconnaissance of the area by vehicle.*

- Check for openness of tracks, vegetation segments present and the current impact status on any areas of dieback. Check what vegetation segment occurs on these dieback sites. (See 6.4 below)

- Check that roads intended for use as end points of assessment line's are present and trafficable (if vehicle access is necessary).

- Alter positions of assessment lines if necessary to accommodate changes due to inaccessibility." (p. 20)

6.2.3 Field Procedure
" *- Using a compass and hipchain walk along each assessment line recording the vegetation segment that is present at each 100m interval and at any perceived point of change in the vegetation segment along the line.* […]" (p. 20)

6.2.4 Office Procedure

"- *Transfer assessment data onto a plan and join up common points on boundaries where applicable*." (p. 20)

6.3 Method 2

"*This method incorporates the use of 70mm or 230mm aerial photography that has been taken of the area to be assessed.*" (p. 21)

6.3.1 Preliminary Office Procedure

- *Use vegetation information above (6.1) to indicate possible trends and classifications of vegetation to be expected in the area.*

- *Choose random sites on the flight line diagram to do plots.*

- *Choose random areas, across contours, to do sample assessment lines. Mark on the flight line diagram.*

- *If area is DRA ensure that a current permit for entry has been issued.*

- *Check which rainfall zone the area is in as this will affect the presence or absence of certain vegetation segments."* (p. 21)

6.3.2 Preliminary Field Procedure

- "*Do a reconnaissance of the area by vehicle.*

- *When travelling through and around the area do sample plots at the preselected (random) sites. Record exact position of plot on film.*

- *Do a number of assessment lines at the predetermined positions. Record exact position of lines and plots on film.*

- *Determine the vegetation segment classifications for individual and line plots.*

- *By the end of the reconnaissance an appreciation of general vegetation segment presence and distribution should have been gained."* (p. 21)

6.3.3 Office Procedure

"- *Cheek the plot sites on film to establish the visual attributes of the vegetation segment that is at each plot.*" (p. 21)

"- *Note any areas where the vegetation segments in the field are different but the visual attributes on film are the same. These areas must be set aside for strip line assessment to determine boundary positions.*

[…]

- *It is important that interpreters take a lot of care in defining vegetation segments from the film.* […] *The golden rule is 'If in doubt, check'.*" (p. 21)

Determination of Vegetation Segment at Plots:

"*6.4.1 On the plot sheet (Appendix 13) record vertically the occurrence of trees and undergrowth. The ratings are:*

- *For trees, an area of 40m radius from the observation point.*

0 - Absent.
1 - One or two trees.
2 - Three to five trees.
3 - More than five trees, but contributing less than one third of total stand.
4 - Between one third and one half of total stand.
5 - More than one half of the total stand.

For undergrowth, an area of 20m radius from the observation point.

0 - Absent.
1 - Very rare, seen only after careful search.
2 - Present, observable, but in small numbers only.
3 - Common locally, but not uniformly over the whole area.
4 - Common over the whole area.
5 - Completely dominating the undergrowth.

(Havel 1975 : page 70)" (p. 22)

"*6.4.2 Record for the plot the number of representatives from each Indicator Group (shown on right hand side of plot sheet) and their occurrence rates on the Vegetation Distribution Decision Sheet.*

6.4.3 Cross out any indicator groups that are not represented.

6.4.4 Cross out obvious non-types eg. Wandoo on Blackbutt presence or absence is indicative of certain types. Directly opposing types in relation to topography (eg S and E).

6.4.5 Underneath the table in the Decision Sheet, record the number of occurrences of each vegetation segment across the eight columns, Eg. Z-1, T-4, U-1 etc.

6.4.6 There will usually be a small number of segments left with higher ratings than the others. Again, eliminate the very low occurrence level indicators.
[…]
CAUTION: Be careful not to eliminate segments with one or two high occurrence wet site indicators." (p. 23)

6.5 Conclusion
"*The two methods of vegetation assessment currently being used by interpreters are described above.*
[…]

The decision on which method to use in a given area will depend on when the information is required, how much interpreter time is available and the degree of accuracy that is required by the user of the data.
[…]" (p. 23)

Armillaria Map
"*The purpose of the map is to show the distribution of Armillaria throughout a mapping cell.*" (p. 24)

Requests by Regions/Districts
"*Interpreters are often required to assist regional and District staff with disease protection and dieback demarcation, see Appendix 11 'Demarcation Procedures'. It is important that interpreters ensure that the request contains the following:*

The type of information or level of assistance required is clearly stated together with the purpose of the request. It is important to identify who will be using the information.

When the information is required or completion date.

Format for information (ie. Map, table, short report etc.).

Accuracy level." (p. 25)

Motorbike Use and Safety
Motorbike Use in D.R.A.

1. *Bikes must be cleaned down regularly. Whenever soil or plant tissue is adhering to the machine it must be cleaned.*
2. *Bikes must be used only when dry soil conditions occur.*
3. *Creeks a*nd wet areas *must not be crossed when it is likely* t*hat soil will adhere to the bike and be transported elsewhere.*

[…]

5. *Bikes must be used as <u>transport</u> in the field.* […]

Above all else, interpreters must be aware that the situation in which they intend using a motorbike must pass a 7 Way Test." (Appendix 3, p. 1)

Appendix 5 Sampling Procedure
"*Upon reaching the site and having thoroughly investigated the area. Select a recently killed plant for sampling.*

Ensure the mattock has been sterilised.
Clean leaves, twigs and soil from around the base of the plant
Chop sections of root, bark and cambium from all sides of the plant.

<u>Banksia species</u>: Collect sections of the collar region, include lateral roots. […]

[…]
Collect several handfuls of soil from around the base of the plant. The mattock can be used to lift soil into the sample bag. This reduces the risk of cross contamination due to infected material on the hands.
[…]" (Appendix 5, p. 1)

Sampling of plants suspected to be susceptible to P. cinnamomi.
"*If plant identity is unknown, collect a part of the branch/leaf section and if possible a specimen of the flower.*
[…]

Collect root and collar tissue plus a soil sample from around the plant.

Sample is processed in the normal fashion except for:

i) *Dwellingup Research is to be informed of the nature of the sample ie. a plant being tested for susceptibility as an indicator of P. cinnamomi.*

ii) *Ask for the roots to be surface sterilized and then plated.*

iii) *If root material is found to have <u>P. cinnamomi</u> then the number of cuttings plated and the number of cuttings showing fungal growth are to be recorded.*

v) *If a sample returns a positive result only in the cup on the first process, it must be processed again as a positive result on the plate is essential.*

vi) *It is essential that the sampler keep clear, accurate records of all sampling done to test reliability or susceptibility of plants as <u>P. cinnamomi</u> indicators.*" (Appendix 5, p. 2)

Appendix 6 : Completing Sample Information Sheets
"*The information recorded must provide the reader with a brief, but detailed insight to the forest within close proximity, … the site characteristics – the factors that determined … the sample was taken; the factors that were reviewed in making the interpretation; perhaps a comment about what the disease might do in the future ie. R.O.S., impacts; and what can be determined. Interpreters must be instructed in , and … able to complete, filling out these sheets to a satisfactory, standard. The standards control officer must be able to quickly and easily gain an insight to the salient features occurring at any site.*" (Appendix 6, p. 1)

NOTE: REFER TO DOCUMENT FOR DIAGRAM - Relative Importance of Observable Factors

Appendix 11 : Dieback Demarcation Procedures
"*The currently approved 'Dieback Demarcation Procedures' for our Department are shown below! They are taken from page 21 of 'Working Arrangements and Environmental Control Specifications for Burning, Logging Operations in the Northern jarrah Forest' Oct. 1st, 1985.*" (Appendix 11, p. 1)

4.Pre-Logging-Operations:
"*A C.A.L.M. officer is responsible for establishment and supervision of coupes.*

4.1 *Coupe boundaries to be identified by white painted - crosses around total cutting area - crosses facing into coupe.*

4.2 *- Dieback risk boundaries must correspond to hygiene plan boundaries. These are demarcated by C.A.L.M. officer. These should be checked by experienced interpreters (or experienced District personnel) for accuracy before operations commence.*

- These boundaries are to be taped yellow and blazed on 3 sides - 2 blazes will face along the line and the third will face into dieback bush. All blazes to be painted yellow.

4.3 *- C.A.L.M. officer and Bunnings Foreman demarcate sub-coupe boundaries with red flagging tape increasing to three red tapes on corners and defined junction points.*

- 'Special care zones' are demarcated by C.A.L.M. tree marker with white painted crosses on one side facing sub-coupe area.

[…]" (Appendix 11)

LEGISLATION - 1984

<u>Conservation and Land Management. No. 126 of 1984</u>

"*AN ACT to make better provision for the use, protection and management of certain public lands and waters and the flora and fauna thereof, to establish authorities to be responsible therefor, and for incidental or connected purposes*

[Assented to 8 January 1985]" (p. 1881)

Part IV. - Department of Conservation and Land Management
Division 1. - Establishment of Department

"*33.(1) The functions of the Department are, subject to the direction and control of the Minister-*

(a) to manage land-

(i) to which this Act applies; or

(ii) which becomes subject to the management of the Department under subsection (2), and the associated forest produce, fauna and flora;

(b) to provide the Commission, the Authority and the Council with such assistance as they may reasonably require to perform their functions;" (p. 1905)

"*(d) to be responsible for the conservation and protection of flora and fauna throughout the State, and in particular to be the instrument by which the administration of the Wildlife Conservation Act 1950 is carried out by the Executive Director pursuant to section 7 of that Act;*

(e) to carry out or cause to be carried out such study or research of or into-

(i) the management of land to which this Act applies; and

(ii) the conservation and protection of flora and fauna, as the Minister may approve;

(f) to provide advice to, or undertake work for or jointly with, and to supply services or facilities to, any department, public or private body or other person if that Minister is of the opinion that the provision of that advice or the undertaking of that work is in the public interest;
(g) upon request by the Minister to whom the administration of the Land Act 1933 is committed, to advise him on the reservation, alienation, and disposal of Crown land in rural areas under that Act." (p. 1906)

"*33(3) The management of land referred to in subsection (1) (a) (i) and the associated forest produce, flora and fauna shall be carried out-*

(a) where there is a management plan for the land, in accordance with that plan; or" (p. 1906)
"*(b) where there is for the time being no such plan-*
(i) in the case of national parks and nature reserves, in such a manner that only necessary operations are undertaken; or
(ii) in any other case, in accordance with the provisions of section 56 applicable to the land.
(4) In subsection (3) (b), 'necessary operations' means those that are necessary for the preservation or protection of persons, property, land, flora or fauna, or for the preparation of a management plan.

(5) Nothing in subsection (1) shall be read as limiting the functions of the Commission and the Authority under sections 19 and 22 respectively.

34. Subject to this Act and the Public Service Act 1978, the Executive Director has power to do all things that are necessary or convenient to be done for, or in connection with, the performance of the functions of the Department." (p. 1907)

Part V. – Management of Land
Division 1. – Management Plans
"*54. (1) A controlling body shall be responsible-*

(a) for the preparation of proposed management plans; and

(b) the review of expiring plans and preparation of further management plans,

for all land which is vested in it whether solely or jointly with an associated body.

(2) This Part applies to the preparation of a plan under subsection (1) (b) in the same way as it applies to the preparation of an initial management plan." (p. 1914)

"*(3) Proposed management plans for any land shall be prepared-*

(a) by the controlling body for that land through the agency of the Department; and

(b) within such period after the commencement of this Act as is reasonably practicable having regard to the resources of the Department available for the purposes." (p. 1915)

"*55. (1) A management plan for any land shall contain –*

(a) a statement of the policies or guidelines proposed to be followed; and

(b) a summary of the operations proposed to be undertaken,

in respect of that land during a specified period which shall not exceed 10 years.

(2) A management plan shall state the date on which it will expire, unless it is sooner revoked, but notwithstanding anything in this section or in the plan, a plan which would otherwise expire shall, unless it is revoked, remain in force until a new plan is approved." (p. 1915)

"*56. (1) A controlling body shall, in the preparation of proposed management plans for any land, have the objective of achieving or promoting the purpose for which the land is vested in it, and in particular management plans shall be designed –*

(a) in the case of indigenous State forest or timber reserves, to ensure the multiple use and sustained yield of that resource for the satisfaction of long-term social and economic needs;
[…]" (p. 1916)

"*(2) In subsection (1) (a) 'multiple use' means as many different uses as are possible and compatible among themselves.*" (p. 1916)

62(2) A classification, or amendment of classification, of any land or waters shall not be made under this section-

(a) unless it is in conformity with the provision of section 56 which is relevant to, or any management plan for, that land or those waters; and

(b) in the case of land to which section 16 applies, unless the owner, and any person occupying the land with the consent of the owner, has given approval in writing to the classification or the amended classification.

(3) This section applies to any national park, nature reserve, marine nature reserve or marine park." (p. 1919)

Part VII. - Control and Eradication of Forest Diseases

"*86.(1) Where land held as a mining tenement under the Mining Act 1978 is in a risk area or a disease area and the holder of the tenement intends to explore or exploit a part of it he shall, at least 3 months before the day on which he intends to commence to do so, give to the Minister notice in writing thereof in which the part of the tenement and that day are specified.*

(2) Where the holder of a mining tenement gives notice, under subsection (1), the Minister shall give him written authority to explore or exploit, as the case may be, the part specified in the notice on and after the day so specified unless the Minister, after consultation with the Minister to whom the administration of the Mining Act 1978 is for the time being committed, has good and sufficient reason to the contrary, but the holder may do so only-

(a) by entering that part by a route described in the written authority; and

(b) subject to such conditions as are specified in the written authority.

(3) A holder of a mining tenement shall not contravene or fail to comply with the terms of a written authority given under this section.

Penalty: $500." (p. 1930)

Part IX. – Offences and Enforcement
Division 2. – Forest Offences
"*108. No person shall-*
[…]
(e) unlawfully cut, break, throw down or in any way destroy or damage any building, fence, or gate, in or enclosing any State forest or timber reserve or unlawfully cut through or break down or otherwise destroy the bank, dam, or wall of any part of any natural or artificial reservoir or pond of water within or partly within and adjoining any State forest or timber reserve." (p. 1940)

Part X - Regulations
Regulations as to forest diseases
"*129. (1) The regulations may provide for -*
(a) the prohibition or regulation of the admission to risk areas or disease areas, and the use or movement therein, of potential carriers or classes of potential carriers;
(b) the regulation of the conduct of persons in respect of potential carriers in risk areas or disease areas;
(c) the notification, and the manner of notification, of any occurrence, or suspected occurrence, of infection and the furnishing by persons of all information within their power in respect of any such occurrence or suspected occurrence;
(d) the conferral of power on an authorized person to stop and examine any potential carrier and to signpost and barricade roads for that purpose;
(e) the detention, control, removal, treatment, cleansing and quarantine of infected carriers, or potential carriers or infected earth, soil or trees;
(f)in respect of an alleged breach of the regulations or any condition, involving a potential carrier, the circumstances under which the owner of the potential carrier is deemed to be the person in charge of the potential carrier at the time of the offence ..." (p. 105)

POLICY STATEMENT - 1984

Forests Department Annual Report 1984. 1985

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1982, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

FORESTERS' MANUAL – 1984

Foresters' Manual : Part 2 : Field Administration. 1984 [in *Foresters' Manual*. 1979]

Alienating Land Must Not Interfere with Land Management Procedures
"*2.031 It is important that good quality suitably situated forest be retained for dedication as State forest, particularly in the case of forest growing in soils resistant to Phytophthora cinnamomi.*[…]" (p. 11)

RECREATION PLAN – [1984]

Forest Recreation Framework Plan. [1984]

Definitions
"*Management Priority Areas – the forest has been divided into areas in which the dominant and secondary uses are specified and their priority ranking nominated. Each unit is known as a management priority area (M.P.A.) and is described according to its dominant (or priority) use. Areas in which recreation is the management priority are known as Recreation M.P.A.s.*" (p. ii)

Summary
"*The aim of this plan is to provide a framework for planning, development and management of forest recreation in the Northern Region.*

The plan covers the nature of forest recreation, analyses the availability of recreational opportunities in the region and discusses a range of management options. The various environmental, management, legislative and economic constraints which apply are considered.

The policy adopted is to provide for recreational activities which:

(i) are forest-dependent;
(ii) are environmentally acceptable;
(iii) do not endanger other forest users, and
(iv) are not disruptive to the majority of other forest users.

The region is subdivided into a series of 'management units' for which appropriate recreation strategies are developed.

The plan then specifies a series of regional strategies which will apply to all management units. These cover site design and maintenance, provision for the disabled, visitor information, dieback hygiene, mining, urban development, use of firearms, camping, off-road vehicles and other matters.

The plan concludes with proposals for implementation and control and specifies the structure of the follow-up plans to be developed by local staff in divisions." (p. iii)

7. Forest Recreation Development and Management Constraints
"*The capacity of the Forests Department to implement a recreation policy is constrained by a number of factors. Such factors may be environmental, management, legislative or economic.*

In the Northern Region of State forest, where land use pressures are intense, a number of factors currently determine how the forest is used and managed for outdoor recreation. These existing constraints can be summarised as follows:" (p. 31)

7.1 Environmental and Management Constraints

"*Several major environmental considerations have a constraining influence on recreation and other forest land uses in the Northern Region. The most important are:*

- *The need to prevent the spread of jarrah dieback from infected to dieback-free forest areas;*

[…]

These factors were considered in assessing the capacity or capability of the forest to sustain different types of recreational use (refer to Table 6). That is, recreational activities which are likely to result in substantial environmental degradation have been directed away from the more sensitive portions of the landscape. […]" (p. 31)

"*With respect to management constraints, the ability to provide for recreation is influenced by land tenure and land use. The land considered in this plan is managed under the multiple use concept and includes all land under the control of the Conservator of Forests. In simple terms, this means that recreation provision must be integrated with the provision of other forest values (e.g. timber and water production) and their protection requirements (from disease and fire in particular).*

The whole of the Northern Jarrah Forest has been classified into Management Priority Areas (Map 3). In some areas, recreation is the designated management priority while in others, recreational activity has been given a lower priority." (p. 31)

7.2 Legislative Constraints

"*A number of Acts, Special Agreements and Government Regulations influence provision for and management of State forest in the north for recreation. Those with direct application are:*

Forest Diseases Regulations – much of the forest in the intermediate and eastern low rainfall zones has been classified as a forest disease risk area and is subject to a period of quarantine (Map 4.) Quarantined forest is only accessible along particular specified routes, or on foot. The future management of these areas will depend upon developments in dieback hygiene techniques." (p. 32)

9. Regional Planning and Management Strategies

9.1 The Concept of Use Zoning

"*The approach adopted in this plan is that of use zoning. This recreation management concept is widely employed elsewhere. Under this approach, recreation activities sharing similar environmental and cultural requirements are allocated to designated zones or management units. Allocation of activities to areas is based on user needs, assessed recreation land use capabilities and the existing environmental, legislative and management constraints. It is in essence a reflection of recreation land use suitability, i.e. capability as modified by existing constraints.*" (p. 37)

9.2.5 Monadnock Management Unit

"*The Specific Management Strategies are:*

- *to exclude all road construction activity so as to discourage vehicular use and to minimise the problems of erosion and dieback spread;*

[…]" (p. 43)

9.3 Planning and Management Strategies Applicable To All Management Units

"*In addition to the management unit strategies just outlined, there are a number of other recreation planning and management aspects for which Regional policy directives are required.*
These are …
1. Design and Development of New and Existing Sites

All recreation development within the Region, whether it be the construction of new areas and facilities or the redevelopment of existing sites, must be in accord with the requirements of Fire and Dieback Control policy. Plans must be approved by the Regional Superintendent and the Recreation Officer. Specialist staff will be available to assist Divisions with these sites." (p. 47-48)

5. Recreation in Relation to Dieback
"*The need to protect forest values from the effects of jarrah dieback (Phytophthora cinnamomi) is and will remain a Regional management objective of the highest priority.*

Strategies
- *forest disease risk areas will remain available for all form of non-motorised recreational pursuits provided they conform to normal hygiene practices and standards;*

- *dieback hygiene requirements must be considered in planning all motorised recreation in the jarrah forest.*" (p. 50)

POLICY STATEMENT - 1983

Forests Department Annual Report 1983. 1983

NOTE: REFER TO ENTRY UNDER ANNUAL REPORT 1982, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

GUIDELINES - 1983

Dieback Review, 1982 : Seven Way Test Guidelines. 1983

"*The Dieback Policy 1982 states that 'before operations are permitted, the following factors must be evaluated:*
- *Type of operation*
- *Degree of hygiene*
- *Risk of introducing, P. cinnamomi*
- *Forest type*
- *Likely impact*
- *Land use, and*
- *Consequences of impact on land use'*

This SEVEN WAY TEST, as it is now known, can be applied to proposed operations inside or outside of proclaimed Disease Risk Areas.

To assist Divisional and Regional Staff in the preparation of these tests, guidelines were issued early in 1983. These have been tested and have been revised on the basis of the comments received from users.

The tables of impact and consequence have also been revised and represent the current 'State of the Art'. […]

These guidelines and tables will be revised at 12 monthly intervals, as additional data becomes available." (p. [i])

Guidelines for the Preparation of Form FD 781, Seven-Way Test
1.The Work Proposed
Purpose
"*- Describe briefly but fully the reasons for the test and the need for access.*" (p. 1)

Type and Extent of Work

"- *Describe briefly the type of operation proposed*
- *Nominate Division, Block*
- *Describe by extent (ha), by numbers (20 drill holes), by distance (10 kms)*
- *Describe intensity of activity, e.g. 5 trees ha $^{-1}$, 20m^{3}ha^{-1}, clearfell, clear and surface mine*

[…]" (p. 1)

2. Hygiene Measures Required

"*Can the operation be approved without any hygiene? If the answer is no, apply increasing degrees of hygiene, commencing with the simplest and progressing to the most complex, e.g.:*

Machines clean on commencement
Dry soil conditions
Supervision – by operating company, e.g. S.E.C.
Supervision – by F.D. staff
Supervision - need for briefing and/or training of staff
Nominate access routes and show these on maps
Upgrade access where necessary." (p. 1)
"*Dieback hygiene maps – specify type of map, e.g. 70 mm photos, ground surveys by trained interprets, ground surveys*
Dieback categories (see standard categories on dieback hygiene plans (Attachment).
Split-phase operation
Operation based on mini-catchments
Clean-down between mini-catchments" (p. 2)

3.Risk of Dieback Fungus

"- *Based on the estimated risk of introducing or of spreading the fungus, the number of possible introductions and the likelihood of the fungus surviving if it is introduced:*

the estimated risk is that which applies <u>AFTER</u> the appropriate hygiene measures have been applied.

