DUPLICATE

LAND USE MANAGEMENT PLAN NORTHERN JARRAH FOREST MANAGEMENT PRIORITY AREAS



LAND USE MANAGEMENT PLAN

NORTHERN JARRAH FOREST

MANAGEMENT PRIORITY AREAS

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FOREWORD

Multiple use management in the jarrah forest north of Harvey has developed to the extent that all land areas have been allotted a management priority to which they are currently seen to be best suited. Secondary and tertiary uses have been defined. This classification together with sample prescriptions and controls for efficient management are presented in this document.

The management concept adopted best satisfies existing demands while allowing flexibility in options for the future. Periodic review is essential and the proposals will be updated at about 5 year intervals.

A draft has been circulated for assessment and comment by various authorities which have direct involvement in the use of forest land. Most of these comments have been incorporated in this framework document. The Forests Department expects continuing consultation with responsible authorities at the more detailed implementation level.

> B.J.BEGGS CONSERVATOR OF FORESTS

INTRODUCTION

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.

Under the provisions of the Forests Act 1918-76, the Forests Department has legislative responsibility for the control and management of all matters of forest policy on State Forests and Timber Reserves and is specifically required to prepare working plans periodically for regulating the management of these forests. Working plans are subject to the approval of the Governor in Council. However, a number of other Acts also affect the management of this forest land (Appendix 1).

The Forests Department is decentralised throughout the forest area and has built up expertise in forest land management. This includes catchment management, recreation, conservation of flora and fauna, production of timber and other forest products and protection (from insects, fire, disease, changes in tenure, etc.). (Appendix 2)

Following Government approval of a Multiple Use Management Policy (1976) the Forests Department has produced a number of documents related to the management of State Forests.

These include

- * Forest Policy (1976)
- * General Working Plan No. 86 (1977)
- * Perspective for Multiple Use Planning in the Northern Jarrah Forest (1977)

The next stage in this hierarchal development of Multiple Use Management Plans is the allocation of areas to a Management Priority, and the detailing of management prescriptions and controls necessary for efficient management. This was undertaken for a study area (Figure 1).

RESOURCE VALUES

The major forest values currently recognised are those associated with water and timber production, recreation, flora, fauna, scientific study, education and minor forest products (such as honey and wildflowers). The aim of management is the regulation of these resources to best meet demand while protecting the forest from damaging agencies.

Special provisions must also be made within the forest for service facilities (roads, dams, transmission lines, pipelines), as well as for mining of minerals (defined in the Mining Act), mining of bauxite (Special Agreements) and stone and earth (defined as Forest Produce in the Forests Act). Each aspect is an integral part of total land use planning.

MULTIPLE USE

Since the forest area is limited and demand for its various values is high and increasing, management must cater for an optimum mix of uses.

In its simplest form, Multiple Use means the concurrent use of land for several different purposes. Some land uses

cannot be practised concurrently, others may be partially or fully compatible. The success of Multiple Use often depends on the intensity of management.

There are different interpretations of the concept, the most common being:

a) Division of an area into smaller units, each having one exclusive use:

Multiple Use is practised over the whole area by a combination of the parts.

b) Combination of uses so as to maximise net social benefit:

This approach assumes no constraints on management, a situation which seldom exists in practice, and requires considerable data on sociology, economics, environmental aspects and site potential.

c) The selection of priority uses for an area and the inclusion of secondary and tertiary uses which do not significantly interfere with the primary land uses:

This necessitates a ranking of land use priorities and can be carried out satisfactorily using existing data, current constraints and experienced value judgement. The Forests Department has adopted this approach in its formulation of a Land Use Management Plan for the northern jarrah forest.

Multiple Use has temporal as well as spatial dimensions. Flexibility in planning is essential. In the longer term, land use priorities may alter with evolutionary changes in socioeconomics, technology and plant succession.

Joint products which are complementary at one level of production may be competitive at another. Often, the more intensive the land management system, the greater is the conflict with Multiple Use. Periodic review and reassessment of the plan is essential and will be arranged at intervals of about 5 years.

The inter-relationships between desirable components of Multiple Use Planning are shown in Appendix 3.

PLANNING PROCEDURE

The procedures used in the preparation of this Land Use Management Plan (LUMP) were as follows:

- 1. Listing and appraisal of the level of demand for the various forest resources.
- Zoning of the forest into management categories, based on criteria of climate and geomorphology.
- 3. Allocation to a Management Priority based on criteria of site potential, economic viability, operational feasibility and protection.
- 4. Allocation of compatible secondary and tertiary land uses to each Management Priority Area.
- 5. Drawing up management prescriptions for each land use activity within each MPA.
- 6. Detailing the Land Use Management Priority Areas onto the Hardwood Operations Control System (HOCS) sheets.
- 7. Drawing up of operational job prescriptions.

8. Control of the field implementation of the LUMP through the HOCS and other control systems.

This document deals with stages 2 to 4, with illustrative examples only of the procedures involved in stages 5, 6 and 8.

Zoning into Management Categories

The study area is a large and heterogeneous area. Climate and geomorphology show marked east-west gradients, and form appropriate mapping units for regional planning. The forest has been divided into a number of management categories and proposed management strategies for each have been drawn up (A Perspective for Multiple Use Planning in the Northern Jarrah Forest, 1977).

Ten management categories were recognised (Figure 2) and defined as follows:

High Rainfall Areas (greater than 1150 mm/annum)

- 1. Dissected river valleys and escarpments.
- 2. Lateritic uplands.

Low Rainfall Areas (less than 1025 mm/annum)

- 3. Dissected river valleys.
- 4. Lateritic uplands
- 5. Broad valleys and depressions.
- 6. Monadnocks.

Intermediate Rainfall Areas (1150/1025 mm/annum)

- 7. Dissected river valleys.
- 8. Lateritic uplands.
- 9. Broad valleys and depressions.
- 10. Monadnocks.

The rainfall zones shown in Figure 2 vary from those shown in the General Working Plan and the Perspective, although the same isohyets are used to broadly define the high, intermediate and low rainfall areas. A revised rainfall plan for part of the south west has recently been prepared. The isohyets for this plan (FD No. 1513) were interpolated by the Lands Department from rainfall data provided by the Bureau of Meteorology. The more recently available isohyet data (1978) have been used in this study.

It is not yet possible to define a clear cut boundary between the high and low rainfall areas and it was therefore necessary to create an interim, transitional, intermediate zone. Increased research may eliminate the need for this zone, but in the meantime, because of the potentially high salinity risk, it is prudent to manage it on the same basis as the low rainfall areas.

A summary of the site characteristics for each zone, its current and proposed land use are illustrated in Table 1.

Allocation to Management Priorities

Each part of the northern jarrah forest has been allocated a management priority based on the criteria of site potential, economic viability, operational feasibility and protection. In deciding the management priority for each area the following questions were considered relevant:

a) Site potential - Are the proposed land use activities in harmony with the inherent site potential, and the constraints imposed by nature and by the environment? What are the current land uses? What are the main problems which result from existing uses?

