WATER QUALITY AND PRODUCTION

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

SILVICULTURE GUIDELINE - 1997

Silviculture guideline 1/97 : Fire as a Silvicultural Tool in the Jarrah forest

4. Fire and Silvicultural Strategies
4.1 Thinning
Silvicultural Objective
"[…]*In some cases thinning is carried out for aesthetic reasons or to increase streamflow.*" (p. 4)

OPERATIONS MANUAL – 1997

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

Section 1 : Planning and Monitoring
Specification 1.1 : Harvesting and Regeneration Plans
1. Responsibilities
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 input into the computer system 'SILREC' will be collated every six months with assistance from Forest Management Branch.*" (p. 17)

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)

"*The plans shall include:*
(1) A 1:250, 000 overview plan showing the approximate location of all proposed harvesting areas for each year of the plan.
(2) 1:50, 000 block plans showing proposed harvesting boundaries and major access – also shows CALM grid.
(3) 1:25, 000 plans showing, when available:
[…]
- *river and stream zones, if known; if not, rivers and streams to be highlighted and FOIC to determine order in field..*

[…]" (p. 16)

3. Plan Amendment
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

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)

Section 4 : Coupe Management
Specification 4.1 : Coupe Demarcation
NOTE: THIS ENTRY HAS BEEN AMENDED TO THE FOLLOWING-
"*3 Sensitive boundaries including river, stream and fixed travel route (road) zone boundaries must be identified prior to cutting in the same way as coupe boundaries, that is with white painted crosses facing the cutting area. Diverse ecotype zones will be similarly marked where appropriate. The exact location of boundaries of river, stream and fixed travel route zones is decided by the Forest Officer in Charge, using the following guidelines:-*

3.1 River and Stream (Riparian) Zones
Native Hardwood Forests:-

STREAM ORDER	***WIDTH EITHER SIDE (APPROX.) (M)***	***TOTAL WIDTH (APPROX.) (M)***	***MINIMUM WIDTH EITHER SIDE (M)***
First	*30*	*60*	*20*
Second	*30*	*60*	*20*
Third	*30*	*60*	*20*
Fourth	*75*	*150*	*50*
Fifth upwards	*200*	*400*	*100*

(p. 37)

Section 5 : Environmental Protection
Specification 5.3 : Protection of Water
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

MISSION AND OBJECTIVES – 1995

CALM Annual Report 1994/95. 1995

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

GUIDELINES - 1995

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

Introduction
"*The following set of guidelines provides instructions for all phases of landing, snig track and in-coupe shunt operations from planning through to rehabilitation.* […]" (p. 1)

Planning And Design
- "*Landings will be located outside the possible area of influence of reserves and special care zones as defined in the Regional Management Plans and Manual of Timber Harvesting in Western Australia. Areas of influence being that area likely to be affected by mud overflow into reserve, damage by burning off operations, etc.*" (p. 1)

- *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

MANAGEMENT PLAN - 1994

Forest Management Plan 1994-2003. 1994

Vision Statement
"*The Government requires that the State's forests are managed so as to provide in perpetuity for biodiversity, fresh water, timber, recreation and tourism, heritage values and other products such as honey and wildflowers.*" (p. i)

1. Forest Policy Statement
Purposes of Reservation of State Forests of the South-West
"*In accordance with section 55(1a) of the Conservation and Land Management Act (1984). State forests and timber reserves within the Swan, Central Forest and Southern Forest Regions, to which this Management Plan applies, are reserved for the purposes of conservation, recreation, timber production on a sustained yield basis, water catchment protection and other purposes being a purposed prescribed by the regulations.*" (p. 1)

Production Objective
"*To manage the forest to produce the range of commercial values approved by Government, in a manner which is ecologically sustainable and provides a fair return to the State.*

To achieve this objective CALM will:
[…]
- *Preserve the quality of water supplies from forests.*" (p. 3)

2. The Strategies for the Sustainable Management of Native Forests
Managing Forest Structure
Silviculture in the Karri Forest
"*2.Coupe size and dispersal, in combination with stream and river zones and retained patches of mature forest, will be planned to ensure that, where possible, there is a maximum distance of approximately 400 metres between areas of mature forest.*" (p. 11)

Silviculture in the Jarrah Forest
"6. In the intermediate and low rainfall zones of the jarrah forest where saline groundwaters are present, a minimum of 30 percent of the forest will be retained unharvested, or thinned to a minimum basal area of 15 square metres per hectare, in any 15 year period."(p. 12)

"*7.Regrowth stands will be thinned to a minimum density of 10 square metres per hectare of basal area except in areas with a high risk of discharging saline groundwaters, where the minimum basal area will be 15 square metres per hectare."*(p. 12)

"*8. No harvesting will occur in river and stream zones, other than trees removed in the course of road construction of for fire control or public safety.*[…]" (p. 13)

River and Stream (Riparian) Zones
"*The biological, hydrological and aesthetic benefits of the provision of zones of undisturbed vegetation adjacent to rivers and streams can be summarised as follows:*

- *they minimise, and, in almost all situations, eliminate any adverse effects of timber harvesting on water quality for human use;*

- *they limit groundwater rise in stream lines, thus minimising the outflow of saline groundwaters on 'high risk' sites;*

[…]

The river and stream zone system has been comprehensively reviewed within CALM and with the assistance of the community. It will now be extended into the jarrah forest of the Central Forest and Swan Regions. Thus, all streams in the forest will be protected by a zone of retained vegetation.

The following guidelines will be used for selection of riparian zone width:

Stream Order	*Width Either Side (Approx.) (m)*	*Total Width (Approx.) (m)*	*Minimum Width Either Side (m)*
First	*30*	*60*	*20*
Second	*30*	*60*	*20*
Third	*30*	*60*	*20*
Fourth	*75*	*150*	*50*
Fifth upwards	*200*	*400*	*100*

Under this distribution of river and stream zones, the areas and forest types which will be allocated in the Southern Forest Region are shown in Table 4.[…]" (p. 26)

Table 4 Estimated areas by forest Type in river and stream zones, Southern Forest Region

Forest Type	*Area (ha)*
Jarrah	*24 545*
Karri	
Even ages regeneration	*3 900*
Other karri	*15 595*
Other forest	*455*
Other	*17 680*
TOTAL	*62 175*

In CALM's Central Forest Region and Swan Region, approximately 90 000 hectares will be allocated to river and stream zones." (p. 27)

3. Managed Forest Values
Managing Areas of Special Significance
River and Stream Zones
"*Timber harvest will be excluded from all river and stream zones. Vehicle movement across riparian zones will be restricted to properly engineered and sensitively constructed stream crossings.*" (p. 42)

"*Felling will be restricted to those trees removed in stream crossing construction and individual trees which may pose a safety hazard.*" (p. 42)

Nature Conservation
Ecological Processes
"*This Forest Management Plan will ensure that the ecological processes continue to be maintained by:*
[...]

- *ensuring that the current high water-quality levels in rivers, streams, wetlands and their catchments, in forest areas are maintained;*

[…]" (p. 42-43)

Hydrological Values
"*The existing forest management strategies have ensured that Western Australia's native forested catchments have provided a large source of high-quality water for domestic and commercial uses. The forest management procedures to be followed under this Plan will ensure the maintenance of water quality by:*

- *the retention of zones of undisturbed vegetation on every river and stream throughout the publicly owned forest areas in the south-west of Western Australia;*

- *restrictions on the proportion of forest which may be harvested in forest areas with saline groundwater tables.*

CALM and the Water Authority of Western Australia will cooperate to identify second order water catchments with high salt risk as is required by Ministerial Condition 16-1.

In addition to these measures, cooperative planning procedures with the Water Authority of Western Australia will ensure that, where possible, and depending on other conflicting forest values, potential water resource development sites are set aside for the future use and benefit of the community.

CALM will also continue to work, in cooperation with the Water Authority and other relevant agencies, to reverse stream salinity where this is a problem, by soundly planned reforestation." (p. 48)

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." (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)
-

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)

TIMBER HARVESTING … 1993 ED. – 1993

Timber Harvesting in Western Australia … 1993 Ed. 1993

PART 1 : CODE OF LOGGING PRACTICE

Section 7 : Environmental Protection
Water
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (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 'Provisional Manual of Hardwood Logging Planning'. The following is a summary.*" (p. 20)

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

2. Plan Types
2.3 Short Term Integrated Harvesting and Regeneration Plan
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

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 2 : Roading
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 4 : Coupe Management
Specification 4.1 : Coupe Demarcation
3.1 River and Stream Reserves
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)
***EXCEPT* FOR THE FOLLOWING SECTION (WHICH WAS FORMERLY TITLED*, In the Area Known Originally as the Woodchip Licence Area*) -**
Native Hardwood Forests
"- *Width of river or stream zones must be varied according to the table below.*

Stream Order	*Width Either Side (approx. m)*	*Total Width (approx. m)*	*Minimum Width Either Side (m)*
First	*30*	*60*	*20*
Second	*30*	*60*	*20*
Third	*30*	*60*	*20*
Fourth	*75*	*150*	*50*
Fifth upwards	*200*	*400*	*100*

Elsewhere
NOTE: THIS SECTION IS NOT IN THE 1993 EDITION

Section 4.3 : Extraction
NOTE: REFER TO ENTRIES FOR THE ABOVE IN 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection
Specification 5.3 : Protection of Water
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

OPERATIONS MANUALS - 1993

Fire Operations Manual : Volume 1. 1993

NOTE: INCLUDES UPDATES ISSUED 1997

7.8 Aerial Burn Plans
"*The plans will be used to provide:*
(a) Detail to the WA Water Authority for catchment areas …
[…]" (p. Chapt 7 – page 12) Issued 14/1/97

Fire Operations Manual : Volume 2 : Fire Protection Instructions. 1993

Fire Protection Instruction 28 : Water Point Construction and Maintenance
Active Sites
"*Active sites are permanently flowing which about running water courses. As most point will be located in stream reserves special care needs to be taken to avoid damage which may lead to siltation or turbidity of the water course.*" (Fire Protection Instruction 28 : p. 3) Issued 15/9/93

"*Constructing access to water courses means clearing sufficient manoeuvring room for trucks, but leaving a one metre strip along the water course boundary, along which the bedlog is positioned to prevent erosion etc. Pushing of live trees is only possible after permission from the Regional Manager.*" (Fire Protection Instruction 28 : p. 3) Issued 15/9/93

Fire Operations Manual : Volume 3 : Fire Protection Instructions. 1993

Fire Protection Instruction 54 : Standards for Coupe Preparation for Post Harvest and Regeneration Burning

4.3 Water
"[…] *Erosion control barriers are to be constructed where necessary.* […]" (Forest Protection Instruction 54 : p. 2) Issued 21/09/93

5.5 Advance Mop-Up (Pushing In)
"*This is the pushing of logs and large debris away from any boundary (into the burn) before burning commences. This allows better control when burning adjacent to no-burn areas (stream reserved etc) and avoids costly and extensive mopping up after the burn.*" (Forest Protection Instruction 54 : p. 5) Issued 22/09/93

5.6 Buffer Burns
"*Burning of stream or river zones as buffers will require approval from the Regional Protection Officer.*" (Fire Protection Instruction 54 : p. 6) Issued 22/09/93

5.8 Road, River and Stream Amenity Zones
"*Normally these zones should not be burnt adjacent to post harvest or regeneration burn unless exceptional circumstances dictate, and then only with the permission from the Regional Protection Officer. However, in some instances, even with the best preparation and the utmost care during the lighting of the slash, hopovers may occur into these reserves. In this situation, prior preparation of tracks on the opposite side of the amenity*

zones to the slash burn (at the prescribed distance form the road/river/stream) is. […]"(Fire Protection Instruction 54 : p. 7) Issued 22/09/93

GUIDELINES - 1993

Dieback Hygiene Evaluation : User Guidelines. 1993

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 dependant species which has great ecological significance.*

In general the following effects apply:
[...]
Water. Water production in diseased areas may in fact be enhanced due to increased runoff. If vegetative cover is markedly reduced water quality may decrease due to increased sedimentation and salination.

Catchment Protection
It is important that a deep rooted tree component be retained so as to control salinity - especially in areas of low rainfall and high salinity risk. Degradation of vegetative cover may also lead to turbidity and siltation problems." (p. 5)

POLICY STATEMENT - 1992

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

Strategies
"*3. Locate/relocate apiary sites at acceptable intervals, taking account of constraints such as the following:*
[…]
3.5 Risk of water pollution or soil degradation caused by beekeepers' activities.
[…]" (p. 4)

TIMBER HARVESTING … 1992 ED. – 1992

Timber of Harvesting in Western Australia … 1992 Ed. 1992

PART 1 : CODE OF LOGGING PRACTICE

Section 7 : Environmental Protection
Water
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (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. Responsibilities

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

2.3 Short Term Integrated Harvesting and Regeneration Plan
NOTE: REFER TO ENTRIES UNDER 1990 EDITION

Plan A : Operations Plan
NOTE: REFER TO ENTRIES UNDER 1990 EDITION

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

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 completely between 12 and 24 months following the completion of harvesting. (Refer Attachment 1.1.3)" (p. 27)

Attachment 1.2.3 : Seven Way Tests : Guidelines for Assessment of Level of Consequences

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

Specification 2.3 : Road Construction
Part A : Hardwood

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

Specification 2.4 : Gravel Pit Selection Working and Rehabilitation
Guidelines for the Management and Rehabilitation of Gravel Pits : South West Forest Areas

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

Section 4 : Coupe Management
Specification 4.1 : Coupe Demarcation

3.1 River and Stream Reserves

In the area known originally as the Woodchip Licence Area

3.2 Road Reserves

In the area known originally as the Woodchip Licence Area

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

Section 4. 3 : Extraction
NOTE: REFER TO ENTRIES FOR THE ABOVE IN 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection
Specification 5.3 : Protection of Water
NOTE: REFER TO ENTRY UNDER 1990 EDITION (SIMILAR WORDING)

GUIDELINES - 1992

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

"*Quarrying on Conservation and Land Management (CALM) lands results in the loss of conservation and production values. It also impacts on aesthetics, recreational and water production values.*" (p. 1)

Water Conservation
"*Pits proposed in harnessed catchments must be discussed with Water Authority of WA.*[…] *Pits are not to be located within stream reserves.*" (p. 3)

"*For water courses in non harnessed catchments or outside the 3km zone the minimum buffer width is 50m.*" (p. 3)

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)

Land may be classified

(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)

Miscellaneous Offences
"*107. A person shall not-*
[…]
(d) 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 land to which this Part applies;" (p. 26)

POLICY STATEMENT – 1991

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

1.4.2 Camping Accommodation
"*(xi) Overnight accommodation on boats will be permitted subject to conditions appropriate to the water(s) concerned.*" (p. 12)

1.5 Visitor Safety
Policy
"*1.5.5 In the interest of public health, care will be taken to protect water supplies and catchments from pollution and to provide adequate means of sewerage and garbage disposal.*" (p. 14)

1.6 Special Groups/Events
Policy
"*1.6.1 The Department will attempt to accommodate special interest groups subject to Section 33 of the CALM Act (management plans, 'necessary operations') and the general principles listed at the beginning of this document.*" (p. 15)

"*1.6.2 Approval of activities is generally the responsibility of Regional Managers.*" (p. 15)

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)

"*1.8.12 ... However on domestic water supply dams and some other water bodies such as Lake Clifton, water craft are prohibited for reasons of preservation of the resource, health, etc.*" (p. 19)

"*In general, boating will only be allowed on nature reserves by way of management plan or interim management guidelines after consideration of the likely environmental and social impacts (see Policy 2.2).*" (p. 19)

2.1.5 Competitive Car Rallies and Other Motor Sports
Identification and Selection of Suitable Areas
"*4. ... Refuelling areas will not be permitted within 500 metres of any permanent stream or waterbody.*" (p. 47)

"*9. All events, whether on or off-road, will be subject to periodic monitoring by the Department to identify any impacts resulting from such activity and to subsequently carry out at the organiser's expense any rehabilitation which might be required.*" (p. 48)

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 IN THE FOLLOWING SECTION) –

"*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)

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

Introduction
"*The aim of silvicultural practice in the jarrah forest managed for multiple use purposes is to develop or maintain a forest structure that will achieve objectives for nature conservation, timber production, water quality and water production, heritage and aesthetics.*

This specification details:

the broad goals for each value,
requirements for integrated planning,
the standards to be achieved for all values, and
guidelines for field application.

and outlines the variation to silvicultural practice that will be made to cater for various forest values, recognising their relative importance in different areas. It deals with the application of these strategies at the coupe level in areas from which timber is harvested.

The broader strategy that deals with zoning of the forest and the location, arrangement and harvesting is established at the regional planning level. This includes determining where harvesting can best located to achieve the strategic goals, the allocation of zones (e.g. water, wildlife) from which harvesting is to be excluded and the establishment of relative priorities between values.

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.

The treemarking and silvicultural treatments outlined in Sections 4 –7 of this specification do not apply to extensively managed areas of eastern and Sunklands jarrah forest (Sect. 3.2.3). A new specification is being prepared to cover these areas." (p. 2)

1. Management Objectives and Silvicultural Strategies

1.1 Water

Management Objectives

"* *To maintain the quality of water in all forested catchments.*

* *To enhance the quantity of water yielded from the forest within harnessed catchments*" (p. 3)

Silvicultural Strategies

- "*Maintain an undisturbed stream zone in all forest areas (dimensions and protective measures are specified in The Manual of Hardwood Logging Specifications).*

- *Ensure that harvesting in salt sensitive areas of the intermediate and low rainfall zones does not lead to the excessive reduction of forest cover which may then result in a reduction in water quality.*

This will be achieved through:

maintaining a stand basal area of at least 15m^2/ha in the salt sensitive areas of the intermediate rainfall zone (900-1100mm) at the time of thinning.

regenerating no more than 70 per cent of a second order catchment in one felling cycle.

regenerating all gaps

separating felling cycles by at least 10 years

Maintain regrowth stands in the high rainfall zones of harnessed catchments at a density which will enhance water yields by thinning to a density between 10m^2/ha and 20m^2/ha." (p. 3)

3.1Inventory

"*The following are essential planning tools*

(1) Contour Maps showing watercourses
(2) Visual Resource Management Zones
(3) Rainfall Zones
(4) API Type maps, and other maps showing cutting histories and silvicultural treatments
(5) Streams and other permanent zones
(6) Wildlife Values

It is also valuable to have current 230mm aerial photography as this assists in the interpretation of forest structure. Site/vegetation type maps for the area are useful indices for several values.