- *Risk of introduction is related to the type of operation, the time of the year, the hygiene used, the location in the topography and the landform.*

- *Spread by artificial means is related to the type and scale of operation. It is complicated by the risk of natural spread from existing dieback. See also the hygiene plans, and the time lapse between the photography, the preparation of the plans and the operation.*

[…]." (p. 2)

4.Landform and Vegetation Types

"*- Describe according to types used in the impact category tables, (Attachment), wherever possible. Avoid using 'Jarrah forest with some marri'.*

- Describe using:
System 6 vegetative types
System 6 landform classes
Mr. Havel's site types
A.P.I. types
Mr. McCutcheon's soil classification (Sunklands)
where these classifications are available.

[…]

– The vegetation type has a strong bearing on its susceptibility to dieback, e.g. jarrah of wandoo, dense banksia or Acacia pulchella etc." (p. 2)

5. Likely Impact on Vegetation
"*Refer to the relevant tables of impact and to definitions of impact classes. Consider increasing or decreasing the impact depending on the disturbance to be caused by the operation, e.g. drill hole, a selection cut, clearfelling etc.*" (p. 3)

6. Land Use
"*- Refer to G.W.P. No. 87 (1982) for land use categories. Consider particularly the primary use, but also secondary and tertiary uses. Is the operation within or outside a proclaimed disease risk area? Is the operation within or outside on active catchment? Is the reservoir used for irrigation, or for domestic use, or both?*" (p. 3)

7. Consequences on Land Use
"- *Refer to the relevant tables, considering particularly the primary use. Also evaluate the consequences on a broad scale, e.g. although 100 ha of forest may become infected, is it likely that the reservoir will become saline?* […]

[…]

- *If extraction roads become infected, then the forest below these roads is placed at risk. There could be moderate-high impact on some vegetative types, with high consequences on land use.*

- *If hygiene fails totally, all of the area is placed at risk, with potentially high impact on the vegetation and high consequences on land use.*" (p. 3)

The Swan Coastal Plain
"[…] *State Forests considered here include Moore River, Yanchep, Gnangara, Peel, McLarty, Myalup and Ludlow.*" (p. 1)

Description
"*Six landforms and soils systems will be described.*" (p. 1)

Table 1 : Swan Coastal Plan : Level of Consequence of Dieback Infection by Site Types on Primary Land Use Classes
NOTE: TABLE CATEGORIES ARE AS FOLLOWS -

Site Type	*IMPACT ON VEGETATION*		*LAND USE CLASSES*				
	Over-storey	*Under-storey*	*FFL Preser-vation.*	*Catchment Protection*	*Water Product-ion*	*Protection Of Forest Values*	*Timber Production Hardwood Pines*

REFER TO DOCUMENT FOR FULL TABLE

The Northern Jarrah Forest

"*Although the total number of possible permutations is very large indeed, the situation is simplified by the fact that in the Northern Jarrah Forest, physical and biological factors tend to be strongly integrated. The following eight categories can be identified between the Helena and Preston Rivers.*" (p. 4)

Description

Yarragil Landform

"*Shallow valleys and depressions in the high rainfall zone, with high opportunity for infection and with physical conditions favouring the development of the disease – types C, D, W, E (Havel, 1975). Within these, there is a gradient with respect to the proportion of susceptible species, ranging from low in case of C, to high in cases of D and E.*" (p. 4)

Dwellingup Landform

"*Lateritic uplands in the high rainfall zone, with lesser opportunity for infection and physical conditions only seasonably favouring the development of the disease – types T, S, P and O. Within these there is a gradient of disease impact, fertility and drainage T-S-P-O which favours the intensification of the disease. All types contain a high proportion of susceptible species.*" (p. 4)

Scarp, Helena and Murray Landforms

"*Dissected river valleys and scarp in high rainfall zone, with high opportunity for infection from adjacent uplands, offset by physical conditions favouring the host rather than the pathogen – U, Q, T, R, G, C. Within these, there is a variation in the proportion of susceptible species, but the overall susceptibility is low.*" (p. 4)

Cooke Landform

"*Monadnocks, with conditions similar to the scarp – G, R, Z, M, S. Opportunity for infection has been increased in part by the use of these high hills as fire lookouts, necessitating the construction of roads. Impact varies considerably, depending on site-vegetation type.*" (p. 4)

Williams and Michibin Landforms

"*Dissected valleys in the low rainfall zone, with moderate opportunities for infection, but with physical conditions not conducive to the development of the disease – M, G, Y, L. The susceptibility of these types is further lessened by a high proportion of resistant species, the overstorey and by virtual absence of susceptible second storey.*" (p. 5)

Dwellingup and Yalanbee Landforms

"*Lateritic uplands in the low rainfall zone with a low opportunity for infection, and a physical condition only marginally favourable to the establishment of the disease. Although the susceptible second storey is largely or entirely absent, there is a considered proportion of susceptible species in overstorey and shrub storey – H, Z, P, M.*" (p. 5)

Pindalup, Coolakin and Goonaping Landforms

"*Broad shallow valleys in the low rainfall zone, with moderate opportunity for infection due to lower overall activity, and with physical conditions conducive to the development of the disease – F, J. A, B, E, W, Y.*

Within these there is a very strong gradient with respect to the presence of susceptible species. Types A and Y which normally occupy valley floors are low in susceptible species, whereas types B, E, F and J have a particularly high proportion of them." (p. 5)

Collie Basin (Collie, Cardiff and Muja Landforms)

"*Gently undulating landscape with gravels on upper slopes (Collie), broad shallow swampy depressions of grey sands (Cardiff) and sandy swampy valleys (Muja). Impact on both overstorey and understorey is high in the Cardiff Landform, with lesser impact on Muja (greater predominance of resistant species) and Collie (slightly drier and better drained)*" (p. 5)

Table 2 : Northern Jarrah Forest : Level of Consequence of Dieback Infection by Site Types on Primary Land Use Classes

NOTE: TABLE CATEGORIES ARE AS FOLLOWS -

Site Type	*IMPACT ON VEGETATION*		*LAND USE CLASSES*				
	Over-storey	*Under-storey*	*FFL Preser-vation.*	*Catchment Protection*	*Water Product-ion*	*Protection Of Forest Values*	*Timber Production*

REFER TO DOCUMENT FOR FULL TABLE

The Sunklands
Description
"*Description of site types …*" (p. 7)

"*Type 1 Laterites – uplants mainly, with boulders or gravelly, sandy to loamy matrix. Drainage may be impeded. Jarrah and jarrah-marri, generally of above-average site quality. Sheoak, Agonis parviceps, Persoonia longifolia, some Banksia grandis. Some dieback occurrences with high impact. Kingia landform.*

Type 2 Shallow sands over laterite – downslope and adjoining Type 1. Soil depth less than 50 cm over gravels or massive laterite. Jarrah, sheoak, Banksia grandis and B. attenuata, P. longifolia, blackboys. Generally lower site quality. Dieback impact moderate to high, site dry. Jarrahwood landform." (p. 7)

"*Type 3 Deep sands over 50 cm (coloured) - midslope to lower slope, light yellowish-brown, occasional gravel < 20%, jarrah and jarrah-marri overstorey. Woody pear, B. grandis, Persoonia, Casuarina, Kingia, blackboys. Impact on overstorey and understorey is moderate to high, especially at wetter end of the type.*

Type 4 Deep sands over 50 cm (leached) - plateaux, upper slopes to midslope (Sunklands), ranging from Dry, 4 a, to wet swamps, 4 d. Coffee rock layer present. More open jarrah, marri rare, understorey at dry end B. attenuata, B. ilicifolia; understorey at wet end Melaleuca preissiana, B. litteralis, occasional bullich and blackbutt, Type 4 understorey Persoonia, A. parviceps, blackboys. Impact on understorey – very high at wet end on susceptible species, less so at drier end. Impact moderate on overstorey except on fringes of wetter areas. Mungardup landform.

Type 5 Loamy-textured to 60 cms - low slopes (north of Blackwood), more widespread through the landscape (especially south of Blackwood). Grey to yellow, low gravel per cent, sand to loamy at surface. Jarrah with marri more dominant, sometimes bullich. B. grandis, A. parviceps, Kingia, B. littoralis. Impact on understorey moderate if banksias dominate, elsewhere is low. Preston landform.

Type 6 Excluded because of limited extent.

Type 7 Creeks - lower slopes, strongly coloured (browns, yellow-brown, yellow-red), loams to silty loams. May be underlain by lateritic pavement. Occasional jarrah, marri, bullich, Hakea lasiantha, A. divergence.
Impact on understorey low, as many species are resistant. Impact on jarrah high to very high." (p. 8)

Area
"*Area (percentages) from original surveys are as follows:*

	Sues Road	*Jarrahwood*
Laterites	*10%*	*24%*
Shallow sand	*2*	*12*
Deep sands	*19*	*27*
Leached sands	*39*	*24*
Loamy-textured	*22*	*7*
Heavy-textured	*1*	-
Creeks	*4*	*7*
	97%	101%" (p. 8)

Table: Sunklands : Level of Consequence of Dieback Infection by Site Types on Primary Land Use Classes

NOTE: TABLE CATEGORIES ARE AS FOLLOWS -

Site Type	*IMPACT ON VEGETATION*		*LAND USE CLASSES*				
	Over-storey	*Under-storey*	*FFL Preser-vation.*	*Catchment Protection*	*Water Product-ion*	*Protection Of Forest Values*	*Timber Production*

REFER TO DOCUMENT FOR FULL TABLE

The Southern Jarrah Forest : Level of Consequence of Dieback Infection by Site Types on Primary Land Use Classes

NOTE: TABLE CATEGORIES ARE AS FOLLOWS-

Site Type	*IMPACT ON VEGETATION*		*LAND USE CLASSES*				
	Over-storey	*Under-storey*	*FFL Preser-vation.*	*Catchment Protection*	*Water Product-ion*	*Protection Of Forest Values*	*Timber Production*

NOTE : REFER TO DOCUMENT FOR FULL TABLE

The Karri Forest
Karri forest in pure and mixed stands
"*The impact is very low on the overstorey and very low to low on the understorey on marginal karri sites. Chief significance is as a potential reservoir of inoculum.*" (p. 13)

Jarrah forest of high quality with karri type understorey

"*High quality jarrah forest with understorey of ferns, netic Acacia urophylla, Leucopogon verticillatus. High rainfall zone on slopes and ridges, e.g. Carey Block. Impact low on overstorey and on understorey. Of significance as a potential reservoir of inoculum.*" (p. 13)

Jarrah forest on laterites
"*Many sites show low to moderate impact, despite considerable opportunities for infection. May have high to very high impact where sites are shallow and concreted or if heavily disturbed and repeatedly inoculated.*" (p. 14)

Jarrah forest on depositional sands
"*Jarrah on depositional sands with ti-tree, bullich and blackbutt – in the ti-tree swamp the overall impact on the understorey and overstorey is very low. On the fringes, especially when slopes are gradual, the impact on both understorey and overstorey is high.*" (p. 14)

Jarrah forest on quartzites
"*Jarrah forest on deep quartzite sands high in the landscape, with ti-tree, blackbutt, jarrah and bullich. Where the forest is open, with blackboys, zamia palms, Persoonia and Podocarpus drouyniana, the impact is high in the understorey and moderate in the overstorey. Where the forest has dense ti-tree, the impact is low in both overstorey and understorey.*" (p. 14)

Jarrah on shallow podsols
"*Jarrah on shallow grey and yellow podsols on mildly undulating slopes and ridges, e.g. Quininup area. Dense understorey. Impact on understorey and overstorey is low to moderate, depending on site wetness, position on the slope and aspect.*" (p. 14)

Wandoo woodlands
"*These sites have few indicator species. The impact on understorey and overstorey is very low, but these areas may act as a potential reservoir of inoculum for the adjacent jarrah and banksia woodlands.*" (p. 14)

Jarrah woodlands and low rainfall (<900 mm) forest
"*Typical eastern jarrah forest < 900 mm, often with numerous small trees. In the uplands and slopes, impact to date on both the understorey and overstorey has been low. May have high impact if heavily disturbed and repeatedly inoculated. In the gullies and low slopes impact on understorey and overstory is high in the susceptible species*." (p. 14)

Banksia and Casuarina woodlands
"*These may be extensive in area, on drier sandy soils, on slopes and ridges. Impact to date has been low, with only odd individual plants killed near roads and creeks. The impact may be increased if these sites are heavily disturbed and repeatedly inoculated*." (p. 14)

Stabilised dunes
"*Grey to white sands with jarrah, marri, zamia palms, peppermint. The overall impact on the overstorey and understorey is low.*" (p. 15)

Flats
"*Flats with ti-tree, blackboys, sedges, with jarrah and banksia on slight rises. Overall impact on understorey vegetation is low, but the susceptible species (mainly blackboys) are killed. In the fringes, on gradual slopes, the impact on the understorey and overstorey is moderate*." (p. 15)

Table 5 : Level of Consequence of Dieback Infection by Site Types on Primary Land Use Classes

NOTE: TABLE CATEGORIES ARE AS FOLLOWS-

Site Type	*IMPACT ON VEGETATION*		*LAND USE CLASSES*				
	Over-storey	*Under-storey*	*FFL Preser-vation.*	*Catchment Protection*	*Water Product-ion*	*Protection Of Forest Values*	*Timber Production Hardwood Pines*

REFER TO DOCUMENT FOR FULL TABLE

Impact

"*Earlier studies (eg Batini, 1973; Havel, 1975; Shea, 1975) showed that dieback and site were related and proposed reasons for this.*

In the tables contained in this document, the observed impact on dieback on the understorey and overstorey vegetation are given. These impacts relate to mortality and not to effects on growth or other parameters of plant health.

These impacts have been subdivided into five classes. These classes and their relationship to those used in the Dieback Policy 1982 (page 7) are as follows:

DIEBACK POLICY 1982		*TABLES OF IMPACT AND CONSEQUENCE*
Low impact	*Very low:*	*Very few, if any, species or individual plants are killed*
	Low:	*Few species are susceptible, some individuals are killed*
Moderate impact	*Moderate:*	*Most of the dominant species are susceptible and some of the individuals are killed*
High impact	*High:*	*Most of the dominant species are susceptible and many of the individuals are killed*
	Very High:	*Most of the dominant species are susceptible, most individuals are killed*

The data in these tables is based on existing experience and the observed impacts to date. These data will be improved as research continues into the effects of site vegetation type, disturbance, climate and landform on disease expression. As new data becomes available, these tables will be revised. It is, however, essential to collate the best available knowledge in one place at this point in time." (p. 17)

Consequences

"*The tables also show the assessed level of consequence of dieback infection, by site types, on the primary land use class. Five land use classes are shown*:

FFL Preservation
Catchment Protection
Water Production
Protection of Forest Values
Timber Production

FFL Preservation - the consequences shown are higher than the impact rating. Any impact of dieback in FFL Preservation areas will have serious consequences on the land use.

Catchment Protection - the consequences shown are higher than the impact rating on the overstorey component. In this land use category, it is important that a deep-rooted, tree component be retained, so as to control salinity.

Water Production - the consequences are lower than the impact rating. Dieback has substantially increased water yield in some areas.

Protection of Forest Values - the consequences listed are the same as the assessed level of impact on the understorey vegetation.

Timber Production - the consequences listed are the same as the assessed level of impact on the overstorey vegetation.

The tables can be used to assess the level of consequence on secondary and tertiary uses as well. For example, a Water Production MPA would have secondary uses such as Catchment Protection and Timber Production, and a tertiary use such as Protection of Forest Values. Levels of consequence (Dwellingup, high rainfall, deep, well drained, lateritic uplands) would then be as follows:

Primary Use	*Water Production*	*Low*
Secondary Uses	*Catchment Protection*	*High*
	Timber Production	*Moderate*
Tertiary Use	*Protection of Forest Values*	*Moderate to High*

(p. 19)

Hygiene Map – Legend
Secure Dieback-Free

"*GREEN* *Forest apparently free of dieback and upslope from Dieback, Suspect, Uninterpretable and NEQ roads.*" (p. 20)

Low Potential Risk

"*GREY* *Forest apparently free of dieback but downslope from Dieback, Suspect, Uninterpretable or *NEQ. Considered to have low potential for infection by Phytophthora cinnamomi by natural spread.*" (p. 20)

Uninterpretable

" *PURPLE* *Forest in which susceptible plants are absent or too few to enable the interpretation of P. cinnamomi presence or absence.*" (p. 20)

NEQ

"*YELLOW* *Forest adjacent to roads in which there is a potential for *incipient disease.*" (p. 20)

High Potential Risk

"*BROWN* *Forest apparently free of Dieback or Uninterpretable, but downslope from, or in the same swamp as Dieback or Suspect. Considered to have a high potential for infection by P. cinnamomi by natural spread, in free water.*" (p. 20)

Suspect

"*BLUE* *Forest in which the evidence for P. cinnamomi presence or absence is inconclusive.*" (p. 20)

Dieback

"*RED* *Forest areas which show current dieback symptoms and are supported by laboratory recoveries of P. cinnamomi from soil and tissue samples.*

**NEQ – Not Effectively Quarantined*
Roads, tracks within the Disease Risk Area which have had considerable use throughout all Seasons, with an unknown degree of hygiene.

**Incipient Disease*
Forest in which P. cinnamomi may be present, but symptoms are yet to appear." (p. 20)

Procedure

Production of Guidelines

"*1.* *Prepare first draft of guideline, Protection Branch, in consultation.*
2. *Distribute first draft for comments from experts.*
3. *Re-draft original guideline.*
4. *Distribute to Regions/Divisions for implementation.*
5. *Obtain comments and suggestions from users.*
10.2*Re-draft and improve, 6 to 12 monthly review.*" (p. 21)

GUIDELINES – 1983

Guidelines for Slash Burning in the Karri forest. 1983

4.4 Perimeter Tracks

"[…] *Attention must be paid to all requirements for dieback pegging and hygiene and to erosion control and stream protection when selecting and constructing perimeter tracks.*" (p. 9)

HANDBOOK – 1983

Bauxite Mining : Northern Jarrah Forest : Mining Operations Handbook 1. Ed. 2. 1983

NOTE: REFER TO ENTRY UNDER 1981 EDITION AS IT CONTAINS SIMILAR DETAILS EXCEPT FOR AMENDMENTS TO THE FOLLOWING PRESCRIPTONS-

'Rehab 83' : Prescription for Rehabilitation of Bauxite Mines in the Western Jarrah Forest
"*Rehab 83 now represents the best current 'State of the Art' describing techniques to be used in bauxite mine rehabilitation in the western jarrah forest.*" (p. 1)

Objective
"*An objective is a broad statement of what it is expected to achieve within known constraints.*

The overall objective for rehabilitation of bauxite mines in the western jarrah forest is:-

'To regenerate a stable forest ecosystem, planned to enhance or maintain water, timber, recreation, conservation and/or other nominated forest values'.

Specific goals (not listed in order of importance since priorities may vary with designated land use) are:-

[…]
2.4 Protection: to conserve the residual soils; to control dieback spread, and to ensure that unacceptable fire hazards do not accumulate." (p. 2)

4. Rehabilitation Planning
"*Rehabilitation planning occurs at two levels:*

The first is broadscale regional minesite planning on a 5-year time-scale. The second is the detailed operational annual planning on a pit-by-pit basis." (p.3)

4.1 Broadscale Regional Planning
"*The mining company is required to produce each year an updated 5-year Mining and Management Plan for approval by Government. In the preparation of these plans, the following aspects of rehabilitation are to be considered:-*
[…]
- *Dieback Hygiene*

[…]
This prescription deals with Mining Operations only within Water Production M.P.A.s and Recreation M.P.A.s.
[…]" (p. 4)

4.3 Annual Operational Planning
"*Detailed proposals for each minepit are prepared roughly 12 months in advance of rehabilitation.* […]" (p. 6)

"*Each detailed proposal is prepared jointly by Forests Department and mine company staff, and is to deal with the following factors:-*
[…]
- *Dieback hygiene, drainage, erosion control and water management – specific measures to be adopted from initial drilling through to completed rehabilitation.*

[…]

A conceptual rehabilitation proposal will be prepared for each area, and must be initialled as 'Agreed To' by the local Forests Department officer in charge." (p. 6)

5. Dieback Management

"*Because bauxite mining and rehabilitation involves massive soil and vehicular movement under all weather conditions, together with substantial modification to natural drainage patterns in the forest, close attention to dieback hygiene is essential.*

The two key management aims are:-

(i) to minimise the spread of infection into diebackfree forests and minesites.

(ii) to manage access and drainage so as not to expand areas which favour the survival and pathogenicity of the disease." (p. 7)

6. Preparation of Pits for Planting
"*6.2 Overburden and topsoil will then be evenly respread over all areas to be regenerated. The distribution of this material from pit to pit will be in accordance with the following dieback hygiene requirements:*" (p.9)

"*(i) no infected material to be carried to diebackfree areas.*
(ii) minimise the movement of topsoil
(iii) clean plant and machinery before entry to diebackfree areas where required.
(v)move soil mainly in dry conditions.