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PHYSIOGRAPHIC

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LOW RAINFALL 1 1025mm p.a.	Monadnocks	\langle	Residuals. Cooke	Erosional	Rock, shallow	eatuis Jarrah Marri Rock Sheoak	25m	low moderate protectable high low	Hardwoods Recreation	Flora Fauna Recreation Water Supply
	Broad valleys		Beraking. Goonaping	Depositional	Sands and c'ays	Jarrah (sands) Wandoo (clays)	20-25т	high nch-protectab e low low sands	Agriculture Coal mining Hardwoods	Flora Faune Hardwoods Coal mining Pine Dantations (in Collie Basin: Water succ.
EASTERN LOW R	Lateritic plateaux		'Lateritic uplands, Nockine'	Stable	Laterites	Jarrah Wandoo Powder Bark	25m	low moderate-low protectable low high	Hardwoods	Hardwoods Flora-Fauna Water supply
	Major valleys		·Darkin'	Erosional	Red earths	Wandoo Jarrah	25m	cow cow non-protectable moderate moderate-high	Agriculture Hardwoods Pine plantations Recreation	Water supply Conservation Hardwoods Recreation
RMEDIATE RAINFALL 1150mm p.a.	Monadnocks		Residuals, Cooke	Erosional	Rocks, shallow	Jarrah Marri Rock Sheoak		w tow moderate protectable high low	Hardwoods Recreation	Flora Fauna Recreation Water Supply Basin;
	Broad valleys		Beraking Goonaping	Depositiona	Sands and clay	Jarrah Marri	25-30m	high non-prot. low low	Agriculture Coal mining Hardwoods	Flora Fauna Flora Hardwoods Recric Coal mining Water Pine plins. (in Collie Basin, Water supply
CENTRAL INTERN	Lateritic plateaux		'Lateritic uplands'	Stable	Laterites	Jarrah Marri	25-30m		Hardwoods e	Water supply Water supply Fora Fauna Hardwoods Hardwoods Flora Fauna Recreation Pine pitns.
CE	Major va eys	\geq	.Darkin'	Erosional	Red earths	Blackbutt Marri Jarrah	30m maderate	non-prot. high	Agriculture Hardwoods Pine pltns. Recreation	
SH RAINFALL 150mm p.a.,	Lateritic plateaux		Lateritic	Stable	Laterites	Jarrah Marri	30 + m hi <i>o</i> h	moderate protectable moderate low-moderate	Bauxite mining Hardwoods	Water Supply Bauxite Mising Hardwoods Flora Fauna Recreation
WESTERN HIGH RAINFALI	Scarp and rajor valleys		Helena Darkin	Erosional	Red earths	Jarrah Marri Wandoo Blackbutt	30 + m moderate	moderate-low non-protectable high	Agriculture Hardwoods National parks Pine plantations Quarrying Recreation Water storage	Water supply Water storage Recreation Hardwoods Flora Fauna Pine plantations
ZONE	LANDFORMS	STYLISED LANDFORM SHAPE	SURFACES Name	- I y pe	SOILS	VEGETATION Dominants	Height (metres) DIEBACK Occurrence	Susceptibility Protection from natural spread WATER YIELD SALT STORAGE	CURRENT MAJOR USES	PROPOSED MAJOR USES Within State Forest)

- b) Economic viability Are the proposed land uses economically gainful? Are the anticipated benefits greater than the direct or indirect (e.g. environmental) costs? What is the anticipated demand/supply position for each of the products? Does the area have a scarcity value? Are the proposed uses sustainable in the long term?
- Operational feasibility Are the proposals likely to be acceptable to today's society? Do they run contrary to current legislative or policy constraints? Are they likely to be acceptable to other land users? (e.g. the public, private companies, other Departments). What is the option value offered by each proposal? Is the proposal flexible enough to adjust to changes in demand, technology and constraints?
- d) <u>Protection</u> Are the proposals protectable from alienation, fire, disease, pollution or other harmful agencies?

Forest values often have differing protection requirements. The system of protection applied to each must be compatible with the priority use and all secondary uses must be viewed in relation to their compatibility with the protection needs of the primary use. Where inconsistencies are found, concessions will be made between the needs of the various land uses by modification to the protection system, provided that the primary management objective is not unduly prejudiced.

In arriving at decisions on management priorities a lot of relevant data available both within the Forests Department and published by other organisations was consulted.

The allocation of priorities to land resources will necessitate compromise between the various land users. Since demand, technology and constraints are subject to change, periodic reappraisal of the allocation of areas to a management priority is essential. As far as possible the planning has taken current requirements into account, without eliminating options for future changes in land use.

Management Priority Areas MPAs

The following management priority areas have been recognised and designated in Figure 3:

- a) Catchment protection
- b) Water production
- c) Recreation
- d) Timber production
- e) Scientific
- f) Conservation of flora and fauna

The following activities and land uses are also shown (Figure 3):

- g) Bauxite mining (followed by recreation, water production, timber production, catchment protection, etc.)
- h) Pine plantations
- 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.

Catchment Protection MPAs

Because of the sensitive nature of this zone and the enormous damage which inappropriate land uses may cause, current management should be cautious. Other land uses, especially recreation, timber production and bauxite mining should only be permitted under conditions where the risk of dieback spread and water pollution are low and research has shown that any adverse effect (e.g. cutting, dieback, mine clearing) can be rapidly and permanently reversed by either regrowth or artificial restocking with an appropriate vegetative cover.

Water Produduction 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.

Recreation MPAs

Because of the aesthetic appeal of the landscape, the increasing demand for forest-based recreation, and the fact that the catchments are not currently utilised, recreation is considered to be a priority use in these zones (Figure 3).

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. Eventually it may still be possible to utilise the water potential while still providing for a level of recreation.

Several options can be suggested, depending on the requirements of the Water Supply Authorities:

- to encourage suitable recreation on irrigation catchments;
- to accept the higher cost of full treatment (but for a small catchment, not the whole of the domestic water supply system);
- to use the water for industrial not human use;
- to assist in the upgrading of recreational facilities (especially toilets) in these areas;
- in the case of the Murray River, to dam several of the smaller tributaries (Yarragil, Nanga, Davies, etc.) rather than the river itself.

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.

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.

Scientific MPAs

The scientific areas have been selected because of particular features (e.g. Lang, Amphion) or particular needs (e.g. Yarragil, Marrinup). Once the purpose of each study has been satisfied (General Working Plan No. 86, 1977) the priority use for each area will be reassessed.

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.

Buffer Zones for Conservation of Flora and Fauna MPAs

These are designed to provide additional protection for the Conservation of Flora and Fauna MPAs. Prescriptions will aim to provide a gradation between the undisturbed core of the MPAs and the adjoining land. Where a Conservation of Flora and Fauna MPA adjoins or is surrounded by an inadequate buffer, a perimeter buffer will be created within the core areas to allow for activities such as protective prescribed burning.

Influence Zones

A number of natural and artificial features and some land uses exert an influence on the management of the surrounding forest. The area so affected has been named an influence zone and provides a transition between the feature and the surrounding area of forest. Examples include:

- a) natural features streams, areas with special aesthetic or geological significance, historical sites;
- b) artificial features power lines, conveyor belts, roads, some recreation sites;
- c) land uses townships, private property, reservoirs and other water storages, mining operations.

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.

In parts of the hatched area sizeable areas of healthy, protectable forest occur. Mining would not be a preferred form of land use, since areas which are already dieback affected offer a more suitable alternative.

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. Bauxite mining should not proceed until research has conclusively shown that its effects on water quality and other forest values can be tolerated or that adequate remedial procedures are available.

Mining and conservation of flora and fauna are seen to be mutually exclusive options. Bauxite mining should not be permitted, especially within core areas of the Conservation of Flora and Fauna MPAs, since the process destroys indigenous values which cannot be replaced.

From the recreational viewpoint, the transient effects of mining on access and on degrading the visual environment may be considerable. In the absence of adequate forward planning, the opportunity for silvicultural thinning in indigenous stands is reduced by uncertainty as to their future.

Pine Plantations

The locations of existing pine plantations are shown in Figure 3. There are no plans to substantially expand the area of pine plantation within this study area, with the possible exception of dieback areas. The existing plantations will be managed with due regard to the designated priority uses. These pine plantations are important to the State's timber production requirements and the commercial plantations will mostly be replanted to pine after the end of the first rotation.

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 or agricultural development in close proximity to these 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.

Service and Access Ways

Other land uses, e.g. roads, railways, transmission lines, gravel pits, farmlets, etc., are usually too small to be delineated meaningfully on the overall land use plan. These uses are clearly identified at the more detailed operational phase, which is covered by the Hardwood Operations Control System (Figures 4 to 8).

Agriculture

Agriculture was not considered in detail because of its general incompatibility with the policy of maintaining and increasing the forest area to cater for the increasing public demand for the full range of forest values (G.W.P. No.86).

Agriculture is also incompatible with the requirement to maintain water quality because of its potential for bacterial pollution in the high rainfall areas and for stimulating salt discharge in the lower rainfall areas. In view of the economic conditions facing the agricultural industry, it also appears that the area of agricultural land already available elsewhere in the South West is adequate to meet any likely demand in the foreseeable future.

Some rural subdivisions within or near State Forest (e.g. hobby farms) have potential to adversely affect forest

management. These proposals are normally referred to the Forests Department by the Local Authorities or the Town Planning Department and are dealt with in detail at that level of planning.