A coupe plan is prepared showing:

WATER: *Harnesssed catchments*
Rainfall Zones
Stream Zones=

VISUAL RESOURCE: *VRM Zones (including seen area)*
VRM Special Areas
Roadside Zones (Southern Forest Region)=

WILDLIFE: *Significant values*

TIMBER: *Low Value/Non Productive Areas*
Structural Types (where known)

= Note that these zones are currently subject to review" (p. 6)

3.2Field Inspection
"*A field inspection of each coupe must be made to verify the values that are present.* […]" (p. 6)

4. Treemarking
4.1 General
"*Treemarking is the means by which stand objectives are marked out in the forest so that harvesting and tending operations can proceed. By making trees to be retained the forester provides a vision of the future development of the stand.*

Before marking commences, the forester must know:

the water, visual resource and wildlife objectives within the coupe, and the type of trees likely to be removed commercially.

Marking specifications will vary in accordance with the above objectives. (See Appendix 2).

The first task in marking a patch of trees is to determine the silvicultural objective (thinning, regeneration release, or shelterwood) and whether its boundaries are apparent. The process for making these decisions is outlined in 'Treemarking and Silviculture in the Jarrah Forest' (1987)

Only after the objective has been identified for each patch can individual trees be marked.

Marking habitat trees and logs for retention are the first priority." (p. 9)

4.2 Marking to Promote Growth (Thinning)
"[…] *Thinning aims to increase the growth of selected crop trees. In the high rainfall zone it will also increase the yield of water.*" (p. 9)

Technique
"*Mark to retain the desired density of crop trees …, fauna habitat trees and logs … and elements for diversity.* […]" (p. 9)

"*The retained basal area must be regularly checked with a 2-factor prism.*" (p. 9)

Partially-stocked Stands
"*Where the stocking of crop trees is less than specified in Appendix 4, but at least 50% of that density, all crop trees must be retained and sufficient non-crop trees to keep the stand at a minimum basal area of 10m^2ha (15m^2/ha in the salt sensitive parts of the Intermediate Rainfall Zone)*" (p. 10)

MANAGEMENT PLAN – 1990

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

Management Objectives
"*Under the CALM Act, State forest is to be managed to ensure the multiple use and sustained yield of the forest resource for the satisfaction of long term social and economic needs.*

The management objectives for this catchment reflect the priority use determined by CALM's northern forest region management plan. For the Waroona Dam catchment area these are for production of water and wood." (p. 18)

4.2 Water Production
"*Provision of a reliable, good quality water supply to the Waroona Irrigation District is a primary objective of the reservoir and catchment.* […]

The objective recognises the following factors:

- *initial testing indicates that the water is currently suitable for domestic use with simple chlorination as the only treatment required, however further monitoring is required to confirm this;*
- *there is often an overflow from the dam during the winter, non-irrigation months which is no presently utilized;*
- *planning for Perth's long term water requirements identifies utilisation of some of this water as possible cost-effective supplement to the Metropolitan supply scheme.*" (p. 18)

4.3 Wood Production
"*Provided that existing forest management techniques such as stream zone protection are maintained, wood production is considered compatible with the water production objective.*" (p. 18)

4.4 Recreation
"*The recreation objective must recognise the primary land uses within the catchment and be consistent with the previously described objectives. To this end, both CALM and Water Authority have formulated guidelines to assist planning and management of recreational use.*

CALM management guidelines may be briefly reiterated as 'Provide and allow for the widest range of recreational opportunities consistent with:

- *the purpose and vesting for the land;*
- *the ability of the natural system to sustain the activity without impairment;*
- *the ability of the Department to supervise the activity where land values may be 'impaired' (CALM, 1987, c).'*

In addition, the Water Authority guidelines in relation to tourism and recreation are to:

- *ensure that developments are designed to minimise the risks of soil erosion, stream turbidity and bacteriological pollution;*

- *keep the affected area to the minimum size necessary to achieve the desired recreational goal and ensure that disturbed ground is stabilised;*

- *direct development away from the vicinity of the dam outlet works;*

- *prevent continuously disturbing activities such as trail bikes and off road vehicles (Water Authority, 1987).*" (p. 19)

"[…] *Practical recreational management objectives within the catchment are a blend of the above guidelines.*" (p. 19)

7.0 Identification of the Preferred Development Option
"*The draft management plan evaluated three alternative development philosophies from which the following broad strategy for control of future development was selected.*

'Maintain and cater for the present demand for recreational and environmental use.

Provide recreational and environmental management prescriptions that resolve the identified problem areas'." (p. 28)

"*On the basis of available data the investigation concluded that the reservoir and catchment environment could sustain the present levels of recreational use provided that:*
[…]
ii) *Recently initiated monitoring of water quality is continued.*

iii) *A survey to determine the requirements of recreational users is commenced as soon as possible.*

iv) *Management prescriptions to resolve problem areas that have been identified, require institution and policing.*

v) *Management prescriptions must be flexible so that adjustments to patterns and type of use can be made if monitoring results indicate such needs exist.*

There is also a fall back situation for water quality management that should be noted. If monitoring shows that active recreation on the reservoir is causing unacceptable water quality deterioration, drastic reduction or prohibition would enable recovery to desirable standards within a short time-frame. This is because the annual water yield from the catchment is high relative to the volume of the reservoir, enabling rapid dilution and displacement of contaminated water. Maintenance of the ability of the catchment to provide good quality water is implicit in this suggestion. The protection of stream zone and foreshore vegetation in particular, and forest vegetation and soil stability in general, therefore, has paramount importance." (p. 28)

Management Prescriptions
"*Effective management of the resource will depend to a large extent on how effectively people are managed. One effective tool for achieving this is through a zoning mechanism such as the creation of management units.* […]" (p. 29)

8.2.3 Effluent Disposal
Objective
"*To ensure that there is no opportunity for direct entry of sewage to the reservoir.*" (p. 33)

8.2.4 Parking and Vehicle Access at the Reservoir's Edge
Objectives
"*To provide parking that allows views of the reservoir but does not spoil those views or cause erosion.*

To provide only essential access to the water's edge so that disturbance is minimised, erosion does not occur, and the scenery is not degraded." (p. 34)

8.2.5 Picnic and Barbecue Sites
Objective
"*To provide adequate picnic and barbecue facilities while ensuring minimal impact on catchment values.*" (p. 35)

8.2.6 Off-road Activity (Including vehicles and horses)
Objective
"*To protect the biological, physical and scenic environment of the catchment by directing potential off-road activity to nominated roads and tracks.*" (p. 35)

Prescriptive
"*All vehicle activity outside gazetted roads and existing forestry tracks will be prohibited.*" (p. 36)

8.2.7 Bushwalking
Objective
"*To provide opportunity for bushwalking consistent with catchment protection objectives.*" (p. 36)

8.2.9 Swimming
Objective
"*To allow swimming in designated areas as long as there is no unacceptable degradation of water quality*." (p. 36)

8.4 Resource Management
"*Whilst the primary aim of this plan is to develop effective management of recreational use, it also needs to consider management of other land uses in the area, particularly for the priority uses of water and wood production. Management prescriptions for both the priority land uses and other minor land uses are outlined below.* […]" (p. 39)

8.4.1 Water Supply
Objective
"*To provide a reliable water supply to the Waroona Irrigation District and to prevent adverse long-term deterioration in water quality.*" (p. 39)

Prescriptions
- "*Irrigation waters will continue to be supplied to the Waroona irrigation system as required by farmers in accordance with current procedures.*

- *Water quality monitoring will be conducted, as outlined in Appendix A, to enable greater understanding of the effect of recreation on water quality.*" (p. 39)

8.4.2 Forest Management
Objective
"*To enable a level of hardwood production from the area of State forest that is sustainable indefinitely, consistent with requirements such as protection of water catchment, conservation and provision of recreational opportunity.*" (p. 39)

Rationale
"*CALM has a suite of management prescriptions which deal specifically with forest management. Most of these are outlined in the Regional Management Plans (CALM, 1987, a). Existing policies cover areas such as harvesting techniques for forest products, dieback management, fire management, mining control, weed control, stream zone protection, feral animal control, forest track maintenance and rehabilitation. These policies deals adequately with the management issues which could arise within the State forest components of the catchment, and which are relevant to this management plan.* […]" (p. 39)

Prescriptions
"*CALM forest management prescriptions will be routinely applied within the catchment area.*" (p. 39)

8.4.4 Mining
Objective
"*To minimise the impacts of bauxite mining in the catchment and exclude mining activity from the viewshed of the reservoir.*" (p. 40)

Rationale
- "*Any mining activity within the catchment will be conducted according to CALM management prescriptions and closely supervised. Particular attention will be given to minimisation of turbid runoff from mine areas.*" (p. 40)

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)

Rationale
"*Extraction of gravel from the banks of the reservoir is sometimes conducted but is considered to be incompatible with a number of other uses, principally in regard to visual acceptability and bank stability.*" (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)

MANAGEMENT PLAN – 1990

<u>Lane Poole Reserve Management Plan 1990-2000. 1990</u>

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)

B8.1.2 Fire History
"*Current strategies in the Reserve are aimed at the protection of community and forest values, consistent with the priority land uses of conservation and recreation. Some of the values protected are:*

- *Life and property.* […]
- *Water catchments. In October 1986 Cabinet determined that water development should not be a purpose of the Reserve. The potential remains, however, to develop the river and/or a number of the tributaries outside the Reserve for water supply purposes.*
- *Flora and Fauna.* […]
- *Timber values.* […]" (p. 35)

C7.4 Declared and Exotic Plants
Prescriptions
"*1. CALM in conjunction with the Agricultural Protection Board, will increase control measures to prevent the further spread of blackberry along the Murray River.* […] *Water quality and spray loss will be carefully controlled and comply with existing legislative requirements.*" (p. 95)

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.*

Rehabilitation will be designed to restore or enhance values which existed prior to mining. In the Recreation Zone, these values are recreation and protection of water catchments. In areas adjoining the Conservation Zone, important values to be protected include conservation, water catchment and forest values. […]" (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
"*5. CALM will assess the Recreation Zone for its current and potential recreation and landscape values and will review silvicultural criteria for wood production. Visually prominent areas will be delineated and excluded from commercial timber utilization. Other areas will be excluded from cutting if needed to protect water values or the aesthetic value of roadside vegetation.*

Within the remaining areas, cutting will be based on accepted forestry practices concentrating on forest stands which have been severely degraded by fire or dieback." (p. 120)

Prescriptions
"*10. Operations will be planned to minimise the degradation of other resource values, particularly soils and water. Monitoring is needed to determine baseline data on water quality and stream biota.*" (p. 121)

C13.4 Water Supply
"*The 5 objectives are:*

To protect the quality and quantity of water resources of the Reserve.
To ensure, wherever possible, that activities outside the Reserve have a minimal detrimental effect on the water resources of the Reserve.
To protect waterbodies with high conservation values.
To protect conservation values through the protection of stream water quality, stream courses and vegetation.
To protect recreation values which are dependent upon, or closely associated with, water on its course through the Reserve." (p. 122)

Background
"*The maintenance of the quality and quantity of water resources is fundamental to the protection of the Reserve's conservation and recreation values. Water resources play an important role in the maintenance of biotic systems and they provide the focus for a wide range of recreational opportunities.* […]" (p. 122)

Prescriptions
"*1. Planning and management will ensure protection of water quality, stream courses, aquatic fauna and streamside vegetation. A monitoring program based on biological data will be used to supplement existing programs.*

2. Management of the Reserve must ensure compatibility with water catchment protection regulations." (p. 123)

"*6. The Reserve and surrounding forests will be managed so that salinity, nutrient input or turbidity are maintained at current or acceptable levels. Logging and regeneration operations on slopes immediately adjacent to water courses, and land exchanges for agriculture, will be regulated to avoid adverse impacts on water quality.*" (p. 124)

MANUAL OF HARDWOOD … 3rd ED. – 1990

<u>Manual of Logging Specifications … 3rd Ed. 1990</u>

Section 1 : Planning and Monitoring
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 preparatio*n." (p. 1)

Section 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." (p. 2)

"*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.
[…]
- CALM mapping grid.
[…]" (p. 2)
-"*stream buffers if known; if not, streams to be highlighted and FOIC to determine stream order in field.*
- VRM buffers as they become available.
- special care zones (eg., areas close to domestic dams - 9 refer Section 4.1 of this Manual).
[…]
- contours.
- areas previously cut over.
- no entry areas.

[…]" (p. 3)

3.Plan Amendment
"*Logging plans can only be amended by the logging plan officer. Amendments must be approved in writing by the Regional Manager.*" (p. 3)

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).*" (p. 3)

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)

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. Risk: rate as - very low, low, high, very high.
[…]
2. Hazard: rate as low, moderate, or high, on vegetation types or landforms. Refer to 7-Way Test Guidelines for categories.
[…]
3. Landuse: rated as low, moderate, high.

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

Secondary landuses must also be considered." (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 2.2 : Road Construction
Part A : Hardwood
"*(c) Major Stream Crossing:*
* *Must be constructed with pipes or a bridge with a minimum design period of 1:50 years. Full earth/log fills are not permitted.*
* *Borrow areas must not be located within river or stream reserves.*
* *Water from borrow areas must be directed into silt trap or vegetative filter.*
* *Fill must be consolidated to minimise erosion of loose soil and risk of slumping.*" (p. 31)

* "*Embankments must be left rough surfaced or corrugated and at an angle at least equal to the natural angle of repose for the soil type (see also (e) below).*
* *Machine activity in the watercourse and disturbance of stream vegetation must be minimised.*
* *No heaps of debris to be created within 40m of watercourse.*
* *A compacted, gravel pavement must be created on both sides of a stream crossing (In some specific instances this may have to be sealed.)*" (p. 31-32)

Specification 2.4 : Gravel Pit Selection Working and Rehabilitation
Guidelines for the Management and Rehabilitation of Gravel Pits : South West Forest Areas
2.5 Water Conservation
"*Pits proposed in harvessed catchments must be discussed with Water Authority of WA.* […] *Pits are not to be located within stream reserves.*

As a minimum standard all second and third order (or higher) water courses within 3km of a catchment reservoir are to have a buffer of 100m from the drainage point of the pit.

For water courses in non harnessed catchments or outside the 3km zone the minimum buffer width is 50m." (p. 37)

Section 4 : Coupe Management
Specification 4.1 : Coupe Demarcation
"*3. Sensitive boundaries including 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 pained 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:-*

3.1 River and Stream Reserves
General:
The purpose of river and stream reserves is to protect the water body from sedimentation, siltation and turbidity caused by the erosion of soil from disturbed land surfaces. The undisturbed vegetation of the reserve reduces the energy of overland flows resulting in the deposition of undissolved solids before they enter the water body.

Stream reserves also provide a wide variety of fauna habitat and act as corridors for fauna movement and recolonisation of disturbed areas.

They also provide a softening of the visual impact of logging operations.

The width of the river or stream reserve is dependant on vegetation type, slope, susceptibility of the soil to erosion, the intensity and duration of rainfall events and whether the watercourse is within a harnessed catchment.

A river or stream reserve is measured from the outside edge of the stream zone vegetation.

In the area known originally as the Woodchip Licence Area:
- Width of a river reserve must be at least 200m on each side of the river.

- Width of a stream reserve must be at least 100m on each side of the stream." (p. 53)

Elsewhere:
"*- For all second or third order (or higher) watercourses within 3km 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 for other streams. (See fig.4.1.1 for explanation of stream orders).*

- For watercourses 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 w-,~-, will be at the discretion of the Forest Officer in Charge.

3.2 Road Reserves
General:
- The purpose of road reserves is to screen the unsightly aspects of logging operations from view on major roads and to act as habitat and movement corridors for fauna.

In the area known originally as the Woodchip Licence Area:
- Width of road reserves must be at least 400m on both sides of main roads.

Elsewhere:

- *Width of road reserves must be 100 to 200m on both sides of main roads.*

- *Width of road reserves must be between 0 and 100m on both sides of other roads*
[…]" (p. 54)

Specification 4.2 : Stump Height
NOTE: REFER TO ENTRIES FOR THE ABOVE IN 1987 EDITION – SIMILAR WORDING

Specification 4. 3 : Extraction
NOTE: REFER TO ENTRIES FOR THE ABOVE IN 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection
Specification 5.1 : Protection from Jarrah Dieback Disease
"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)

Specification 5.3 : Protection of Water
NOTE: REFER TO ENTRIES UNDER 1987 EDITION – SIMILAR WORDING
***EXCEPT* FOR THE FOLLOWING-**
"*3. Water protection measures are necessary during:*
a) planning (specification 1.1)
b) road construction and maintenance (specification 2.2 and 2.3)
c) gravel pit working and rehabilitation (specification 2.4)
d) coupe demarcation (specification 4.1)
e) extraction (specification 4.3)
f) haulage (specification 4.4)
g) logging operation inspection and certification (4.5)
h) protection from jarrah dieback (5.1)
i) protection of soil (specification 5.2)" (p. 94)

CODE OF LOGGING … – 1990

Code of Logging Practice. 1990

Section 7 : Environmental Protection
Water
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (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.

- *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 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:-*
[…]
7.8 Prepare and implement strategies to promote and encourage development of the forest production requirements of the State.

This will involve:

> […]
>
> *7.8.5 Re-forestation of cleared lands with hardwood forests to supplement production from native forests and to assist in soil and water conservation.*" (p. 17)

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)

STRATEGIC PLAN (SOUTHERN REGION) – 1989

Strategic Plan : Southern Forest Region. 1989

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.*

[…]
3.1 Biophysical Resources
Hydrology

To protect, control and rehabilitate land which contributes to the water supplies of the State. Minimize changes in quality, quantity and seasonality of water resources.