All soil movement must be agreed to by the Forests Department." (p. 8)

6. The Forest Improvement and Rehabilitation Scheme Prescription : F.I.R.S. 82
Objective
"*The objective of FIRS is:-*

> *'To improve the capacity of the forest for longterm production of water, timber, recreation, conservation and/or other forest values.'*

This objective implies two broad categories of treatment

(i) The rehabilitation of areas of advanced dieback forest, so as to regenerate its productive capacities, and
(ii) The improvement of the health and vigour of other stands so as to render them less susceptible to dieback disease impact." (p. 6.1)

The Prescription
"*4.1 <u>FIRS 1</u> – *Water Production MPA*
**Advanced Dieback*
**Pipehead or pumpback catchments only*

For all sites except stream zone.

(i) Define according to field inspection and demarcation of areas where the jarrah overstorey is largely dead or dying.

(ii) Determine and specify hygiene requirements, as detailed in 'Jarrah 81'.

[…]
(v) […]
Carry out erosion control on all unwanted roads, tracks, landings and pits. Drainage must not empty

into DBF forest.

[…]" (p. 6.3)

"*4.2 FIRS 2 - * Water Production MPA*
** Advanced Dieback*
** All other catchments*

(i) As for (i), (ii), (iii), (iv), (v), (vi), (vii) and (viii) in the FIRS 1 prescription.

[…]" (p. 6.4)

"*4.3 FIRS 3 - *Water Production MPA*
** Other forest (i.e. <u>not</u> advanced dieback).*

These are stands where the overstorey has not suffered extensive mortality. […]" (p. 6.5)

"*<u>General</u>*
The <u>optimum means</u> of treating jarrah forest so as to improve resistance to infection or disease intensification, is still to be proven. A number of variables are involved (e.g. thinning, banksia de-stocking, legume regeneration, special fire and water management) and the aim is to combine these in a treatment regime which will maximally disfavour the fungus while at the same time improving the natural health and vigour of the forest.

A wide range of treatments is currently being investigated. The 'base' prescriptions, about which variations will be designed, is:

(i) Define according to field inspection and demarcate dieback categories. Demarcation is required in order to implement hygiene.

(ii) Determine and specify hygiene requirement as detailed in Jarrah 81." (p. 6.5)

"*(iii) <u>If it is an even-aged 'pole' stand</u>:*

- Mark crop trees for retention at a stocking of 150-250 sph depending on site and age.

(Thinning guides based on height and basal area are to be used where available). The definition of a crop tree is as used in 'Jarrah 81'.

- Jarrah is the preferred species, but if absent or deficient, retain marri, blackbutt, wandoo or bullich.

- Harvest all marketable poles, logs and minor produce from trees not marked for retention. Crop trees must be protected from falling and snigging damage. Ensure erosion control, crop tree protection and landing rehabilitation measures are carried out.

(NOTE: Thinning of DBF stands only to be done if the silvicultural advantage is considered to be worthwhile and hygiene measures are of the highest order. […]" (p. 6.5)

"*(iv) <u>If it is not a 'pole stand'</u>:*
- Carry out standard selection mark as per J81.
[…]
- Harvest for poles, sawlogs or minor forest produce all trees not marked for retention as crop trees. Crop trees to be protected from falling and snigging damage.

Erosion control and crop tree protection to be carried out.

[…]
(vii)Erosion control works to be completed prior to autumn rains. It is <u>essential</u> to ensure that water from roads, pits, conveyors, etc. does not drain into the treated stand.

(viii) Conduct Autumn burn under dry soil conditions aimed at minimum scorch and maximum heat in soil. Timing of burn important in order to maximise banksia suppression. Burn only after banksia cones are dry or seed has germinated following pushdown. Burn Autumn after Spring pushdown. Allow one winter with Summer pushdown if sufficient drying time has not elapsed.

(ix) Legume seeding in these areas will not be done for the time being as this technique is under review.

(x) Close all unwanted roads. Upgrade drainage on existing roads to ensure no water flows into forest unaffected or only lightly affected by dieback." (p. 6.6)

Forest Management After Bauxite Mine Rehabilitation in the Western Jarrah : Prescription 82
Responsibilities
"*This new prescription deals with the subsequent management of these areas, comprising the regenerated stands on pits, roads, crusher sites and other sites disturbed by mining.*" (p. 7.1)

3. Objective
"*The objective of management after rehabilitation in the forests of the mining envelopes is: To sustain a site-adapted forest capable of resisting fire, disease and parasites, able to regenerate naturally and produce valued products.*" (p. 7.1)

6.5 Success Criteria
"*In the long term, the desired forest ecosystem will have the following characteristics:-*
**<u>Capacity to withstand</u> summer drought, windstrom, periodic fire and the presence of P.C. or parasites.*"
(p. 7.3)

"*(iii) <u>P.c</u>.*

All stands to be banksia free, and periodically regenerated with predominantly legumenous understorey. Techniques are to be developed to ensure no ponds or free water lie on the forest floor. (See below)." (p. 7.4)

POLICY STATEMENT - 1982

<u>Forests Department Annual Report 1982. 1982</u>

NOTE: SIMILAR WORDING IN ANNUAL REPORTS FOR 1983, 1984, 1985

3. Objectives
"*The Government forest policy involves the following management objectives.*

Water Supplies: To protect, control and rehabilitate where necessary, those forest areas that contribute to the water supply requirements of the State." (p. 7)
[…]
Forest Protection: To maintain and add to the areas of permanently reserved forests; to protect these forests from fire, insects and other harmful agencies and to maintain and improve the health and vigour of the forest area.

[…]" (p. 7)

REVIEW - 1982

Dieback Review 1982 : Task Force Discussion Paper. 1982

Appendix 6. Access Policies
"*Until the results of the trials are evaluated, activities will be permitted only where reliable dieback maps are available, where the risk is lowest and where the consequences of infection are within acceptable limits.*

Activities will be permitted only where hygiene conditions are prescribed (e.g. split phase, stockpiling, access roads).

The degree of control exercised will be related to the degree of risk and to the magnitude of the consequences." (p. 16?)

POLICY - 1982

Dieback Policy 1982 : Adopted as a Consequence of the 1982 Dieback Review. 1982

1. Policy Proposed
"*BEFORE FOREST OPERATIONS ARE PERMITTED, THE FOLLOWING FACTORS MUST BE EVALUATED:*

TYPE OF OPERATION
DEGREE OF HYGIENE
RISK OF INTRODUCING P. CINNAMOMI
FOREST TYPE
LIKELY IMPACT
LAND USE, AND
CONSEQUENCES OF IMPACT ON LAND USE

Initially, major, new operational proposals arising from Chiefs of Division or Regions will be evaluated by Protection Branch and submitted by COD of Protection to the Policy Review Group for a decision." (p. 8)

2. Policy Proposed
"*A DECISION TO ACCEPT, REJECT OR MODIFY THE PROPOSED ACTIVITY WILL BE MADE ONLY AFTER THE RELEVANT FACTORS IN POLICY NO.1 HAVE BEEN EVALUATED.*

Major, new decisions will initially be referred to the Policy Review Group. Once precedents have been set the responsibility for approval will be progressively transferred to COD Protection, Regional Superintendents and O.I.C.s. Divisions." (p. 8)

2. Policy Proposed
"*ONCE A DECISION TO PROCEED WITH AN OPERATION IS MADE, EXISTING GUIDELINES AND PRESCRIPTIONS WILL BE USED, OR NEW GUIDELINES WILL BE PREPARED.*

The Dieback Hygiene Guide contained in Jarrah 81 will be used as a prototype in planning each operation." (p. 8)

Access
"[…] *Some control over access is available because of Forest Disease Regulations. Additional control is obtained by specifying access routes, coupes etc. and through negotiations with interested parties.*

Access to areas of forest will be required and control of this aspect is important." (p. 9)

4. Policy Proposed
"*HYGIENE REQUIREMENTS MUST BE CONSIDERED BEFORE VEHICULAR ACCESS TO THE FOREST WILL BE PERMITTED. THE DEGREE OF CONTROL EXERCISED WILL BE RELATED TO THE DEGREE OF RISK OF INTRODUCING THE DISEASE AND THE MAGNITUDE OF THE CONSEQUENCES.*" (p. 9)

5. Policy Proposed
"*VEHICULAR ACCESS TO THE FOREST WILL BE PERMITTED ONLY WHERE AND WHEN THE RISK OF DISEASE INTRODUCTION IS LOW, AND WHERE CONSEQUENCES OF INFECTION ARE ACCEPTABLE.*" (p. 9)

6. Policy Proposed
"*A BASIC ROAD NETWORK, BASED WHEREVER POSSIBLE ON EXISTING ROADS WHICH MINIMISE DISEASE SPREAD WILL BE DEFINED. PROCEDURES AND DEADLINES WILL BE ESTABLISHED BY THE OPERATIONS DIVISION.*

This road system will need to cater for approved needs (access to private property, roads for fire control etc.)." (p. 9)

7. Policy Proposed
"*ALL OTHER ROADS WILL BE CLOSED.*

Active closures would involve ripping, seeding, and planting of trees and understorey for distances of up to 50 metres." (p. 10)

8. Policy Proposed
"*CONSTRUCTION OF NEW ROADS WILL TAKE PLACE ONLY WHERE ABSOLUTELY ESSENTIAL. WHERE NEW ROADS ARE NECESSARY, THESE MUST BE LOCATED AND CONSTRUCTED SO AS TO MINIMISE THE RISK OF DISEASE INTRODUCTIO OR THE IMPACT OF ADDITIONAL SPREAD.*

These roads will generally be located lower in the profile but not so low as to cause problems of stability or damage to the environment. [...] *The design and location of cut-offs and culverts is therefore of great significance.*" (p. 10)

Forest Disease Risk Areas
"*A. <u>Proclaimed Disease Risk Areas</u>*

A_1 *Long Term Isolation*
These are areas where there is a high risk of infection, or where the disease would have high consequences; where exclusion of the disease is the aim and where continued capability for mapping the disease is necessary.

A_2 *Short Term Isolation*
These are areas where the disease would have low or uncertain consequences, where the location of the disease is not accurately known.

They are isolated for mapping purposes, to determine whether an area should go into categories A_1 , A_3 or A_4.

A_3 *Limited Access*
Areas available for operations (e.g. logging, mining, exploration), once mapped for disease occurrence, and where disease risk legislation is still applicable.

A_4 *Other Areas of Forest*
Areas which are not considered to be at risk, e.g. tuart, karri, wandoo forests and some softwood plantations.

Areas of jarrah forest where the disease risk is considered to be low, e.g. red loams on Murray and Helena landforms.

Forest disease areas.

B. Non Proclaimed Areas" (p. 12)

11. Policy Proposed
"*WHERE THERE IS A DEMONSTRATED NEED, ACCESS TO RESOURCES WITHIN LIMITED ACCESS DISEASE RISK AREAS WILL BE PERMITTED.*

Resource use must be planned so as to minimise the introduction or artificial spread of the disease. Strict control of each operation will be necessary ..." (p. 13)

12. Policy Proposed
"*ACCESS TO RESOURCES WITHIN DISEASE RISK AREAS WHERE ACCEPTABLE DIEBACK-FREE MAPS ARE AVAILABLE WILL BE ALLOWED UNDER PERMIT SUBJECT TO THE MOST UP-TO-DATE HYGIENE CONDITIONS*." (p. 13)

13. Policy Proposed
"*SELECTED AREAS WILL BE SUITABLY MONITORED AT REGULAR INTERVALS TO ASSESS THE EFFECTS OF EACH OPERATION ON THE INTRODUCTION, THE RATE OF SPREAD AND THE INTENSIFICATION OF THE DISEASE*." (p. 13)

15. Policy Proposed
"*WHEN ALLOCATING RESOURCES, PREFERENCE WILL BE GIVEN TO AREAS FOR WHICH DIEBACK-FREE MAPS PRODUCED FROM 70 MM PHOTOGRAPHS ARE AVAILABLE, AND WHERE THE CONSEQUENCES OF INTRODUCING THE DISEASE ARE ACCEPTABLE ...*" (p. 14)

16. Policy Proposed
"*PRIORITIES FOR FUTURE INTERPRETATION AND MAPPING WILL BE BASED ON THE NEEDS OF INDUSTRY AND FOREST USERS, CONCENTRATING PRIMARILY BUT NOT EXCLUSIVELY, ON JARRAH FOREST WITHIN PROCLAIMED DISEASE RISK AREAS.*" (p. 15)

21. Policy Proposed
"*THE FORESTS DEPARTMENT WILL GIVE HIGH PRIORITY TO DIEBACK CONTROL AND ACTIVITIES RELATED TO DIEBACK.*" (P. 17)

23. Policy Proposed
"*IN SETTING PRIORITIES, THE AIM WILL BE TO ACHIEVE LONG TERM SOLUTIONS, RATHER THAN SHORT TERM, LOCALISED NEEDS.*" (P. 17)

24. Policy Proposed
"*HIGH PRIORITY WILL BE GIVEN TO COLLATING AND DISSEMINATING RESEARCH AND OTHER DATA, AS A BASIS FOR TRAINING AND FOR DEVELOPING MANAGEMENT PRESCRIPTIONS AND TO ASSIST IN GAINING PUBLIC AWARENESS AND UNDERSTANDING*." (p. 18)

WORKING PLAN - 1982

Working Plan No. 87 1982. Part I, General Working Plan for State Forests in Western Australia. 1982.

Sawlog Production
Strategy
"*(11) Prevent damage to soil values and further artificial spread of dieback disease by reducing winter logging operations and developing summer stockpiling techniques.*" (p. 31)

Roundwood Products
Policy
"*(1) Supply poles from jarrah forest where this does not increase the risk of spreading dieback disease, or result in conflict with other land uses.*
[…]" (p. 33)

Protection Implications for Forest Land Management
"*Protection of the various forest value is necessary if the objectives of management are to be achieved. For instance, if jarrah dieback disease were allowed to degrade forests on the salt-sensitive areas of the catchment, stream salinity would increase*." (p. 18)

Jarrah Dieback Disease
Management Objective
"*To limit the spread of infections of jarrah dieback disease and to improve the resistance of the forest to the disease.*" (p. 59)

Policy
"*(1) Classify State forests according to disease presence, susceptibility of sites and resistance of vegetation to the disease.*

(2) Where warranted extend the proclamation disease risk areas to allow detection and mapping of existing infections.

(3) Improve and apply hygiene measures.

(4) Rehabilitate infected areas with dieback disease resistant species to suit the designated land use.

[…]
(7) Continue with logging trials over a range of sites in proclaimed areas." (p. 59)

Strategy
"*(1) Use aerial photography and ground surveys to prepare accurate maps to monitor diseased areas.*

(2) Include or exclude areas from proclamation as disease risk areas depending on the information available for implementing dieback disease hygiene.

(3) Develop and apply hygienic procedures for all operations that involve vehicular access into State forest.

(4) Rehabilitate infected areas in salt sensitive zones either by manipulation of forest environment to discourage the disease, or revegetation of degraded sites. This work will be extended beyond the salt sensitive zones as priorities dictate.

(5) Develop and extend trials of various operational hygiene techniques, including logging, road making and mining, to test their effectiveness.

(6) Continue to disseminate information on dieback disease and its control to all forest users and the general public. Maintain training programmes in forest hygiene for staff and other organizations.

[…]" (p. 59)

Inventory and Planning
"*This branch collects data needed for forest management, assesses and presents it to assist in decision making and assists with the preparation of the plans required to implement sound forest policy.*" (p. 64)

"*Standard work of the branch includes:*

(1) Air photo interpretation for forest types, dieback disease mapping, and management control purposes.
[…]" (p. 64)

"*In this planning period, emphasis will be placed on the following projects in addition to the standard work listed above:*

(1) Continue to photograph dieback disease risk areas for dieback disease mapping and as a lesser priority to map dieback disease outside these areas.
[…]" (p. 65)

Mapping
"*Major tasks of the branch during the current planning period will be to:*
[…]
(3) Produce flight diagrams and dieback-free maps in association with the interpretation of dieback disease from 70 mm photography.
[…]" (p. 66)

WORKING PLAN – 1982

General Working Plan No. 87 of 1982 : Part II. 1982

"*The detailed prescriptions for the operations in each Division which appear in this document are designed to implement the policy contained in Part 1 of General Working Plan No. 87. These prescriptions are intended to remain in operation until 31st December, 1986, unless an earlier revision of the plan becomes necessary in the light of new factors which might arise in the meantime.*" (p. 1)

Dieback Operations
"*All areas under quarantine will be mapped for dieback extent before the are released from quarantine. Mapping will generally be based on the interpretation of large scale colour transparencies, although some mapping will be carried out based on ground surveys. For all mapping purposes it is important that no control burning is carried out for 3 years prior to mapping as dieback symptoms are obscured by burning. Once an*

areas has been mapped and released from quarantine it will be operated under dieback hygiene to reduce the artificial spread of P.C. to an absolute minimum." (p. 2)

Management Priority Areas
"*The M.P.A.'s listed in this Working Plan are those areas in which timber production is not a primary objective.*

Commercial cutting on core areas of M.P.A.'s is not to be carried out as a standard practice. […]

Cutting in Scientific and Recreation M.P.A's will be in accordance with management prescriptions for these areas." (p. 2)

General Prescriptions For The Whole Northern Region
Quarantine
"*A large proportion of the region has been quarantined since 16.1.1976 to give time:-*

a) for dieback symptoms to express themselves;
b) to develop accurate dieback mapping techniques;
c) to develop and test hygienic methods of operation.

Sufficient time has elapsed for dieback symptoms to express themselves and accurate dieback mapping techniques are now available. Some quarantined areas in this region have been mapped for dieback and in one of these areas, a logging trial has been initiated to test the accuracy of the dieback maps and to develop and test hygienic methods of operation with a view to applying them operationally." (p. 3-4)

7. Regulation Of The Harvest
7.2.1 Hardwood Sawlogs
"*No logging will be permitted under conditions allowing <u>Phytophthora cinnamomi</u> to be readily spread, nor irreparable soil damage to occur.*[…]

See detailed prescriptions for each Division" (p. 4)

7.2.3.5 Chipwood
"*No logging will be permitted under conditions allowing <u>Phytophthora cinnamomi</u> to be readily spread, nor irreparable soil damage to occur.* […]" (p. 5)

7.2.4 Hardwood Piles and Bridge Timber
"*7.2.4.2 No logging will be permitted under conditions allowing <u>Phytophthora cinnamomi</u> to be readily spread, nor irreparable soil damage to occur.* […]" (p. 5)

7.2.5 Hardwood Poles
"*7.2.5.2 There will be no winter snigging and carting of poles (apart from approved stockpiles) except from dieback areas or areas being cut over for sawlogs in winter.*" (p. 6)

7.2.6 Hardwood Fenceposts, Strainers, Rails, etc.
"*Requests for supplies will be directed firstly to areas to be cleared, secondly to dieback areas, thirdly to dieback free areas recently cutover and to timber for settlers reserves as last priority.*" (p. 6)

7.2.8 Other Hardwood Products (Bean Sticks, Stakes, etc.)
"*Material will be made available from trees unsuitable for sawmilling, providing it is not a silvicultural disadvantage to remove such trees, that the risk of dieback spread is no greater than in a sawlog operation and that the removal of such trees is compatible with the designated land use.*" (p. 6)

7.5.2 Gravel, Stone and Sand
"*Gravel, stone and sand will be provided for government and semi-government authorities where there is no reasonable alternative supply and where the supply will not result in the spread of dieback or prejudice amenity values.* […]" (p. 9)

General Prescriptions For The Whole Central Region
Quarantine
"*A large proportion of the region has been quarantined since 16.1.1976 to give time:-*

a) for dieback symptoms to express themselves
b) to develop accurate dieback mapping techniques
c) to develop and test hygienic methods of operation

Sufficient time has elapsed for dieback symptoms to express themselves and accurate dieback mapping techniques are now available. Some quarantine areas in this region have been mapped for dieback and it is intended to have one or more quarantine logging trials in some of these areas to develop and test hygienic methods of operation with a view to applying them operationally." (p. 4)

7.2.1 Hardwood Sawlogs
"*No logging will be permitted under conditions allowing Phytophthora cinnamomi to be readily spread, nor irreparable soil damage to occur.* […]" (p. 4)

7.2.2 Hardwood Chiplogs
"*W.A. Chip and Pulp*
Part of the region is wihin F.P.L. (Chipwood) No. 1588 held by W.A.C.A.P. This is an eastern section of Nannup Division. Most of this area is currently quarantined." (p 4)

7.2.3.5 Hardwood Firewood
"*No logging will be permitted under conditions allowing Phytophthora cinnamomi to be readily spread, nor irreparable soil damage to occur.* […]" (p. 5)

7.2.4 Hardwood Piles and Bridge Timber
"*7.2.4.2 No logging will be permitted under conditions allowing Phytophthora cinnamomi to be readily spread, nor irreparable soil damage to occur.* […]" (p. 6)

7.2.5.2 Hardwood Poles
"*There will be no winter snigging and carting of poles (apart from approved stockpiles) except from dieback areas or areas being cutover for sawlogs in winter.*" (p. 6)

7.2.6 Hardwood Fenceposts, Strainers, Rails, etc
"*Requests for supplies will be directed firstly to areas to be cleared, secondly to dieback areas, thirdly to dieback free areas recently cutover and to timber for settlers reserves at last priority.*" (p. 7)

7.2.9 Other Hardwood Products (Bean Sticks, Stakes, etc.)
"*Material will be made available from trees unsuitable for sawmilling, providing it is not a silvicultural disadvantage to remove the trees required and that the risk of dieback spread is no greater than in a sawlog operation. There will be no winter operations (generally April to November) except from dieback areas of areas being cutover for sawlogs.*" (p. 7)

7.3 Wildflowers
[…] *Wildflower picking will not be permitted in the core areas of Conservation M.P.A.'s, within 100 metres of any road used by the public, or in quarantine areas.*" (p. 10)

7.4 Honey
"*The present level of beekeeping in State forest will be maintained with due regard to location of apiary sites at appropriate intervals to avoid transference of disease and conflict with major land use objectives.*

Where possible apiary sites will be relocated outside quarantine areas and the core areas of Conservation M.P.A.'s" (p. 10)

7.5.2 Gravel, Stone and Sand
"*Gravel, stone and sand will be provided for government and semi-government authorities where there is no reasonable alternative supply and where the supply will not result in the spread of dieback or prejudice amenity values. Supplies will not generally be made available to private contractors who will be expected to use private sources.*" (p. 10)

General Prescriptions For The Whole Southern Region
Quarantine
"*A large proportion of the region has been quarantined since 16.12.1977 to give time:-*

a) for dieback symptoms to express themselves;
b) to develop accurate dieback mapping techniques;
c) to develop and test hygienic methods of operation.