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.

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.

For each of the conservation of flora and fauna MPAs detailed management plans are being prepared.

TABLE 2 ALLOCATION OF OTHER USES TO MANAGEMENT PRIORITY AREAS

MANAGEMENT PRIORITY	SECONDARY USES ∅	TERTIARY USES *	INCOMPATIBLE USES
Conservation of flora and fauna MPAs	Catchment protection Scientific study Water production	Recreation Timber salvage and regeneration. Honey production.	Activities which alter structure or composition of the forest or introduce dieback disease.
Catchment protection MPAs	Conservation of flora and fauna Scientific study Honey production Wildflower management Water production	Recreation Timber production Bauxite mining Communication lines	Activities which introduce dieback disease, remove native cover without the provision of successful regeneration or increase the risk of erosion and pollution.
Water production MPAs	Catchment protection Timber production Bauxite mining Scientific study Communication lines Wildflower management	Recreation Conservation of flora and fauna Honey production	Activities which restore a dense deep rooted vegetative cover throughout the area or increase risk of erosion, siltation, chemical or biological pollution.
Recreation MPAs	Conservation of flora and fauna Honey production Catchment protection Scientific study Wildflower management	Timber production Bauxite mining Communication lines Water production	Activities which permanently destroy the aesthetic appeal of the landscape or require the cessation of recreational activities

ø Secondary uses are those which are largely compatible with the primary use.

^{*} Tertiary uses may be permitted but only as long as there will be no significant harm to the primary use.

MANAGEMENT PRIORITY SECONDARY USES Ø		TERTIARY USES *	INCOMPATIBLE USES	
Timber production MPAs	Catchment protection Conservation of flora and fauna Recreation Scientific study Wildflower management Honey production Water production	Communication lines Bauxite mining	Activities which permanently destroy the productive capacity of the forest.	
Scientific study MPAs	Catchment protection Timber production Bauxite mining Wildflower management Water production	Recreation Conservation of flora and fauna Honey production Communication lines	Activities detrimental to the scientific objectives of the study.	
Pine plantations	Catchment protection Scientific study Water production	Recreation Communication lines	Activities which endanger the plantation especially those which could increase the frequency of fire.	
Water storage (domestic)	nil	nil	Activities detrimental to water quality.	
Water storage (irrigation)	Recreation e.g. fishing picnics	Recreation e.g. power boating water skiing camping	Activities which cause serious erosion to banks or damage to engineering structures	

 $[\]emptyset$ Secondary uses are those which are largely compatible with the primary use.

^{*} Tertiary uses may be permitted but only as long as there will be no significant harm to the primary use.

Sample prescriptions for some management activities are contained in a separate section of this document.

Hardwood Operations Control System

The existing Hardwood Operations Control System is the means of translating multiple use planning into operational prescriptions for implementation in the field. The basic operational unit is the Forest Block, comprising some 4 000 ha and having clearly defined boundaries.

All hardwood operations are planned, budgeted, implemented, recorded and controlled according to the priority uses allotted to each Forest Block through the Hardwood Operations Control System (HOCS). The three major aims of HOCS are:

- To provide prescriptions for all major hardwood operations as a basis for positive control, using the Forest Block as the basic unit of management.
- 2. To provide a complete, compact and convenient record and control system for both operational Divisions and the Inventory and Planning section.
- 3. To provide data for yield control by continually testing actual values against estimates.

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.

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.

Control Systems

Examples of other control systems operating in the Department are given in Appendices 5, 6 and 7.

Public Input

The Forests Department Policy Statement, General Working Plan No. 86 (Part I) and Planning Perspective, formed the background to this detailed planning proposal. These documents have been made available to interested departments and organisations and subsequently to the public for comment.

Much of the State Forest under consideration is covered by the System 6 study of the Environmental Protection Authority (Figure 1).

The Forests Department's proposals for conservation of flora and fauna MPAs included in this Land Use Management Plan were the subject of a detailed submission to the System 6 study during 1976. In addition, a measure of public demand for these uses was obtained by reviewing all public and Departmental submissions to the System 6 study organisation. The main topics which concern the State Forests in the study area included the conservation and recreation aspects of

- * the Darling Scarp and its environs
- * the Brookton Highway and environs
- * the Murray River valley
- * the Monadnocks (Mt. Dale, Cooke, etc.)
- * the lower Helena valley

Activities which received regular comment included

- * provision of walking trails, access for bushwalking
- * camping on State Forest
- * provision for motorcycle and car rallies

DISCUSSION

The land uses recommended in this study have been matched with the inherent site potential of each area and are in harmony with the environment and the reasonable requirements of various sectors of society. All current land uses have been considered and have been allocated an appropriate place in the landscape.

In addition, a number of options are possible in the future, for example:

- bauxite mining could be permitted in a conservation of flora and fauna MPA if the State decides, in 20 or 30 years, that this course of action would be desirable. The reverse is not possible. Once the area is mined it loses its indigenous value and can no longer be useful as a conservation of flora and fauna MPA.

- a valley which remains undammed (for example the Murray Valley) can always be dammed, at a later date. Once dammed, parts of the valley, its flora, fauna and natural recreational appeal are destroyed or changed forever.
- bauxite mining could be extended into the eastern parts of the catchments already harnessed once research has conclusively shown that certain environmental disbenefits can be reversed quickly and effectively.
- recreation could be permitted on existing catchments and even reservoirs, but only if it is proved by research that these activities will not affect the health of the water users, or if costly treatment is undertaken.

The great concern in land use planning is that land may be committed irrevocably to activities which promise short term benefits and which may cause long term harm. The advantage of reserving options is future flexibility. Decisions of great consequence and with possible long term disbenefits need not be made now from a position of ignorance. Planning must therefore be periodically reviewed as new information becomes available.

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.

* The areas recommended for bauxite mining are large. They are closer to refineries and ports and present the least environmental problems. They contain a very considerable proportion of the total resource.

- * The existing water supply catchments are protected (primarily from pollution by salt, human faecal matter, dieback and fire). Yield increases through forest manipulation are being investigated.
- * Recreation pressures are channelled away from existing utilised catchments for many recreational 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.
- * Conservation of flora and fauna areas to cover the complete range of species types have been selected. These will be protected from dieback and managed for the conservation of the plant, animal and other resources.
- * Timber production will continue (with appropriate safeguards) in all areas other than the "cores" of the conservation of flora and fauna MPAs.
- * The needs of apiarists, science, education, aesthetics, etc. have also been catered for.
- * Consistent with other multiple use requirements, the proposal takes into account the public requests for access to key areas the scarp, the Murray and lower Helena valleys, the monadnocks. Management prescriptions along major and tourist roads cater for public needs and activities.
- * The proposal is flexible enough to be responsive to changes in public demand and recognises the need for ongoing research to provide the basis for evaluating changes to this management plan.

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PRESCRIPTIONS FOR MANAGEMENT ACTIVITIES

MANAGEMENT PRESCRIPTIONS

Prescriptions deal with specific activities within a Management Priority Area and define how the particular management objectives are to be achieved.

Prescriptions are prepared for all management activities within Management Priority Areas. These activities include prescribed burning, logging and regeneration, stand improvement, dieback hygiene, recreation developments, seed and wildflower collection, bauxite mining, road construction and maintenance and many others. Sample prescriptions for two activities (logging and prescribed burning) are included in this document, to indicate the type of prescription used and the items covered. These form the basis for more detailed job specifications which are issued to supervisory staff.

Prescriptions must allow for flexibility at field level where in situ decisions may need to be made about specific land use factors. Within a particular management priority area (e.g. recreation) allowance can be made for readily identifiable influence zones (areas containing streams, tourist roads, picnic areas, walk trails, etc.) However, field inspection may reveal small areas which require a different management emphasis and in these cases, the prescription will be amended to meet specific requirements.

Prescriptions will be reviewed regularly in consultation with other authorities, in the light of technological developments, and with a deeper insight into land use management requirements.

HARDWOOD LOGGING SAMPLE PRESCRIPTION FOR MARRINUP BLOCK

1. Objective of Management

To undertake hardwood logging in a manner which will treat and regenerate the forest in accordance with the land uses allocated to Marrinup Block.