[…]" (p. 7)

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
Noxious Weeds
"*Objective*
1. Control and contain noxious weed infestations in accord with CALM policy. Identify and map all noxious weed infestations.
[…]
Measure of Performance
'Priority'
[…]
2.Use of chemicals to be in accord with Chemical User Manual and W.A.W.A. requirements on catchments.
[…]" (p. 49)

Environmental Controls
"*Codes of Logging Practice*
Objective
1. Ensure all logging contracts contain a comprehensive 'Code of Logging Practice." (p. 58)

Water Quality
"*Objective*
1. Maintain integrity of defined river and stream reserves.

Measure of Performance
'Priority'
1.No clear felling intrusion into river or stream reserves

Objective
1.Install additional buffers or special care zones on sensitive watercourses. Maintain streamside vegetation free of unnecessary disturbance by logging equipment.

Measure of Performance
'Priority'
1. Prescribe conditions for all temporary stream fills and permanent stream crossings, as situations arise." (p. 59)

Key Result Objectives : Roads
Environmental Protection
"[…]

2. *Liaise with Water Authority to develop standard drainage prescriptions, especially near stream crossings.*" (p. 61)

MANUAL OF HARDWOOD … 2ND ED. – 1989

Manual of Hardwood Logging Specifications … 2nd Ed. 1989

Specification 1.1 Logging Plans
NOTE: REFER TO ENTRY FOR THE ABOVE IN 1987 EDITION (SIMILAR WORDING)
***EXCEPT* FOR –**

Specification 1.1 Logging Plans
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)

Attachment 1.2.3 : Seven Way Tests
Guidelines for Assessment of Level of Consequences
NOTE: REFER TO ENTRY FOR THE ABOVE IN 1987 EDITION (SAME WORDING)

Section 2 - Roading
Specification 2.1 : Selection of Log Haul Routes
NOTE: REFER TO ENTRY FOR THE ABOVE IN 1987 EDITION (SIMILAR WORDING)

Section 6 – Planning
Specification 1.4 : Roading Plans
"*2. The relevant Regional Inventory Branch offices are responsible for the preparation of rolling two year, five year and 15 year roading plans for each supply area:*

2.1 Two Year Plan – on 1:25, 000 scale, showing incoupe roading requirements.
2.2 Five Year Plan – on 1:50, 0000 scale, showing major haul road requirements.
2.3 Fifteen Year Plan – on 1:100, 000 scale, showing likely requirements for major haul roads." (p. 14)

2. Road Construction and Maintenance
Specification 2.2 Road Construction
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 4 : Coupe Management
Specification 4.1 : Coupe Management
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
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

Section 5 : Environmental Protection

Specification 5.3 : Protection of Water
NOTE: REFER TO ENTRY UNDER 1987 EDITION (SIMILAR WORDING)

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.*

The aim of jarrah silvicultural practice is to maintain and develop forest structures which satisfy goals relating to water, timber production, landscape, wildlife conservation and other values. This specification primarily deals with practices relating to timber production and is modified by reference to detailed specifications concerning other values. (eg 5/89) Maintenance of Habitat for Hole Nesters in Timber Production Operations in the Jarrah Forest).

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
2.1Stand Objective
"*To provide for sustaining production of high quality timbers and other forest values by developing and enhancing a grouped forest structure with silvicultural objectives appropriate to the stage of development of each group.*" (p. 1)

2.2Silvicultural 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)

MINING ON C.A.L.M. – 1989

Mining on C.A.L.M. Lands Guidelines. 1989

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)

Compliance With Acts

"*5. The licencee complying with and ensuring that all persons under its control operating in the licence area are aware of and comply with the provisions of:*

(i) the Conservation and Land Management Act, 1984 and the Regulations thereunder;

(ii) the Bush Fires Act, 1954-77 and the Regulations thereunder;

(iii) the Wildlife Conservation Act, 1950, as amended and the Regulations thereunder, and

(iv) *the Country Areas Water Supply Act, 1947 and the Regulations thereunder*." (p. 2)

POLICY STATEMENT – 1988

Implementing the Timber Strategy. 1988

Securing the Conservation Estate

"*When the reserve system is completed, over 30 per cent of the forest will be in conservation reserves with A class security.*

The remainder of the forest will be managed for multiple use which will ensure that conservation, recreation, water production, as well as timber values, are maximised. In the karri forest, 50 per cent of the forest will be managed with a priority for conservation." (p. 2)

POLICY STATEMENT - 1988

Policy Statement No. 3. Dieback and Logging. Rev. 1988

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)

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)

NOTE: THE ENTRY UNDER TIMBER PRODUCTION HAS CHANGED TO INCLUDE AN ADDITIONAL OBJECTIVE (THE FINAL OBJECTIVE)

"*Prepare and implement strategies to promote and encourage development of the forest production requirements of the State.*

This will involve:
[…]

- *Re-forestation of cleared lands with hardwood forests to supplement production from native forests and to assist in soil and water conservation.*" (p. 9)

STRATEGIC PLAN – 1988?

Central Forest Region Strategic Plan. 1988?

Basic Raw Materials (Function)
Objective
"*To minimise the impact of basic raw material (gravel, sand, stone) on designated land use values on CALM land.*" (p. 50)

Strategy
"*v. Locate borrow pits wherever possible outside Nature Reserves, National Parks, stream and road reserves and away from public view.*" (p. 50)

Industry Control & Regulation (Apiarists) (Function)
Objective
"*To facilitate beekeeping subject to minimising conflict with other land use objectives.*" (p. 57)

Strategy
"[…]
v) Risk of water pollution caused by beekeepers' activities.
[…]" (p. 57)

Measure of Performance
"[…]
3. There is minimal conflict with other land use objectives." (p. 57)

W.A.W.A. & S.E.C. Hardwood Establishment (Function)
Objective
"*To successfully carry out reforestation on behalf of the WAWA and the SEC within the Wellington Catchment.*" (p. 58)

Strategy
"*i)Liaise with officers of WAWA and the SEC to ensure that the District knows which areas are to be planted at least eighteen months in advance.*

ii) Prepare an accurate soil map 12 months prior to planting.
[…]
iv) Carry out a soil survey at least 12 months in advance of planting to enable tree species to be matched to soil types.

v)Rip and/or mound all areas to control grasses and weeds prior to planting.

vi) Plant areas with allocated tree species and fertilise the seedlings.

vii)Monitor the survival of planted areas by carrying out a survival assessment the autumn following planting." (p. 62)

Measure of Performance
"*1. Survival is not adversely affected by waterlogging or weeds.*

2. All species are planted in accordance with the species selection map.

[…]
4. Areas to be planted is established by end of August." (p. 62)

Environmental Protection
Objective
"*9. To manage catchments needed for water supply so as to maintain or enhance water quantity and quality in accordance with the requirements of the Water Authority of Western Australia (WAWA).*" (p. 114)

Strategy
"*i) Continue close liaison between regional and district officers of CALM and WAWA.*

ii) As required, develop management plans for catchments jointly with WAWA.

iii) Accord the Department's land use zoning in the region with gazetted catchment boundaries and the salination risk zoning. This zoning will form the basis of all operational plans and prescriptions and will ensure that water resources conservation is the priority objective.

iv) Allow recreation on catchments to proceed as determined by the W.A. Water Resources Council.

v)Ensure that the extension of water-based recreation to other locations in catchments is consistent with the maintenance of water quality." (p. 114)

"*vi) Maintain recreation developments on water reserves and gazetted catchments.*

vii)Ensure that logging and roading prescriptions contain erosion and pollution control measures.

viii) Program prescribed burning to seasonally separate planned burns adjoining water reservoirs.

[…]" (p. 115)

Measure of Performance
"*1. WAWA satisfied with CALM management of catchments.*" (p. 114)

CODE OF LOGGING … – 1988

Code of Logging Practice. 1988

Section 7 : Environmental Protection
Water
NOTE: REFER TO ENTRY UNDER 1987 EDITION, *CODE OF HARDWOOD LOGGING PRACTICE* (SIMILAR WORDING)

OPERATIONS GUIDELINE – 1988

Guidelines for Slash Burning in the Karri Forest. 1988

4.3 Stag and Cull Falling
"[…] *Care must be taken to avoid unnecessary damage to stream, river reserves from stag falling operations.*" (p. 8)

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)

CONSERVATION POLICY - 1987

Strategies for Conservation and Recreation on CALM Lands in Western Australia. 1987

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 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:

> *manage the land vested in the NPNCA and LFC;*
> [...]" (p. 4)

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)

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 STATE'S NATURAL ECOSYSTEMS AND SPECIES BOTH TERRESTRIAL AND AQUATIC, AS WELL AS AREAS SUITABLE FOR RECREATION AND THE PRODUCTION OF RENEWABLE NATURAL RESOURCES.*" (p. 6)
>
> *This will involve:*
>
> [...]

Categorising lands and waters entrusted to the Department into priority use zones and applying the principle of multiple use to provide for the needs of nature conservation, recreation and production.

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.

[...]

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.

[…]" (p. 7)

POLICY STATEMENT - 1987

Policy Statement No. 18 : Recreation. 1987

1.5 Visitor Safety
Policy
"*1.5.9 In the interests of public health, care will be taken to protect water supplies and catchments from pollution and to provide adequate means of sewerage and garbage disposal.*" (p. 14)

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)

"*1.8.13 Power boats will not be permitted in areas where their use is not already established ...*" (p. 18)

"*1.8.14 Generally sailing boats, canoes and small rafts may be permitted in closed waters. However some areas, e.g. Lake Clifton, water supply dams, are restricted to water craft for reasons of preservation of the resource, health etc.*" (p. 19)

2.2 Boating/Canoeing/Sailing
"*The CALM Act empowers CALM as managers of land and water to determine where boating may occur on the estate which it manages. Thus CALM can direct where boating activities may occur although the Navigable Water Regulations still apply and vice versa.*" (p. 49)

Policy
"*2.2.1 Boating will be allowed on nature reserves only by way of a management plan or interim management guidelines after consideration of the likely environmental and social impacts of any activity or where there is a pre-existing arrangement/agreement in place.*" (p. 49)

"*2.2.2 Generally boating on nature reserves will be limited to those activities which are directed toward the appreciation of the natural values of the reserve.*" (p. 49)

"*2.2.3 Power boating on CALM controlled water bodies within national parks will only be permitted by way of an approved management plan. Particular consideration will be given to the environmental impacts of boats including disturbance of wildlife, fuel pollution as well as disturbance created to other park users.*" (p. 50)

"*2.2.8 Commercial interest in providing boating opportunities is high ... Commercial activities will be assessed and approved according to recreation policy statement 1.2.*" (p. 50)

2.3 Swimming
Policy
"*2.3.1 Public swimming areas may be designated subject to an assessment of the suitability of the water body to accommodate this activity being made. Such factors as the potential impact of swimming on biophysical resource values and the risk posed to public health and visitor safety will be considered.*" (p. 51)

"*2.3.2 Where major conflict between uses such as swimming, boating and fishing is likely, areas may be zoned. Zoning will be temporal, spatial or both.*" (p. 51)

"*2.3.4 Where there are concerns about water quality issues such as pollution and amoebic meningitis in designated public swimming areas, the Public Health Department or other appropriate authorities will be asked to periodically monitor and assess water quality and known dangers will be signposted as required.*" (p. 52)

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

TIMBER STRATEGY - 1987

Timber Production in Western Australia : a strategy to take W.A.'s south-west Forests into the 21st Century. 1987

Objective
"The objective of this strategy is to provide a plan for an efficient timber industry which is sustainable indefinitely. At the same time the water catchments, conservation and recreation opportunities provided by the State's forests must be protected and managed to meet the needs of all Western Australians." (p. 2)

Hardwood
The Southern Forest Region
Karri-Marri Sawlogs
"*As is proposed in the Southern Forest Region Management Plan, no timber will be removed from road, stream and river zones by clearfelling. It has been assumed, however, that the existing practice of selective cutting of these zones will continue, provided this practice is compatible with conservation and catchment protection objectives.*" (p. 38)

MANAGEMENT PLANS - 1987

Northern Forest Region Regional Management Plan 1987-1997. 1987
Central Forest Region Regional Management Plan 1987-1987. 1987
Southern Forest Regional Management Plan 1987-1997. 1987

Part 3. Land Use Classification and Management
Production
Water
"*Catchments are managed to optimise both the quantity and quality of water produced. CALM land on gazetted catchments and water reserves is jointly managed by CALM and WAWA.*" (p. 45 of *Northern Forest Region Regional Management Plan 1987-1997*)

Apiculture
Strategies
"*(i) Locate apiary sites at acceptable intervals, taking account of constraints such as:*
[...]
risk of water pollution caused by beekeepers' activities;
[…]" (p. 91 of *Northern Forest Region Regional Management Plan 1987-1997*)

Northern Forest Region Regional Management Plan 1987-1997

Production
The Resource
"*As a salinity control measure, clearing controls have been imposed by WAWA on the Helena catchment. Clearing or logging of indigenous vegetation on this catchment can only be carried out under a WAWA licence and based on guidelines relating to salinity hazard zones A, B, C and D.*" (p. 46)

Regional Strategies
"*In addition to implementing Department policies and guidelines … during the period of this plan CALM staff in the region will:*

(i) seek to comply with water purity standards required by WAWA;
[...]
(iv) consult with WAWA on other management activities likely to affect water quality and/or quantity on both CALM and WAWA lands e.g. road construction, mining other than bauxite, noxious weed control, logging intensity on forested catchments, prescribed burning;

(v) seek liaison with WAWA on proposed changes of land purpose in water supply catchments;
[...]
(vii) as required, develop management plans for catchments jointly with WAWA;" (p. 47)

Hardwood Timber
Regional Strategies
"*(iv) implement the 'Code of hardwood logging practice' and 'Manual of specifications for control of hardwood logging operations in the Northern Jarrah Forest' (CALM. 1986);*" (p. 48)

Recreation
Camping
"[…]*Backpack camping is permitted in many areas of State forest and national parks but is not allowed in nature reserves or in developed water catchment areas other than at approved sites.*" (p. 38)

Regional Strategies
"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*
[...]
(iii) liaise with local authorities and other agencies in the region over the need for, and location of, new campsites;

(iv) apply restrictions on certain activities at each site to ensure that conservation objectives are not compromised ...;
[…]" (p. 39)

Motorised Recreation
"*Car and motorcycle rallying is permitted in some areas of State forest by special arrangement with the Department, but not in national parks or nature and Water Authority reserves.*" (p. 40)

"*Car and motorcycle rallying is permitted in some areas of State forest by special arrangement with the Department, but not in national parks or nature and Water Authority reserves.*" (p. 40)

Pets
"*Pets ... are not permitted on developed catchments (W.A. Water Resources Council 1985) or nature reserves.*" (p. 41)

Swimming, Boating and Fishing
"*Important water-based recreation issues are:*
[...]
protecting the environment from damage through excessive or inappropriate use." (p. 43)

Regional Strategies
"*In addition to implementing Departmental policies and guidelines ... during the period of this plan CALM staff in the region will:*

(i) list sites at which water-based recreation does or could occur;
[...]
(v) monitor the effects of water-based recreation on the environment in and around the water body and modify plans in the light of any changes;

(vi) continue close liaison with WAWA on the issue of recreation in catchments to ensure compatibility of recreation plans with all management objectives." (p. 43)

<u>Central Forest Region Regional Management Plan 1987-1997</u>

Production
The Resource
"*In two catchments in the region, one developed (Wellington) and one undeveloped (Warren), clearing controls have been imposed by WAWA. Logging and clearing of indigenous vegetation within these catchments can only be carried out under a WAWA licence and based on guidelines relating to salinity hazard zones A, B, C and D.*" (p. 47)

Regional Strategies
"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*

(i) continue close liaison between regional and district officers of CALM and WAWA;

(ii) *as required, develop management plans for catchments jointly with WAWA;*

(iii) *accord the Department's land use zoning in the region with gazetted catchment boundaries and salination risk zoning. This zoning will from the basis of all operational plans and prescriptions and will ensure that water conservation is the priority objective;*

(iv) *allow recreation on catchments to proceed as determined by the W.A. Water Resources Council;*

(v) *ensure that the extension of water-based recreation to other locations in catchments is consistent with the maintenance of water quality;*

(vi) *maintain recreation developments on water reserves and gazetted catchments;*

(vii) *ensure that logging and roading prescriptions contain erosion and pollution control measures;*

(viii) *program prescribed burning to seasonally separate planned burns adjoining water reservoirs;*

(ix) *continue to provide an afforestation service to WAWA on the Wellington catchment;*
[…]" (p. 48)

Hardwood Timber
Regional Strategies
"*(iv) maintain the 'Code of Hardwood Logging Practice' which defines silvicultural, disease and environmental criteria for logging, within the context of CALM management policies and objectives;*" (p. 49)

Swimming, Boating and Fishing
"*Important issues with respect to water-based recreation are:*
[…]
protecting the environment from damage through over-use or inappropriate use." (p. 44)

Regional Strategies
"*In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will:*

(i) *consider existing patterns of use and potential future demand to determine which activities are appropriate for each site;*
[...]
(vi) *monitor the effects of water-based recreation on the environment in and around the water and modify plans in the light of any changes;*

(viii) *continue close liaison with WAWA on the issue of recreation in catchments to ensure compatibility of recreation plans with all land management objectives e.g Wellington Dam/Harris River development;*

[...]" (p. 44)

<u>Southern Forest Region Regional Management Plan 1987-1997</u>

Production
The Resource
"*As a salinity control measure, clearing restrictions have been imposed by WAWA on three catchments in the region, one developed (Denmark) and two undeveloped (Warren, Kent). Logging and clearing of indigenous*

vegetation within these catchments can only be carried out under a WAWA licence and based on guidelines relating to salinity hazard zones A, B, C, D." (p. 44)

Regional Strategies
"In addition to implementing Departmental policies and guidelines … during the period of this plan CALM staff in the region will, in conjunction with the Water Authority:

(i) evaluate the impact of any dam proposals on CALM lands;

(ii) manage lands to minimise impacts on water quantity and quality;

(iii) apply management strategies required to achieve Water Authority standards;

(iv) continue close liaison between regional and district officers of CALM and Water Authority of W.A.;
(v) as required, develop management plans for catchments jointly with the Water Authority of W.A." (p. 44)

Hardwood Timber
Regional Strategies
"*In addition to implementing Departmental policies and guidelines (see Appendices 1 and 2), during the period of this plan CALM staff in the region will:*
[...]
(vii) ensure that all logging and related operations conform to the 'Code of Logging Practice';
[…]" (p. 46-47)