Sufficient time has elapsed for dieback symptoms to express themselves and accurate dieback mapping techniques are now available. […]" (p. 3)

7. Regulation Of The Harvest
7. 2.1 Hardwood Sawlogs
"*No logging will be permitted under conditions allowing <u>Phytophthora cinnamomi</u> to be readily spread, nor irreparable soil damage to occur. In karri operations, or other operations free of P.C. no logging will be permitted under conditions allowing irreparable soil damage to occur. Generally this will be from 1st June to 1st November. Stockpiling will be necessary to maintain supplies when conditions allow P.C. to be spread or irreparable soil damage to occur. See detailed prescriptions for each Division.* […]" (p. 3)

7.2.7 Hardwood Fenceposts, Strainers, Rails, etc.
"*Material suitable for fencing requirements will be made available from logs unsuitable for sawmilling, providing it is not a silvicultural disadvantage to remove the trees required and that the risk of dieback spread is no greater than in a sawlog operation.*" (p. 7)

7.2.9 Other Hardwood Products (Bean Sticks, Stakes, etc.)
"*Material will be made available from trees unsuitable for sawmilling, providing it is not a silvicultural disadvantage to remove the trees required and that the risk of dieback spread is no greater than in a sawlog operation. There will be no winter operations (generally April to November) except from dieback areas or areas being cutover for sawlogs.*" (p. 7)

7.3 Wildflowers
"*Seeds, plants and plant parts will be supplied from State forest according to the demand where this does not conflict with the distribution and perpetuation of the species or the major land use objectives, or the requirements of the Wildlife Conservation Act.*

Wildflower picking will not be permitted in the core areas of Conservation M.P.A.'s, within 100 metres of any road used by the public or in quarantine areas." (p. 8)

7.4 Honey

"*The present level of beekeeping in State forest will be maintained with due regard to location of apiary sites at appropriate intervals to avoid transference of disease and conflict with major land use objectives.*

Where possible apiary sites will be relocated outside quarantine areas and the core areas of Conservation M.P.A.'s." (p. 8)

MANAGEMENT PLAN – 1982

Hardwood Management Plan (Central Region). 1982

Section 1 : Introduction
1.1 Objectives and Policy
"*1.1 Objectives and Policy*
Hardwood timber specifications in the Central Region must:
[…]
(3) be in accordance with dieback hygiene rules.
All operations must be based on need to avoid the spread of the disease.

[…]" (p. 1)

1.2 Scope
"*(1) This Hardwood Management Plan attempts to cover all hardwood operations in the Central Region. Sawmill logging cannot be considered in isolation. Silvicultural, hygiene and protection objectives cannot be neglected unless all operations are considered and co-ordinated.* […]" (p. 1)

2.4.4 Influence Zones and Conservation Practices
"*These are areas designated by the planner which surround special natural or artificial features in the forest.*

*For example: * Streams and rivers*
** Roads, railway lines, S.E.C. lines*
[…]
** Tourist, recreation facilities, scenic drives, walk tracks etc.*

After designation, the O.I.C. will prepare an appropriate prescription for each area taking into account land use, dieback status, hygiene, aesthetics, conservation values and risks of visual or noise pollution or of undesirable effects on water supply." (p. 5)

3. Sawmill Logging Operations
3.1.1 Five Year Logging Plan
"*(1) This plan is to be prepared by IPS in close consultation with Divisions. When preparing the logging plan the following must be considered.*

- *Policy as per the General Working Plan*
- *Management Priorities*

[…]" (p. 6)

"*(2) Logging in quarantine areas can only proceed with permission from the Conservator of Forest.*" (p. 7)

3.1.2 Planning the Annual Cut

"*(1) Areas proposed for cutting must be protected from fire for at least three years. This is to allow the accurate demarcation of dieback disease symptoms.*" (p. 7)

3.1.3 Dieback Hygiene
"*(1) Dieback hygiene measures are to be prescribed for all activities in State Forest. These prescriptions must be on the basis of risk categories and must cover such aspects as season of operation, access, briefing of personnel, cleanliness of vehicles, risk category demarcation, sequence of operations, and quarantine implications.*

(1) Every endeavour must be made to confine logging in all but graveyard areas to the dry summer months in order to reduce the possibility of spreading the disease.

When this is not possible the careful attention to roads low in profile, split phase logging, coupe selection, dieback demarcation, wash downs and road stabilisation must be given.
[…]
(4)Cutting operations in all uninfected and resistant categories will cease within 40 metres of the green-line indicating the presence of dieback infection.
[…]" (p. 8)

3.1.4 Roading
"*(3) <u>For winter hauling</u> it is preferable that main access is entirely along a dieback infected road. If logging dieback free forest then washing down before entry into coupe is essential.*
[…]
(5) Roads must be constructed in dry soil conditions:
(i) vehicle cleanliness must be controlled by blowing down or washing down.
(ii) Road-working machinery must be washed down when travelling from dieback forest into dieback-free forest at designated washdown points.
(iii) Washdown point must be on boundary of dieback on downslope of roadside, draining from road to diseased forest.
(iv) Washdown point must have hard surface for machine to stand on eg. reject sleepers or belting, surface to be kept clean." (p. 8)

3.1.5 Logging Method
"*<u>Winter logging – dieback free forest</u>*
It is to be avoided as much as possible <u>but</u> where it has to take place then access must be low in the profile and a split phase system must be used. […]" (p. 9)

5. Regeneration and Rehabilitation
5.1 Species Preference
"*(2) Where rehabilitation of dieback is programmes* [sic] *then dieback resistant species must be used.*
[…]" (p. 20)

NORTHERN REGION OBJECTIVES AND GOALS- 1982

<u>Northern Region : Objectives and Goals 1982/83. 1982</u>

1.1 Departmental Objective : Conservation
"*Our overall aim is to achieve the Departmental objective, which is*
'the conservation, though planned use and management, of forest land and resources for the greatest long term social and economic benefit'." (p. 1)

1.2 Regional Objective

"*The role of the Regional Group is to determine management strategies for each activity in the region, so as to provide co-ordinated direction for the achievement of Departmental objectives by divisions.*

Where necessary, management strategies will be presented in the form of Regional Plans. These will take account of: -

- *Departmental objectives, policies and strategies*
- *Land use objectives*
- *Site capability and potential*
- *Protection requirements*

[…]" (p. 1)

1.3 Resources
"*The forest resources of the northern region are water, timber, flora and fauna, minerals, recreational and scientific/educational values and the physical environment of soil and air.*

Factors which threaten the long-term conservation of these resources are fire, disease, alienation of land, and uses which permanently destroy the productive capacity of the forest.

The specific land, resource and protection objectives are:" (p. 1)

1.4 Land Management
1.4.2 Objective
"*To oppose or restrict the alienation of State forest or its further use for public or private utilities which result in loss of forest values.*" (p. 2)

1.5.6 Minerals
Objectives
"*(2) <u>Other</u> (e.g. gravel): to supply gravel etc. on S.F. only where reasonable alternative supplies are not available and only if dieback spread does not result.*

(3) <u>For all mined areas</u>: to rehabilitate mined areas to best suit designated land use priorities.

[…]" (p. 5)

1.6.2 Dieback
"*<u>Objective</u>: to minimise the effect of dieback on the forest, through (i) good hygiene practice; (ii) maintenance of a productive and vigorous forest, and (iii) rehabilitation of dieback areas.*

<u>1982/3 Goals</u>
(i) Organize training programmes and provide staff to ensure good DB maps are prepared in advance of all operations.
(ii)Review access within Quarantine as Diebackfree maps become available.
(iii)Upgrade nursery hygiene.
[…]" (p. 6)

"*1.7.3 <u>Protectability</u>*
<u>Objective</u>: to ensure that management plans account for the present and future protection of the forest and the community from destruction by fire or disease." (p. 9)

POLICY – 1981

Review of the Dieback Disease Situation. 1981

"*The Forests Department has adopted a three-pronged attack on the dieback disease problem in State forests:*

(a) the development of accurate maps of disease location,
(b) the application and continuous updating of stringent hygiene procedures,
(c) the management of the forest ecosystem to create conditions unfavourable for the fungus." (p. 5)

"*The desirable sequence of management begins with three years of quarantine, followed by aerial photography with the large-scale shadow-free colour system and finally the production of accurate maps of disease distribution. This will enable operations such as timber getting, bauxite mining and forest improvement treatment to be carried out under strictly controlled hygiene procedures, thereby reducing the risk of disease infections being spread to new areas. All forest activities need to be carefully planned and subject to intensive supervision.*

Several different hygiene procedures are used, either separately or in combination, depending on the circumstances. These include confining forest activities to summer disease safe periods, vehicle washdown, limitation of vehicle access in the forest and specification of more appropriate equipment for some tasks." (p. 5)

"*Management of the forest as an ecosystem will progressively include more measures designed to render the forest environment less favourable to the disease organism. Based on the current state of knowledge, such measures will include:*

(a) *cooling and drying the surface soil by improving the density of tree crowns and promoting dense, low understorey vegetation;*

(b) *improving the proportion of certain plants in the understorey such as Acacia pulchella, which have been shown to contain substances which actively reduce zoospore numbers and inhibit their germination;*

(c) *improving the overall nutrient status of the site, e.g. by promoting an understorey of legumes;*

(d) *improving the ability of the most important host (jarrah) to resist infection through improvement of tree health;*

(e) *reducing the disease inoculum potential by removal of highly susceptible species such as Banksia grandis;*

(f) *avoiding any modifications to soil drainage patterns which would make soil more suitable for sporulation and zoospore survival;*

(g) *eliminating, or at least minimizing, any disturbance which leads to the puddling of soil that can stimulate zoospore production;*

h) *ensuring that any water used in the forest is free of fungal inoculum;*

(i) *ensuring that all nursery plants are free of dieback disease.*" (p. 6)

"[…] *We are dealing with a very complex ecological problem for which there is no simple answer. Nevertheless, we expect continued progress in the development of measures to inhibit the activity of the dieback disease and to help in learning to live with this unique situation.*" (p. 6)

GUIDELINES - 1981

Jarrah 81 : Guidelines for Planning and Control of Logging and Silvicultural Operations in the Northern Jarrah Forest, West of Quarantine. 1981

1. Introduction
1.1 General
"*Hardwood timber production operations in the northern jarrah forest must:*

(i) *conform with provisions of the General Working Plan;*
(ii) *be in accordance with the land use plan;*
(iii) *satisfy dieback hygiene rules; and*
(iv) *result in maintenance or improvement of the health and vigour of the forest.*" (p. 2)

1.2 Basic Principles
"*(i)* *Logging operations can only be considered for areas where timber production is compatible with the primary land use - L.U.M.P.*

(ii) *Every operation must be evaluated from the standpoints of best hygiene option, or least impact of hygiene failure, or least impact of hygiene failure – see the 'Dieback Hygiene Guide' – Appendix 1 to these notes."* (p. 2)

"*(iii)* *There are no universal prescriptions. Each stand must be treated on its merits, with the best treatment determined after study of land use priority, dieback status, stand structure, site and silvicultural options.*" (p. 3)

2.3 Disease Control Implications
"*2.3.1* [...]

Because of the variable levels of the pathogen in soil particularly and in roots throughout the year there will be varying degrees or levels of risk associated with management activities in the forest. Hygiene prescriptions will need to reflect this." (p. 6)

"*2.3.7* *These considerations continue to support the case for allowing those industries and activities which have the potential for soil movement, to operate in disease-free upland jarrah sites only during dry soil periods.*

Even in this instance disease spread is possible through transport of root material, or from traversing lowland or moisture gaining sites. Maximum use of hygiene techniques must, therefore, continue." (p. 7)

Part 3. The Logging Operation
3.1.2 Classification
"*Classify the area to be cut.*
[…]

(iii) *From latest Dieback maps updated by road traverse, ground survey and any other relevant information, delineate dieback categories, as follows:*

Show dieback categories:
Dieback-free protectable *: no colour*
Dieback *: red*
Suspect and downslope of suspect *: blue*
Dieback-free but downslope of dieback *: yellow*" (p. 7)

"*In the definition of the categories Downslope of Dieback and Downslope of Suspect, pay special attention to drainage patterns and slope. In most instances, dieback spread downslope will be vertical, not fan-shaped. Only use a fan pattern if this appears likely from a field inspection of the drainage pattern on the ground.*

(iv) *If dieback category cannot be determined, and the class 'suspect' is not appropriate, apply the class 'uninterpretable' - but only as a last resort. Seek specialist advice.*

(v) *Sub-divide blocks into coupes. Each coupe is a single dieback category, namely:*

Dieback
Dieback-free protectable
Dieback-free downslope of dieback
Suspect and Downslope of Suspect

or parts of a single category.

Where areas of Dieback-free forest are sub-divided into coupes, try to make each coupe a microcatchment by using natural drainage and contour patterns." (p. 9)

3.1.4 Integration of Harvest for all Produce
"*It is desirable to arrange one harvest for all products so as to avoid repeated returns to the area.*" (p. 9)

3.1.5 Allocation of Coupes
"*Basic priority is to utilise dieback forest before dieback-free downslope of dieback, before dieback-free protectable. Wherever possible, avoid logging suspect forest until suspicions are or are not confirmed.*" (p. 9)

"*Dieback can be logged when soils are moist (provided machines do not bog or cause unacceptable soil damage).*[…]" (p. 9)

3.1.6 Road System
"*Design basic access system and mark on plan.*
Observe these guidelines:
(i) *Use as few roads as possible;*
(ii) *Avoid new roading, unless required to relocate parts of existing roads for access to dieback-free forest;*
(iii) *Roads to be low in the profile as possible;*
(iv) *Define unwanted roads for closure; ...*
(vi) *Work through the 'Dieback Hygiene Guide' to cross-check decisions taken.*" (p. 9)

3.2 Roading

"*3.2.1* [...] *Ensure the dieback risk category is demarcated where boundary crosses a road to be used. Ensure any road required for access within a coupe remains in the single dieback category. In-coupe haul roads which pass through dieback into dieback-free forest may be used if surface-stabilised but this will always be subject to daily monitoring during wet weather.*[…]" (p. 10)

"3.2.2 *Construct roads only in dry soil conditions.*

(i) *Control vehicle cleanliness by blowing down or washing down;*

(ii) *Road-working machinery to be washed down when travelling from dieback forest into dieback-free forest at designated clean points;*

(iii) *Clean down point to be on boundary of dieback on downslope of roadside, draining from road to diseased forest;*
[…]" (p. 11)

3.2.3 Road Specifications
"*Construct roads according to expected soil conditions at the time the road will be used and according to amount of expected use.*" (p. 11)

"*(ii)* *<u>For Roads to be used during Wet or Moist Warm Soil Conditions</u> (Winter/Spring/Autumn)*
If the road crosses or enters dieback-free forest, specifications will allow for rapid drainage and stabilised road surface.

eg.6m road clearing with 4m road surface but drained on both sides of road.

For access into dieback-free forest, stabilisation is required on steep slopes, tight corners and dieback areas. Gravel surface is required and culverts every 200m where slopes exceed 1:15." (p. 12)

3.2.4 Road Works
"*(ii)* *Gravelling to be carried out during dry soil conditions.*[…]" (p. 12)

3.5 Logging
3.3.1 General
"*<u>Hygiene</u> variations are summarized as follows:*" (p. 12)

Coupe	*Status of Plant on Entry to Coupe*	*Logging System*	*Status of Plant on Exit From Coupe*
Dieback-free protectable	*Must be clean*	*Split Phase*	*Need not be clean*
Dieback-free Downslope of Dieback	*Must be clean*	*Split Phase*	*Must be clean*
Suspect and below Suspect	*Must be clean*	*Split Phase*	*Must be clean*
Dieback	*Need not be clean*	*Conventional*	*Must be clean it exit route traverses dieback-free forest*

The Dieback Hygiene Guide ... must be used to cross-check each decision taken for each area." (p. 13)

3.3.2 Vehicle and Machinery Cleanliness
"*Where cleanliness is prescribed on entry to or exit from a coupe, or sub-coupe, this applies to all plant and vehicles.*

Washdown must be at the point of entry, if there is any risk of dieback pick-up en route to the forest.

If log roads deteriorate, or free water lies on the road so that there is a risk of soil pick-up and transport, haulage through dieback-free forest must cease, or a washdown at each entry to dieback-free forest must be done." (p. 13)

3.3.3 The Mill Landing
"*Hygiene at the mill landing is crucial as it is the focal point for all logging operations.*

The mill landing must be designed to prevent infected vehicles and trucks travelling back to the forest." (p. 13)

3.3.4 Conventional Logging System
"*Coupe boundaries must be carefully marked and no plant or equipment may cross out into dieback-free forest unless it is cleaned.*[…]" (p. 14)

3.3.5 Split Phase Logging in Coupes Other Than Dieback
3.3.5.1 General
"*Logging operations in (i) dieback-free protectable, (ii) downslope of dieback and (iii) suspect forest, will be based on the split phase system.*

The aim is to prevent Phytophthora on log trucks and loaders being spread up into the coupe by snigging machines. Potential infections are kept to the valleys.

The snigging phase for each landing must be completed before loading and hauling commence.[…]" (p. 14)

3.3.5.2. The Bush Landing
"*Each bush landing will service a nominated area, called a sub-coupe.*" (p. 14)

"[…]*Landings must be as low in the profile as possible. Use existing gaps.*" (p. 14)

"*A six metre uncleared strip is left between the haul road and the edge of landing to act as a buffer.*" (p. 15)

3.3.5.3 The Shunt
"*When landing construction is completed a shunt road to the haul road will be installed leaving a physical barrier (eg. log) at the parking entrance. The Shunt is for parking of all outside vehicles until snigging of the sub-coupe is completed. No machine or vehicle may travel from the haul road onto the landing until snigging on the sub-coupe is complete. This is the vital key of the split phase operation.*" (p. 15)

3.3.5.4 Falling
"*The company bush boss will demarcate major snig tracks through the sub-coupe, ensuring point of entry into landing is designed to prevent water run-off onto landing (see diagram).*" (p. 15)

3.3.5.5 Snigging
"*(i) Once within a coupe, the movements of the snigging machine must be strictly controlled. Machinery must work systematically from one sub-coupe to the next, starting on a new sub-coupe only after the*

previous one is completed. Sub-coupes at 'the back' of the coupe will be worked first. When the tree-marker is satisfied that all operations in the sub-coupe are completed, the machine must be cleaned down before moving to the next sub-coupe." (p. 15-16)

"*(ii) Skidders will construct major snig tracks and then remove logs along snig tracks as directed by the company bush supervisor.* […]" (p. 16)

"*(iv) Approval of the tree-marker is required before machinery may move to a new sub-coupe, following a joint inspection with bush boss of the recently cut over sub-coupe, to check utilisation, hygiene and erosion control.*" (p. 16)

3.4.1 Environmental Standards

"*(i) Check for damage to crop trees including dieback resistant trees and advance re-growth.*

[…]" (p. 18)

3.5 Log Stockpiling

"*3.5.1 The aim of stockpiling is to maintain log supplies to a mill without causing irreversible damage to the forest at times when damage is most likely to occur.*

[…]
Damage to the forest is most likely during wet or moist soil conditions and most critical when Phytophthora is sporulating." (p. 19)

"*3.5.3 The aim is to obviate the need for logging in dieback-free forest during moist/wet soil conditions.*" (p. 19)

"*3.5.4 Dumps are to be either at mill landing or adjacent to haul roads which have no access problems during wet soil conditions.*" (p. 19)

Part 4 : Silvicultural Practice

"[…] *Treatment will vary according to land use priority, stand health and structure and site quality.*

However, there is a <u>uniform aim</u>: to maintain or improve the health and productivity of the forest. This aim is to be achieved by:

(i) The selection (or establishment) and protection of future crop trees, followed by

(ii) Cultural practices which strengthen the capacity of the forest to tolerate existing or possible future dieback infection." (p. 20)

4.2 Planning

(iv) Site Quality

"*To simplify the preparation and implementation of prescriptions stands will be inspected, classified and encoded before cutting commences.*" (p. 21)

4.3 Classification and Encoding

"*Before logging commences in a coupe, a detailed field inspection must be carried out. This will provide data for classification and the assignment of a stand code, as set out overleaf:*" (p. 21)

4.5 Prescriptions

4.5.3. Stand C

"* *Water Production MPA*

* *Extensive mortality in jarrah overstorey*

(i) Mark for retention and fully protect all sound, healthy dieback tolerant species - eg. marri, blackbutt, bullich.