2. Factors to be Considered

- 2.1 Primary land uses recreation, water production
 and scientific (see Figure 3).
- 2.2 Compatible uses timber production, conservation of flora and fauna, minor forest products, bauxite mining, catchment protection.
- 2.3 Dieback risk a considerable proportion of the block is already affected by dieback.
- 2.4 Other factors influencing logging and regeneration:
 - (a) Mining for bauxite by Alcoa has been carried out since 1971. It is anticipated that mining will continue in this block over the next 10 years. Areas to be cleared for mining will receive priority for logging and full utilisation of all saleable forest produce.
 - (b) Logging prescriptions may need to be modified in influence zones adjoining recreation sites, railway reserves, tourist roads, walk tracks, industrial areas, scientific areas, S.E.C. lines, South Dandalup Dam and private property (see Figure 11).

3. Prescription

- 3.1 General procedures:
- 3.1.1 Check that the proposed logging conforms with the 3 year plan.
- 3.1.2 Collect management level inventory information on the timber resource available.
- 3.1.3 Obtain Conservator's approval for areas to be logged. Details of the submission to include: access routes, wash down points and influence zones.
- 3.1.4 Identify logging areas in terms of dieback risk categories (dieback infected, not currently protectable, protectable and resistant) by the use of aerial photography and detailed field mapping of the disease.
- 3.1.5 Schedule of the logging operations to treat dieback risk categories in the following order of priority - dieback, non-protectable, protectable or resistant.
- 3.1.6 Vary the treatment according to dieback risk category:
 - (a) Dieback and non-protectable forest to be fully utilised - all saleable forest produce to be removed.
 - (b) Protectable and resistant forest to be treated according to the uniform system of silviculture; subject to adequate stocking, full utilisation of distribution poles greater than 9.5m in length, sawlogs to be

removed following treemarking. (All trees greater than 60cm d.b.h. to be treemarked). Below this diameter limit, future crop trees are to be retained. Where regrowth is inadequate, sufficient seed trees will be retained.

- (c) In all risk categories favour the retention of marri, blackbutt and bullich within the stand.
- 3.1.7 Remove forest produce in the following sequence poles, piles, veneer logs, sawlogs, fencing and other round timber supplies and firewood.
- 3.1.8 Check standards of utilisation by regular field inspections to ensure maximum utilisation is obtained.

Monitor actual volume removed from cutting coupes against that estimated using management level inventory.

- 3.1.9 Remove logging debris from the base of future crop trees in areas that are not to be mined for bauxite.
- 3.1.10 Implement erosion control measures by strategic placement of haul roads, snig tracks and landings, careful dispersal of water from drainage channels and revegetation of disturbed surfaces.
- 3.1.11 Implement dieback hygiene measures during logging operations. Ensure vehicle cleanliness, isolate operations to a particular dieback risk category, nominate specific access routes, log protectable and resistant areas during dry soil conditions and ensure that all operators are fully trained, briefed and continually supervised.

- 3.2 Effects of land use on the general logging prescription:
- 3.2.1 Recreation the prescription will apply throughout with the exception of influence zones.
- 3.2.2 Water Production the prescription will apply throughout with the exception of influence zones.
- 3.2.3 Scientific the prescription will apply in the C.S.I.R.O. study area, and the micro-catchment of the southern tributary of Marrinup Brook as a requirement of those studies. No logging is to take place in the Mardo study area.
- 3.3 Effects of influence zone on the general logging prescription:
- 3.3.1 Stream Zones avoid logging within at least 20 metres either side of an ecologically defined stream zone. Tops from trees fallen into the zones are to be removed. Snig tracks and landings are not to be placed within stream zones.
- 3.3.2 South Dandalup Dam no logging will take place in a buffer strip, in forest immediately adjoining the top water level, except for the salvage of dying trees under special provisions agreed to by the M.W.B., e.g. a summer operation only, immediate rehabilitation of snig tracks, no debris to be left below top water level, no landings, no entry below top water level. The strip will generally be of the order of 100 m wide but may be increased substantially on steeper slopes or where site conditions warrant.
- 3.3.3 Developed recreation sites, e.g. Oakley Dam,
 Marrinup Mill Site, Golf Course These areas

are to be surrounded by a buffer in which no cutting is to take place, with the exception of dying or dangerous trees. The width of the buffer is to be a minimum of 100 metres, and will be sufficient to ensure that the vista from the recreation area is free from visual impact of logging. Minimise aesthetic impact by removing debris around all trees and by flattening all tops.

- 3.3.4 Recreation routes, e.g. railway lines, tourist roads, walk tracks In the forest immediately adjoining these routes -
- 3.3.4.1 All merchantable dying and dangerous trees overhanging the route are to be removed for safety reasons.
- 3.3.4.2 Retain a buffer strip, having a minimum width of 100 metres each side of the route, and of sufficient width to ensure the vista from the route is part of the buffer. The logging and regeneration prescription applied to this buffer will depend upon the forest dieback risk category in which the buffer is located.
 - (i) Dieback: fully utilise all merchantable material in the buffer and rehabilitate or regenerate with resistant species.
 - (ii) Not Currently Protectable: remove only dying and hollow-butted trees. Remove logging debris from the base of trees.
 - (iii) Protectable: as for not currently protectable.
 - (iv) Resistant: as for protectable.

- 3.3.4.3 Where extensive forest vistas form a backdrop to cleared private property the prescription is to be modified so that there is minimal visual impact. A small sample area is to be logged initially to determine the degree of impact.
- 3.3.4.4 Minimise aesthetic impact by removing debris around all trees and by flattening all tops.
- 3.3.5 Landings and log dumps are not to be placed within influence zones. Haul roads and snig tracks in influence zones are to be landscaped and rehabilitated.

PRESCRIBED BURNING SAMPLE PRESCRIPTION FOR BANKSIADALE BLOCK

1. Objectives of Management

To carry out hazard reduction burning over the block without detriment to the allocated land uses.

2. Factors for Consideration

- 2.1 Primary land uses water production, catchment
 protection.
- 2.2 Compatible land uses timber production, conservation of flora and fauna, minor forest products, catchment protection, bauxite mining, scientific study.
- 2.3 A considerable proportion of the block is protectable from dieback and has been quarantined.
- Other factors logging is not proposed within the next 10 years and it is not anticipated that the area will be subject to bauxite mining applications within the next 10 years. The South Dandalup Dam adjoins the southern boundary of the block.

3. Prescription

- 3.1 From the master burning plan ascertain the year Banksiadale Block is due to be burnt for hazard reduction.
- 3.2 Using forest type maps, carry out field assessment of fuel quantity and crop tree height. Stratify samples according to the proportion of major forest types represented. These factors provide the basis for adopting fire behaviour parameters which are compatible with land use objectives.

- of 6 tonnes per hectare. If fuel quantities are generally lower, consider deferment of burn, taking into account hazard reduction plans for the protection of surrounding public and forest values.
- 3.4 Complete the detailed burning prescription form F.D. 655 (see Appendix 6).
- 3.5 Complete a check list detailing persons and property to be protected from damage during the burn on F.D. 659 (see Appendix 7).
- 3.6 Submit both F.D. 659 and 655 to the Conservator for approval to carry out prescribed burning as planned.
- 3.7 Upgrade roads surrounding the burn under dry soil conditions. Grading or surface scraping is prohibited in quarantined areas.
- Jamin spring, with the Byram Drought Index less than 100 and under a Fire Danger Index of 12-16 metres/hour. A minimum edge depth of 80 metres, in which the unburnt duff layer remains to act as a filter strip for runoff into the dam, is required.
- 3.9 Ignite the perimeter fuels along the remaining boundary of the area under a Fire Danger Index of 12-16 metres/hour and ensure a minimum burnt edge of 80 metres. This edging is to be undertaken in spring where the Byram Drought Index is less than 100 and prior to ignition of the internal area, or in the autumn preceding the spring burn.