The Special Situation of Road, River and Stream Zones
"*A system of zones along major roads, rivers and streams was developed in the mid 1970s for State forests in the Southern Forest Region. The system was incorporated into the Environmental Impact Statement (EIS) for the Marri Woodchip Project which was prepared by the Forests Department and subsequently approved by the Environmental Protection Authority. The system was designed to provide these primary values:*
[...]
buffer zones between logging areas and major watercourses;
[...]" (p. 10-11)

"*During the period of this plan it is proposed that an intensive review of road, river and stream zones in the region will be undertaken with the objective of improving their efficiency in providing amenity, wildlife habitat and stream protection. Commitments with respect to the review are:*

> *No changes will be made to the existing system without evaluation and approval by the Environmental Protection Authority. The new system will include a provision that road, river and stream zones will not be subject to clearfelling.* [...] *selective cutting in the zones, which has been practised throughout the period since the EIS was approved, will continue.*
>
> *There will be no decrease in the area of the existing road, river and stream zones."* (p. 11)

Recreation – Day Use
Regional Strategies
"*(vii) minimise impacts of recreation activities on ecological and aesthetic values.*" (p. 39)

Swimming, Boating and Fishing
"*Important issues with respect to the management of water-based recreation are:*
[...]
protecting the environment from damage through over-use or inappropriate use." (p. 40)

Regional Strategies
"*In addition to implementing Departmental policies and guidelines ... during the period of this plan CALM staff in the region will:*
[…]
(ii) determine which activities are appropriate for each site;
[...]
(v) monitor the effects of water-based recreation on the environment in and around the water body and modify plans as necessary;

(iii) continue liaison with the WAWA on the issue of recreation in catchments." (p. 42)

MANAGEMENT PLAN – 1987

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.*" (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.
[…]
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 –*

- *The Shannon Park contains the most protected watershed in the State's south-west and the largest contiguous area of karri forest reserved for conservation.*

- *The four main rivers (Donnelly, Warren, Gardner and Shannon), plus other minor rivers and streams which flow through the Parks, are of great conservation and recreation value. In addition, between them they have an estimated potential yield for water supply of 680 million cubic metres per annum. This yield represents 45% of the divertible potable water resources that remain undeveloped in the south-west region.*" (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:
[…]
2.Protect and preserve the surface waters and groundwaters of the Park, in terms of both quantity and quality." (p. 48)

2.0 Land Tenure
2.1 National Park Status
Objective
"*1. To complete reservation of the Shannon and D'Entrecasteaux National Parks.*" (p. 54)

Prescriptions
"*3. The government will declare the Shannon Basin a national park. As the philosophy behind its declaration was the setting aside of a complete watershed within a conservation area, the boundaries will follow the boundary of the Shannon Basin watershed, not existing linear cadestral features (as is the case within many other reserves) (Map 2). Gazettal as national park will be preceded by revocation of the State forest that occupies the northern three-quarters of the Basin, and cancellation of part of Sir James Mitchell National Park (Class A).*" (p. 55-56)

3.2 Water Resources
Objectives
"*1. To protect the water resources of the Parks from changes to quantity, quality and seasonality.*

2. To protect water bodies with high conservation values from disturbance by recreational use (eg. Lake Maringup, Lake Quitjup, Charley Lake).

3. To facilitate recreational use of other water bodies without endangering their quality.

4. To ensure that, as far as possible, activities outside the Parks do not harm the water resources of the Parks." (p. 65)

Background
[…] *… one of the main aims of reservation of the Shannon watershed was to maintain in as pristine a condition as possible one major south-western river and catchment system.*

The water resources of the Shannon and D'Entrecasteaux are important for three reasons. They are vital in regard to the creation and maintenance of the Park's biotic system, they play a significant role in recreation within the Parks and they are of considerable regional significance in their potential for development for public water supply purposes." (p. 65)

"*Maintenance of water quality and quantity is fundamental for the protection of the Park's values. Water quality parameters of greatest importance are salinity, nutrient loading (especially phosphates and nitrates) and turbidity. Water quantity is important with regard to both the seasonal flow and fluctuation, and the absolute volume.*" (p. 66)

"*Any change in the quantity or seasonality of the water passing through the Parks must affect the biological and physical systems of the Parks.* […] *These changes could result from the diversion of water from or to the Parks' water systems or through land management practices in their catchments.*

Management actions within the Parks can also affect water quality. Road building and use, particularly across or near streams or lakes, can yield eroded material which will increase salinity, nutrient loading and sedimentation. […] *Infecting areas within or outside the Parks with Phytophthora cinnamomi (such as through the use of infected gravel for road building) can result in water bodies and especially wetlands becoming affected.*

Recreational use of water bodies has a number of direct effects on water quality. These include fuel and oil spillage from motors, erosion of stream-banks by boat wash or launching, and introduction of aquatic weeds. Land-based facilities and activities associated with the use of the water bodies can also affect water quality through pollution and erosion from facilities, roads and other developments close to the water body (eg. camp grounds, toilets, picnic grounds). Activities that are essentially land-based can also affect water quality (eg. activities leading to changes in plant cover in catchment areas)." (p. 66)

"*A number of potential dam sites on the Donnelly, Warren and Gardner Rivers and their tributaries, located just upstream of the D'Entrecasteaux, have been identified by the Water Authority (Map 5). A potential dam site on the upper Shannon and potential pipehead development in the lower Shannon have also been recognised.* […]

No major developments are proposed in the next 20 to 30 years. However, sufficient time must be allowed to conduct detailed and extensive studies prior to any development proposal being made available for public comment." (p. 67)

Prescriptions
"*1. Park management will be directed towards protection of the hydrologic systems and water resources of the Parks. These will be protected from damage, disturbance, infection and changes in quantity and quality.*

2. Any major development for water supply will require environmental assessment according to the Environmental Protection Act (1986).

3. The provision of recreational opportunities will take into account the need to protect the water resources of the Parks. Appropriate location, construction and use of facilities will be used to minimise potential impacts.

4. Recreational use will not be facilitated on water bodies within areas containing rare, endangered or fragile plant communities (Map 8) or on Lake Maringup, Lake Quitjup and Charley Lake.

5. Recreational use of water bodies will be permitted and where appropriate facilitated provided that it does not endanger water quality. However, power boats will not be permitted on water bodies unless other factors are of overwhelming importance.

6. In consultation and with the assistance of the Water Authority, efforts will be made to ensure that activities outside the Parks do not harm the water resources of the Parks. This will require liaison with other government departments, local government and landowners." (p. 67)

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)

"[…]
10. To maintain the quality of water resources.
[…]" (p. 76)

GUIDELINES - 1987

Northern Forest Region Regional Management Plan 1987-1997. 1987
Central Forest Region Regional Management Plan 1987-1987. 1987
Southern Forest Regional Management Plan 1987-1997. 1987

Appendix 2, Departmental management guidelines
Catchment management
Objective
"*To manage catchments needed for water supply so as to maintain or enhance water quantity and quality in accordance with the requirements of the Water Authority of Western Australia (WAWA).*

Specifically, the aim is to:

protect existing healthy vegetation from agents that might lead to deteriorate of water quality;

rehabilitate degraded areas to ensure water quality is maintained or restored;

regulate other uses of gazetted catchments when they compete with water supply objectives;

monitor the quality of streams where changes in land uses are involved;

investigate techniques of land management with the aim of maximising water supply without detrimentally affecting quality;

liaise with water supply authorities (WAWA) concerning all aspects of water supply and any new management practices proposed;

ensure that CALM plans allow for new dams and major supply facilities proposed by WAWA." (p. 87 of *Northern Forest Region Regional Management Plan 1987-1997*)

Strategies
(i) *Direct management of salt-sensitive areas to establish and maintain a deep-rooted perennial crop, and restore vegetation cover as quickly as possible where it is removed.*

(ii) *Design harvesting and silvicultural practices to increase water quantity while protecting water quality.*

(iii) *Protect and maintain stream reserves.*

(iv) *Keep road construction and maintenance to a standard necessary for catchment protection."* (p. 87 of *Northern Forest Region Regional Management Plan 1987-1997*)

"*(v)* *Minimise the spread of dieback disease, particularly in salt-sensitive areas.*

(vi) *Continue prescribed burning on catchments in such a way as to minimise turbidity and ash pollution and to regulate run-off.*

(vii) *Manage existing land uses on catchments to minimise the risks of siltation, turbidity, salinity and biological pollution.*

(viii) *Avoid land use changes where they prejudice water values or potential storage sites.*

Plan recreational activities on catchments according to guidelines prepared by the Western Australian Water Resources Council." (p. 88 of *Northern Forest Region Regional Management Plan 1987-1997*)

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 -

[…]

(e) stream, amenity and road reserves

[…]" (p. 1-2)

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)

[…]

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

Low: water production

Moderate: timber production, recreation

High: catchment protection." *(p. 12)*

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:-

[…]

* *avoid stream reserves, except for stream crossings*

[…]

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)

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*
[…]	[…]	[…]	[…]	[…]
Major stream Crossings	*See (c) below*	*See (c) below*	*To be avoided*	*To be avoided*
[…]	[…]	[…]	[…]	[…]

(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.*

[…]

* *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* […]." (p. 20)

(d) Off-Shoots:

* *Off-shoots must be sufficient in number to prevent table drain erosion.*

[…].

* *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.*

[…]." (p. 21)

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.*
[…]
* *Pits must not be located in areas likely to create severe drainage and/or erosion problems particularly if rehabilitation is likely to be delayed.*
[…]
(p. 23)

Section 4 : Coupe Control
Specification 4.1 : Coupe Demarcation
"*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 ***River and Stream Reserves***
General:-
- *Width of river or stream reserves is dependent on vegetation type, slope and susceptibility of the soil to erosion.*

- *A river or stream reserve is measured from the outside edge of the stream zone vegetation.*

In Woodchip Licence Area:-

- *Width of river reserve is 200m on each side of river.*

- *Width of stream reserve is 100m on each side of stream.*

Elsewhere:-

- *For all second or third order watercourses within 3km 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. (See Fig.4.1.1 for explanation of stream orders).*

- *For watercourses 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. 40-41)

Specification 4.2 : Falling (Including Tree Marking Techniques)
"*5. Trees leaning into road, stream or amenity reserves must not be felled unless specifically indicated for removal by a Forest Officer.*" (p. 46)

Specification 4.3 Extraction
"*9. No extraction machine may enter a road, stream or amenity reserve without the specific approval of a Forest Officer.*" (p. 49)

Section 5 : Environmental Protection
Specification 5.3 : Protection of Water
"*1. Many catchments in the Northern Jarrah Forest are harnessed, that is the water from such catchments is collected in man-made reservoirs for industrial and/or domestic use. It is therefore essential that effective water protection measure are undertaken during all phases of logging in the NJF.*

2. During logging operations measures must be taken to protect water from unnatural increases in:
(i) salinity (the salt content of water)
(ii) sedimentation (the deposition downstream source of disturbance, of material across the full range of particle size)
(iii) siltation (the deposition of particles larger than clay but smaller than sand)
(iv) turbidity (discolouration of water due to suspended silt clav or organic matter)

3. Water protection measures are necessary during:
(a) planning (specifications 1.1 and 1.3)
(b) road construction and maintenance (specifications 2.2 and 2.3)
(c) gravel pit working and rehabilitation (specification 2.4)
(d) coupe demarcation (specification 4.1)
(e) extraction (specification 4.3)
(f) haulage (specification 4.4)
(g) protection of soil (specification 5.2)

CALM staff and industry personnel must be totally familiar with the requirements for protection of water as detailed the above specifications.

4. No roading or logging may take place within 500m of the high water mark of any reservoir without prior notification of the relevant Water Authority." (p. 86)

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)

7.32 Water

"*An Operator shall take any special measures prescribed by the Forest Officer in Charge for the protection of water purity in water courses in or adjacent to hardwood forest areas in which he is working.*

7.33 An Operator shall ensure that no logging machinery or vehicles enter stream reserves, unless authorised by a Forest Officer.

7.34 All culverts and road drains shall be kept clean of soil, slash or other debris likely to obstruct the flow of water. Damage caused to roads by a failure to carry out this instruction will be regarded as damage covered by clause 2.8." (p. 26)

OPERATIONS MANUAL - 1987

Southern Forest Region Operations Manual. 1987

Slash Burning Prescription Preparation – Karri

Scope

"*This prescription describes the procedures for preparing slash for burning (from Karri Logging Operations) and is applicable to either clear felled or seed-tree areas.*" (p. 41)

Objectives

"*2.1 To produce suitable seed bed for natural or artificial regeneration.*
1.2 To induce seed fall from seed trees.
1.3 To remove logging residues, so as to allow safer access for planting operations and reduce future damage to future crop trees.
1.4 To meet these objectives, using the maximum fire intensity possible, within control, safety, and cost guidelines." (p. 41)

Technique (Office)

"*4.2 On your plan indicate:-*
[…]
d) Stream Reserves, Water Reservoirs.
[…]." (p. 41)

Technique (Field)

"*5.1 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:-*

a) Topography
b) Road construction/improvement requirements (for burning, plus future planting and protection needs).
[…]
c) Locations where edges to be pushed in (advance mopup) – where no burn or high value areas are adjacent.
d) Water supplies (existing and proposed).
e) Danger points (for vehicles or lighters).
f) Slash component – age, density, arrangement, type etc
g) Consider desirable wind direction, lighting pattern/method, and burn quality required. Commensurate with season desired.
h) Stag falling requirements (within coupe and buffer).
i) Location/s of control points.
j) Special areas in buffers requiring protection (karri pole stands etc).
[…]

l) Environmental problems – permanent creeks, steep slopes, phytophthora (dieback) occurences.
m) Any log salvage within buffers.
n) Consider season of burn and timing of buffer burns.
[…]
p) Problem areas (dense gullies near boundaries).
q) Fuel sampling within buffers.
r) Allocate tentative sectors along boundaries." (p. 43)

Water Point Construction and Maintenance
7.2 Active Sites
"*7.2.1 As described above, active sites are those which abut running water courses. Because of this most points will therefore be located in stream reserves so special care needs to be taken to avoid damage which may lead to siltation or turbidity of the water course.*

7.2.2 Constructing access to water courses as above means basically clearing sufficient maneuvering room for trucks, but leaving a 1 metre strip along the water course boundary along which the bedlog is positioned to prevent erosion etc. Pushing growing trees is only possible after permission from Regional manager.
[…]" (p. 99)

Standards for Coupe Preparation for Karri Regeneration
4.7 Stream & Road Reserves
"*Under normal circumstances these reserves must not be burnt out as a buffer adjacent to a slash burn unless exceptional circumstances dictate and then only with the permission from Regional Manager Southern Region.*

However in some instances, even with the best preparation and the utmost care during the lighting of the slash hopovers may occur into these reserves. In this situation, prior preparation of tracks on the opposite side of the reserves (at the prescribed distance from the stream/river) is good insurance. Burning out of a stream reserve to this track following multiple hopovers may be preferable to suppression activities in the reserve with heavy machinery." (p. 127)

Maintenance of Access for Fire Control
3.3 Drainage
"*It is essential that effective drainage maintenance be practiced. […] Turbidity of adjacent waterways is to be avoided also for obvious reasons.*

To effectively drain road surfaces, off shoot drains at the required spacing and sufficient culverts (frequency of both depends on slope).

Off shoot drains must only have sufficient fall to the outlet end to allow water to decelerate before it discharges into a filtering medium (litter, tops, scrub etc). This will allow soakage into the soil and thus avoiding turbidity in adjacent streams and soil erosion. […]" p. (170)

Access Construction for Blackberry Control Work
1.Scope
"*These guidelines refer to access construction work which may be required to enable control work to be carried out on thickets of blackberries in the Southern Forest Region. They apply whether the work is done by the Department of C.A.L.M. or by a contractor on our behalf.*" (p. 172)

2. Objective
"*To ensure access tracks for blackberry control work are environmentally acceptable.*" (p. 172)

3.1 Overall Principle
"*Thickets of blackberries which would necessitate access construction to do control work normally occur in environmentally sensitive zones ie: along rivers and streams. These zones are often protected from other*

operational activities consequently it is illogical to create disturbance without a very compelling reason. As a rule the construction of mineral earth access tracks for blackberry control is to be minimised." (p. 172)

3.4 Construction of Mineral Earth Access
"*If such access is required the following will apply:-*
[…]
c) Wherever possible no access to be constructed where there is a risk of winter flooding covering it.
d) No access to be closer than 10 metres to the stream edge.
e) Erosion control barriers to be installed according to Item 16 of the Industry Control Manual.
[…]" (p. 173)

Appendix 2 : Prescription For Industry Roading
"*6. Planning and implementation of each creek crossing will be prescribed in detail to minimize siltation from run-off from roads and drains.*

6.1 Borrow areas for fill to be approved and will not be closer than 20m from creek. Water draining from borrow pits to be directed into a silt trap or vegetation filter strip.

[…]
6.3Table drains to turn water off at regular intervals and silt traps to be installed at all creek crossings.

6.4 Fill be consolidated to minimise erosion of fill and risk of slumping.

6.5 Batter of large fills to be terraced and revegetated. Rocking will be prescribed where necessary.

6.6 Machine activity in the watercourse will be minimised. No heaps of debris within 40m of the creek.

[…]
10. Maintenance. Whilst roads are still being used for log hauling the Industry will maintain them. Pipes to be cleaned out regularly. Silt traps to be cleaned out when required." (p.176)

CORPORATE MISSSION AND OBJECTIVES - 1986

CALM Annual Report 1st July 1985 to 30th June 1986. 1986

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.*

Conservation

> *To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.*" (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.*

[…]

To achieve the primary objectives the Department will:

Provide an effective administrative framework for the conservation of wildlife throughout the State and the management of lands, waters and natural resources entrusted to the Department.