[…]" (p. 24)

Part 5. Implementation
5.1 Responsibility
"*Classification of the forest and implementation of both hygiene and silvicultural prescriptions are the responsibility of Senior Divisional staff who will direct treemarkers and Industry staff.*" (p. 27)

5.2 Procedure
"*The basic steps are:-*

(i) Inspection of logging coupes
(ii) Classification and encoding stands within coupes
(iii) Marking coupe sheets
(iv) Treemarking to prescription
(v) Logging and Regeneration treatments
(vi) Return of coupe sheets so that work programme can be compared with work carried out
(vii) Update of protection and burning plans to ensure protection of regeneration." (p. 27)

FORESTERS' MANUALS – 1981

Fire Control : Foresters' Manual. 1981[in *Foresters' Manual.* 1979]

Annual Burning Plan and Notification
"*Prescription and preparation for burns in hardwood forest susceptible to dieback disease must be completed before 1 March, during the dry summer months, to maximise hygiene*." (p. 24)

Prescriptions
"*9.043 A prescription is to be prepared for all burns whether hand, aerial, karri regeneration or clearing burns. Job specifications have been prepared describing the methods of fuel sampling and proper recording for the prescription form, i.e.:*

FD 655 for hardwood
FD 574 for burning under pine canopy
FD 657 for clearing or regeneration burns

Where applicable, burning prescriptions are to include constraints on vehicle movements and wash-down to prevent the spread of dieback. […]" (p. 25)
Updated 10/81

Prescription to Ensure Protection From Damage
9.044 When the inspection and prescription are being prepared for each prescribed burn, every object, operation or establishment within the area which may suffer damage must be identified and action taken to ensure protection. The position of anything liable be recorded on the inspection form so that protection is not overlooked, see PAFSOU and Environmental Check List forms

Dieback Quarantine Area
9.045 In dieback quarantine areas road preparation will be restricted to log removal and slashing or brushing litter from spatially safe road surfaces. No grading is to be carried out in these areas without the written approval of the Regional Superintendent." (p. 25)
Updated 10/81

Conditions for Edge Burning
"[...] *Dieback hygiene requirements must be strictly observed during edge burning operations, especially in early spring*." (p. 28)
Updated 10/81

Hand Burning
"*9.076 The overseer (or officer) directly in charge of a hand burn must ensure that the gang members are fully briefed on the job ahead. They must know:*

(a) *The whole area to be burned and its boundaries. The most satisfactory procedure to achieve this is to drive the gang around the boundary tracks dragging a marker behind the vehicle where this can be done without risk of spreading dieback;* […]." (p. 34)

Updated 10/81

Fire Appreciation
"*9.104 The method of fire fighting, particularly in areas managed to prevent the spread of dieback to be carried disease, requires the Controller to carry out and implement a fire appreciation based on FD613. This involves considering alternative fire fighting strategies to achieve the best compromise between successful fire suppression and dieback hygiene requirements.*

The Controller will decide priorities and make an objective assessment of the time to suppress the fire, based on the fire line constructed by the available fire fighting forces compared with the rate of perimeter spread for the fire." (p. 48)
Updated 10/81

FORESTERS' MANUALS – 1981

Foresters' Manual : Part 12 : Mining in Forest Areas. 1981 [in *Foresters' Manual*. 1979]

Dieback Hygiene in Mining Operations
"*12.039 Apart from the mining operations, the movement of mining equipment and the activity of the almost continuous test drilling programme in areas well in advance of current mining are likely to spread Phytophthora cinnamoni (the pathogen causing dieback disease). Special washing down procedures have been developed, and are especially important for the highly mobile test-drilling units*." (p. 16)

Appendix II : Application for Coal Mining Leases
"*3.4 Access to and from, and the movement of vehicles and personnel within the 'mining area' is restricted to those roads and tracks agreed to by the Divisional Forest Officer.*

Vehicle access and the use of potential carriers of the disease known as Phytophthora cinnamomi in the 'mining area' are subject to Forest Disease Regulations, and may only be granted under permits issued by the Forests Department.

Permits for vehicle access and the use of potential carriers of Phytophthora cinnamomi in a Forest Disease Risk Area, for exploration purposes, will only be considered after the area involved has been effectively quarantined, photographed and mapped to show precisely the extent and location of Phytophthora cinnamomi.

3.5 The holder must wash down and clean all equipment, rigs, vehicles, tools and other equipment, in accordance with the standard required by the Divisional Forest Officer. This must be carried out prior to and on each occasion any such equipment, rig, vehicle, tool or other equipment is brought onto or taken from the "mining area", unless otherwise advised by the Divisional Forest Officer or his nominee.

3.6 The holder must comply with the instructions of the Conservator of Forests, or his nominee, concerning the disease known as Phytophthora cinnamomi, the prevention and spread of that disease and general forest hygiene." (p. [20])

HANDBOOK – 1981

Bauxite Mining Northern Jarrah Forest Mining Operations Handbook 1. Edition 1. 1981

3.2 Planning Priority
"*For planning purposes, the Department seeks to guide mining into areas of least conflict with other land uses.*

In the overall planning process, the Forests Department is required to :-

1. *Review and make recommendations on company 25 year plans. These depict overall mining strategy and sequence of operations.*

2. *Review and make recommendations on company 5 year plans. These cover detailed operational proposals and sequence.*

3. *Approve the annual applications, which cover the specific areas of forest to be cleared.*

There are 4 possible responses : opposition, deferment, modification and approval or simple approval.

Dealing with these in turn:" (p. 14)

"*Modify/Defer*
Proposals to be modified, or mining deferred for areas where time is needed to study long-term effects, or because to mine elsewhere first is more sensible from State's viewpoint; e.g.

areas designated catchment protection, where salinity risk high;
quarantine areas;
zone around dams and reservoirs;
high quality, dieback-free forest.

Approve
Areas where there are none of the above problems." (p. 15)

3.3 Mining Plans
"*5 Year Plans (also known as Mining & Management Programmes, or MMPs). Prepared by Alcoa annually for each minesite for review by MMP Liaison Group, Government Departments etc., and approval in principle by Minister for Resource Development.*" (p. 15)

3.6 Procedure for Review of 5 Year Plans
"*4. Check forest values within proposed mining areas. Show an overlay, areas proposed for mining which have these characteristics :-*

(i) Diebackfree
(ii) High in the landscape (i.e. protectable and above existing mines or mine access)

(iii) JA or JA+ forest." (p. 16)

8. Management of Rehabilitated Stands
8.3 Disease Management
"*The aim is to prevent the regenerated stands from becoming infected with Phytophthora cinnamomi. This will be attempted by maintaining an in-pit environment which is hostile to the fungus.*

Factors hostile to PC are :-

(i) Use of 'resistant' trees
(ii) Establishment of legume understorey
(iii) Maintain pits banksia-free
(iv) Prevent free water ponding and impede drainage
(v) Maintain stand vigour by thinning and fertilizing" (p. 57)

'Rehab 80' : Prescription for Rehabilitation of Bauxite Mines in Western Jarrah Forest
3. Rehabilitation Objective
"*The overall objective for rehabilitation of bauxite mines in the western jarrah forest is :-*

'To regenerate a stable forest ecosystem, capable of maintaining or enhancing water, timber, recreation, conservation and/or other nominated forest values'.

Specific goals (not listed in order of importance since priorities may vary with designated land use) are :-
[…]
3.2 Protection : To conserve the residual soils; to control dieback spread; and to control fire hazard.

[…]" (p. 38)

5. Planning Approval
"*5.1 Overall rehabilitation planning must precede, not follow, the mining operation. Accordingly, the following aspects must be taken into account in the preparation and approval of the 5 year Mining and Management Plans for each mine site :-*

[…]

- *dieback hygiene, in particular topsoil allocation and protection of dieback forest.*

- *future access and management.*" (p. 39)

"*5.3 A detailed rehabilitation plan will be prepared for each pit. This will indicate :-*
[…]

- *erosion control and water management measures to be adopted*

[…]

- *access*" (p. 39)

6. Preparation of Pits For Planting
"*6.2 Overburden and topsoil will then be evenly respread over all areas to be regenerated.*

The distribution of overburden and topsoil from pit to pit will be in accordance with dieback hygiene requirements – i.e., avoid transfer of infected material to diebackfree sites.

[…]" (p. 40)

7. Planting

"*7.1 Criteria for selection of tree species to be used are :-*

(i) Tolerance to dieback

[…]" (p. 40)

10. Scrub Seeding

"*10.1 The aim of scrub seeding is to assist with erosion control and general site rehabilitation. Species to be used will be reviewed for each site each year. Criteria for species selection will be dieback tolerance, habit and nutritional value.*

10.2 Base species to be used will be selected from : Acacia pulchella, A. strigosa, A. drommondii, A. saligna, Kennedya coccinea and K. prostrata.

[…]

10.4 Species not to be used are non-indigenous species Proteacaea or large woody and inflamable species such as Albizzia.

[…]" (p. 42)

Interim Prescription : FIRS 80

6. Dieback Status

"*Within each management priority area, the following dieback categories will be identified as requiring a different improvement or rehabilitation approach :-*

6.1 Graveyard dieback – areas where dieback disease has intensified to the point of deaths of jarrah trees.

6.2 Other forest – protectable diebackfree forest, non-protectable areas, understorey infected and suspect dieback areas." (p. 46)

10. Forest Other than Graveyard Dieback in Water Production MPA

"*10.1 Define according to field inspection and demarcate dieback-free forest, dieback understorey infected and suspect dieback areas. Demarcation is required in order to implement hygiene.*" (p. 50)

MANAGEMENT PLAN - 1980

Land Use Management Plan : Northern Jarrah Forest : Management Priority Areas. 1980

"*Because the northern jarrah forest is located within 150 kilometres of the Perth metropolitan area, there are strong demands for the various products and values of the forest. In some areas there is conflict between alternative forms of land use (Forest Focus, 1973). Inappropriate land uses may have far-reaching and damaging effects.*

Timber production, bauxite mining, water yield, recreation, conservation of flora and fauna, water purity (bacterial, viral, physical or chemical quality), forest disease and fire control are key factors in land use decisions within this region." (p. 2)

Appendix 4 : Key Features, Major Conflicts and Priority Use for MPAs
Catchment protection MPAs

" […]

- *current disturbance of forest cover by dieback disease, hardwood logging operations and other human activity is moderate to low.*

- *a considerable proportion of the landscape is highly susceptible to dieback disease.*

- *productivity of the indigenous forest (uninfected by dieback disease) is moderate to low.*

[…]

Major conflicts

- *clearing of the native forest cover (by agriculture, bauxite mining or dieback) will result in increases in stream salinity.*

[…]

- *some kinds of human activity increase the probability of spreading more dieback into this area*.

[…]" (p. 42)

Water production MPAs

Key Features

"[…]

- *past disturbance of forest cover by dieback, fire and cutting has been considerable.*

- *dieback is already quite widespread*." (p. 43)

Major conflicts

"[…]

- *some types of recreation close to major streams and reservoirs may lead to pollution of the water supply.*

- *bauxite mining and dieback will severely reduce the productivity of the indigenous forest. The rehabilitation of mined over and diseased areas may partly alleviate this conflict*." (p. 44)

Timber production/catchment protection MPAs

"[…]

- *dieback occurrence and forest disturbance are moderate to low*." (p. 47)

Major Conflicts

"[…]

- *land uses which spread dieback will reduce the long term productivity of these sites and decrease other forest values (e.g. aesthetic, conservation).*" (p. 47)

Table 2 : Allocation of Other Uses to Management Priority Areas

"*Management Priority*	*Secondary Uses*	*Tertiary Uses*	*Incompatible Uses*
Conservation of flora and fauna MPAs	*Catchment protection* *Scientific study* *Water production*	*Recreation* *Timber salvage and regeneration* *Honey production*	*Activities which alter structure or composition of the forest or introduce dieback disease.*

Catchment protection *MPAs*	*Conservation of flora and fauna* *Scientific Study* *Honey production* *Wildflower mangmt* *Water production*	*Recreation* *Timber production* *Bauxite mining* *Communication lines*	*Activities which introduce dieback disease, remove native cover without the provision of successful regeneration or increase the risk of erosion and pollution.*

[…]" (p. 18)

Hardwood Operations Control System

"*All hardwood operations are planned, budgeted, implemented, recorded and controlled according to the prior uses allotted to each Forest Block through the Hardwood Operations Control System (HOCS).* […]

Full integration between HOCS and the MPA system is achieved by showing management priority areas on HOCS sheets (Figures 4 and 6). Dieback risk categories are also available on HOCS (Figures 5 and 7).[…] *Using these and other 'key' plans, all forest operations in that block are planned and suitable prescriptions are prepared*." (p. 20)

"*Prescriptions are modified, as required, to account for the influence zones of other activities or features. The HOCS sheets are then used to record the implementation of those operations in the field.*

This system has been used for several years and is coping with the more intensive aspects of multiple use forest management." (p. 21)

Management Prescriptions

"Prescriptions deal with specific activities within a Management Priority Area and define how the particular management objectives are to be achieved.

Prescriptions are prepared for all management activities within Management Priority Areas. These activities include prescribed burning, logging and regeneration, stand improvement, dieback hygiene, recreation developments, seed and wildflower collection, bauxite mining, road construction and maintenance and many others. Sample prescriptions for two activities (logging and prescribed burning) are included in this document, to indicate the type of prescription used and the items covered. These form the basis for more detailed job specifications which are issued to supervisory staff.

Prescriptions must allow for flexibility at field level where in situ decisions may need to be made about specific land use factors. Within a particular management priority area (e.g. recreation) allowance can be made for readily identifiable influence zones (areas containing streams, tourist roads, picnic areas, walk trails, etc.) However, field inspection may reveal small areas which require a different management emphasis and in these cases, the prescription will be amended to meet specific requirements.

Prescriptions will be reviewed regularly in consultation with other authorities, in the light of technological developments, and with a deeper insight into land use management requirements." (p. 26)

Hardwood Logging Sample Prescription for Marrinup Block

1.Objective of Management

"*To undertake hardwood logging in a manner which will treat and regenerate the forest in accordance with the land uses allocated to Marrinup Block.*" (p. 27)

Factors to be Considered

"[…]

2.3 Dieback risk - a considerable proportion of block is already affected by dieback.

[…]" (p. 27)

3. Prescription

3.1 General procedures

"3.1.1 Check that the proposed logging conforms with the 3 year plan.

3.1.2 Collect management level inventory information on the timber resource available.

3.1.3 Obtain Conservator's approval for areas to be logged. Details of the submission to include: access routes, wash down points and influence zones.

3.1.4 Identify logging areas in terms of dieback risk categories (dieback infected, not currently protectable, protectable and resistant) by the use of aerial photography and detailed field mapping of the disease.

3.1.5 Schedule of the logging operations to treat dieback risk categories in the following order of priority - dieback, non-protectable, protectable or resistant.

3.1.6 Vary the treatment according to dieback risk category:

(a) Dieback and non-protectable forest to be fully utilised - all saleable forest produce to be removed.

"(b) Protectable and resistant forest to be treated according to the uniform system of silviculture; subject to adequate stocking, full utilisation of distribution poles greater than 9.5m in length, sawlogs to be removed following treemarking. (All trees greater than 60cm d.b.h. to be treemarked). Below this diameter limit, future crop trees are to be retained. Where regrowth is inadequate, sufficient seed trees will be retained.

(c) In all risk categories favour the retention of marri, blackbutt and bullich within the stand.

[…]

3.1.10 Implement erosion control measures by strategic placement of haul roads, snig tracks and landings, careful dispersal of water from drainage channels and revegetation of disturbed surfaces.

3.1.11 Implement dieback hygiene measures during logging operations. Ensure vehicle cleanliness, isolated operations to a particular dieback risk category nominate specific access routes, log protectable and resistant areas during dry soil conditions and ensure that all operators are fully trained, briefed and continually supervised.

3.2 Effects of land use on the general logging prescription:

3.2.1 Recreation – the prescription will apply throughout with the exception of influence zones.

3.2.2 Water Production - the prescription will apply throughout with the exception of influence zones.

[…]

3.3 Effects of influence zone on the general logging prescription:

[…]

3.3.4.2 Retain a buffer strip, having a minimum width of 100 metres each side of the route, and of sufficient width to ensure the vista from the route is part of the buffer. The logging and regeneration prescription applied to the buffer will depend upon the forest dieback risk category in which the buffer is located.

(i) Dieback: fully utilise all merchantable material in the buffer and rehabilitate or regenerate with resistant species.

(ii) Not Currently Protectable: remove only dying and hollow-butted trees. Remove logging debris from the base of trees.

(iii) Protectable: as for not currently protectable.

(iv) Resistant: as for protectable." (p. 27-31)

Appendix 5 : Forests Department : Conditions of Permit

"*1. Permit holders must be able to interpret a Forests Department map and navigate access routes shown on the permit.*

2. Permit holders must obtain a map from Forests, Dept . ..... showing routes on the permit.

3. If the route shown on permit has been accidentally blocked, the permit must leave the quarantine area by route of entry and seek alternative access from Forests Dept.

4. If rain occurs during the period of permit, the permit holder must:

4.1 check the permit at Forests Dept. office before entering the quarantine area
OR
4.2 leave the quarantine area by exit route shown on permit
AND
4.3 seek re-endorsement of the permit from Forests Dept. before entering quarantine area again.

5. Vehicles must not enter a forest quarantine area without a valid permit. No vehicle may remain within a forest quarantine area after a permit has expired.

6. Vehicles entering a forest quarantine area may only use access routes shown on the permit.

7. Do not remove, deface or interfere with road signs, gates or road blocks on boundary or within a forest quarantine area.

8. Do not remove earth or vegetation from the forest quarantine area or move earth and vegetation from one place to another within the forest quarantine area except under conditions laid down in the permit.

9. Any Police or Forests Dept. officer may request name and address of a person within a forest quarantine area.

10. Any Police or Forests Dept. officer may stop, examine and detain a vehicle within a forest quarantine area." (p. 51)

GUIDELINES - 1980

Dieback Hygiene Guide. 1980 [included as Appendix 1 of *Jarrah 81 : Guidelines for Planning and Control of Logging and Silvicultural Operations in the Northern Jarrah Forest, West of Quarantine.* 1981]

"*An aid for planning forest operations so that dieback spread is prevented or minimized*" (p. i?)

"[…] *An effective means of controlling the disease is by the practice of 'dieback hygiene'. The aim of dieback hygiene is to prevent transport of the fungus from infected to dieback-free forest.*" (p. 1?)

"*This guide has been designed to help foresters plan and conduct an hygienic forest operation. It will <u>NOT</u> provide him with the detailed job prescription; this will vary for almost every job and every site. Rather it concentrates on the principles involved, to be used as a guide and memory-jogger at the planning phase of every operation.*" (p. 1?]

NOTE: THE GUIDE CONTAINS FLOW-CHARTS DEMONSTRATING COURSES OF ACTION

FORESTERS' MANUAL – 1980

<u>Foresters' Manual : Fire Protection. Rev. 1980</u>

Hazard Reduction
Annual Burning Plan
"*58.The Area O.I.C. shall draw up a current burning plan each year setting out the proposed programme.* [...]

All hardwood burning (hand and aerial) proposals are to be shown on a 1:50,000 plan with job numbers and areas. These plans will be used to provide: […]
(b) Protection Branch with records.
(c) Drafting Branch with necessary information for the preparation of flight plans.

These will be submitted after vetting by Fire Control Forester and Regional Leader, to the O.I.C. of Protection Branch by the following dates:

Hardwood - 15th May (Note paragraph 59)
Plantation - 15th March.

59.Prescription and preparation for burns in hardwood forest susceptible to dieback disease must be completed before Ist March during the dry summer months to maximise hygiene." (p. 18)

"*Where applicable, burning prescriptions are to include constraints on vehicle movements and wash-down to prevent the spread of dieback.* [...]" (p. 19)

61.In dieback quarantine areas road preparation will be restricted to log removal and slashing or brushing litter from spatially safe road surfaces. No grading is to be carried out in these areas without the written approval of the Regional Superintendent." (p. 19)

Conditions for Edge Burning
"'*95. To strengthen roads and firelines acting as boundaries of a burn and so avoid time-consuming mop-up and patrol, edging is allowed in late autumn, winter and early spring when subsequent weather will not*

[…] *allow the edge burn to flare tip and continue running*. […]" (p. 31-32)

NOTE: DATE OF ISSUE IS UNCLEAR – "*Revised 10/79*" or "*Issued 12/78*"

"[...] *The area within edging burns must be burnt out before the summer to prevent uncontrolled fire damage. Dieback hygiene requirements must be strictly observed during edge burning operations, especially in early spring*." (p. 32)
Issued 12/78

Fire Attack
Sequence of Action
"*178.The following sequence of action will be taken in the event of a fire endangering State forest:*
[…]

178.3The most senior officer present will take charge and despatch forces laid down in the operation orders or despatcher tables, ensuring that dieback checklists are followed as set out in Job Specification No. 3." (p. 54)
Issued 12/78

Counter attack
"*186.In counter-firing the fire fighters fall back some considerable distance from the advancing fire, usually to a prepared fire line or track, and there set 'back-fires' which are allowed to run back towards the main fire with the object of burning out a wide strip of country ahead of the main fire.*

This method should never be used if any of the direct attack methods are likely to succeed and dieback hygiene requirements can be met." (p. 57)
Issued 12/78

Fire Appreciation
"*188.The method of fire fighting, particularly in areas managed to prevent the spread of dieback disease, requires the Controller to carry out and implement a fire appreciation based on F.D. 613. This involves considering alternative fire fighting strategies to achieve the best compromise between successful fire suppression and dieback hygiene requirements*." (p. 58)
Issued 12/78

MANAGEMENT PLAN – 1980?

<u>Land Management Plan for State Forest in the Mount William Area. 1980?</u>

2.4 Dieback Hygiene
"*Normal hygiene measures are being applied to drilling operations (e.g. restrictions on access, vehicle cleanliness, season of operations, etc.). Other mining activities (clearing, topsoil removal, haul road construction, extraction of ore and rehabilitation of pits) have not been carried out hygienically because*

(a) no practical method has yet been developed for these major operations;

(b) mining has so far been centred in areas where the degree of infection is high and where pickets of healthy forest have been relatively small.

From disease management point of view the following points are important:

(a) The current classification of risk categories recognises forest infected by dieback, non-protectable from infection, protectable from infection and resistant to infection (Figure 1). While these categories are useful to identify disease location, and where it will spread naturally, they fail to convey varying impact on the vegetation." (p. 7)

There is considerable evidence of partial resistance of jarrah forest stands and this varying impact of the disease is now recognised as an important part of defining operational techniques and priorities. Much of the area classified as non-protectable in the Mt. William area contains vigorous forest which should have considerable natural resistance to disease and is expected to persist as viable jarrah forest.

(b)Immediately to the north and south of the proposed 25 year mining proposals, are areas exhibiting a high impact from the disease, and in some areas, total forest collapse (Figure 1). Least impact on forest values will occur if mining takes place in these areas first (Park, Clarke and Kent Blocks).