- 3.10 Locate and isolate areas of dieback infected forest with a surrounding break constructed with hand tools. Ignite this break under Fire Danger Index of 12-16 metres/hour and ensure a minimum burnt edge of 80 metres. The dieback infected area is to be burnt subsequent to burning the remainder of the block.
- 3.11 Ignite the main area using aerial ignition techniques, according to the following provisions:
 - a) wind direction use southerly bearing winds to avoid ash contamination to the dam waters;
 - a spring burn is necessary for variable fuel moisture condition;
 - c) fire intensity burn between 16-20 metres/hour to ensure maximum scorch height 6 metres and 70% coverage of the area.
- 3.12 Ignite isolated dieback infected sites under weather conditions which will produce high ground temperatures (dry soil and slow moving fire) in order to provide ashbeds for natural regeneration and to promote an acacia understorey.
- 3.13 Carry out a post-burning inspection to determine area burnt and whether fire intensities varied from the prescribed limits. Review assessment and prescribing techniques accordingly.

APPENDICES

RELEVANT ACTS

1. Acts implemented by the Forests Department

Forests Act 1918-1976

Sandalwood Act 1929-1934

Timber Industries Regulations Act 1926-1969

Native Flora Protection Act 1935-1938

(This Act will be repealed and the Wildlife Conservation Act will be suitably amended. Control will then be exercised by the Department of Fisheries and Wildlife).

2. Acts under which the Conservator or Forests Department are nominated as having specific responsibility

Alumina Refinery Agreement Act 1961-1974

The Alumina Refinery (Pinjarra) Agreement Act 1969-1972

The Alumina Refinery (Worsley) Agreement Act 1973

The Bushfires Act 1954-1973

The National Parks Authority Act 1976

The Wildlife Conservation Act 1950-1975

3. Acts affecting Forest Land Management

Aerial Spraying Control Act 1966-1973

Agricultural and Related Resources Protection Act 1976

Agriculture Protection Board Act 1950-1976

Country Areas Water Supply Act 1947-1976

Environmental Protection Act 1971-1975

Land Act 1933-1972

Local Government Act 1960-1975

Main Roads Act 1930-1976

Metropolitan Water Supply Sewerage & Drainage Act 1909-1975

Mining Act 1902-1973

Soil Conservation Act 1945-1974

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- WARD, D. (1977) Tree removal and salinity in Helena catchment, Western Australia. Res. Pap. For. Dept. W.Aust. 29.

5. RECREATION

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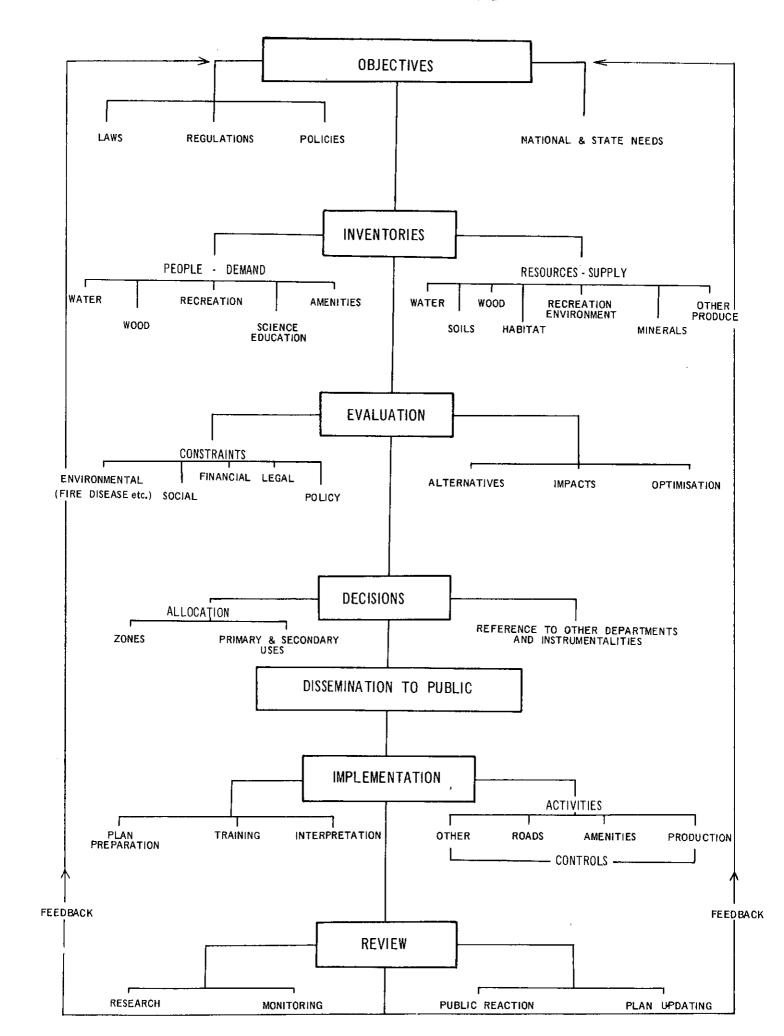
9. MISCELLANEOUS

Forest Focus Series

Information Sheet Series

Annual Reports

41.
STAGES OF MULTIPLE USE PLANNING



APPENDIX 4

KEY FEATURES, MAJOR CONFLICTS AND PRIORITY USE FOR MPAS

Catchment protection 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.

Major conflicts continued

- 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 and will destroy the natural ecology of the site.

Priority use

Because of the sensitive nature of this zone and the enormous damage which inappropriate land uses may cause, current management should be cautious. Other land uses, especially recreation, timber production and bauxite mining should only be permitted under conditions where the risks of dieback spread and water pollution are low and research has shown that any adverse effect (e.g. cutting, dieback, mine clearing) can be rapidly and permanently reversed by either regrowth or artificial restocking with an appropriate vegetative cover.

Water production MPAs

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.

Key features continued

- 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.

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.

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.

Recreation MPAs

Key features

- located on catchments which are not currently used for water supply.
- situated close to main river valleys, streams, steeply incised landscape or the Darling Scarp.
- generally in the higher rainfall zone.
- situated relatively close to centres of population and reasonably accessible by road.
- some of the areas have distinct scarcity value.
- rehabilitation of dieback areas and of mine sites can be planned so as to enhance recreational use.

Major conflicts

- the long term proposals of water authorities to build more dams (e.g. Murray, Marrinup, Dirk Brook, etc.) poses a serious threat to recreational opportunities.
- recreational activities may lead to site deterioration (over use), spread of dieback, vandalism and pollution.
- 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.

Priority use

Because of the aesthetic appeal of the landscape, the increasing demand for forest-based recreation, and the fact that the catchments are not currently utilised, recreation is considered to be a priority use, Figure 3.

The recreational developments should be such as will not seriously prejudice future water values or development by Water Supply Authorities. 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. Eventually it may still be possible to utilise the water potential while still providing for a level of recreation.

Several options have been suggested depending on the strategies of the Water Supply Authorities:

- to accept the higher cost of full treatment (but for a small catchment, not the whole of the domestic water supply system).
- to use the water for industrial, not human use.
- to assist in the upgrading of recreational facilities (especially toilets) in these areas.
- in the case of the Murray River, to dam several of the smaller tributaries (Yarragil, Nanga, Davies, etc.) rather than the river itself.

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.

- productivity of indigenous forest (uninfected) is moderate to high.
- bauxite values are variable from high (Plavins-Inglehope)
 to low.
- some areas may be utilised for water supply in the longer term.

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.

Priority use

Because of the sensitive nature of this area to salinity increases current management tactics should be cautious, especially in the areas located on catchments which may be utilised for water supply in the longer term.

Scientific MPAs

Key features

- areas required for scientific study, as controls or for reference purposes.
- usually large, often discrete catchments are involved.
- a number of these studies aim to assess the impact of land uses on hydrology.

Major conflicts

- degree of conflict depends on the purpose behind the study (e.g. Lang - the study of dieback spread in the absence of human interference necessitates minimal activity).
- most studies involve some form of treatment (cutting, mining, etc.). Where treatment is not permitted (e.g. the control) this may be a temporal restriction only (say 5-12 years).
- because scientific MPAs have been selected with care and in areas where there is an obvious need, no major long term conflicts are foreseen. For long term studies, absolute security is required.