This will involve:

- *The maintenance of a Policy Directorate to establish, review and refine Departmental aims, policies and priorities; to monitor the implementation of management plans; and to see that goals are achieved.*
- *The maintenance of an operations wing to implement policies and management plans and to set up efficient financial, administrative and management systems.*" (p. 9)

"*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:

- *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. "* (p. 10)

[…]

- "*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)

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)

POLICY STATEMENT - 1986

Policy Statement No. 14 : Weeds on CALM Land. 1986

Strategies
"*4.8 The Water Authority will be advised one month before any spraying is undertaken in a water supply catchment.*" (p. 3)

POLICY STATEMENT - 1986

Policy Statement No. 3. Dieback and Logging. Rev. 1986

3. Forests North of the Preston River ...
Comment
"*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)

STRATEGIC PLAN - 1986

Strategic Plan : Southern Forest Region. [1986]

3. Regional Strategic Objectives
3.1 Biophysical Resources
Hydrology
"*To protect, control and rehabilitate land which contributes to the water supplies of the State. Minimize changes in quality, quantity and seasonality of water resources. Ensure that provision of recreational opportunities takes account of the need to protect water resources*" (p. 3?)

Hardwood Timber Production
Key Area : Water Quality
Objective
"*1. Maintain integrity of defined river and stream reserves. (Width, lack of disturbance, unburnt condition).*

2. Install additional buffers or special care zones on sensitive watercourses.
Maintain streamside vegetation free of unnecessary disturbance by logging equipment." (p. 24?)

Measure of Performance
"*1. Prescribe conditions for all temporary stream fills and permanent stream crossings.*" (p. 24?)

MANUAL OF SPECIFICATIONS … 1986

Manual of Specifications for Control of Hardwood Logging Operations in the Northern … 1986

"*3.Plans covering the first two years of the five year plan (Two Year Logging Plan) shall wherever possible include the following individual plans:-*" (p. 3)
"i*) Logging plan – highlighting the following information –*
[…]
(e) stream, amenity and road reserves
[…]" (p. 4)

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*

[…]

3.The exact alignment of proposed new roads must be approved by the District Manager. […]" (p. 24)

Specification 2.2 : Road Construction

"*(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 to 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 of watercourse.*
* *A compacted, gravel payment must be cleared on both sides of stream crossing (In some specific instances this may have to be sealed.)*" (p. 26)

"*(d) Off-Shoots:*

[…]

* *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 2.4 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).*

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.*

[…]

* *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.*

[...]." (p. 29)

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
"*9. No extraction machine may enter a road, stream or amenity reserve without the specific approval of a Forest Officer.*" (p. 43)

Specification 5.3 Protection of Water
"*1. Many catchments in the Northern Jarrah Forest are harnessed, that is the water from such catchments is collected in man-made reservoirs for industrial and/or domestic use. It is therefore essential that effective water protection measures are undertaken during all phases of logging in the NJF.*

1. During logging operations measures must be taken to protection water from unnatural increases in:
(i) salinity (the salt content of water)
(ii) sedimentation (the deposition downstream from a source of disturbance) of material across the full range of particle size
(iii) siltation (the deposition of particles larger than clay but smaller than sand)
(iv) turbidity (discolouration of water due to suspended silt, clay or organic matter)

2. Water protection measures are necessary during:
(a) planning (specifications 1.1 and 1.3)
(b) road construction and maintenance (specifications 2.2 and 2.3)
(c) gravel pit working and rehabilitation (specification 2.4)
(d) coupe demarcation (specification 4.1)
(e) extraction (specification 4.3)
(f) haulage (specification 4.4)
(g) protection of soil (specification 5.3)

CALM staff and industry personnel must be totally familiar with the requirements for protection of water as detailed in the above specifications.

4. No roading or logging may take place within 500m of the high water mark of any reservoir without prior notification of the relevant Water Authority." (p. 71)

POLICY - 1985

Forests Department Annual Report 1 July 1984 to 21 March 1985. 1985

NOTE: REFER TO ENTRY UNDER 1982 EDITION, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

MANAGEMENT PLAN – 1985

Northern Forest Region : Working Arrangements and Management Program. 1985

"*The objectives for land management in the Region will broaden as the new Department of Conservation and Land Management develops policies and management plans. In the interim it is important the Region establishes its goals and strategies and arrangements for management of personnel and land so that morale is maintained and work programmes proceed to schedule.*

This document provides those interim goals, strategies and arrangements." (p. 1)

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:*

- *Water Supplies: To protect, control and rehabilitate, where necessary, those forest areas that contribute to the water supply requirements of the State.*

[…]" (p. 23)

5.1 Regional Objectives
State Forest and Timber Reserves
Water Production
"*Most indigenous forest in the Region is harnessed water supply catchment. (Mundaring Weir, Canning, Serpentine, North Dandalup dams). Important underground supplies are tapped from Gnangara plantation. All activities must therefore be compatible with maintaining water quantity and purity.*" (p. 25)

Objectives
- "*Department G.W.P. 87. Protect healthy catchment, rehabilitate degraded catchments, regulate forest use to protect water quality, monitor water quality, maximise water supply and liaise with water authorities.*

- *Region. Ensure adequate communication between water authority experts and District staff on operations requirements.*" (p. 26)

Strategy
- "*Prepare rehabilitation programmes in conjunction with water authorities e.g. planting P.W.D. Lands at Mundaring.*

- *Ensure water quality protection measures are built into operations prescriptions for logging, mining etc.*

- *Provide water authority representation on Regional Committees developing operations procedures on catchment land e.g. M.O.G.*

- *Identify specific water management costs and arrange a budget and joint funding.*" (p. 26)

6. Industry
Hardwood Logging
Objectives

- "[…] *Reaccess* [sic] *logging prescriptions for applicability to major land use e.g. level of cut in saline zone of harnessed catchments.* […]" (p. 33)

LEGISLATION - 1984

Conservation and Land Management Act. No. 126 of 1984

"*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 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)

POLICY - 1984

Forests Department Annual Report 1984. 1984

NOTE: REFER TO ENTRY UNDER 1982 EDITION, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

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 stream and underground water pollution in all domestic water supply catchments and borefields;*" (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:*
[…]
<u>Water Catchment Area</u> – most of the Northern Jarrah Forest is harnessed for water supply and subject to catchment regulations (Map 4). A number of other areas are classified as future water reserves. In the Wanneroo area, the majority of State forest is included in the Gnangara Water Reserve and some of this area is subject to underground pollution control by-laws.

In the absence of any detailed local data on the effect of water recreation on water quality, the water authorities have adopted a cautious approach to recreation on forested catchments. Current recreation management policies are based on the type of water use (domestic or irrigation) and the distance from the reservoir.

The W.A. Purity of Water Advisory Committee has proposed subdivision of Northern Region catchments into 'recreation zones'. This zoning concept has been submitted to the System 6 Study and is accepted as an interim working arrangement between various authorities. These zones are defined in Appendix C as are the recreation uses currently permitted in each." (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.*

Successful implementation of the zoning strategy hinges on 3 factors. These are …
- *that the allocation of activities to areas is realistic in providing environments satisfactory to user groups;*
- *that users are made fully aware of why and where specified use areas have been allocated. This requires a comprehensive visitor information and education programme;*
- *that access and facilities are planned and located so as to encourage the type(s) of activities considered most suitable for a particular area or zone.*" (p. 37)

9.2.3 Dissected River Valleys
Unit Description
"*This use pressure is likely to increase and is a special problem which must be addressed in the divisional recreation plan.*" (p. 41)

Management Strategy
"*This unit is an example of a recreational environment in which zoning has direct application. If increasing user conflicts and environmental degradation are to be minimised, then the valley systems will need to be carefully zones and managed for a particular range of recreational activities.*" (p. 41)

The Specific Management Strategies are:
- "*to tightly control vehicular access. Consideration will be given to closing existing tracks and river access points where these are resulting in high levels of site disturbance;*
- *to upgrade existing sites and provide new facilities which are designed to sustain high levels of recreational use;*
- *to identify designated sites for tent camping.* […]
- *to protect conservation values and discourage any land use activities which could significantly detract from the valley landscapes;*
- *to actively discourage all forms of off-road vehicle activity through signposting and where funds are available, patrols of sensitive areas.*" (p. 41)
- "*to continue discussion with relevant water supply authorities regarding possible future recreational use and development of valley systems such as the Helena, Canning, Serpentine and South Dandalup which have already been dammed.*" (p. 42)

9.2.4 Uplands Management Unit
"*The Specific Management Strategies are:*
- *to seek endorsement (concurrence) of water supply authorities for a range of activities that include picnicking, bushwalking, orienteering, back pack camping and sightseeing, at least on an experimental basis, to facilitate a co-ordinated study of pollution risks, …*" (p. 42)

9.2.6 Eastern Woodland Management Unit
"*The Specific Management Strategies are:*

[…]

- *to identify areas where trial/trial bikes and formal motor rallies might be conducted without jeopardising water quality or flora and fauna values.*

[…]" (p. 44)

9.2.7 Reservoir Management Unit

"*Unit Description: This unit includes all reservoirs and pipehead dams and their immediate catchment areas as included in Zone 1 of the Water Purity Advisory Committee Report. As indicated previously, most major river systems in the region have been dammed for water supply purposes so that this unit occupies what were formerly dissected valley zones plus much of the adjoining uplands.*" (p. 44)

"[…] *Under current restrictions, all water-contact activities are prohibited and land-based forms of Zone 1 (refer to Appendix C for details). Control is patrolling and the closure of some roads.* […]" (p. 45)

"*The Specific Management Strategies are:*

- *to co-operate with the relevant Water Supply authorities in any joint research and monitoring programmes, the primary objective of which will be to study what risks various types and levels of recreational activity pose to water quality, …*" (p. 45)

POLICY - 1983

Forests Department Annual Report 1983. 1983

NOTE: REFER TO ENTRY UNDER 1982 EDITION, SIMILAR WORDING FOR ANNUAL REPORTS FOR 1983, 1984, 1985

GUIDELINES – 1983

Guidelines for Slash Burning in the Karri forest. 1983

4.3 Stag and Cull Falling

"[…] *Care must be taken to avoid unnecessary damage to stream, river reserves from stag falling operations.*" (p. 8)

GUIDELINES – 1983

Dieback Review 1982 : Seven Way Test Guidelines. 1983

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:*

[...]
Catchment Protection
Water Production
[...]

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 can 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.
[…]" (p. 19)

HANDBOOK – 1983

Bauxite Mining : Northern Jarrah Forest : Mining Operations Handbook 1. Ed. 2. 1983

NOTE: REFER TO ENTRY UNDER EDITION 1981 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
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:-

2.1 Water Values: to ensure that mined areas provide acceptable water quality and quantity.
[…]" (p. 2)

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:-*
[…]
- *Water management systems and water course protection.*
- *Land use priorities.*

[…].

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)

7. Water Management
"*7.1 Careful water management must be considered in every phase of the operation from initial clearing and road construction through to completion of rehabilitation.*" (p. 9)

7.3 Criteria for Success

"*Irrespective of the system which is used, it must satisfy the following basic criteria:-*

- *there must be minimum topsoil erosion within pits;*
- *the system must meet standards of stream turbidity, salinity and biological purity prescribed by the appropriate water supply authority;*
- *there must be no long term ponds of water lying either within or below pits or roads;*
- *the need for long term maintenance must be minimal.*
- *peak flood levels (as prescribed by the water authorities) must not emanate from mined over catchments.*" (p. 9)
- "*the system must be acceptable in terms of costs, aesthetics and land use priority.*" (p. 10)

Water Management Systems

"*7.5 In catchments where <u>water retention and infiltration</u> is prescribed, this will be achieved by:*

(ii) *infiltration and silt trapping in the contoured rip lines and*

(iii) *collection of overland flow either in a series of mid-slope contour banks and a pit bottom sump or by a system of grade discharge banks directing overland flow to predetermined sump areas within the pit.*

Each sump must have the capacity to cope with the runoff from a 10 day 15 year storm event as calculated from meteorological records and mine pit characteristics. This design will be based on an accepted hydrological model with an appropriate safety factor of 2.

[…] *Where specified contour interception banks must be provided with suitably constructed overflows and non-erodable spillways. Construction of these devises must be completed before the first autumn rains.*" (p. 10)

"*Where grade discharge banks are used, these will comprise stabilized waterways which direct water to detention sumps within the pit. Sump and drain locations will be indicated on the conceptual rehabilitation plans.*

<u>Note</u>: It is recognized that the use of a water retention system may give rise to prolonged pools or saturated zones within or just below pits, and this does not conform with one of the success criteria for water management.

7.6 In catchments where the discharge of water is prescribed, water management will be achieved by:

(i) *infiltration and silt trapping in the contoured rip lines and,*
(ii) *control of overland flow by grade banks and slow release detention ponds or filter systems.*

Each slow release detention pond or filter system must have the capacity to handle the run-off from a 15 year storm event, as calculated from meteorological records and minepit characteristics. Stable overflow sections are to be provided so that more extreme run-off events will not cause severe erosion or damage.

This requires the installation of adequate grade banks approximately along each 10m vertical contour within each pit, and the construction of a discharge system at the bottom of the pit. This discharge system must adequately filter the water and must be so constructed to avoid saturation or erosion of jarrah forest downslope of the pit.

7.7 Drainage from mine access roads, haul roads or from pits must not flow into unmined jarrah forest, but must be channelled (via ponds or filters) directly into water courses.

7.8 All erosion control earth works must be completed and effective before the first Autumn rains (ie. generally before 30th April each year).

"*Standards will be monitored and remedial action specified using an Inspection and Action Checklist (APPENDIX II).*" (p. 11)

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 FIRS 1 – *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'.

(iii) Mark for retention and ensure full protection of sound, healthy dieback tolerant species such as marri, wandoo or blackbutt. Retain advanced regrowth and saplings of dieback tolerant species. Retain sound healthy sheoak, particularly on sites which will not be planted.

[…]
(v) Bulldoze or fell those trees not marketable or marked for retention, and stack into heaps at regular intervals to create ashbeds. […]

Carry out erosion control on all unwanted roads, tracks, landings and pits. Drainage must not empty into DBF forest.

(vi)Scarify harsher compacted sites (to improve seed germination) prior to sowing.

(vii) Burn the heaps at the most convenient time.

(viii) Sow leguminous understorey species in late May at rate of 0.5 kg per hectare bulked with 450 kg/ha of superphosphate." (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.

(ii) Select promising sites (i.e. not massive ironstone or caprock) and plant small groves or clumps of E. wandoo, E. resinfera or E. patens. […]" (p. 6.4)

"*4.3 FIRS 3 - *Water Production MPA*
** Other forest (i.e. not advanced dieback).*

These are stands where the overstorey has not suffered extensive mortality. […]" (p. 6.5)

"*General*
The optimum means 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) If it is an even-aged 'pole' stand:*

- 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) If it is not a 'pole stand':*
- 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 essential 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)

4.6 FIRS 6 : Influcent (Stream) Zones
Stream Zones in Water Production MPA

"*(i) Define according to vegetation – e.g. adjacent to stream and carrying bullich, blackbutt with ti-tree understorey*

(ii) Demarcate with blazed or flagged line where required.
(iii) If specific fire treatment necessary, install temporary fireline.
(iv) Inspect for man-made features (such as gravel pits, roads, earth dumps) which may contribute to stream turbidity. If located prescribe erosion control measures – e.g. cross drains, sumps, seed bed preparation and apply seed.
(v) Protect from fire for 2 years before mining adjacent areas and at least 5 years subsequent." (p. 6.7)

Stream Zones in Recreation MPA
"*Apply all measures listed above. In addition, the following will be undertaken.*

Survey recreation facilities within the stream zone (e.g. picnic site, walk trail) and ensure:

- *Dead or dangerous overhanging trees are felled.*
- *Special attention is given to erosion control away from car parks and access roads.*
- *Limited hazard reduction burning is programmed to prevent dangerous hazard adjoining picnic areas.*" (p. 6.8)

Implementation
"*5.1 Annual FIRS works programmes will be drawn up each year in accordance with approved mining plans and available finance. The 'FIRS Year' is regarded as running from the end of one planting season to the end of the next. Each annual plan will be subject to endorsement by Alcoa.*" (p. 6.8)

"*5.3 The following priorities apply:*

1. *Carry-over areas from previous year.*
2. *Banksia control, autumn burn and drainage improvements in DB Free or lightly affected stands.*
3. *Rehabilitation of advanced dieback in pipehead catchments.*
4. *Other rehabilitation.*

5.4 The Regional Leader will review progress monthly through the year in each Division to ensure that programmes are completed according to prescription and budgets not over-spent.

5.5 The Regional Leader will prepare a report for Alcoa at the completion of each financial year which will describe: areas treated, costs and treatments used." (p. 6.8)

"*5.6 Completed work is to be recorded in detail in the H.O.C. System (or on 1:10, 000 scale plans in the divisional office until the H.O.C.S. is operational).*" (p. 6.9)

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)

POLICY - 1982

Forests Department Annual Report 1982. 1982

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)

WORKING PLAN - 1982

Working Plan No. 87 1982. Part I, General Working Plan for State Forests in Western Australia. 1982.

Resource Management
Management Objective
"*To manage State forest catchments needed for water supplies so as to maintain or enhance water quantity and quality in accordance with the requirements of water supply authorities.*" (P. 23)

Policy
"*(1)Protect existing forested catchment areas from agents that might lead to deterioration of water quality.*

(2) Rehabilitate degraded areas where necessary to ensure that water quality is maintained or restored.

(3) Regulate all other uses of forested catchments when they compete with water production objectives.

(4)Liaise with water supply authorities to ensure that the water quality of streams is monitored where changes in land use are involved.

(5) Investigate techniques of land management with the aim of maximising water supply without detrimentally affecting quality.

(6) Liaise with water supply authorities concerning all Departmental matters affecting water supply and any new management practices proposed." (p. 23)

Strategy
"*(1) Direct forest management on salt-sensitive areas towards maintenance of a deep-rooted perennial crop and to restore vegetation cover as quickly as possible where it is removed by dieback disease or other causes.*

(2) Design harvesting and silvicultural practices to increase water quantity whilst protecting water quality.

(3) Keep road construction and maintenance to the standard necessary for catchment protection.

(4) Minimize the spread of dieback disease particularly where any activities occur on salt-sensitive areas.

(5) Continue prescribed burning on catchments in such a way as to minimize turbidity, ash pollution and salinity and to regulate run-off.

(6) Manage existing land uses on catchments to minimize the risks of siltation, turbidity, salinity and biological pollution.