(c) Mining in protectable forest using current techniques is certain to increase disease spread. Mining in non-protectable areas will hasten the infection of those areas." (p. 7-8)

3. Management Prescriptions
"*In drawing up prescriptions the following factors have been taken into account:*
[…]
(b)Primary and compatible land uses – these are summarised in Table 1." (p. 11)

"*(c) Dieback risk categories (Figure 1) – much of the area is infected with dieback, although a significant proportion is protectable from disease. Some areas which are not protectable from infection are expected to show little impact. Similarly some infected areas exhibit low impact from the disease.*

Most gully systems contain high quality bullich stands which are not susceptible to the disease." (p. 12)

3.1 Prescribed Burning
3.1.2 Prescription
"*3.1.2.3 Upgrade roads surrounding the burn only where absolutely necessary and then under dry soil conditions.*

[…]" (p. 13)

3.2 Hardwood Logging
"*3.2.2.1 Identify logging areas in terms of dieback risk categories (dieback infected, non-protectable, protectable and resistant) by the use of aerial photography and detailed field mapping of the disease.*

3.2.2.2 Schedule the logging operations to treat dieback risk categories in the following order of priority – dieback, non-protectable, protectable or resistant. The impact of the disease on some non-protectable sites will be more severe than in others. Logging priorities in this risk category will be first directed to those sites where the disease is expected to have severe impact.

3.2.2.3 Vary the treatment according to dieback risk category.

(a) Dieback and non-protectable forest to be fully utilised – all saleable material to be removed.
(b) *Protectable and resistant forest to be treated according to the uniform system of silviculture. Subject to adequate stocking, full utilisation of distribution poles greater than 9.5m in length, sawlogs to be removed during treemarking. All trees greater than 60cm d.b.h.* to be removed. Below this diameter limit only future crop trees are to be retained. Where regrowth is inadequate, sufficient seed trees will be retained.*" (p. 15)

"*3.2.2.8 Implement dieback hygiene measures during logging operations. Ensure vehicle cleanliness, isolate operations to a particular dieback risk category, nominate specific access routes, log protectable and resistant areas during dry soil conditions and ensure that all operators are fully trained, briefed and continually supervised.*" (p. 16)

3.3 Stand Improvement (Forest Improvement and Rehabilitation Scheme)
3.3.3.2 Dieback Infected Zone
"*These areas are characterised by a very light overstorey and sparse ground cover. Some areas are shallow to cap rock. The major requirement is to ensure soil erosion is prevented and, where necessary, this is most practically achieved by application of ground cover.*

(a) *Salvage all saleable jarrah produce from the area. Carry out erosion control measures on haul roads, snig tracks and landings.*

(b) *Push (or fell) dead and dying trees into small heaps to provide ash beds after burning. These heaps are to be placed in scattered pockets on deeper soils but should not occupy more than 75% or not less than 50% of each dieback infected area. This treatment will provide for both water production and the production of good quality timber.*

(c) *Eradicate all living banksia.*

(d) *Retain all living marri except those unable to withstand the regeneration burn because of bole damage.*" (p. 20)

"*(e) Burn area in autumn to form ash beds.*

(f) Plant dieback resistant eucalypt seedlings at a stocking of 625 ha (average tree spacing of 4 metres x 4 metres) on and around the ashbeds such that tree clumps will develop on 50-70% of the area.

(g) fertilise seedlings at 3 weeks and 9 weeks after planting.

(h) Broadcast acacia seed together with appropriate fertiliser over the entire area at a rate of 1 kgm/ha." (p. 21)

3.3.3.3 Protectable and Non-Protectable Zone

"*(a) Remove all saleable distribution poles and sawlogs under dry soil conditions. Carry out erosion control measures on haul roads, snig tracks and landings.*

(b) Eradicate all banksia stems and thin jarrah, marri, bullich and blackbutt crop trees to a stocking of 250 stems/ha (average tree spacing of 6 metres x 6 metres). Favour the retention of dieback resistant species where high impact from the disease is likely, and jarrah where partial resistance is indicated.

(c) Remove all debris from around the boles of crop trees.

(d) Ignite area under weather conditions which will produce high ground temperatures (dry soil and slow moving fire) in order to promote acacia regeneration.

(e) *Physically close all tracks not required for management access or forest protection.*" (p. 21)

"*(f) In areas where pre-burn inspection has indicated an absence of acacia in the understorey, carry out broadcast seeding (with fertiliser) up to a maximum rate of 1 kgm acacia seed/ha.*" (p. 22)

3.3.3.4 Resistant Zone

"*This area is to be treated the same as protectable and non-protectable zones with the exception that seeding with acacias and associated fertiliser treatment is not required.*" (p. 22)

3.3.5 Rationale for Treatments

3.3.5.3 Introduction of Acacia

"*Designed to increase forest resistance to disease and reduce potential for erosion. Opening up the canopy to increase tree growth and enhance the potential for dieback infection and spread, and acacia introduction is expected to offset this.*" (p. 24)

3.5 Dieback Hygiene (for access, engineering and mining operations, drilling, wildfire suppresison)

"*General hygiene prescriptions are outlined here to cover the variety of activities on State Forest which require the movement of vehicles and machinery, thereby posing a risk of spreading dieback disease. The technical and engineering prescriptions for such activities are not included as they must conform to the requirements of the relevant authority or organisation. In the case of the Forests Department, engineering specifications are contained within the Foresters Manual.*" (p. 30)

3.5.1 Objective of Management
"*To ensure that activities which take place in the forest are concerned in a manner that will avoid the artificial spread of jarrah dieback disease.*" (p. 30)

3.5.2 Treatment Zones Recognised
"*Four basic categories of forest are recognised for hygiene purposes, i.e. Dieback Infected, Non-Protectable, Protectable and Resistant. Protectable stands have the best chance of long term protection from infection and stringent application of hygiene measures must be applied when operating in these areas.*

The impact caused by artificial spread depends on amount of existing infections, their position in the landscape and the susceptibility of the forest to the disease. Within the non-protectable classification it must be recognised that the impact of the disease will vary. […]" (p. 30)

3.5.3 Prescriptions
3.5.3.1 General Vehicle Access
"*(a) Nominate access for specific operation being undertaken on the forest (e.g. logging, car rallying, access to apiary sites, access to public utilities, etc.). Since Western Boundary Road, Wagerup-Willowdale Road, Nanga Road and Waterous Formatin are hard surfaced and well drained, there are no restrictions to access at present.*

(b)Close roads where not required for general forest management or industrial use. This applies particularly to roads traversing protectable forest areas.

(c) *Specific hygiene requirements for activities are outlined below. Logging is covered by a separate prescription.*" (p. 31)

3.5.3.2 Engineering, clearing & mining operations
"*This prescription covers surveying, timber removal, clearing and construction phases. Mining construction and extraction on approved sites will continue under all conditions.*

(a) Restrict all phases to periods of dry soil conditions. Operations to cease temporarily after heavy rainfall and recommence only after approval by the Forest Officer in Charge, Harvey.
[…]" (p. 31)

"*(b) Brief all personnel involved on dieback hygiene requirements before work starts. Check that these requirements are being observed.*

(c)Ensure regular consultation with roading authority in order to:
- designate access to the alignment;
- define risk categories for segregation of operations and specific vehicle cleanliness requirements;
- demarcate risk categories in the field;
- locate specific requirements for vehicle cleaning;
- demarcate areas for gravel removal.
Gravel from infected areas only may be used for surfacing roads traversing dieback sites." (p. 32)

3.5.3.3 Road Maintenance (including gravel)

"*(a) All roads to be pegged by coloured markers to indicate the boundary between infected and non-infected forest. The side of the marker visible when entering dieback infected forest is to be painted yellow and the other side painted green.*

(b) Infected and non-infected sections to be graded separately. Grader to be washed down or brushed free of adhering soil before commencing work in uninfected sections.

(c)Grading to be restricted to dry soil conditions except where necessary for road safety requirements. Confine winter grading to treatment of gravelled surface. Table drains will be cleaned out in dry soil conditions where necessary." (p. 32)

"*(d) Ensure that graders working on forest roads traversing infected and non-infected sections are provided with broom, water tank and pump and fungicide.*

(e)Gravel for minor repairs of road surfaces in non-infected areas to be obtained from non-infected pits, and using equipment which has been thoroughly washed down before entering the pit.

The use of gravel form infected pits to be confined solely to roads traversing dieback infected sections." (p. 33)

3.5.3.4 Drilling
"*(a) Require advance notice to be given, indicating the type of drilling intended (i.e. exploratory, ore development or grade control), the area to be operated over, and the estimated time the task is expected to take.*

(b) Require stringent application of hygiene measures for exploratory and ore development drilling, and provide job specifications to cover the following aspects:

- season of operation – to be carried out in dry soil conditions (December to February);
- rainfall periods – drilling to cease for short periods after rain unless operating entirely within dieback infected country.
- soil disturbance – rubber tyred rigs to be used, soil not to be pushed, creeks or boggy areas not to be traversed;" (p. 33)
"*- crossing risk category boundaries – drilling to be cleaned of all soil material when crossing from infected to healthy forest;*" (p. 33-34)
"*- daily advice of drilling location – required in order to afford some protection in the event of wildfire.*

(c)Except for the nomination of access, the same restrictions are not required for grade control drilling (i.e. where the mining boundaries are determined). Introduction of hygiene measures to this facet of mining will be introduced in conjunction with techniques to make mining extraction methods more hygienic." (p. 34)

3.5.3.5 Vehicle Cleanliness
"*(a) Designate areas where vehicles are to be cleaned of soil material.* […]

(b) Where cleansing is required to take place in the forest, select a washdown station on a rocky (hard surface) and well drained site near a drainage channel. Alternatively provide timber ramps on which vehicles can be cleaned." (p. 34)

3.5.3.6 Fire Suppression
"*(a) Use the following measures as part of wildfire suppression techniques:*
- *nomination of safe access;*" (p. 34)
"- *use of hand tools where control by this method is likely;*
- *use of fungicide in water supplies;*
- *carry out vehicle cleaning prior to entering healthy forest.*

(b) *The degree to which hygiene measures are applied to wildfire suppression must be determined in relation to the relative threat to life and property.*" (p. 35)

3.6 Environmental Control over Bauxite Mining and Rehabilitation of Mined Areas
3.6.2.4 Rehabilitation Phase
"*(e) Between May and August, Alcoa will plant dieback resistant tree species over the prepared sites to the specifications of the Forests Department.*[…] *Tree species will be determined for each mined area by the Forests Department and will generally include:*

Eucalyptus wandoo
Eucalyptus accedens
Eucalyptus calophylla
Eucalyptus patens
Eucalyptus saligna
Eucalyptus maculata
Eucalyptus resinifera
[…]" (p.41)

WORKING PLAN - 1977

General Working Plan No. 86 of 1977. Part I

Resource Management Objectives
Jarrah Dieback Disease
"*To limit the spread of infections and to rehabilitate dieback-infected areas to suit the future land use.*" (p. 4)

Research
"*Operational and rehabilitation techniques in relation to dieback and disease control including manipulation of the fire regime, are projects of major priority*." (p. 7)

4.2 The Concept of Multiple Use of Land Management
"*(c)The selection of a priority or dominant use for an area with the practice of secondary uses which in some circumstances may not significantly interfere with the primary aim, but in others may impose a restriction on output from each competing use. This necessitates a social ranking of use priorities which can usually be done satisfactorily with limited data and experienced value judgement. The Forests Department has adopted this approach for the future management of State Forests and timber reserves.*

Multiple use has temporal as well as spatial over-tones. In the long term the structure of use priorities may alter with socio-economic, technological and successional changes. Such changes could be brought about by a number of influences such as dieback spread, mining, increased water supply requirements or altered demand for wood." (p. 31)

5. Resource Management
5.1.6 Water Management Strategy
"*1. Direct forest management on salt-sensitive areas towards maintenance of a deep-rooted perennial crop. Restore vegetation cover as quickly as possible where it is removed by dieback or other causes.*" (p. 49)

5.2 Wood Production

5.2.5.5 Poles, Fencing Material and Other Roundwood
"[...] *In addition the pole-getting operation has ranged widely in the forest increasing the risk of infecting extensive areas with jarrah dieback.*

To overcome these problems it is considered necessary to restrict the operation in jarrah forest to summer and in association with sawlogging operations, and to direct the industry to greater use of marri, karri and ultimately, pine poles." (p. 70)

5.2.6.2 Sawlog Production Strategy
"*8. Prevent damage to soil values, and further artificial spread of dieback, by reducing winter logging operations and developing summer stockpiling techniques.*" (p. 72)

5.2.6.4 Residue Production Strategy
"*Firewood supplies will be made available where they are not part of the allocated residue resource, where they do not create a disease risk ...*" (p. 73)

5.2.6.5 Poles and Other Roundwood Production Policy
"*1. Supply poles from jarrah forest where this does not increase the risk of spreading dieback, or result in conflict with other land uses.*" (p. 74)

5.2.6.8 Forest Management Strategy
"1.[...] *Forest improvement work will only be implemented where disease and other damaging agencies can be controlled.*" (p. 75)

5.3 Other Forest Produce
5.3.5.2 Honey Production Policy
"*1. Locate apiary sites at acceptable intervals taking account of constraints, such as*
[...]
d) access with respect to forest disease risk areas or pockets of diseased forest;
[…]" (p. 79)

5.5. 3 Area Available for Conservation Purposes
"*On those parts of management priority areas where management involves exclusion of commercial timber production, the concept of a 'forest park', envisaged in the Conservation Through Reserves Committee Report and defined in the Environmental Protection Authority recommendations, will be adopted. A 'forest park' is defined as 'an area of forest which is kept unavailable for the commercial production of timber except in the ordinary course of forest management and to such limited extent as would enable the Conservator for the betterment of the park to cut and remove timber for the purpose of tree regeneration in any areas containing trees which have been damaged or which have deteriorated through age, fire or disease.*" (p. 89)

5.7 Mining
5.7.2 Gravel, Stone and Sand
5.7.2.4 Objective of Management
"*The objective is to provide gravel, stone and sand for Government and semi-government authorities where there is no reasonable alternative supply, and where the supply will not result in the spread of dieback or prejudice amenity values.*" (p. 109)

5.7.2.5 Gravel, Stone and Sand Policy
"*2. Ensure dieback hygiene methods are used in the excavation, transport and spreading phases of the operation.*" (p. 110)

5.7.2.6 Management Strategy
"*2. Ensure gravel, stone and sand from dieback infected sites are used only in areas similarly affected.*" (p. 110)

5.9.4 Jarrah Dieback Disease
5.9.4.4 Objective of management
" *To limit the spread of infections and to rehabilitate dieback-infected areas to suit the future land use.*" (p. 126)

5.9.4.5 Dieback Policy
"*1. Classify State forests according to disease presence, susceptibility of the site and disease resistance of the vegetation to the disease.*

2. Continue to use forest quarantine measures to detect and map the disease.

3. Continue to improve and apply hygiene measures.

4. Rehabilitate infected areas with resistant species to suit the anticipated land use.

5. Continue to investigate methods of disease control and rehabilitate techniques." (p. 127)

5.9.4.6 Management Strategy
"*1. Improve remote sensing techniques to prepare accurate maps for subsequent monitoring of diseased areas.*

4. Extend the area of forest quarantine giving priority to high value forests with low levels of infection.

3. Continue to apply hygiene restraints into all permits, licenses and contract operations which involve vehicular movement on State forests.

4. Rehabilitate infected areas in the salt-sensitive zone to a full canopy of deep-rooted perennial species in accordance with predetermined management priorities.

5. Extend practical trials of various operational hygiene techniques to test their effectiveness ..."(p. 128)

WORKING PLAN – 1977

General Working Plan No. 86 of 1977 : Part II. 1977

Regulation of the Cut
"*All trade operations will be controlled by the issue of annual coupes under logging plans to be drawn up in accordance with the requirements of the forest hygiene programme and revised annually.*" (p. 1)

Dieback Operations
"*All areas under quarantine will be mapped for dieback extent before they are released from quarantine. Mapping will generally be based on the interpretation of large scale colour transparencies, although some mapping will be carried out based on ground surveys. For all mapping purposes it is important that no control burning is carried out for 3 years prior to mapping as dieback symptoms are obscured by burning. Once an area has been mapped and released from quarantine it will be operated under strict dieback hygiene to reduce the artificial spread of P.C. to an absolute minimum.*" (p. 2)

PLANNING POLICY - 1977

A Perspective For Multiple Use Planning in the Northern Jarrah Forest. 1977

"*The perspective is drawn primarily from the viewpoint of multiple use management in the northern jarrah region. Nonetheless, it establishes principles that can be applied to State Forests as a whole. It also establishes a framework for more broadly based regional land use plans.*" (p. 2)

Introduction

"*The Forests Department is required to provide a multiplicity of benefits from the northern jarrah forest according to the inherent capabilities of the environment, the existing statutory constraints and the recognised public demand. This objective is attainable because sufficient data are now available for a comprehensive and environmentally responsible regional plan.*" (p. 4)

"*This document sets the overall perspective for the development and subsequent implementation of detailed proposals. In doing this the region has been divided into six management zones based on geomorphology and climate. However, for detailed local planning it is envisaged that site vegetation zoning will be more appropriate and precise.*

The management strategies proposed supplement the Forests Department policy on multiple land use." (p. 4)

1.4 Dieback Disease

"*This disease is a most important factor in land use planning because of its devastating effects on the vegetation where jarrah and Proteaceous elements plan an important part.*" (p. 11)

"*The pattern of dieback occurrence is the result of an interaction between environmental factors and historical events. Broadly its impact is most damaging in high rainfall areas, on poorly drained areas and on nutrient deficient soils. The spread, hence the greatest damage has taken place adjacent to the western scarp, in areas logged since the introduction of logging tractors and trucks, and in intensely developed areas (e.g. Collie Coal Basin).*

These generalisations explain the pattern of existing dieback infections. The disease is largely absent from the transitional and eastern zones of the region, and it is imperative that this remain so to avoid deterioration in forest values, including water quality (Figure 4)." (p. 12)

2. Economic and Legal Constraints

2.6 Plant Quarantine

"*In an attempt to control the spread of dieback disease and to define the existing infection, the Forests Department has declared the eastern portion of the State Forest to be subject to quarantine, under the Act for the Amendment of the Forest Act (Prevention and Eradication of Disease 1974).*" (p. 14)

"*The areas under quarantine are those in which the disease is considered to be present in sufficiently low levels to warrant protection and corrective action. The planned quarantine period is three years, during which time all access is prohibited except on a few good quality roads (some restricted to dry weather use only). (Figure 7).*" (p. 15)

3.4 Sawn Timber Production

"*Sawmilling commenced soon after European settlement. Prior to the introduction of treemarking in the 1920s the forest areas were virtually clean cut. Selective cutting took place until 1968, when the relationship between mechanised logging and dieback incidence was proven. The current system aims at a heavy cut to reduce the area traversed by logging equipment and so minimise the amount of forest placed at risk from dieback.*" (p. 18)

"*Logging operations have much potential to spread dieback and a considerable effort is being applied to develop techniques of logging and permit control which minimise the risk. Progress has been made with techniques such as summer stockpiling, greenline cutting, strict hygiene measures and education of personnel in this industry.*" (p. 18-19)

3.9 Minor Forest Products

"*Five hundred apiary sites are located in this zone. In addition, many beekeepers place hives on private property adjacent to, or within the forest belt. Sites are issued providing there is no conflict with existing land use, dieback hygiene requirements are satisfied, and the site is at least three km from an adjacent site.*" (p. 21)

4. Proposed Management Strategies

4.2 Lateritic Uplands, High Rainfall Zone (more than 1 150 mm/annum)

Current Land Use

"*a)* *Hardwood silviculture, based on high stocking rates, a high proportion of merchantable species and high growth rates.*

b) *Bauxite mining, based on the large and deep deposits, whose value is enhanced by their proximity to ports.*

c) *Catchment protection, important because of the high rainfall and low accumulation of salt.*

d) *Recreation, based on proximity to centres of population, and ready access.*

e) ***Conservation of indigenous flora and fauna. At risk because of widespread dieback disease***." (p. 26)

Management Strategy

"*b)* *Mining is acceptable here (particularly in the western parts of this zone, where a considerable area is already infected by dieback), because:*

[…]

(ii) *the scope for spreading dieback is low since most gullies are already infested;*

[…]

(iv) *the vegetation is already disturbed by dieback, can no longer be considered natural and will need to be rehabilitated. Within existing catchments a minimum cover to increase water yield, restore aesthetic appeal and provide for erosion control is proposed.*" (p. 27)

4.3 Dissected River Valleys, Low Rainfall Zone (less than 1 025 mm/annum)

Current Land Uses

"*a)* *Catchment protection*

b) *Mixed farming*

c) *Hardwood silviculture*

d) *Silviculture of <u>Pinus radiata</u>*

e) *Conservation of fauna and flora*

f) *Recreation*" (p. 30)

Management Strategy

"*f)* *further recreational facilities will be developed in the Murray Valley, where this does not conflict with quarantine needs.*" (p. 30)

4.4 Lateritic Uplands Low Rainfall Zone (less than 1 205 mm/annum)

Current Land Uses

"*a)* *Hardwood silviculture based on jarrah and wandoo*

b) *Catchment protection*

c) *Conservation of flora and fauna*

d) *Agriculture, primarily grazing but with some cereals*

e) *Potentially, this land unit could be mined for bauxite. It has marginal potential for dry-land recreation.*

Most land uses are subject to serious limitations. The value of the hardwood is reduced by the lower productivity. The jarrah areas have been only slightly affected by dieback. The wandoo sites are not susceptible. These uplands contribute little to streamflow and although the yield is increased by clearing, there is an excessive rise in salinity." (p. 31)

Management Strategy

"*b) The main requirement is the retention of an adequate vegetative cover of deep rooted perennials. This means extreme caution with respect to the possible introduction of dieback, the earliest possible regeneration of cut over stands and the artificial revegetation of areas denuded in the past.*" (p. 32)

"*h) Construction of new lines of communication or upgrading of existing facilities must be minimal and planned with extreme care, so as not to spread dieback or increase the area cleared.*" (p. 33)

4.5 Broad Valleys and Depressions, Low Rainfall Zone (less than 1 025 mm/annum)
Current Land Uses

"*a) Catchment protection*
b) Agriculture
c) Hardwood silviculture
d) Conservation of flora and fauna" (p. 33)

Management Strategy

"*a) In view of its low productivity and its importance to catchment protection and to conservation, this land unit is viewed primarily as a protection forest.*

b) Although not a prime area for water production, the main requirement in order to protect the water supply is the retention of an adequate vegetative cover. This means extreme caution with respect to the possible introduction of dieback, the earliest possible regeneration of cutover stands and the artificial regeneration, with deep rooted perennials, of areas denuded in the past." (p. 34)

"*i) Areas used as sand leases must be carefully selected, so as to minimise the risk if dieback is introduced.*" (p. 35)

4.6 Monadnocks (found predominantly in the intermediate rainfall zone (1 025 to 1 150 mm/annum) and low rainfall zone

"*The major forms of land use are catchment protection, flora and fauna conservation and recreation.* […]" p. 36)

Management Strategy

"*a) This unit will be regarded primarily as protection forest (flora, fauna, catchment). Adequate conservation areas are being selected.*
b) *Recreational activity must be strictly zoned due to the high risk of erosion, introduction of dieback and pollution.*
    (i) Where there are no all-weather roads to the summit motorised access will be excluded (e.g. Eagle Hill, Mt. Cooke).
    (ii) Where an all-weather road exists (Mt. Dale) access will be restricted to one slope only.
    […]" (p. 37)

4.7 The Intermediate Rainfall Zone

"*This zone is a transition between the high and low rainfall zones. To the west the occurrence of dieback is high and the salinity risk is low, whereas to the east the reverse applies.*

This is considered to be a critical management zone because of possible salinity and the interaction between timber, bauxite mining and conservation values (flora and fauna). It requires intensive evaluation and monitoring (especially with respect to hydrology and dieback) before responsible management decisions on future use can be taken. […]" (p. 38)

POLICY - 1976

'Focus on Forest Policy' in *Forest Focus* Number 17 April 1976

Forest Protection
"*Protection of State Forest has become complex and more difficult to achieve. The department recognises the need to protect a wider range of values and the protection services must accommodate the objectives of all land uses. Disease control measures must be planned to minimise conflict with various forms of land management.* […]" (p. 13)

"*Dieback control will be continued through quarantine and hygiene measures.* […]" (p. 13)

Forest Policy
"*The Forests Department will manage the state-owned forests and timber reserves in Western Australia according to a policy that will ensure provision for the optimum social and material needs of the people. At the same time the policy will provide for the environmental well-being of the forests themselves.*

The policy involves the following objectives:
[...]
Forest Protection

To maintain and add to the areas of permanently reserved forests; to protect these forests from fire, insects and other harmful agencies; to maintain and improve the health and vigour of the forest area." (p. 15)

MANUALS – N. D. – 1976?