Priority use

The scientific areas have been selected because of particular features (e.g. Lang, Amphion) or particular needs (e.g. Yarragil, Marrinup). Once the purpose of the study has been satisfied (General Working Plan No. 86, 1977) the priority use for each area will be reassessed.

Conservation of flora and fauna MPAs

Key features

- located on catchments which are not currently utilised and also on catchments currently harnessed for water supply.
- contain a range of ecotypes and animal or plant species considered to be worthy of conservation.
- are an above-average to excellent representation of that type.
- are not severely affected by dieback.
- are situated so as to be protectable from natural dieback spread and have been selected with natural, defensible boundaries.

Major conflicts

- any activity which changes the structure or species composition is detrimental to the site's long term conservation value.
- activities such as bauxite mining, roading, powerline construction, cutting, intensive recreation and dieback are particularly harmful.
- for security, the areas should preferably be as large as possible. This conflicts with other land uses and a compromise solution has generally been necessary. The size problem has been partly overcome by the development of the "buffer and core" concepts.

Priority use

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.

APPENDIX 5

FORESTS DEPARTMENT

FD 626 Revised 1976

Permit to enter Dieback Quarantine Area

Pern	nit No		Division:	***************************************	***************************************			
1.	Applicant's Name a	nd Address:						
	Phone No.							
2.	Reason for Entry:							
3.	Description of Applicant's Vehicles/Plant:							
	Make	Туре	Tracks or Tyred	Colour	Reg. No.			
		······································		<u> </u>				
1.	Period of Permit: Extensions:	·						
j.	Access and Exit Rou	ıte Details:						
•								
	·							
	Hygiana Baguiramar	***						
	Hygiene Requirements: General: It is the responsibility of the permit holder to ensure that his plant and vehicles are							
	free from dirt or mud before entering the Quarantine Area. Washing down is to be carried out as specified hereunder:							
		10						
•	Other Requirements	: (See over for con	ditions of permit)					
	Application Approve	d: Date:			est Officer)			
hav	e read and agree to ob	oserve the conditio	ns of this permit and re					
mer	ndment, October 1974.	TELL THE COMMING	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	garanono unuoi	and rongoods Add			
ato.								

Signature of Permit Holder.

APPENDIX 5 contd.

FORESTS DEPARTMENT

CONDITIONS OF PERMIT

- 1. Permit holders must be able to interpret a Forests Department map and navigate access routes shown on the permit.
- 2. Permit holders must obtain a map from Forests Dept.....showing routes on the permit.
- If the route shown on permit has been accidentally blocked, the permit holder must leave the quarantine area by route of entry and seek alternative access from Forests Dept.
- 4. If rain occurs during the period of permit, the permit holder must:
 - 4.1 check the permit at Forests Dept. office before entering the quarantine area

OR

4.2 leave the quarantine area by exit route shown on permit

AND

- 4.3 seek re-endorsement of the permit from Forests Dept. before entering the quarantine area again.
- 5. Vehicles must not enter a forest quarantine area without a valid permit. No vehicle may remain within a forest quarantine area after a permit has expired.
- 6. Vehicles entering a forest quarantine area may only use access routes shown on the permit.
- 7. Do not remove, deface or interfere with road signs, gates or road blocks on the boundary or within a forest quarantine area.
- 8. Do not remove earth or vegetation from the forest quarantine area or move earth and vegetation from one place to another within the forest quarantine area except under conditions laid down in the permit.
- 9. Any Police or Forests Dept. officer may request name and address of a person within a forest guarantine area.
- 10. Any Police or Forests Dept. officer may stop, examine and detain a vehicle within a forest guarantine area.

APPENDIX 6

FORESTS DEPARTMENT

	F.D. 655.	
	PRESCRIBED BURNING PRESCRIPTION FORM	
1.	LOCATION Division Job No	
	Block Area Ref. Sq	
2.	PLAN Attach 1:31680 scale plan of burn showing burn boundary, burn history, forest species, fuel sample lines, buildings, power lines other public utilities and reserves, plots, logging operations, tops and private property boundaries.	,
3.	DESCRIPTION OF AREA	
3.1.	1 Litter Quantity range	
	<u>Total</u> (J) to t/ha (K) to t/ha	
	<u>Available</u> (J) to t/ha (K) to t/ha	
	AFF used	
3.1	2 Trash Fuel Quantity (K only)	
	Total to t/ha. Available tot/ha	
3.1	3 Scrub Types	
	Available Scrub Quantityt/ha	
3.2	Average Slopes Light fuel Heavy	
3.3	Forest Types and Size	
3.4	Logging tops (Species, year of logging)	
4.	BURN PRESCRIPTION COMMENTS	
4.1	Season of Burn	
4.2	Available Fuel Quantity Total Range	
	Jarrah to tonne/ha	
	Karri to tonne/ha	
4.3	Acceptable Scorch Height	
	Jarrah m Karri m	
4.4	Actual R.O.S. Range (m/hr)	
	Jarrah Karri	
4.5	F.D.I. range (m/hr)	
	Johnsh Karri	

	2.	001.11.1344.24.7
4.6	F.D.I. for each lighting (J or K scale) FUEL TYPE	
	1st to m/hr ()	
	2nd to m/hr ()	
	3rd to m/hr ()	
	4th to m/hr ()	
5.	METHOD OF BURNING	
5.1	Prescribed Wind Direction and Max. Strength	
5.2	P Direction of Flight Lines	
-	Desired Start Time hrs.	
6.	REMARKS (Areas requiring special attention et	c.)
	••••••••	
-	•••••••••••••	
7.	PRE-BURN PREPARATION	
7.1	Edging	

7.2	Road Maintenance	
		•
7.3	Road Signs	
7.4	Dieback Hygiene	
0	NO DITE TO A DION ALL AL DATE DO VI	
8.	NOTIFICATION - Attach PAFSOU	
8.1	Field checks required before burning commences to ensure no persons or property within burn	
	area	
9.	SUPPRESSION FORCES REQUIRED (at each lighting)

10.	COMMENTS BY PROTECTION OFFICER	

APPENDIX 6 contd.

3.

11.	SIGNATURES
	Officer Prescribing Date
	D.F.O Date
	Approved Date
12.	FIRE BEHAVIOUR REPORT
	Average headfire flame height at peak of the burn m
	" rate of forward spread m/hr.
	Time when strips joined

	Officer or Overseer
13.	POST BURN INSPECTION AND RECORD
13.1	Attach 1:31680 scale plan showing -
	Areas greater than 1 ha where full scorch has occurred.
	Internal areas greater than 10 ha unburnt.
	Unburnt pockets or burn perimeter where escapes are possible.
13.2	Further action required
	•••••••••••••••••••••••••••••••••••••••

Inspecting Officer or Overseer.

PROTECTION OF PERSONS AND PROPERTY FROM DAMAGE DURING PRESCRIBED BURNING

	Items to be Checked	(a) During Preparation			(b) Just Prior to Burn			
•	(P.A.F.S.O.U.)	Office Check	Field Check	mitial	Office Check	Field Check	Initial	
PROPERTY	Buildings						1	
	Plots							
	Bridges							
	Camps							
	Other							
ADVICE TO	Burning notices							
NE I GHBOURS	Low Flying							
	Public Warning							
	BURNING IMMINENT signs; display 3 or 4 days prior to burn							
	Other							
F.D.	Research							
OPERATIONS	W.P.O.							
	Soil Surveyors							
	Other	$\downarrow \downarrow \downarrow$						
SERVICES	Telecom						<u> </u>	
	S.E.C., Westrail, M.R.D.							
	Shire	1						
	Water Supply, P.W.D.	-					····	
	Other]]						
OTHER FOREST	Hunters and Fishermen						·	
USERS	Researchers, Students	<u> </u>						
	Defence Forces					İ		
	Geologists, Surveyors							
	Ag. Protection Board							
	Gravel Licenses							
	Recreationists							
	Other							
UTILISATION	Sawmilling							
	Apiarists	\downarrow						
	Pole and Pile Licenses	 			,		·	
	Firewood							
	Minor Forest Produce							

O.I.C's Signature	an€	Date	

APPENDIX 7 contd.

FORESTS DEPARTMENT

INSTRUCTIONS TO OFFICERS USING FORM F.D. 659

Physical checks must be carried out for each burn to ensure that persons or equipment known to be in the area have left and that no other persons or equipment have moved into the area.