(7) Avoid land use changes where they prejudice water values or potential storage sites." (23)

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)

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
"*3.1 A Land Use Management Plan (LUMP) has been drawn up allocating each part of the Northern Region (with the exception of Wanneroo Division) to one or more of the management priorities listed below:-*

a) Catchment protection
b) Water production
[…]

The following activities and land uses are also covered:-
[…]
i) Water storage
[…]

3.2 For each primary land use, secondary uses (largely compatible with primary land use) and tertiary uses (permitted only as long as there is no permanent interference or significant harm to the primary use) have been specified." (p. 1)

Regulation of the Harvest
7.1 Water
"*The Forests Department responsibility is to manage the catchments which occur on State forest in accordance with the reasonable requirements of the water supply authorities. For further details see Part 1 of the G.W.P. and the LUMP.*" (p. 4)

General Prescriptions For The Whole Central Region
"*3. LAND USE*

3.1 A Land Use Management Plan (LUMP) has been drawn up allocating each part of the Central Region to one or more of the management priorities listed below:-
[…]
d) Water Production
e) Catchment Protection
[…]

The following activities and land uses are also covered in the Land Use Management Plan:-
f) Mining (followed by recreation, water production, timber production, etc.)
g) Water Reservoirs
h) National Parks
i) Proposed National Parks
j) Communications, Service Facilities (roads, railways, S.E.C. lines etc.)

3.2 For each primary land use, secondary uses (largely compatible with primary land use) and tertiary uses (permitted only as long as there is no permanent interference or significant harm to the primary use) have been specified." (p. 1)

Regulation of the Harvest
"*7.1 <u>Water</u>*
The Forests Department responsibility is to manage the catchments which occur on State forest in accordance with the reasonable requirements of the water supply authorities. For further details see Part 1 of this GWP and the L.U.M.P." (p. 4)

General Prescriptions For The Whole Southern Region
"*3. LAND USE*
3.1 A Land Use Management Plan (LUMP) has been drawn up allocating each part of the Southern Region to one or more of the management priorities listed below:-
a) Catchment protection
b) Water production
[…]
g) Road, river and stream reserves

The following activities and land uses are also covered:-
[…]
j) Water storage

3.2 For each primary land use, secondary uses (largely compatible with primary land use) and tertiary uses (permitted only as long as there is no permanent interference or significant harm to the primary use) have been specified." (p. 1)

7. Regulation Of The Harvest
Water
"*The Forests Department responsibility is to manage the catchments which occur on State forest in accordance with the reasonable requirements of the water supply authorities. For further details see Part 1 of the G.W.P. and the LUMP.*" (p. 3)

MANAGEMENT PLAN – 1982

<u>Hardwood Management Plan (Central Region). 1982</u>

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. Forest Types and Silviculture
2.2.2 Land Use Management Priorities (L.U.M.P.)
"*To enable a silvicultural system to be prescribed management priority must be considered.*

(1) Catchment Protection
(2) Water Production
[…]" (p. 3)

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*
[…]

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)

3.1.2 Planning the Annual Cut
"*(5) Existing access roads, stream reserves, amenity strips etc. must be defined.*" (p. 7)

3.2.2 Preparation of Coupe Plans
"*(2) The cutting coupe boundaries will also be determined by:-*
[…]
- *Catchments and micro-catchment boundaries*

[…]" (p. 10)

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:

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 Resource Management*
1.5.1 Water
Objective: to manage State forest water catchments so as to maintain or enhance water quality and quantity, to standards acceptable to the Water Authorities.

1982 Goals: (i) To clearly identify areas in the forest where the objective is not being met (emphasis: water quality).

(ii) To develop remedial management where necessary.

Responsibility : R/L Hardwood forests
Priority : 2." (p. 3)

"*1.6.4 The Physical Environment*
Objective: to ensure that land use or management has no deleterious effects on the soils, air and waters of the forest, and in particular to prevent pollution of water catchments and of airspace over Perth metropolitan area." (p. 7)

FORESTERS' MANUALS – 1981

Foresters' Manual : Part 12 : Mining in Forest Areas. 1981 [in *Foresters' Manual*. 1979]

Mining Agreement Acts Administration
"*12.035 The mining agreement acts are officially administered by the Department of Industrial Development. There are also several groups of committees concerned with both the practical and environmental aspects of open-cut bauxite mining operations:*
[…]
Purity of Water Committee
[…]." (p. 14)

Group Monitors Forest Values as Risk and Rehabilitation Operations
"*The committee assesses the likely impact of mining activities on forest and some social values, including risk of erosion, stream turbidity, and conservation of flora and fauna. The Committee then reports to the Conservator on whether they consider there are grounds for objection, deferal, or modification to the areas applied for, and for any conditions to be met to meet mining and rehabilitation standards. The group works in close liaison with research and operational bodies associated with the mining sphere. Any abnormal situations are referred for comment and resolution to an interdepartmental working committee consisting of the Chief Engineer (M.W.B.), the Commissioner for Soil Conservation and the Deputy Conservator of Forests.*" (p. 15)

Details to be included in proposals
"*12.042 Proposals for rehabilitation include recommendations for soil erosion control, water disposal, contouring, species of trees, ground cover, and planting patterns and technique to be used. They are submitted to Head Office for approval.*" (p. 17)

"*12.044 Subsequent tending operations are prescribed by the Forests Department. Consideration is given to recommendations put forward by the mining company, the Metropolitan Water Board, the Public Works Department and research personnel.*" (p. 17)

Appendix II
Application For Coal Mining Leases
"*2.Mining will be restricted to exploration operations until:*
[…]
2.3The holder has satisfied the Minister for Works that mining will not adversely affect the water quality and quantity of any reservoir, stream, river or watershed, and approval to proceed has been given by that Minister.

The holder has agreed that no mining operations or associated activities be undertaken in areas designated as Conservation Management Priority Areas." (p. 19)

3. Exploration Conditions*:*
"*3.1* […]*The holder must obtain a license for any clearing on any declared catchment (Part II, Country Areas Water Supply Act 1947/80 as amended).*" (p. [19])

<u>Foresters' Manual : Part 13 : Recreation and Landscape Management. 1981</u>

Recreation Policy
Control of Recreation Facilities
"*13.005 Service facilities, including campsites and caravan parks, are not encouraged on forest land unless there are no alternatives on adjacent land. However, camping associated with hiking and bushwalking is permitted provided that it is ... outside domestic water supply catchment areas.*" (p. 2)

Other Active Recreation
"*13.007 Riding or driving of horses in State forest must conform with water supply and quarantine requirements.*[…]" (p. 3)

Water Supply
"*13.010 Most of the potable and irrigation water in the settled country districts and metropolitan area is harvested from forested catchments, ranging from the underground aquifers of the coastal plain north of Perth – the Gnangara Mound - to the irrigation reservoirs such as Wellington Weir. With few exceptions, the dams are either wholly or partly used for domestic purposes, and the production of clean, pure water is therefore of utmost importance. Recreation activity and the development of recreation facilities must give due consideration to potential effect on water yield, and in most cases will be referred for approval to the appropriate water supply authority, such as the Country Water Supply section of the Public Works Department or the Metropolitan Water Board.*" (p. 4)

Recreation – Capital Development
Toilets
"*13.020 The heavy use of some picnic sites often necessitates the provision of toilets, and although the Department has authority on most areas of State forest, it is nevertheless advisable to seek the approval of local health authorities. In any case, in catchment areas the Department is obliged to consult with the water supply authorities about the type of building and the toilet system to be used.*[…]" (p. 8-9)

Fire Control : Foresters' Manual. 1981[in *Foresters' Manual.* 1979]

Environmental Controls
"*8.The area O.I.C. is to ensure prescribed burning conforms with required environmental standards: …*
Large-scale aerial burning of the slopes adjacent to holding dams and reservoirs for MWSSDB may result in contamination of stored water by ash, particularly when water levels are low.[…]" (p. 26-27)
Updated 10/81

GUIDELINES - 1981

Jarrah 81 : Guidelines for Planning and Control of Logging and Silvicultural Operations in the Northern Jarrah Forest, West of Quarantine. 1981

3. The Logging Operation
3.2.4 Road Works
"*(viii) Where roads are constructed (or maintenance graded) near or across steams* [sic]*, special precautions are needed to prevent erosion and siltation. Use bitumen mulch, silt traps and sumps or rocked walls within table drains.*" (p. 12)

4. Silvicultural Practice
4.5.8 Influence Zones
"*These are areas designated by the planner which surround special natural or artificial features in the forest.*" (p. 26)

"*After designation, the local D.F.O. 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. 26)

HANDBOOK – 1981

Bauxite Mining Northern Jarrah Forest Mining Operations Handbook 1. Edition 1. 1981

Introduction
"*Underlying all these developments, the Forests Department remains the authority basically responsible for the management of State Forest. It is our task to see that designated forest values are preserved in the long term.*[…]" (p. 3)

1.2 Objectives, Policy & Strategy
"*The objective, policies and strategies adopted for forest management in areas affected by bauxite mining operations are set out in Section 5.7 of General Working Plan No. 86 of 1977. They are :*" (p. 4)

1. Forest Management Objective
"*To guide bauxite mining operations to areas where there will be least conflict with other land uses, to minimise environmental damage and to rehabilitate areas affected by mining to best suit future land use.*" (p. 4)

3. Management Strategy
"*3.3Establish a full canopy cover of deep-rooted perennials on areas affected by mining in the salt-sensitive areas of catchments which are harnessed, or proposed to be utilised for water supply.*" (p. 4)

1.4 Legislation
"*5. Bauxite mining Agreement Acts are administered by the Department of Resources Development but as can be seen above there are certain responsibilities directly concerning the Conservator of Forests and his officers.*

There are also several groups and committees which are directly concerned with, and report and recommend on, the practical and environmental aspects of bauxite mining operations. These are :
[…]
Purity of Water Committee (Departmental Rep : Dr Hopkins)
[…]" (p. 8)

3 : Planning
3.1 Land Use
"*The Forests Department recognises bauxite mining as a temporary activity, and is listed in the L.U.M.P. as being : -*

(a) largely compatible with areas designated for Water Production priority;

(b) permitted in areas designated for Recreation, Catchment protection, Scientific and Timber Production priority so long as there will be no significant harm to these primary uses; and
[…]" (p. 14)

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)

"*<u>Modify/Defer</u>*
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.

<u>Approve</u>
Areas where there are none of the above problems" (p. 15)

3.3 Mining Plans
"*<u>5 Year Plans</u> (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)

3.6Procedure for Review of 5 Year Plans
"*8. Check water points to ensure best location with respect to stream zone, location of access roads and power lines.*" (p. 17)

8. Management of Rehabilitated Stands
8.4.2 Thinning
"*Thin at age 7 or when average dominant height exceeds 6m for all Eucalypt species, except Euc. microcorys which is planned for age 5. Thin to 50% of standing stem numbers. This results in stem numbers being reduced from 625 SPH to 300 SPH.*

Priority is to remove malformed or suppressed trees or drought affected species.
[…]
The timing of subsequent thinnings have not been devised and will be influenced by the priority land use objectives.

e.g. Water Production MPA – wide spacing increases water yield and wood production

Catchment MPA – Relatively dense stocking required.
[…]" (p. 58)

'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 :-

3.1 Water values : to prevent any adverse effect of mining on water quality.
[…]" (p. 38)

6. Preparation of Pits For Planting
"*6.5 Pits will be designed to minimise topsoil erosion and to retain rainfall and water inflow by :*

(i) infiltration and silt trapping in the contoured rip lines and

(ii) collection of overland flow in banks and sumps.

Each pit must have the capacity to store the run-off from a 15 year storm event, as calculated from hydrological records and catchment area.

This requires the installation of an adequate grade or contour bank along each 6M vertical contour within each pit.

6.6 Suitably constructed waterways will be installed at the overflow of each bank or sump.

6.7 Success criterion for pit preparation : no turbid water originating on mine pits or associated roadworks to enter a stream or watercourse." (p. 40)

"*7.7 Planting Layout & Design*
[…]
7.7.4 Do not plant trees on overflow channels.
[…]" (p. 42)

Interim Prescription : FIRS 80
Objective
"*The objective of the F.I.R.S. operation is :*

> *'To improve the capacity of the forest for long-term production of water, timber, recreation, conservation and/or other forest values'.*" (p. 45)

3. Land Use Classification
"*Areas for current treatment fall into Water Production and/or Recreation Management Priority Areas. In these areas the following land uses are designated :-*

5.1 <u>*Recreation Priority Area*</u>
Primary Use : recreation
Secondary Use : catchment protection and conservation
Tertiary Use : timber and honey production

5.2 <u>*Water Production Priority Area*</u>
Primary Use : water production
Secondary Use : catchment protection and timber production
Tertiary Use : honey production and conservation

5.3 <u>*Influence zones*</u>
Natural and artificial features which exert an influence on the management of the surrounding forest, e.g. stream zone, certain roads, certain recreation sites, townsites or railway lines." (p. 46)

7. Site Description
"*Within each management priority area and dieback status the following will be identified as possibly requiring different treatments.*" (p. 46)

"*7.2* <u>*Influence zones*</u>
Stream zone – strips adjoining nominated water courses where management must aim to prevent erosion and stream pollution and protect streamside ecosystems." (p. 47)

8. Graveyard Dieback – Water Production MPA
"*For all sites except stream zone.*

8.1 Define according to field inspection and demarcation of areas where the jarrah overstorey is largely dead or dying.

8.2 Mark for retention and ensure full protection of sound, healthy dieback tolerant species such as marri, wandoo or blackbutt (include jarrah in the case of individuals which have long survived in old dieback areas). Include advanced regrowth and saplings of dieback tolerant species.

[…]

8.4 […] *On sites with low timber production potential leave culls not competing with crop trees.*

8.5 Burn in the autumn, and broadcast sow leguminous understorey species in late May at rate of 0.5kg per hectare bulked with 450kg/ha of superphosphate. Consider scarifying harsher compacted sites to improve seed germination prior to sowing. Further treatment differs according to suitability for timber production and influence zones." (p. 47)

"*8.6 Carry out erosion control methods on all unwanted roads, tracks, landings and pits.*

8.7 <u>*Acceptable timber production sites – visible or not visible*</u>

8.7.1 Cultivate and plant site with timber producing species suitable for the site. Plant to achieve 625 stems per hectare. Average 4.0m x 4.0m spacing with preference for ashbeds.

8.7.2 Timber producing species for planting :

(i) For areas where jarrah/marri occurred plant Euc. resinifera, Euc.maculata and Euc. wandoo.
(ii) For areas where jarrah/wandoo or jarrah/blackbutt occurred plant Euc. wandoo and Euc patens.

[…]
8.7.5 Protect from fire for 8-10 years after planting.

[…]
8.8 <u>*Low Potential for Timber Production – Not visible*</u>
No further treatment after 8.6. Do not plant trees.

8.9 <u>*Low Potential for Timber Production – Visible*</u>
Select leguminous understorey species for specific aesthetic purposes. Do not plant trees." (p. 48)

"*8.10* <u>*Stream Zones in Water Production MPA*</u>
8.10.1 Define according to vegetation – e.g. adjacent to stream and carrying bullich, blackbutt with ti-tree understorey.
[…]
8.10.3 If specific fire treatment necessary, install temporary fireline.

8.10.4 Inspect for man-made features (such as gravel pits, roads, earth dumps) which may contribute to stream turbidity. If located, prescribe erosion control measures – e.g. cross drains, sumps, seed bed preparation and apply seed.

8.10.5 Protect from fire for 2 years before mining adjacent areas and at least 5 years subsequent." (p. 49)

9. Graveyard Dieback in Recreation MPAs
"*9.1 Apply as for 8.1 to 8.9 except for the influence zone which will be areas surrounding or adjacent to a depth of about 100 metres, any major or tourist road or existing tourist facility. These areas will be worked according to a landscape and rehabilitation plan which prescribes :*

- *planting pattern*
- *stocking*
- *species*
- *seed mix for understorey species.*

Each DFO will compile a prescription for these areas.

(ii) <u>*Stream Zones in Recreation MPA*</u>
Apply all measures listed under 8.10. In addition the following will be undertaken.
- *Survey recreation facilities within the stream zone (e.g. picnic site, walk trail) and ensure :*

    - *Dead or dangerous overhanging trees are felled*
    - *Special attention is given to erosion control away from car parks, access tracks etc.*
    - *Limited hazard reduction burning is programmed to prevent dangerous hazard adjoining picnic areas.*" (p. 49)

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.*

10.2 Mark for retention healthy well formed jarrah aiming at 250 sph or a 6m spacing. Exceptions to this are permissible where two or three stems of exceptional form and vigour occur within 6m of each other. Selected crop trees to be dominant or co-dominant with 4m defect free bole and healthy crown.

10.3 Areas of 1ha or more which carry a stocking of less than 500 sph of advanced growth require seed trees to be retained.

10.4 Jarrah is preferred species. Where jarrah is absent or is insufficient numbers ensure retention of sound marri, wandoo, blackbutt or bullich.

[…]

10.9 Ensure full protection of crop trees and groups of advance growth from logging and push down activities.

10.10 Carry out tops disposal around crop trees.

10.11 Erosion control works to be completed prior to autumn rains.

10.12 Conduct Autumn burn aimed at minimum scorch and maximum heat in soil. Timing of burn important in order to maximise banksia suppression. Burn only after banksia seed has germinated following push down. Burn autumn after spring pushdown. Allow one winter with summer pushdown.

10.13 Seed with selected legume species at rate of ½ kg/ha following autumn burn." (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)

Management Priority Areas MPAs.

"*The following management priority areas have been recognised and designated in Figure 3:*
a)Catchment protection
b)Water production …
The following activities and land uses are also shown …
g)Bauxite mining (followed by recreation, water production, timber production, catchment protection, etc.)
…
i)Water storage

In four instances, the allocation of a single priority use was considered undesirable. Two uses were then allocated. As conditions arise which lead to a transient or localised incompatibility between these uses, each case will be assessed on its merits.

The key features and major conflicts associated with each management priority area are presented in Appendix 4." (p. 10)

Catchment Protection MPAs
Appendix 4 Key Features, Major Conflicts and Priority Use for MPAs
"*- located on catchments harnessed for water supply (either domestic or irrigation) .*
- situated in lower rainfall zone. Water yields per unit area are low (Figure 9), especially in drought years.
- salt storages in soil and in ground water are moderate to high (Figure 10) .
- topography more subdued, broad flat swampy valleys a feature.
- 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.
- bauxite deposits are generally smaller, dispersed and at a considerable distance from the refineries.