Dieback Hygiene Manual. N.D. 1976?

"*This booklet contains the rules which must be followed to minimize the spread of dieback in the forest.*" (p. 1?)

Section 1 : Recognition of Jarrah Dieback
"*2.* *The presence of dieback can only be detected from the death of patches of susceptible species of native vegetation.*

3. [...] *Note it can take up to three years after infection for visible symptoms of death from dieback to show up in vegetation.*
[….]
9. *If dieback is evident in a watercourse then it must be assumed the water course IS infected and dieback WILL be present downstream from the infection. Therefore it is important to identify the furthest upstream infection in the water course.*

10. *If dieback occurs on a ridge or upper slope, then areas downhill will be infected in time.*" (p. 3?)

Section 2 : Ground Demarcation of Dieback Areas

"*1.* *Boundaries between dieback and healthy forest will be marked on the ground (pegs, survey tape, paint etc) before any forest operation involving use of machinery. Where earthmoving operations are involved boundaries will be pegged.*

2. *Pegs will indicate to machine operators where dieback patches start and finish.*" (p. 4?)

"*4.* *Pegs to be located 5 to 20 m uphill from visible symptoms.*

5. *Where there are no evident symptoms, creeks or shallow flats are to be pegged if dieback occurs upstream from the crossing. Pegs to be located 5 to 20 m each side of watercourse, or edge of flat.*" (p. 4?)

Section 3 : Washing Down
At Headquarters

"*DO*	*use designated ramps or pads to washdown vehicles.*	*DONT*	*forget to remove mud and soil from cleats and underside of protection plates on tracked vehicles.*
DO	*ensure run-off flows into a sump*	*DONT*	*drive vehicle through washdown effluent.*
DO	*use high pressure spray to remove caked-on mud and soil. Use spade or bar to assist removal.*" (p. 5?)		

In the Field

"*DO*	*washdown at designated washdown point or on bridges, rocky crossings or hard well drained surfaces, within dieback areas.*	*DON'T*	*washdown in clean (healthy) forest*
		DONT	*fail to clean any machine capable of infection from infected to healthy forest.*
DO	*treat washing down water in tankers with fungicide (1 Tablespoon of copper sulphate per tanker of 3000 l).*	*DONT*	*drive vehicles through washdown effluent.*
DO	*use a brush, bar or spade to remove compacted soil where necessary.*	[...]" (p. 5?)	

Section 4 Road Selection

"*DO*	*determine known and suspect dieback along the intended route, using dieback plans, air photos and field check on foot.*" (p. 5?)	*DONT*	*duplicate existing access.*
		DONT	*use vehicles, bulldozers, tractors in initial selection of roads.*
DO	*avoid crossing from dieback to non-dieback boundaries.*		
DO	*demarcate by pegging dieback/non-dieback boundaries.*		
DO	*select roads low in the landscape.*		

NO MACHINE OR TRACTOR MOVEMENT ON ALIGNMENT ALLOWED TO THIS STAGE." (p. 5?)

Section 5 Road Construction

"*DO programme earthmoving work for December to March when soil is dry.*

DONT commence road construction unless correct selection procedure has been followed.

DO segregate machine work so that machines do not travel from dieback to healthy forest, as pegged, without washing down BEFORE leaving dieback.

DONT assume machinery is clean. Always inspect before allowing entry.

DONT construct turn-off drains which result in ponding.

DO construct road to shed water and dry quickly.

DO construct deep table drains to carry run-off swiftly and directly into nearest natural watercourse.

DONT forget to write dieback specifications into contracts." (p. 6?)

Section 6 : Road Grading

"*DO peg roads before grading commences.*

DONT grade deeper or wider than prescribed.

DO clean out table drains when soil is dry.

DONT grade soil from dieback into healthy forest as pegged.

DO clean grader before leaving dieback forest.

DO ensure dieback specifications are written into grading contracts and are strictly adhered to.

DO include general specification on grading method and operation of the machine (angle of blade etc) to avoid carrying infected earth long distances into clean forest.

DO include specification applicable to the individual job.

DO provide grader tender with yard broom and small tank, pump and fungicide." (p. 7?)

Section 7 : Gravelling

"*DO programme work for December, January, February and March, when soil is dry.*

DONT use infected gravel on forest roads except where specified in diseased forest.

DO select gravel pits at least 100 m away and upslope from nearest visible dieback disease symptoms.

DONT allow water to pond in gravel pit.

DONT leave infected pits open. Programme them for rehabilitation.

DO wash incoming plant before commencing of gravelling.

DO *plan haul routes from pit to job to avoid crossing dieback areas.*

DO *remove vegetation and stumps from gravel pit before carting commences.*

DO *arrange for sampling and testing of gravel where there is any doubt whether the disease is present.*

DO *ensure dieback hygiene specifications are included in contracts and are strictly adhered to.*" (p. 8?)

Section 8 : Prescribed Burning
"[…]
DONT *travel through boggy creeks.*

DONT *move bulldozers from diseased to healthy forest without cleaning.*

DONT *grade roads unless absolutely necessary.*" (p. 9?)

Section 9 : Fire Suppression
"[…]

DONT *use bulldozers if fire can be suppressed with hand tools.*

DO *despatch forces along hard-surfaced roads.*

DONT *mop up with water from dieback creeks or water points unless copper sulphate is added.*

DO *ensure plant and vehicles are clean before entry to healthy forest.*
[…]
DO *plan firelines to avoid crossing dieback boundaries if bulldozers are used.*

DO *nominate washdown points for incoming and outgoing plant and vehicles.*

DO *ensure washdown on fireline where vehicles are likely to move infected earth into clean forest.*" (p. 10?)

FOREST LEGISLATION – 1975

<u>Forest Diseases Regulations. 1975</u>

"*HIS Excellency the Governor in Executive Council acting pursuant to section 40H of the Forests Act, 1918-1974 has been pleased to make the regulations set out in the schedule hereto.*

W.H. EASTMAN
Acting Conservator of Forests." (p. 4504)

"*1. These regulations may be cited as the Forest Diseases Regulations, 1975.*
[…]
3. Any person who takes a potential carrier into a risk area or disease area, or uses or moves a potential carrier in a risk area or disease area, contrary to any instruction or direction -

(a) given by a forest officer in relation to that potential carrier; or

(b) given by the Conservator in relation to potential carriers of that class by notice published in a newspaper circulating in that risk area or disease area,

or who causes a potential carrier to be so taken, used or moved contrary to any such direction or instruction, commits an offence.

Penalty: For a first offence: not less than twenty dollars nor more than two hundred dollars; for any subsequent offence: not less than one hundred dollars nor more than one thousand dollars.

4. Any person who takes a potential carrier into a risk area, or has, uses or moves a potential carrier in a risk area, -

(a) without the written authority of a forest officer; or
(b) contrary to any condition specified in a written authority,

or who causes a potential carrier to be so taken, had, used or moved without such authority or contrary to such a condition, commits an offence.

Penalty: For a first offence: not less than twenty dollars nor more than two hundred dollars; for any subsequent offence: not less than one hundred dollars nor more than one thousand dollars." (p. 4504)

"*7. A person in charge of a potential carrier in a risk area shall carry a written authority issued in respect of that potential carrier at all times when the potential carrier is being used, operated or moved in that area and shall produce that authority whenever requested to do so by an authorized person.*

Penalty: Fifty dollars.

8.Without affecting the liability of any person for an offence under paragraph (b) of regulation 4 of these regulations a written authority shall determine forthwith on the breach of any condition specified in that authority.

9. A person shall when so requested by a forest officer give all information within his power in respect of any occurrence or suspected occurrence of the forest disease known as jarrah dieback.

Penalty: Not less than twenty dollars nor more than two hundred dollars.

[…]
14. The period for which an infected carrier or potential carrier or earth shall be treated or kept in quarantine for the purposes of these regulations shall be such period as a forest officer determines.

15. Where pursuant to these regulations a person is directed to cleanse and disinfect an infected carrier or potential carrier that person shall carry out that cleansing and disinfecting –

(a) in such manner as is directed by a forest officer; and
(b) to the satisfaction of a forest officer.

Penalty: For a first offence: not less than twenty dollars nor more than two hundred dollars; for any subsequent offence: not less than one hundred dollars; for any subsequent offence: not less than one hundred dollars nor more than one thousand dollars.

16(1) The owner of a potential carrier shall, if required by an authorized person, inform the authorized person as to the identity and address of the person in charge of the potential carrier at the time when an offence relating to that potential carrier is alleged to have been committed against these regulations.

(2) Where an offence against these regulations is alleged to have been committed by the person in charge of a potential carrier and the owner of that potential carrier fails, within fourteen days of being required by an authorized person to identify the person who was in charge of the potential carrier at any time the offence was alleged to have been committed, to-

- *(a) comply with that requirement; or*
- *(b) furnish information to an authorized person from which an authorized person is satisfied that the potential carrier was stolen or being unlawfully used at the time of the alleged offence or that the owner could not reasonably have been aware of the identity of the person in charge of the potential carrier at that time,*

the owner shall be deemed to be the person who committed that offence and shall then be liable to the penalty prescribed in respect of that offence." (p. 4505)

"*19. Any person in a risk area or a disease area shall give his name and address whenever requested to do so by authorized person.*

Penalty: Fifty dollars

20. A person driving or moving a potential carrier shall not-

(a) fail to stop that potential carrier when requested to do so by an authorized person;
(b) ignore or fail to comply with a signpost erected pursuant to these regulations; or
(c) avoid or break through any barricade erected pursuant to these regulations.
Penalty: For a first offence: not less than twenty dollars nor more than two hundred dollars; for any subsequent offence: not less than one hundred dollars nor more than one thousand dollars.

21. A person shall not –
(a) obstruct, hinder or interfere with an authorized person who is exercising any power or performing any duty conferred or imposed by these regulations; or
(b) fail to comply with a direction given by an authorized person pursuant to these regulations.
Penalty: Two hundred dollars." (p. 4506)

FOREST POLICY – 1975?

Forest Policy : Western Australia. 1975

Introduction
"*It has therefore become necessary to restate forest policies to take into account the major changes that have taken place since rigid control of the timber industries was first introduced in 1918.*

The objectives of forest management at that time were to protect the forest estate through control of the industry and to protect the forest itself from fire and other destructive agencies.

In more recent times there has been a greater emphasis placed on multiple-use of the forest but with a strong tendency still to produce timber for industry. However, multiple-use demands have imposed limits on the timber resources of the native forests. Emphasis has therefore been given to pine planting to provide a source of timber to supplement and in some instances replace those native forests that will be required for purposes other than timber production.

This statement will outline the current situation regarding those permanently dedicated State Forests and Timber Reserves which come within the stewardship of the Forests Department and formally establish management objectives according to the requirements that now exist. It will take into account a multiple-use concept of those forests managed by the Forests Department." (p. 2)

2.4 Forest Protection

"*As well as safeguarding the integrity of the forest estate, the principal avenues of the protection which must be afforded the dedicated State Forests are those of cutting control, fire protection and control of forest pests and diseases. Authority to undertake these protective functions is provided in the Forests Act.*" (p. 7)

"*The incursion of the pathogen Phytophthora cinnamomi into the jarrah forests of Western Australia has caused or is likely to cause death of the species over an area now estimated to be 470 000 hectares. While an extensive research programme has isolated the cause of the disease, it has not yet proved possible to eradicate it. It has been necessary to apply strict quarantine measures as part of the overall hygiene programme to contain the causal agent to areas now infected. Sections of the forest are placed in virtual isolation and production operations will be deferred until a later period when the efficacy of the hygiene measures can be assessed.*" (p. 7)

3. Future Management Objectives

3.1 Policy

"*The future policy will emphasise the multiple-use management of State Forests and Timber Reserves. It will continue to provide for the renewable resources of publicly-owned forests to be utilised in the combination that will best meet the needs of the West Australian people. The aim will be to make the most judicious use of the land for some or all of the resources or related service over areas sufficiently large to provide latitude for periodic adjustments in use to conform with changing public needs and the development of the forest itself.*" (p. 12)

3.1.1 Multiple-Use Priorities

"*Multiple-use management implies the realisation of the best combination of forest benefits according to the particular attributes of each area considered. Compatible benefits may be derived simultaneously from the same area, but separate areas must be used where there is conflict in management for non-compatible benefits.*

In order to overcome the problems imposed by limited forest area, it is proposed to establish a system of management priorities so that the greatest possible number of compatible uses can be practised throughout most of the forest, whilst carefully selected representative areas of native forest will be managed specifically to retain them in an undisturbed condition for scientific reference purposes." (p. 12)

"*The major forest values currently recognised for multiple-use management are:*

Timber Production
Water Supplies
Amenity and Recreation
Flora and Fauna
Special Scientific Values

Depending on the appraised attributes of a particularly area, management priorities will be allocated accordingly but not necessarily in the same sequence in each area, whilst in the case of scientific reference areas, this purpose will predominate to the exclusion of all other management priorities." (p. 13)

3.1.2 Multiple-Use Requirements

"*Future requirements to meet the need for multiple-use forest management posed by increasing public demand are:*

Classification and designation of State Forest into areas to be managed according to a scale of multiple-use priorities, together with increased security for these management objectives.

Increased research into recreational use and intensified environmental monitoring and inter-departmental co-ordination and liaison with respect to land use planning in the forest areas of the South West including engagement of professional staff with appropriate qualifications where necessary." (p. 13)

3.2.1 Forest Production

"*The ultimate effects of dieback on productivity within the jarrah forests are not yet known but a possible eventuality must be faced that in order to protect the State's major water supplies, it may become necessary to withdraw a substantial part of the northern forests from timber production.*

At the present time, this is seen only as a possible eventuality. Constant appraisal of the situation will be carried out." (p. 15)

3.2.2 Forest Protection

"*It is intended to continue the existing traditional protective roles of the Forests Department. The forest estate will be kept intact and added to wherever this is possible; fire hazard reduction through prescribed burning will continue and techniques will be amended to match proven environmental requirements; research into means by which the effects of the dieback disease might be ameliorated will be accelerated.*

To a large extent protection of the State Forests has become complex and more difficult to achieve. […] *Limited access because of forest hygiene and quarantine restrictions placed on forest dieback areas will also demand modification of fire suppression measures in some instances.*" (p. 15)

3.2.4 Amenity and Recreation

"*The increasing demands of the population for a forest environment will have to be met for the greater part by State Forests and some areas of National Parks. It is therefore proposed that the Forests Department will continue to provide, as far as is possible, access to the forests and amenities for visitors. Constraints must be applied when access is considered to constitute a risk to either the individual or the forest itself.*" (p. 16)

MANUALS – N.D. – 1975?

<u>Dieback Hygiene Manual. N.D. 1975?</u>

"*This booklet contains the rules which must be followed to prevent dieback spread in the forest.*" (p. 1?)

Section 1 Recognition of Jarrah Dieback

"*2. The presence of dieback can only be detected from the death of patches of susceptible species.*

[…]

9. If dieback is present upstream in any watercourse then the watercourse <u>is</u> infected and dieback <u>will</u> be present downstream." (p. 2?)

Section 2 Pegging Dieback

"*1. Pegging will be done where earthmoving will cross dieback/non dieback boundaries.*

[…]

4. Pegs to be located 5M uphill from visible symptoms.

5. Creeks to be pegged if dieback occurs upstream from creek crossing. Pegs to be located 10m each side of watercourse." (p. 3?)

Section 3 Washing Down
At Headquarters
"*DO* *use designated ramps or pads to washdown vehicles.*

DONT *forget to remove mud and soil from cleats and underside of protection plates on tracted vehicles.*

DONT *drive vehicle through washdown effluent.*

DO *ensure run-off flows into a sump where it can be treated with fungicide.*

DO *use high pressure spray to remove caked-on mud and soil.*" (p. 4?)

In the Field
"*DO* *washdown at designated washdown point or on bridges, rocky crossings or hard well drained surfaces.*

DONT *washdown in clean (healthy) forest.*

DONT *washdown on ridge tops.*

DONT *fail to clean any machine capable of carrying infection from infected to healthy forest.*

DO *treat washdown water in tankers with fungicide ...*"

DONT *drive vehicles through washdown effluent.*
[…]" (p. 4?)

Section 4 : Road Selection
"*DO* *check need for new road or re-alignment.*

DONT *duplicate existing access.*

DONT *use vehicles, bulldozers, tractors in selection of roads.*

DO *determine known and suspect dieback along intended route. Using dieback plans, air photos, field creek on foot.*

DONT *select roads along ridgetops.*

DO *Avoid crossing dieback to non-dieback boundaries.*

DO *demarcate by pegging dieback/non-dieback boundaries.*

DO *select roads low in the landscape.*

No machine or tractor movement on alignment allowed to this stage." (p. 5?)

Section 5. Road Construction
"[…]
DO *programme earthmoving work for December to March only.*

DONT *commence road construction unless correct selection procedure has been followed.*

DO *ensure all incoming machinery is clean.*

DONT *assume machinery is clean.*

DO *segregate machine work so that machines do not travel from dieback to healthy forest, as pegged, without washingdown before leaving dieback.*

DONT *construct frequent turn-off drains into forest, where water can pond.*

DONT *forget to write dieback specifications into contracts.*

DO *construct road to shed water and dry quickly.*

DO *construct deep table drains to carry run-off swiftly and directly into nearest natural watercourse.*" (p. 6?)

Section 6 : Road Grading
"[…]

DONT *grade soil from dieback into healthy forest as pegged.*

DONT *grade long distances with blade full and soil dropping off.*

DO *washdown grader at every opportunity.*

DO *provide grader tender with yard broom and small tank, pump and fungicide.*" (p. 6?)

Section 7: Gravelling
"*DO* *Programme work for December, January and February, March.*

DONT *use infected gravel on forest roads without approval of D.F.O. .*

DO *Select gravel pits at least 100m away and upslope from nearest visible dieback disease symptoms.*

DONT *allow water to pond in gravel pit.*

DO *wash incoming plant before commencement.*

DONT *leave infected pits open programme them for rehabilitation.*

DO *plan haul routes from pit to job to avoid crossing dieback areas.*

DO *remove vegetation and stumps from gravel pit.*
[…]
DO *ensure dieback hygiene specification included in contracts.*" (p. [7])

Section 8 : Prescribed Burning
"[…]
DONT *travel through boggy creeks when preparing prescriptions and perimeters.*

DO *select burn boundaries on well formed hard surfaced roads relatively free of dieback.*

DONT *walk or work bulldozers along perimeter roads when these cross dieback/non dieback boundaries*

DO *travel vehicles on hard surfaced roads only when preparing prescriptions, and burn perimeters.*
[…]" (p. 8?)

Section 9 : Fire Suppression
DO *despatch forces along hard-surfaced roads.*

DONT *use bulldozers if fire could be suppressed with hand tools.*

DO *ensure plant and vehicles are clean before entry to forest.*

DONT *move soil from infected to clean forest.*

DO *use hand tools to suppress fire if this method will succeed.*

DONT *mop up with water from dieback creeks or water points unless copper sulphate is added*

DO *plan firelines to avoid crossing dieback boundaries if bulldozers are used.*

DO *nominate washdown points for incoming and outgoing plant and vehicles.*" (p. 9?)