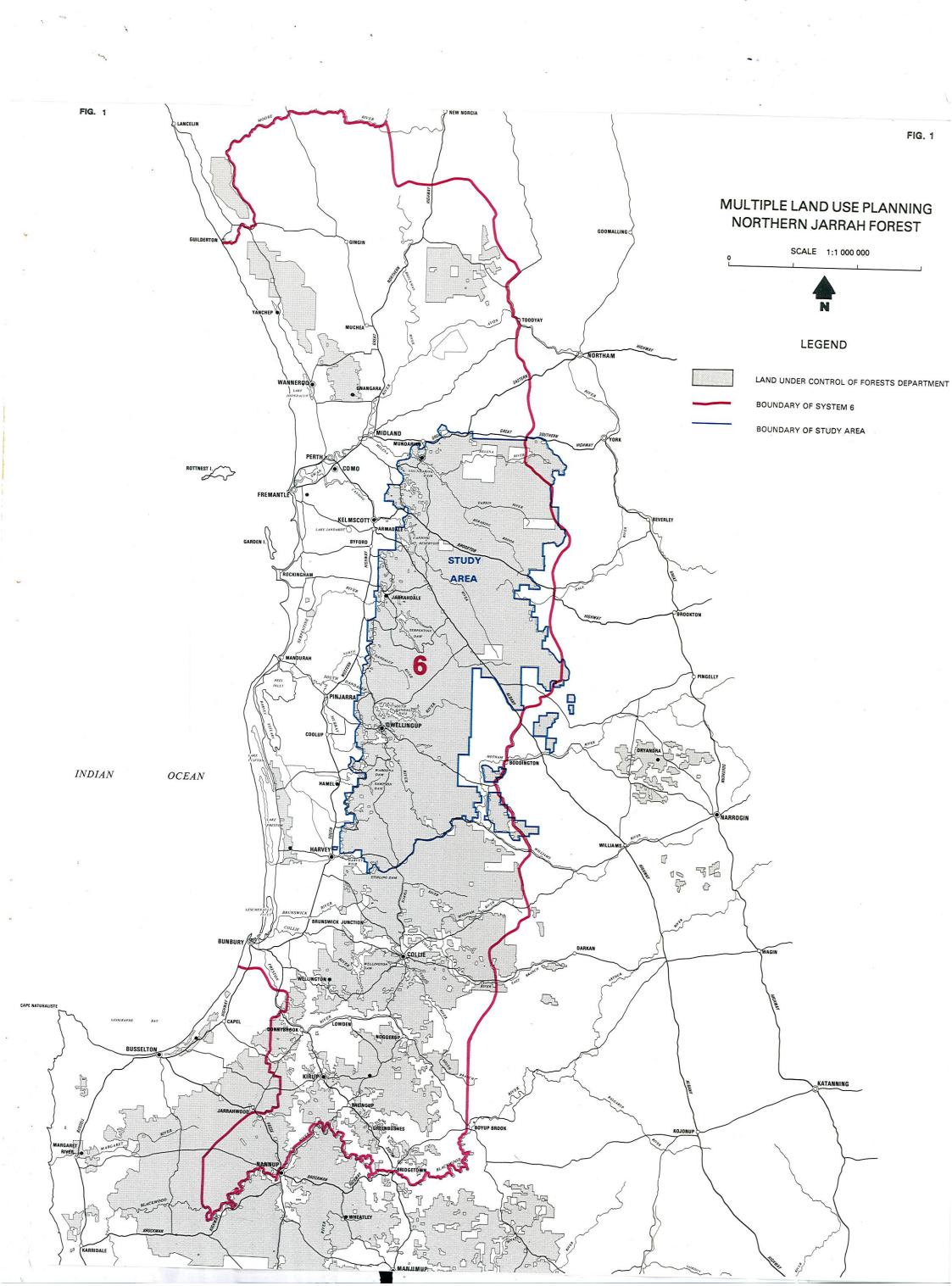
The officer compiling the prescription and/or the O.I.C. must clearly indicate on the form those items requiring checking in the field and those for which an office check, e.g. telephone, will suffice.

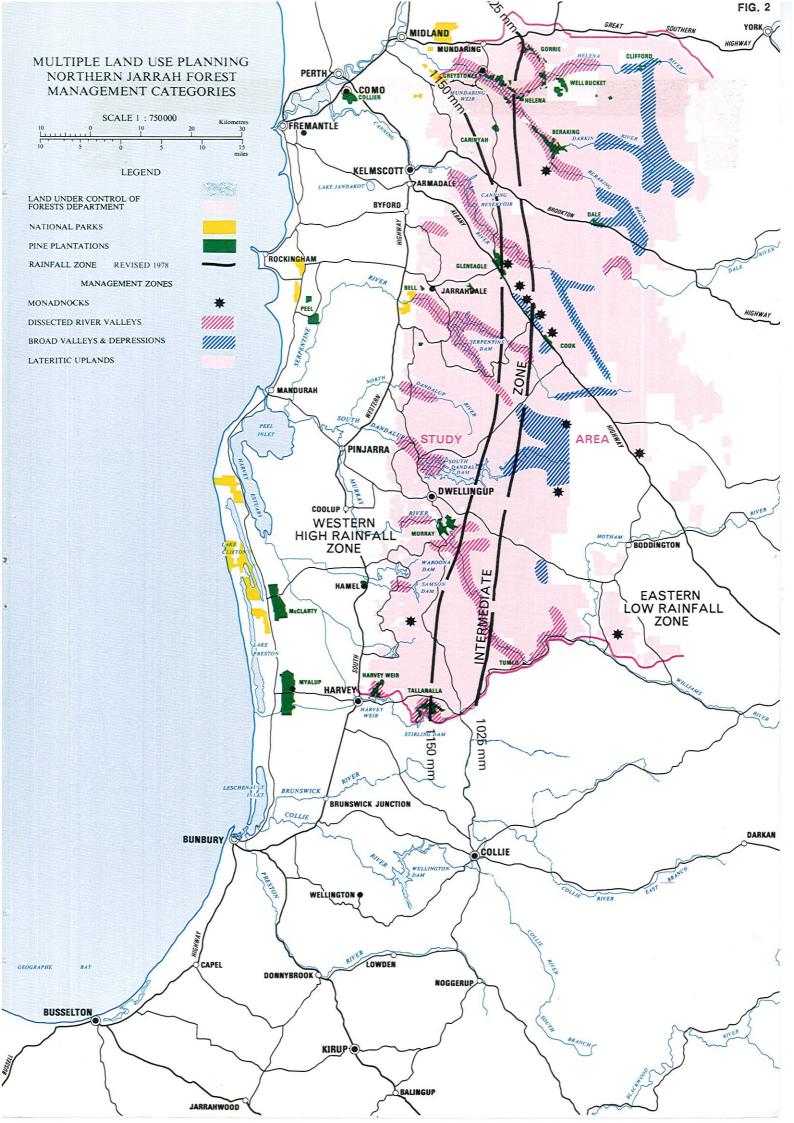
The checking officer must initial each item checked and show the date at the foot of the column or bracketed at the side.

NOTE:

It is important that planning of prescribed burns be sufficiently detailed to prevent injury to personnel and damage to property. When the prescription is being prepared for each prescribed burn, every object, operation or establishment within the area which may suffer damage must be identified and when necessary, action taken to ensure protection. The position of anything liable to be damaged should be recorded on this form so that protection is not overlooked.