Major conflicts
- clearing of the native forest cover (by agriculture, bauxite mining or dieback) will result in increases in stream salinity.
-if stream salinity increases significantly, the existing water supply system is seriously threatened (an example is the current situation in the Wellington reservoir).
- some kinds of human activity increase the probability of spreading more dieback into this area.
-the existing forest cover maintains a high water quality but reduces water yield when compared to cleared areas." (p. 42)

"*-since much of the area is well away from the water body, recreational activities are less likely to cause significant pollution.*
- bauxite mining, even with rehabilitation, is likely to reduce the long term timber production from these areas will destroy the natural ecology of the site." (p, 43)

Water Production MPAs
"*This zone has the greatest potential to yield fresh water. It is especially important in years of below average rainfall. The forest is already highly disturbed and a further reduction in forest cover may increase water yield. Bauxite mining and logging for timber are seen to be compatible uses, and could in fact enhance the yield, but care is needed to minimise turbidity and pollution. Some types of recreation and agriculture are not seen as compatible activities because of the associated pollution problem. Increased timber and water yields can be quite compatible in this zone, subject to the protection of water quality and structures, since the silvicultural treatments which increase timber yield (heavy thinnings) also increase runoff.*" (p. 11)

Key features
- Located on catchments currently harnessed for water supply (either domestic or irrigation).
- situated in the higher rainfall zone. Water yield per unit area is high (Figure 9). Especially important area in drought years.
- salt storages in soil and in groundwater are low to moderate
(Figure 10).
- topography is moderately to steeply incised.
-past disturbance of forest cover by dieback, fire and cutting has been considerable.
-dieback is already quite widespread." (p. 43)
"-the productivity of the indigenous forest (in the uninfected condition) is moderate to high.
-bauxite deposits are larger, deeper and located in proximity to ports and refineries.
-forest disturbance has resulted in increased water yields but salinity has not risen." (p. 44)

Major conflicts
"*-revegetation of dieback or bauxite mined areas to a dense forest cover will reduce water yield.*
- 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)

Priority use
This zone has the greatest potential to yield fresh water. It is especially important in years of below average rainfall. The forest is already highly disturbed and a further reduction in forest cover may increase water yield. Bauxite mining and logging for timber are seen to be compatible uses, and could in fact enhance the yield, but care is needed to minimise turbidity and pollution. Some types of recreation and agriculture are not seen as compatible activities because of the associated pollution problem. Increased timber and water yields can be quite compatible in this zone, subject to the protection of water quality and structures, since the silvicultural treatments which increase timber yield (heavy thinnings) also increase runoff." (p. 44)

Recreation MPAs
"*The recreational development should be such as will not seriously prejudice future water values or development by the Water Supply Authorities. If there is need to harness these catchments in the future, the priority use for these areas will need to be reassessed.*

The major conflict is with the long term needs for water supply development. Provision of recreation MPAs will reduce the existing pressure for active recreation on critical water supply catchments and water bodies." (p. 12)

Key features
"*- located on catchments which are not currently used for water supply* […]" (p. 45)

Major conflicts
"*… - unless adequate provisions for recreation in less sensitive areas are made (such as catchments not currently utilised for water supply,) there is a danger that uncontrolled recreation on existing catchments will increase.*" (p. 45)

Priority
"*If there is a need to harness these catchments in the future, the priority use for these areas will be reassessed.*

The major conflict is with the long term needs for water supply development. Provision of recreation MPAs will reduce the existing pressure for active recreation on critical water supply catchments and water bodies." (p. 46)

Timber Production MPAs
"*Within the study area, there are no areas allocated solely to a timber production priority. However, in the valley: of the Murray River some areas have been allocated a joint Timber Production - Catchment Protection Priority.*" (p. 12)

"*Because of the sensitive nature of this area to salinity increases, current management will be cautious. These MPAs are located on catchments which may be utilised for water supply in the longer term.*" (p. 13)

Timber production/catchment protection MPAs
Key features
"*- not located on catchments which are currently utilised for water supply purposes.*
-water yield moderate to low.
-mainly situated in the salt sensitive zone.
-dieback occurrence and forest disturbance are moderate to low." (p. 47)
"*-productivity of indigenous forest (uninfected) is moderate to high.*
-some areas may be utilised for water supply in the longer term." (p. 47)

Major conflicts
"*-land uses which introduce dieback or clear the native forest will lead to increases in stream salinity. These increases may not be a problem if the catchments are already saline as the result of agricultural practices and are unlikely to be harnessed for water supply. However any increase in stream salinity reduces the option of mixing brackish with fresh supplies.*
-land uses which spread dieback will reduce the long term productivity of these sites and decrease other forest values (e.g. aesthetic, conservation).
-the current conflict of interest between recreational activities and domestic water supply are less real in this area especially in the short term." (p. 47)

Conservation of Flora and Fauna MPAs
"*In catchments not utilised for water supply, conservation of flora and fauna is proposed as the priority use. In active catchments, conservation of flora and fauna and catchment protection share equal priority. Generally these two activities will be fully compatible*." (p. 13)

Associated Activities and Land Uses
Bauxite Mining
"*Areas where bauxite mining can be undertaken with reduced impact on water and some forest values are shown hatched in Figure 3. However the specific locations to be mined are subject to approved Mining and Management Plans, produced and agreed to between the State and the Company. The proposed long term land uses after mining are shown as a wash. Rehabilitation techniques should favour the proposed long term land uses. The boundaries defined in Figure 3 between the Water Production and Catchment Protection MPAs and the salt and water zones in Figures 9 and 10, should not be interpreted as being precisely fixed but are rather the best available approximation at this point in time.*

From west to east within the high rainfall zone (Figures 2 and 3), water yield decreases and salinity rises. Mining should therefore be preceded by drilling and research so as to define whether any substantial salt pockets exist." (p. 14)

"*Other areas where mining is likely to have relatively little impact on water values are on the catchments of the Dale, Williams and Hotham river systems. These are unlikely to be harnessed for water supply because of high salinities resulting from agricultural clearing.*

Mining is potentially most harmful in the catchment protection MPAs and the catchment protection/timber production MPAs." (p. 15)

Water Storage
"*Water storage under the management of Water Supply Authorities is shown in dark blue on Figure 3. Because of pollution problems, Water Supply Authorities oppose uncontrolled recreational use of agricultural development in close areas.*

Management of associated forest values in these localities and on water supply catchments generally will have particular regard to water supply requirements and will take into account the principle of zoning for recreational access established in a joint interdepartmental report to the Water Purity Committee." (p. 16)

Allocation of Secondary and Tertiary Uses
"*Having determined the primary land use, it is possible to allocate secondary uses to the same area, provided that the selected uses are largely compatible. An example is conservation of flora and fauna and catchment protection. As the degree of competition or unsuitability increases, possible tertiary uses emerge. These may be permitted but only as long as there is no permanent interference or significant harm to the primary use. This would normally involve restriction on tertiary uses, e.g. restrictions in space or time.*

Summer logging within a catchment protection MPA would be an example.

There are other uses which are totally incompatible with the primary use (e.g. bauxite mining and conservation of flora and fauna) and these must also be considered.

Allocation of land uses is summarised in Table 2 ." (p. 17)

Prescriptions for Management Activities

"*Management strategies define the way in which policies and objectives are to be achieved. Management prescriptions deal with specific activities in Management Priority Areas. They form the basis for operational job prescriptions. Forest Officers will consult these prior to commencing any activity within an MPA and they will ensure that the operational prescription has satisfied all of the relevant factors outlined.*" (p. 17)

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).'Influence Zones' (for example, those adjacent to tourist roads, railway lines, picnic areas,', private property, town sites, stream verges, etc.) are also shown (Figures 8 and 11). 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)

Discussion

"*The reservation of options is a sensible course of action only when the current land users have been adequately catered for. The Forests Department's proposal has done this.*" (p. 23)

"** Recreation pressures are channelled away from existing utilised catchments for many recreation pursuits. In some areas the land can be rehabilitated to a recreational end point. In others it may be possible to cater for some of the more environmentally damaging forms of recreation.*" (p. 24)

Management Prescriptions

"*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)

MANAGEMENT PLAN – ND - 1980?

<u>Land Management Plan for State Forest in the Mount William Area. 1980?</u>

"*The object of this conceptual plan is to define the Forests Department's ultimate land use aims for the areas*

likely to be affected by mining, as the basis for consideration of mining and rehabilitation proposals.

The provisions herein will be fine tuned as detailed five year mining plans are provided annually." (iii)

1. Land Use in the Mt. William Area

"*Three Management Priority Areas (MPAs) are affected by Alcoa's 25 year mining proposals, namely Water Production, Recreation and an area where Conservation of Flora and Fauna and Catchment Protection are given equal priority.* […]

It must be stressed that though there are no Hardwood Timber Production MPAs designated, all areas except Conservation MPAs will be managed for timber production concurrently with other uses. This is possible because of the high compatibility of timber production management practices with the objective of most other forest land uses.

The 25 year mining proposals are located entirely within the western high rainfall zone, though the eastern extremity abuts the intermediate rainfall zone. As mining approaches this area caution will have to be exercised in relation to potential increases in stream salinity. The land use plan does not provide for mining in the salt sensitive zone. Some 25 years are available to test techniques of safe mining in these problem areas." (p. 1)

1.1 Water Production MPA

"*This primary land use covers catchments harnessed for domestic and irrigation water supply. State Forest provides part or all of the catchment for the following water storages:*

Waroona Dam	-	*Irrigation*
Drakesbrook Dam	-	*Irrigation*
Samson Dam	-	*Domestic and Irrigation*
Samson Pipehead	-	*Domestic and Irrigation*" (p. 1)
"*Bancell Brook Pipehead*	-	*Domestic*
Logue Brook Dam	-	*Irrigation*

The area is extensively used for hardwood timber production and provides some conservation value where there is minimal impact of dieback disease and other vegetation disturbance (from logging, access, construction, public utilities, etc.) Minor products such as wildflowers and honey production are available over the area." (p. 2)

"*Restrictions to recreation depend on the policies of the water supply authorities. The catchments of Samson and Bancell Brook Pipeheads are particularly sensitive to biological pollution and turbidity as they directly feed into domestic supply lines. Table 2 summarises the current restrictions on, and around, water storage areas.*

The approach to recreation management on harnessed catchments will be to maintain the status quo rather than to provide more facilities. It must also be recognised that pressures are now being increased on South West water supplies, and water now used solely for irrigation supplies may be redirected to domestic use in the future.

The land use plan makes provision for bauxite mining on these Water Production MPAs subject to control of erosion and turbidity. This provision is a broad recognition of the minimal impact likely to result from bauxite mining in this area because of –

(a) the degree of existing dieback infection, and
(b) the generally lower salt content in the subsoil of the area.

However, caution must be exercised towards the eastern perimeter of the high rainfall zone as the potential to yield salt can vary markedly. More intensive sampling in these areas in the future will provide data that may alter current plans." (p. 3)

1.2 Recreation MPA
"*These MPAs are outside harnessed catchments and exhibit features of topography and aesthetics which favour recreation as the primary use.*" (p. 3)

3. Management Prescriptions
"*In drawing up prescriptions the following factors have been taken into account:*

(a) Constraints required by Water Supply Authorities on the recreational use of catchment.
(b) Primary and compatible land uses – these are summarised in Table 1." (p. 11)

"*(d) Influence zones – these are indicated on Hardwood Operations Control Sheet in Figure 5a and are streams, dams, ….*" (p. 12)

3.1.3 Effect of Influence Zones on the General Burning Prescriptions
"*3.1.3.4 <u>Stream zones</u> – general prescription will apply.*" (p. 14)

3.2 Hardwood Logging
"*3.2.3 Effect of influence zones on the general logging prescription*
[…]
3.2.3.3 Water Reservoirs (e.g. Waroona, Samson and Logue Brook Dame). No logging will take place in a buffer strip 100 metres in width adjoining the top water level, except for the salvage of dead and dying trees under special provisions (e.g. summer logging only, no placement of landings in the zone, immediate rehabilitation of snig tracks, no debris to be deposited below top water line).

Landings and log dumps are not to be placed within influence zones. Haul roads, snig tracks in influence zones are to be landscaped and rehabilitated.

3.2.3.4 Stream Zones: A buffer zone of 20 metres will be retained on either side of each defined stream with the exception of the steeper sided Samson Brook in the pipehead catchment (below the dam wall) when the buffer zone will be 100 metres. Logging will not be carried out in this zone except for salvage of dead and dying trees under special provisions (see 3.2.3.3). Snig tracks and landings will not be placed within the zone and where debris impinges on the stream it will be removed." (p. 18)

3.3 Stand Improvement (Forest Improvement and Rehabilitation Scheme)
3.3.1 Objective of Management
"*To treat forest areas between mined areas in order to enhance land management objectives.*" (p. 19)

3.3.2 Treatment Zones Recognised
"*Areas vary in susceptibility to, and subsequent impact of, dieback disease, and hence require different treatments. Zones recognised and requiring field demarcation are:*

(a) Stream zone (characaterised by ti-tree, marri, bullich, blackbutt).
(b) Dieback infected zone.
(c) Protectable and Non-Protectable zone.
(d) Resistant zone." (p. 19)

3.2.3 Prescription
"*The general prescription is outlined below and will apply in Recreation and Water Production MPAs except within nominated influence zones.*" (p. 19)

"*3.3.3.1 Stream zone*
No treatment will be carried out in this zone. Where jarrah has been killed by dieback, marri or other resistant species are usually present and persist. Water yield is highest from these zones and is enhanced by the effects of dieback." (p. 20)

3.3.4 Effect of Influence Zones
3.3.4.1 Stream Zones
"*No treatment will be carried out in this zone except where it combines with an influence zone around a recreation feature. In this case dead and dying trees will be felled and, if saleable, will be utilised. Debris will be removed from the boles of remaining healthy trees and visual aerial debris will be placed on the ground.*" (p. 22)

3.3.4.2 Water Storage Areas
"*No treatment will be undertaken in the influence zone area except for the salvage of dead and dying saleable sawlog trees under special conditions (e.g. summer operations only, no placement of snig tracks and landing within the zone, immediate implementation of erosion control measures on snig tracks and landings, no debris to be placed below top water line and no trespass of machinery below top water line).*" (p. 22)

3.4 Recreation Development
3.4.1 Objective of Management
"*To provide recreation facilities in accordance with anticipated demand and specific land management objectives and the requirements of the Water Supply Authority. The general provisions of the recreational report on catchments prepared for the Water Purity Committee will be adopted.*" (p. 25)

3.4.2 Factors to be Considered
"*3.4.2.1 Recreation development will not be expanded in areas where water production is the primary land use.*

3.4.2.2. The demand for recreation use is relatively low at present and largely consists of the requirements of local residents. Water bodies in the area are by far the main attraction, but because water quality must be maintained, the plan does not provide for increased development of facilities associated with dams or on harnessed catchments.

[…]
3.4.2.3 The planning concept employed is to develop important nodes (dams, caravan parks, Mt. William) linked by linear activity zones (e.g. walk tracks, scenic drives, etc.) Small development (e.g. picnic and lookout sites) along these linear activity zones in Recreation MPAs are designed to absorb any increases in demand and to maintain the status quo on catchments and around dams." (p. 26)

3.6 Environmental Control over Bauxite Mining and Rehabilitation of Mined Areas
3.6.2.3 Extraction Phase (carried out all seasons)
"*(a) Continually monitor mining activities in relation to planned procedures for sensitive areas. Refer matters of concern to the Mine Superintendent, but where these cannot be resolved, to be referred to the Regional Operations Leader.*

(b) Maintain a register showing date and location of observed oil spills which occur on harnessed catchments. Immediately notify the local office of the P.W.D. on each occasion, together with the Mine Superintendent and ensure action is taken to remove the hazard." (p. 38)

3.6.2.4 Rehabilitation Phase
"*(a) In conjunction with the Regional Operations Leader, set out preliminary proposals in September each year for rehabilitation based on advice from Alcoa on the availability of areas.* […]

(b) Accompany the Erosion Control and Rehabilitation Working Group and Alcoa environmental personnel on an inspection of areas available for rehabilitation in order to:

- *draw up plans to meet the objectives of pit rehabilitation as outlined in General Working Plan 86, land use management plans, and other submissions such as those made by the Water Purity Committee to System 6 for the northern jarrah forest;*

[…]" (p. 39)

3.6.4.2 Reservoirs and Stream Zones

"*Mining is not to take place within the line of sight of reservoirs without consultation with the Public Works Department. Where mining is to proceed in areas adjacent to reservoirs, their main feeder streams will require specific landscape and environmental plans when applications for clearing are submitted. These plans will include specifications, such as restriction of the mining operations to specific times of the year, extraction sequence to the lower or upper slope, provision for adequate sumps and contour banks progressively in the wake of mining, immediate rehabilitation of mined sites etc.*

Mining operations do not generally impinge directly on lesser stream zones. Adequate sumps or filtering from native vegetation is required to avoid turbid surface water, which might result from drainage from water disposal trials, haul roads and other engineering facilities." (p. 43)

PLANNING POLICY - 1977

A Perspective For Multiple Use Planning in the Northern Jarrah Forest. 1977

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)

"*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.*

Management of the forest resource is a major factor in the region, and because of mutual interactions cannot be divorced from other forms of land management in adjacent areas. This is especially true in the case of saline waters entering the forest from agricultural areas to the east." (p. 2)

Climate and Hydrology

"*Salinity is not yet a problem in the forested parts of these catchments. However, salt storage and baseflow salinity measurements suggest that extreme care must be taken in management practices in the eastern portion of this region. For this reason, management strategies must differ between east and west. A central transitional zone has also been selected for conservative management until adequate data dispel doubts on how the proposed management practices will affect water quality.*" (p. 7)

"*Turbidity of most streams is relatively low and to date no major cases of biological pollution have been recorded.*" (p. 7)

Geomorphology and Soils
"*The central transitional zone (1 025 – 1 150 mm/annum) where the effects of management practices on hydrology are currently in doubt, will, for the time being, be managed conservatively together with the lower rainfall zone.*" (p. 9)