LEGISLATION – 1974

Forests. No. 77 of 1974

"*AN ACT to amend the Forests Act, 1918-1972.*

[Assented to 10th December, 1974]

[…]
1. (1) This Act may be cited as the Forests Act Amendment Act, 1974." (p. 755)

"*3. Section 2 of the principal Act is amended by adding after the passage 'PART IV.- PERMITS, LICENSES, AND FOREST LEASES.', in lines six and seven, the passage 'PART IVA. – CONTROL AND ERADICATION OF FOREST DISEASES.'.*

4. The principal Act is amended by adding after section 40 the following heading and section-

PART IVA. – CONTROL AND ERADICATION OF FOREST DISEASES.

40A. The purposes of this Part are to identify the areas of public land in the prescribed part of the State in which trees may be, may become, or are infected with any forest disease and to control and eradicate such forest diseases as are detected in such areas.

40B. (1) The provisions of and under this Part shall apply notwithstanding the provisions of or under any other Part of this Act or of or under any other Act.

(2) The provisions of this Part and the regulations made under it bind the Crown.

6. The principal Act is amended by adding a section as follows-

40C. In this Part and regulations made under it, unless the context requires otherwise-

'authorised person' means any member of the Police Force or any forest officer;
'disease area' means a forest disease area constituted under this Part;
'infected' means actually affected with forest disease, or liable, by reason of contact, to be so affected;
'infection' has a corresponding meaning to 'infected';
'owner' used in relation to a potential carrier, means the person to whom it belongs or the hirer lessee, borrower, bailee, or mortgagee in possession thereof;
'potential carrier' means anything capable of carrying and transmitting forest disease and includes-

- *(a) soil, trees, timber, firewood, and forest products;*
- *(b) tools;*
- *(c) vehicles;*
- *(d) machinery; and*
- *(e) equipment or implements designed and used or capable of being used for forestry, the production of forest products, timber cutting, timber gathering, the cutting or gathering of firewood, or earth moving;*

'prescribed part of the State' means all those portions of the State that are south of latitude 31 40' and west of longitude 117, and includes all portions, wherever situated, of the municipal districts of the Shires of Plantagenet, Denmark and Albany;

'public land' means-

- *(a) State forests and timber reserves;*
- *(b) any other land vested in Her Majesty and not lawfully contracted to be granted in fee simple including-*
  (i) land of which pastoral leases are held under the Land Act, 1933;" (p. 757)
  "*(ii) land held as mining tenements under the Mining Act, 1904 and the regulations thereunder; and*
  (iii) land the subject of any timber concession, timber lease or sawmill permit; and
- *(c) any other land reserved or dedicated pursuant to the Land Act, 1933 but vested in some person other than Her Majesty;*

'risk area' means a forest disease risk area constituted under this Part;
"road' has the meaning assigned to it in section 6 of the Main Roads Act, 1930, but does not include a main road as defined in that section of that Act; and
'vehicle' includes-

- *(a) every conveyance, not being a train, vessel or aircraft, and every object capable of being propelled or drawn on wheels or tracks, by any means;*
- *(b) an animal being driven or ridden.*" (p. 758)

"*The principal Act is amended by adding a section as follows-*

[…]
40G. (1) Where land held as a mining tenement under the Mining Act, 1904 and the regulations thereunder is in a risk area or a disease area and the holder of the tenement intends to explore or exploit a part of it he shall, at least three months before the date on which he intends to do so, give to the Minister notice in writing thereof wherein the part of the tenement and that date are specified." (p. 760)

"*(2) Where pursuant to subsection (1) of this section the holder of a mining tenement gives notice, the Minister shall give him written authority to explore or exploit, as the case may be, the part specified in the notice on and after the date so specified unless the Minister, after consultation with the Minister of the Crown for the time being administering the Mining Act 1904, has good and sufficient reason to the contrary, but the holder may do so only-*

- *(a) by entering that part by a route described in the written authority;*

and
(b) *subject to such conditions as are specified in the written authority.*" (p. 761)

MANUALS – 1973

Foresters' Manual : Fire Control. 1973

Mopping Up and Patrol
"*195. Officers directing the movement of equipment to and from fires must be aware of the potential dieback spread which could occur and apply hygiene measures to minimise the risk, consistent with the urgency of suppression requirements.*" (p. 32)

MANUALS - 1972

Foresters' Manual : Reforestation and Silvicultural Operations : Jarrah and Karri. 1972

Preliminary
"*4. The operational side of the management of all forests where jarrah is the major species is now oriented markedly towards the control of dieback, caused by the root-rotting pathogen, Phytophthora cinnamomi. Preventing the spread of this disease involves close attention to the organisation of all forest operations, particularly those involving heavy and tracked vehicles. The movement of soil by these agencies between diseased and healthy forest must be completely avoided in areas zoned as lightly or non-affected.*[..] *The importance of forest hygiene measures with respect to dieback cannot be over-stressed; these are the sole means at our disposal of retaining healthy jarrah forest.*

5.Where high quality jarrah forest occurs in blocks of some thousands of acres and is relatively free or only infected with dieback, it is demarcated and declared an Intensive Management Unit ... Particular attention must be pad in these units to the exclusion of new dieback infections and to the removal of existing ones." (p. 3)

Trade Cutting and Permit Control
"*9. Logging operations are confined in any one year to approved cutting sections. These areas are selected by advance planning leading to the preparation of 5-year logging plans by the D.F.O. in consultation with the mill management. Such advance planning must take into account the requirements of dieback hygiene and will allow effective road planning, and the integration of the trade cut with other operations.*" (p. 4)

Forest Hygiene and Jarrah Dieback
"*26. Dispersal is mainly by transportation of mud or soil containing already infected root material and fungal fragments. The main agents for dispersal are vehicles carrying mud, and surface run-off. The fungus also moves as water-borne zoospores which are themselves capable of locomotion over very small distances. Hence the general tendency towards rapid spread down-hill. The rate of uphill spread is slow, amounting to a few feet a year.*

Resistant spores are also produced but their precise function as dispersal agents is not known.

27. The spread of the fungus in the forest occurs through
(a) the natural extension of already affected areas; and
(b) the establishment and subsequent development of new centres of infection.

28. Physical control is likely to be extremely expensive, but any measures which make conditions on already infected areas less favourable for the development of the fungus, or which curtail the possibility of establishing new centres of infection will slow down the overall rate of spread through the forest. This is currently estimated to be about 4 per cent. of affected areas per year.

These measures come under the general heading of Forest Hygiene. They are outlined below and they will be applied to both Departmental and trade operations." (p. 7)

Zoning of Dieback Types

"*29. The forest is divided into a number of zones, based on the degree of infection, in order to provide a basis for movement control and logging priorities. These zones are:*

> *Zone A. Areas containing less than one per cent. dieback affected forest. Only to be logged under strict hygiene.*
> *Zone B.1. Areas containing between one and 10 per cent. dieback affected forest. Logging will be restricted to affected portions only for the time being.*
> *Zone B.2. Areas containing more than 10 per cent. dieback affected forest. Logging will be concentrated in affected portions; unaffected portions may be logged under hygienic conditions before proceeding elsewhere.*

30. Zones will consist of whole forest blocks, or contiguous portions thereof. The minimum area for a single portion of a zone could be of the order of 5,000 acres, but sections of more than 500 acres of unaffected country within an affected zone will be specifically reserved for cutting under a separate prescription.

31. D.F.O.'s will maintain a set of plans showing the zone boundaries throughout their Division. These plans will be updated as new information becomes available from any sources such as ground inspection or air-photo maps supplied by Working Plans.

32. D.F.O.'s will also search for and delineate on the plan any areas of over 1, 000 acres of relatively dieback free forest which is predominantly prime jarrah (90 ft. or more mature co-dominant height). These areas will be set aside as Intensive Management Units to be worked under the strictest hygiene and intensive silvicultural treatment." (p. 7)

Logging Priorities

"*33. Bearing in mind that each of the affected zones will contain substantial tracts of unaffected country, the general sequence of logging will be –*

> *1. Affected areas Zone B.2.*
> *2. Affected areas Zone B.1*
> *2. Unaffected areas in Zone B.2 and Zone B.1 (in that order), using strict hygiene and carefully selected access routes; wherever possible cutting will be in concentric belts surrounding already affected areas.*
> *4. Zone A- only to be logged when no other country is available, and then preferably by permits completely contained in this zone; logging will be under strict hygiene and along carefully selected access routes.*

For the present, unaffected areas of 200 acres or more, in Zones b.1 and B.2, will be reserved from cutting.

34. When these areas are eventually logged, a perimeter belt two chains wide within the unaffected country will be reserved from cutting, so as to reduce the possibilities of contamination by lateral movement across the boundary between the affected and unaffected types ...

36. These prescriptions will apply to the general run of trade operations. Specific instances, such as mining timber operations at Collie, require special prescriptions to be approved by the Inspector. At this stage, the individual permit or licence area should be regarded as the basic unit of planning." (p. 8)

Integration of Operations

"*37. To be fully effective, hygiene measures must be applied to all operations in the forest. Pole and pile, salvage, firewood and other minor operations will follow the sequence of priorities set out in Para. 4, and will be concentrated upon areas scheduled for trade cutting. These operations, using the same access, may precede or follow major logging, but must be programmed to avoid simultaneous use of the same haulage routes.*

38. Where it is necessary to mount separate minor operations, strict hygiene must be observed. Cutting must be completed in all affected areas of Zones B.2 and B.1 before proceeding to unaffected country; lateral movement across the boundary between patches of affected country must not be permitted; and cutting in elevated positions, especially across ridge tops, must not be permitted without specific approval from the D.F.O." (p. 8)

Designation of Access Routes

"*39. The D.F.O. will designate specific access routes to each coupe, including those for independent pole operations, so that unaffected areas will only be logged along clean access routes and the chances of new infections as a result of hauling from affected coupes will be minimised.*" (p. 8)

"*40. Access must receive special consideration when preparing five year logging plans, and the routes selected to serve each coupe must be clearly indicated on Forms 49B.*" (p. 8)

"*41. Construction of new roads by both the industry and the Department will be kept to the essential minimum.*" (p. 9)

"*42. ... Lower, but well drained, slopes following the main gully systems are the preferred locations for new roads; good surface drainage with proper turn-offs linking up with natural drainage channels are to be provided.*

43. Sites for borrow pits must be approved by a competent officer before the start of any excavation; infected gravel must not be used on roads traversing unaffected country; and gravel for roads traversing affected areas should be obtained preferably from isolated patches of unaffected country, from which the spread of further infection will only be very limited.

44. Inspectors will examine and approve divisional roading programmes before estimates each year, and in this connection basic units of 1, 000 acres in jarrah and 400 acres in karri will be adopted to minimise new road construction when subdividing cut-over maiden forest." (p. 9)

Silvicultural Systems

"*45. The concept of heavy cutting to reduce the total area rendered liable to infection each year has many additional advantages in connection with operational control and protection of regrowth.*

Subject to proper local prescription by the D.F.O., the future systems will be-

1. Green Line Cutting (Affected Types Zones B.1 and B.2).

The "Green Line", indicating the outer edge of dieback activity ... Clean Cutting will then proceed inwards from the Green Line, and all logs will be hauled out through the affected area." p. 9

"*2. Uniform System (Unaffected Types in all Zones) ... The Inspector must approve all cutting in unaffected areas and priority will be given to concentric cutting with haulage preferably along the contour around affected areas which have already been cut over.*

Cutting in unaffected areas should stop two chains short of the edge of active dieback, and all logs must be hauled back through the unaffected area.

Vehicle Cleaning

"*46.*[...] *it is essential that all vehicles and heavy equipment should be free of any soil or mud before entering clean country.*" (p. 9)

"*47. Contractors to the Department and to the industry, or their operators, will be required to see that their machinery is in a clean condition, and a hygiene clearance should be given by a competent officer before the equipment starts work in unaffected areas.*" (p. 10)

Departmental Activities

"*49. Strict standards of vehicle hygiene and movement control must be maintained in all Departmental operations, so as to set an example to all other forest users and to reinforce the importance of the hygiene programme in the eyes of the industry and of general contractors.*

50. The following guide lines will be adopted under the general surveillance of the Inspector:-

(1) Divisional works programmes will be planned to avoid cross-travel between the die-back zones, and to reduce the need to work in die-back areas in winter.

(2) ... A thorough hosing down with a high-pressure hose is considered an adequate cleaning. But a proper outlet must be provided for the effluent to avoid contamination of adjacent forest." (p. 10)

"*(5) ... Lesser tracks will be kept free from logs, but will only be graded when in danger of becoming obliterated or when needed for prescribed burning.*" (p. 10)

"(9) *... Inspectors and D.F.O.'s are responsible for seeing that hygiene is properly implemented by all forest users. They must give prior advice of any projects or activities proposed in areas under control and take very opportunity to instruct supervisors and operatives in hygiene requirements before and during the operation. They must also supervise and see that their staff are competent to supervise the hygiene aspects of such projects while in progress.*" (p. 11)

Intensive Management Units : Objects

"*51. The policy of establishing Intensive Management Units in the jarrah forest is aimed primarily at locating and demarcating high quality, relatively dieback-free forest areas for intensive management designed to maximise both volume and value production. Such areas will be afforded the maximum silvicultural attention, and will be kept free of dieback. The aims within I.M.U.'s are:-*

(a) The elimination of existing dieback infections and the complete exclusion of the disease from the area thereafter ..." (p. 13)

"*52. The criteria for selecting areas are as follows:-*

(a) There must be less than one per cent. of the area affected by dieback ..." (p. 13)

Demarcation

"*53. The areas are demarcated on the ground by signposts erected at all points where roads and tracks enter the area. Clear demarcation on the ground is very essential for the success of the strict hygiene measure prescribed for these areas.*

Working Plans

"54. An operational working plan will be prepared and maintained for each I.M.U. " (p. 13)

"*The working plan prescribes all operations, both silvicultural and protective, to be made in the unit ...*" (p. 13)

Sequence of Operations "*55. To achieve the aims of bringing I.M.U.'s into a state of maximum productivity will require a definite priority of operations which should be strictly adhered to. The initial operations in order of priority will be as follows:-*

Control of Dieback

"*56. (a) All areas infected with Phytophthora cinnamomi will be completely cleared of natural vegetation and planted with a hardwood or pine species which have been proven to be resistant to the fungus. Such clearing and replanting will extend for at least 2 chains into healthy forest bordering the infected area.*

(b) All major tracks and road through the I.M.U. will be formed and maintained in a condition where no ponding can take place on the carriageway. Where these tracks traverse swamps and flats, enough gravel fill will be added to build up the carriageway to a point where it remains freely drained during the wettest conditions. Drainage from major roads and tracks will be channelled via cut drains to the nearest creek bed or natural drainage channel. Use of minor tracks is to be avoided.

(c) Access of heavy vehicles and plant to and through an I.M.U. will be restricted to machinery which does not carry mud and soil which is likely to be infected with the fungus." (p. 13)

Current Cutting Practice : General

"*59. The present trend is towards a longer cycle and a far heavier cut, creating much larger gaps for the development of regeneration. The incidence of dieback has dictated this heavier cut; the concentration of logging operations on smaller areas reduces the possibility of spreading the disease.*

Stand Improvement

"*85* ***Selection of Stands*** *…The proximity of dieback infections to a stand will also affects its suitability for treatment; the increased growth accruing from any treatment must have culminated and be harvestable before a moving dieback infection reaches the stand. For this reason, almost all stand improvement operations will be confined to Intensive Management Units where dieback is under control.*" (p. 19)

"*91. ... Any cull felling by log hauliers requires the specific approval of the Superintendent, as it is undesirable to increase the number of salvage operators or to jeopardise hygiene by wide ranging operations.* (p. 19)

"*Removal of Banksia grandis understorey: Dense understoreys of Banksia grandis create strong competition for the overstorey and they also form a reservoir of highly infective material for the fungus causing the dieback disease. For these reasons, their removal is silviculturally desirable.*" (p. 20)

Karri Forest Operations
Current Cutting Practice
"*Five-year plans must take into account dieback hygiene and will be revised annually*." (p. 25)

<u>Foresters' Manual : Control of Trade Operations. 1972</u>

Pile and Pole Licenses
"*(3)* ***Pole stands unaffected by dieback.*** *All poles and piles of marketable size may be removed, subject to prior approval of a treemarking prescriptions by the Superintendent and to the strict observance of logging hygiene.*" (p. 14)

WORKING PLAN – 1971

General Hardwood Working Plan No. 85 : Part I. 1971

0.2 Major Changes Since 1956

"*1.* *Completion of a comprehensive inventory of the forest resource indicating that the total longterm hardwood sawlog yield from Crown land is unlikely to exceed 600, 000 loads per year compared with former estimates of 800, 000 loads per year and actual current demand for Crown timber of approximately 750,000 loads per year. Improved inventory data, and to a lesser extent, the identification of dieback areas have been the reasons for this change in estimate of longterm yield.*" (p. 1)

"*8.* *Modification of logging procedures to conform with:*
(a) *The silvicultural requirements for optimum regeneration in the karri forest.*
(b) *The needs of logging hygiene in areas affected by or susceptible to jarrah dieback.*" (p. 2)

3. Silvicultural Considerations
1. Jarrah Dieback
"*Approximately 5 per cent of the jarrah forest area is now known to be affected by a disease known as 'Jarrah Dieback'. This disease was first observed near Karragullen in 1921. By 1948 it was considered sufficiently disturbing to warrant a fulltime research programme, and in November 1965 the causal agent was finally and positively identified as Phytophthora cinnamomi, a soil-born root-rotting fungus.*

The disease has the potential for destroying considerable areas of the jarrah forest because it kills mature trees and regeneration and also because fungicidal treatments cannot be justified at this stage because of their high cost. Control measures must therefore be directed towards restricting the possibilities of establishing new infections and curtailing the spread of infections already established." (p. 7)

3. Jarrah Logging Hygiene
"*Prescriptions for jarrah logging hygiene were introduced in January 1969 and are based upon the principle of segregating affected from unaffected areas to minimise cross-transport of affected material and of concentrating operations to minimise the total area rendered liable to infection. These prescriptions also provide for the designation of access routes to avoid heavily infected areas and for the physical removal of soil containing infected material from equipment before transferring to unaffected areas.*

The prescriptions have been voluntarily implemented by the timber industry and the decision to seek similar co-operation from other forest users rather than implementation of the prescriptions by regulation has been well-rewarded. […]" (p. 8)

4. Intensive Management Units
"*Intensive management in the jarrah forest envisages, within the constraints of cost benefit evaluation and available finance:*

(a) Maximum forest hygiene to prevent encroachment of Dieback.

[…]

There is little doubt that having assured protection from Dieback and an adequate level of stocking, further application of thinning techniques involving the controlled use of arboricides, results in a substantial increase in both volume and value yields from the forest." (p. 9)

5. Dieback Rehabilitation
"[…] *Because of higher financial priorities it has only been possible in the past five years to complete 4, 030 acres of Dieback rehabilitation out of a total affected area of approximately 150, 000 acres. Early rehabilitation of the remaining affected area is a matter of urgency to protect water values in the major catchments and also to augment supplies of timber from areas having economic advantages on account of their proximity to the Metropolitan area.*" (p. 10)

7.2 Forest Conservation and Multiple Use Management
"*In all operations proper attention will be paid to:*
[…]
2.Continued attention to conservation of flora and fauna of the forest by proper management techniques including fire control and forest hygiene." (p. 36)

7.3 Control Of Trade Operations
"*1. Major trade operations will be controlled by the issue of approved annual coupes under five-year logging plans to be drawn up in accordance with the requirements of the forest hygiene programme and revised annually.*" (p. 37)

7.4 Silvicultural Prescriptions
"*1. The uniform system will be continued in the karri forest and concentrated cutting will be continued in the jarrah forests where control of Phytophthora Root-rot is of vital importance.*

[…]
3. *Selected areas of prime jarrah forest will be set aside as intensive management units for complete protection from Phytophthora Root-rot and for intensive treatment including pole thinning, to improve site productivity.*

4. *Rehabilitation of Phytophthora-affected areas will be continued and increased to the maximum of available finance. Specially selected areas will be converted to pine plantations and the remainder will be rehabilitated with selected resistant eucalypt species.*" (p. 37)

<u>General Hardwood Working Plan No. 85 : Part II : Detailed Prescriptions By Divisions. 1971</u>

O.1 Introduction
"*The detailed prescriptions by Divisions which appear in Part II of this Working Plan are designed to implement the policy contained in Part I of this General Working Plan No. 85. These prescriptions will remain in force until 31st December, 1976, unless an early revision of the Plan becomes necessary in the light of new factors that might arise in the meantime. (See Part I Para. 0.3.1.2)*

0.2 General Prescriptions
"*1. General prescriptions for the implementation of Working Plan No. 85 are contained in Part I, Sections 7.1 to 7.5. All officers concerned are required to familiarise themselves with these prescriptions and to follow them closely.*

2. However the most important of these prescriptions are repeated below for emphasis.

(a) Dieback Hygiene

All forest operations including pole, pile, bridge timber and firewood operations; and all other operations in the forest including road construction, road regrading, power line construction carried out by public or private bodies; will be conducted strictly in accordance with Departmental Dieback Hygiene Procedures of January 1969. (See Part I Para. 7.3.1).

[…]

(c) Five Year Logging Plan

All trade operations will be controlled by the issue of annual coupes under five year logging plans to be drawn up in accordance with the requirements of the forest hygiene programme, and revised annually. (See Part I Para. 7.3.1)." (p. 1)

CODE OF REGROWTH … N.D. - 197-?

<u>'Code of Regrowth Logging Practice' for all Logging Operations … N.D. 197-?</u>

Section 5 : Loading and Hauling

"*5.5 A contractor shall observe any instruction and comply with any procedures laid down to restrict the spread of the disease known as Jarrah Dieback within State Forest. This will apply particularly to the movement of logging equipment and road haulage equipment and the carting of road materials such as gravel.*" (p. 10)