Economic and Legal Constraints
2.1 Legal Tenure of Land
"*Much State Forest in also gazetted as water catchment. Where this occurs forest management practices are constrained by the regulations governing catchment protection.*" (p. 12)

2.2 Catchments
"*Irrespective of ownership all land falling within gazetted catchments supplying water to the Metropolitan Region is subject to regulations proclaimed under the Metropolitan Water Supply, Sewerage and Drainage Act, (1909-1975). The other catchments (supplying Goldfields, agricultural and Great Southern towns, various local town supplies and irrigation requirements) are controlled by the Public Works Department (Country Water Supply Act 1947-1976) (Figure 5).*" (p. 13)

3.3 Water
"[…] *Catchment management has been a prime responsibility of the Forests Department.*" (p. 17)

4. Proposed Management Strategies
4.1 Dissected River Valleys and Scarp, High Rainfall Zone (more than 1 150 mm/annum)
Current Land Use
"*a) Water storage (large storage dams and small pipehead dams).*
b) Recreation, (passive and active), based on optimal opportunity for land and water based recreation and proximity to centres of population.
c) Silviculture of Pinus radiata, based on high soil fertility and high rainfall.
d) Conservation of flora and fauna.
e) Silviculture of indigenous hardwoods, in particular blackbutt and jarrah." (p. 23)
"*f) Grazing of cattle and sheep on improved (clover) and rough pastures.*
g) Horticulture, market gardening and intensive animal production." (p. 24)

Management Strategy
"*(b) Special management areas will be selected and zoned so as to leave some free of human impact and to contain recreation to an acceptable level in others. Conservation (flora and fauna) and catchment protection are best achieved above or between dams. Recreation is best achieved below existing dams.*" (p. 25)

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:*

(i) the possibility for increases in salinity is believed to be low;
(ii) the scope for spreading dieback is low since most gullies are already infested;
(iii) the reduction of the vegetative cover increases water yield;
(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)

"*c) The residual healthy stands of upland jarrah forest (which could represent less than 20 per cent of the area, after mining) will be managed for timber production and water. This involves the restriction of motorised access, and silviculture to maximise increment on the crop trees and to increase water yield.*" (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 Pinus radiata
e) Conservation of fauna and flora
f) Recreation" (p. 30)

Management Strategy

"*c) Conversion of native forest to pine plantations has ceased. Existing plantations will be managed so as not to prejudice water supplies.*

[…]

e) Cutting in the native forest will be managed conservatively so as not to conflict with the objectives of water production (erosion, salinity). Adequate crown cover will be retained or restored by prompt regeneration." (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)

"*e)* […] *In contrast, intensive recreation will be directed to the west of existing dams.*" (p. 32)

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)

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)

"*The value to fauna and flora conservation is based on the great topographic and edaphic diversity, which together provide a wide range of habitats. Of particular interest is the considerable shift in tree species with a relatively minor change in climate, and the tendency for southern shrub species to occur as outliers. Although the mammalian fauna is poorly known, a large number of bird and reptile species are present.* […]" (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.*
[…]" (p. 37)

WORKING PLAN - 1977

<u>General Working Plan No. 86 of 1977. Part I</u>

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)

Resource Management Objectives
Catchment Management
"*To manage State forest catchments which are needed for existing or future water supplies, in accordance with the requirements of water supply authorities, to maintain or enhance water quantity or quality.*" (p. 2)

1.2.1 Policy and Legislative Changes
"*As a consequence the Government stated its forest policy in April 1976. It embodied the following forest 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. 12)

5. Resource management
5.1.2 Water Demand
"[…] *Where State forests and catchments coincide, management requirements are determined by the demand for water in terms of both quantity and quality*." (p. 46)

5.1.2.2 Future Trends
"[…]*The maintenance of vegetative cover is essential to keep stream salinity levels to a minimum in salt-sensitive areas. In areas where salt is not a potential problem, the maintenance of an open forest situation increases the yield of good quality water*." (p. 47)

5.1.4 Objective of Catchment Management
"*The objective is to manage State forest catchments which are needed for existing or future water supply, in accordance with the requirements of water supply authorities, to maintain or enhance water quantity or quality.*" (p. 48)

5.1.5 Catchment Management Policy
"*1. Protect existing healthy forested catchment areas from agents which might lead to deterioration of water quality.*

2. Rehabilitate degraded areas where necessary to ensure that water quality is maintained or restored.

3. Regulate all other uses of forested catchments when they compete with water production objectives.

4. Monitor streams where changes in land use are involved.

4. *Investigate techniques of land management aimed at maximising water production without detriment to quality*.

5. *Liaise with water supply authorities on all matters affecting water supply.*" (p. 49)

5.1.6 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.*

2. Design harvesting and silvicultural practices to maximise water production whilst protecting water quality.

3. Keep road construction and maintenance to the level necessary for catchment protection.

4. On salt-sensitive areas, fire suppression strategy must give priority to minimising the risk of dieback spread.

5. Provide for prescribed burning to be continued on catchments. Burning on each major catchment will be spread over several years to regulate turbidity, ash pollution, and salinity, during the hazard reduction programme or in the event of wildfire.

6. Manage existing land uses on catchments so as to minimise the risks of siltation, turbidity, salinity and biological pollution." (p. 49)

"*7. Avoid land use changes where they prejudice water values or potential storage sites*" (p. 50)

5.5 Flora and Fauna
5.5.3 Area Available for Conservation Purposes
"*Management plans for "forest parks" will take effect as if they were a regulation and so be unalterable except in the manner required in the Interpretation act for the amendment of regulations made under an Act of Parliament. These plans will include consideration of the implications of future water resource utilisation in full consultation with the Public Works Department.*" (p. 90)

5.9.5 Conservation of the Physical Environment
5.9.5.1 Objective of management
"*To minimise the deleterious effects of land use and management on the soil, air and water components of the forest environment.*" (p. 129)

5.9.5.2 Policy
"*1. Provide for conservation of the physical environment in all management plans.*
2. Monitor the effect of human activity on the physical environment of the forest.
[…]" (p. 129)

5.9.5.3 Management strategy
"*1. Prepare environmental reviews with respect to proposals for any major land use of management changes.*

2. Liaise with other forest-using authorities and organisations to ensure their awareness of environmental effect from their activities.

3. Ensure environmental safeguards form part of all management prescriptions.

4. Continue liaison with the Department of Conservation and Environment, other Government departments and interested bodies." (p. 130)

POLICY - 1976

Forests Department 1976 'Focus on Forest Policy', *Forest Focus*, No. 17, pp. 1-15.

Water Supplies
"*In Western Australia, State Forests incorporate a major proportion of the metropolitan and country water catchments. Management of catchments with priority given to water production is an accepted responsibility of the Forests Department …*" (p. 5)

"*The department's policy provides for:*

- *Protection of existing healthy forest catchment areas.*
- *Rehabilitation of degraded areas, where necessary, to ensure that water quality is maintained.*
- *Regulation of all other uses of forested catchments.*
- *Monitoring of streams where land use changes are involved.*
- *Research of land use to maximise water production.*

Careful planning and control can ensure that human activities on catchment areas do not pose a risk to domestic and irrigation water supplies and management of catchments to the requirements of water supply authorities is a major departmental function." (p. 5-6)

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:
[...]
To protect, control and rehabilitate where necessary, those forest areas that contribute to the water supply requirements of the state.

[…]" (p. 15)

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
"*Although fire has always been an integral part of the environment in South Western Australia, human activities increased the likelihood of severe, uncontrolled fires capable of inflicting serious damage to the forest complex. Therefore one of the earliest tasks undertaken by the Forests Department was the development of an effective fire control organisation which implemented the findings of its research through fire weather forecasting, a detection and communication network, development of an extensive road system and training of efficient crews for fire suppression and prescribed burning. This protection has not been restricted to commercially productive forests but has been extended to adjacent areas serving as water catchments and national parks.*" (p. 7)

2.5 Water Catchment
"*Dedicated State Forests in Western Australia incorporate a large proportion of the metropolitan and country water catchments. Management of the catchment area is an accepted responsibility of the Forests Department with priority given to water production.*

The depredation of the jarrah dieback disease in parts of the water catchment areas of the northern forest region has resulted in deaths and reduced productivity of the forests. Formerly, revenue obtained from log royalties in the areas provided funds for catchment management. The situation has now been reached where rehabilitation will be necessary in certain areas to provide a new protective tree cover aimed at regaining the hydrological balance." (p. 7)

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.

The values to be managed as listed above are seen as being of outstanding significance at this date, but depending on the future public demand, additional values may also be recognised." (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)

3.2.3 Water Catchment
"*In the northern jarrah forests, the incursion of dieback, mining, increase visitor demands, and extensive farm clearing to the east of the main forest belt have accentuated the need for the Forests Department's continued and increase participation in the management of all forested water catchments and their adjacent headwaters.*

Careful planning and control will be essential to ensure that human activities on catchment areas do not pose a risk to domestic and/or irrigation water supplies. Removal of vegetative cover by the combination of dieback, wildfires, logging, mining and amenity clearing could, if not controlled, increase stream and reservoir salinity.

Management of catchments to the requirements of the water supply authorities is a major Departmental requirement stemming from increased population demands on limited water resources and the dependence on forests for quality water supplies." (p. 15-16)

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)

3.2.6 Forest Rehabilitation
"*Rehabilitation of forests within water catchments where necessary, is considered to be a most important management objective.*

The Forests Department will continue to manage State Forests for water catchment purposes …" (p. 17)

CIRCULAR - 1973

Circular No. 4/73 : Conservation in Management Practice. 1973) included as an appendix in: *'Hardwood Management Plan : Central Region' (1982)*
1.3.4 Protection of Streams
"*1. Generally 20 metre strips to be reserved from felling other than stag removal on each bank of permanent streams and such other strips as deemed necessary by the Officer in Charge for the protection of other watercourses.*

3. *Felling debris not to obstruct streams. No machines to work in stream beds other than as required for culvert installation or approaches. Temporary log fills to be removed from streams on completion of operations.*" (p. 2)

4.3.1 Roads and Tracks
"*To be installed to specifications set down in Foresters' Manual. Proper provision to be made for surface drainage, culvert outflow to be diverted across filter strips of uncleared natural surface vegetation at least 20 metres wide before entering reservoirs or major watercourses.*" (p. 5)

4.3.2 Clearing
2. Watercourses
"*Ground cover to be left undisturbed (see 2.3.4) and watercourses not to be obstructed by clearing debris.*" (p. 5)

4. Stream Protection
"*Filter strips at least 20 metres wide to be retained uncleared except for stag felling to protect the banks of major watercourses. Strips 10 metres wide to be retained as above to protect lesser watercourses. The precise strip width is a matter for local experimentation and will depend on ground cover and slope. But the principle of retaining sufficient width to allow deposition of silt and to avoid obstruction of streams with clearing debris must be rigorously enforced expecially* [sic] *adjacent to reservoirs and dams.*

Ground vegetation to be left undisturbed and machines not to work in stream beds other than for culvert installation.' (p. 5)

"*4.3.3. Prior approval must be obtained from local Engineer of M.W.B. or C.W.S. where any alterations to the shape, alignment or surface condition of major watercourse are deemed necessary to avoid the drainage of adjacent forest areas.*" (p. 5)

4. Erosion Control
"*The erosion control is of prime importance in hills plantations on gazetted catchments, but it is to be regarded as equally important from the viewpoint of sound land management on all other catchments.*" (p. 7)

5. Drainage and Runoff Control
"*5.1 Grade drains are to be established where necessary immediately after final clearing and before the first winter rains, according to specifications (see specs.)*

5.2 Culvert outfalls to be directed over filter strips of adequate width adjacent to watercourses and under no circumstances to be allowed to enter reservoirs direct." (p. 7)

5.3 Cultivation
"*5.3.1* […] *Particular attention to be given to breaking any furrows or depressions crossing the contour and diverting drainage along grade drains to uncleared ground.*" (p. 7)

5.4 Second Rotation Establishment
"*Erosion buffers adjacent to reservoirs and major watercourses to be established by heavy thinning to promote natural regeneration before the last of the final crop trees are removed. Where this is impracticable, hand planting to be used to restore vegetative cover with minimum disturbance of soil surface, fully recognising that loss of productivity is preferable to siltation of vital water storages.*" (p. 7)

FORESTERS' MANUAL - 1972

Foresters' manual : reforestation and silvicultural operations : jarrah and karri. 1972

"*Management of indigenous hardwood forest aims at producing the highest possible yield of useable wood, consistent with the maintenance of a protective forest cover for water catchments and a general forest environment.*" (p. 3)

"*Areas outside 'Zone A' will receive a lower priority for fire protection and other management operations. But it is important to remember that although Zone B is of lesser significance for further production, much of it is vital for catchment protection, flora and fauna conservation and recreation and will be less intensively managed for these purposes.*" (p. 3)

WORKING PLAN – 1971

General Hardwood Working Plan No. 85. 1971

3. Silvicultural Considerations
Intensive Management Units
"*The initial survey has indicated that of the 3.3 million acres of jarrah forest, approximately 1.62 million acres are of sufficient quality and site productivity to warrant intensive multiple-use management, primarily for future timber production. The remaining area is considered more suited to extensive management for such vital purposes as catchment protection, salinity control, flora and fauna conservation and public recreation, as well as timber production.* […]" (p. 8-9)

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:*
[…]
3. Conservation of catchment values by erosion control, maintenance of stream flow, and maintenance of forest cover." (p. 36)

"*5. Encouragement of recreational use of the forest subject to the provisions of the Forests Act 1918-1969, the Bushfires Act 1954-1965, the Native Flora Protection Act 1935-1938 and the requirements of the Water Supply Authorities.*" (p. 37)

CODE OF LOGGING – N.D. - 197-?

'Code of Regrowth Logging Practice' for all Logging Operations. N.D. 197-?

Section 2 : General

"*2.1 The Instructions contained in this Code shall be observed by all persons carrying out any regrowth logging operation.* […]"(p. 3)

"*2.3 A contractor shall observe all Acts of the State of Western Australia, and in particular, the Bush Fires Act, 1954, the Forests Act, 1918-1976 … 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 Regrowth Logging Practice.*" (p. 3)

"*2.5 A contractor shall exercise strict supervision and control over the operations of all workers employed by him with a view to:*

2.5.1 Preventing any breach of the Forests Act and Regulations and this Code of Practice." (p. 3)

"*2.18 A contractor shall take any special measures prescribed by the Conservator for the protection of water purity in water courses in or adjacent to Regrowth areas.*" (p. 4)

Section 3 : Felling, Trimming, Crosscutting, Etc.

"*3.13 All culverts and road drains shall be kept clear of soil, slash or other debris likely to obstruct the flow of water. Damage caused to roads by a failure to carry out this Instruction will be regarded as damage covered by Instruction 2.10.*" (p. 7)

Section 4 : Extraction

"*4.5 All culverts and road drains shall be kept clear of soil, slash and other debris likely to obstruct the flow of water. Damage caused to roads by a failure to carry out this Instruction will be regarded as damaged covered by Instruction 2.10.*" (p. 8)

"*4.9 Concentrated extraction along creeks or other drainage lines shall not be carried out unless specifically approved by a Forest Officer.*" (p. 9)

Section 5 : Loading and Hauling

"*5.11 All culverts and road drains shall be kept clear of soil, slash or other debris likely to obstruct the flow of water. Damage caused to roads by a failure to carry out this Instruction will be regarded as damage cover by Instruction 2.10.*" (p. 11)

WORKING PLAN – 1926

Working Plan No. 1 : Mundaring Working Circle. 1926

Part I : Summary of Facts
2. Existing Rights and Privileges
"*Water Supply catchment areas, as shown on Map No.2, embrace the whole area of the Working Circle. These Catchment Areas are subject to the by-laws and regulations of the Water Supply Department concerned, but these Departments have agreed to the control of forest produce on these areas being placed in the hands of the Forests Department (see Files 112/20 and 924/24).*" (p. 9)

"*Where any improvements still exist on locations resumed on the Catchment Areas no action in regard to such locations may be taken by the Forester without first referring the matter to the Conservator.*" (p. 9)

"[…] *17, 220 acres surrounding the Helena Reservoir were ringbarked in 1903 with the object of increasing the run-off of water from the Helena Reservoir Catchment Area (see Map No. 3). An extremely good natural regeneration followed.* […]" (p. 12)

Part II : Future Management
8. Objects of Management
"*(1.) To manage the forest so as to maintain a well regulated supply of pure water in the creeks and springs on the reservoir catchment areas.*" (p. 15)

10. Proposals for the Respective Working Sections
10A : Working Section 'A' : Jarrah Forest – Group Selection System
2. Methods and Order of Operations
"*Department operations will consist of Advance Burning, Tree Marking, and Regeneration Cleaning.*

All forest produce permit holders must comply with the by-laws of the Water Supply Department concerned and take all action necessary in order to prevent the pollution of water supply when working on any catchment area.

The various operations in the bush will be carried out in the order, and in accordance with the instructions, given below." (p. 16)

13. Grazing
"*Grazing by domestic animals on the Water Supply Catchment areas which cover the whole of this Working Circle is prohibited by the by-laws and regulations of the Water Supply Departments concerned.*" (p. 26)

LEGISLATION - 1919

Forests Act. No. 8 of 1919

"*AN ACT to provide for the better Management and Protection of Forests.*

[Assented to 3rd January 1919.]" (p. 117)

Part I. – Preliminary
"*1. This Act may be cited as the Forests Act, 1918.*" (p. 117)

Part VII. – Offences, and General Provisions
"*50. Any person who commits or attempts to commit or aids or abets any person who commits or attempts to commit any of the following offences shall be liable to imprisonment for not exceeding one year or to a penalty not exceeding fifty pounds:-*" (p. 137)

"*(e) Unlawfully cuts, breaks, throws down or in any way destroys or damages any building, fence, or gate, in or enclosing any State forest or timber reserve, or who unlawfully cuts through or breaks down or otherwise destroys 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. 138)

Part VI - Regulations
"*67. The Governor may order that the forest produce on any catchment area now or hereafter vested in or controlled by the Minister of Water Supply, Sewerage, and Drainage or other statutory authority shall be placed under the management or control of the Conservator, subject to such conditions as the Governor may think fit; and thereupon such areas shall be deemed Crown land for the purposes and within the meaning of this Act*." (p. 34)