FIGURES





ERRATUM

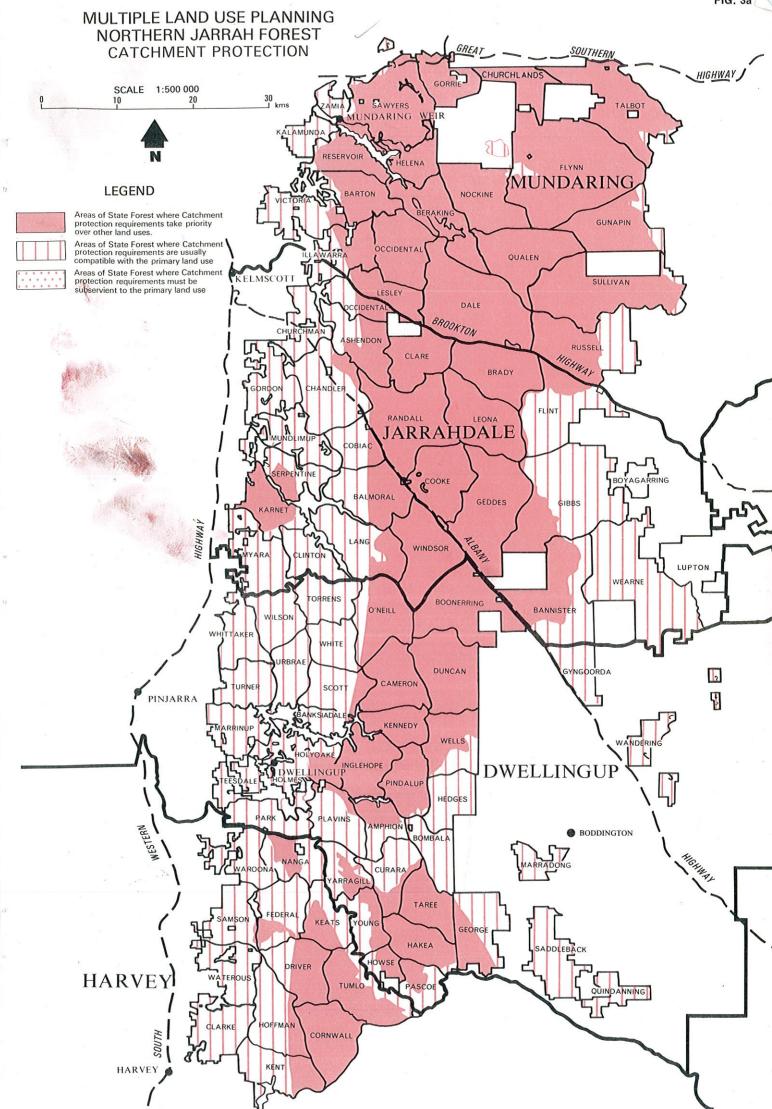
Please attach to Figure 3.

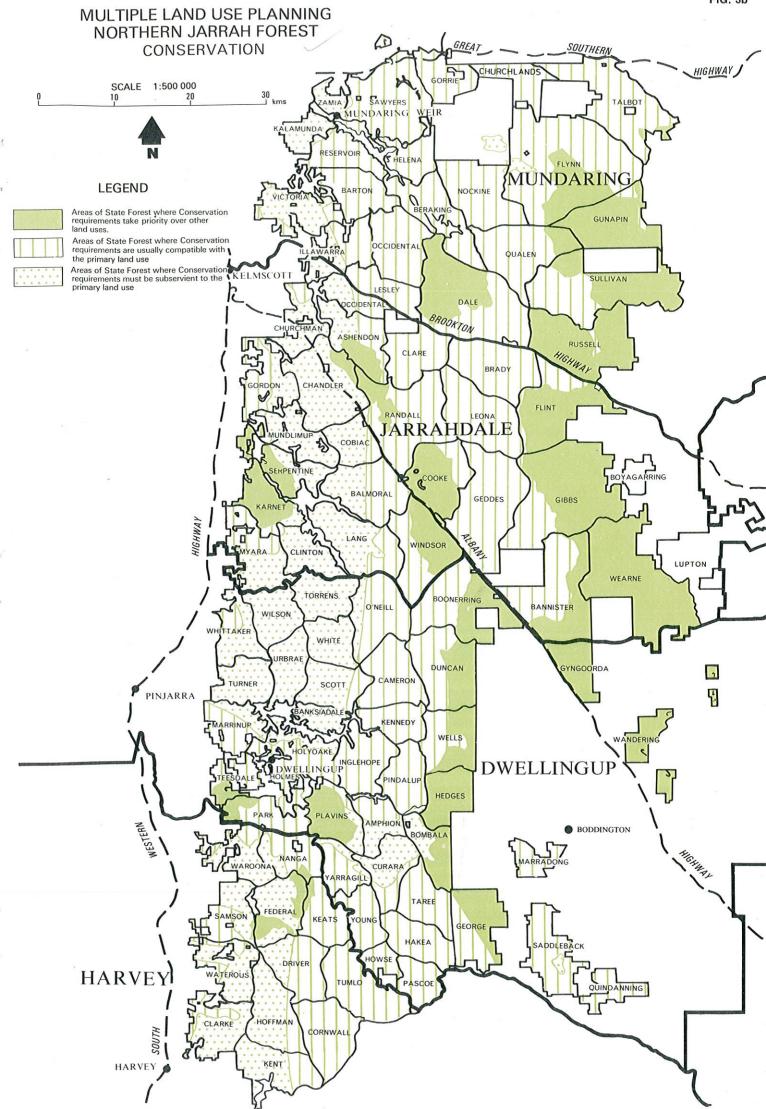
The areas in the eastern zone designated by green and red stripes to indicate equal priorities for recreation-conservation of flora and fauna - mining (parts of Russell, Flint, Gibbs, Wearne, Bannister, Wells, Hedges, Bombala and George Blocks) are incorrectly classified.

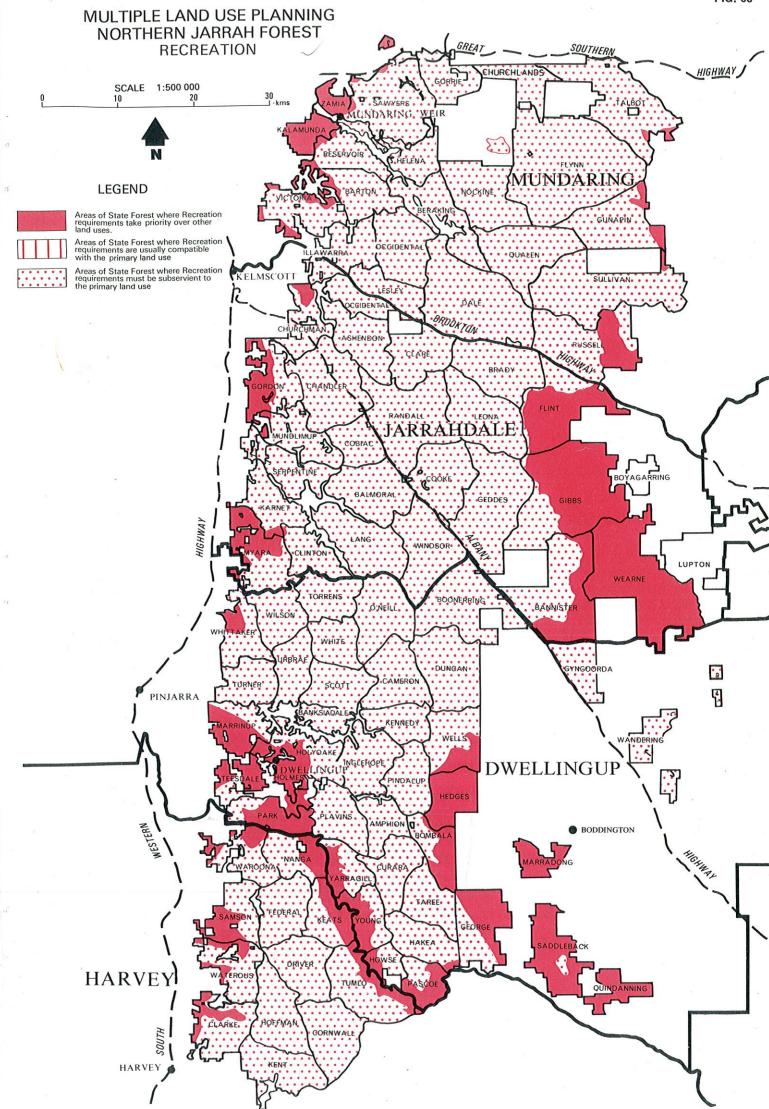
These areas are true multiple use forest which correctly classified would indicate equal priority for all forest values, i.e. forest conservation in the true sense of the word. In other parts of the world the term Protection Forest has been used for this category of managed forest.

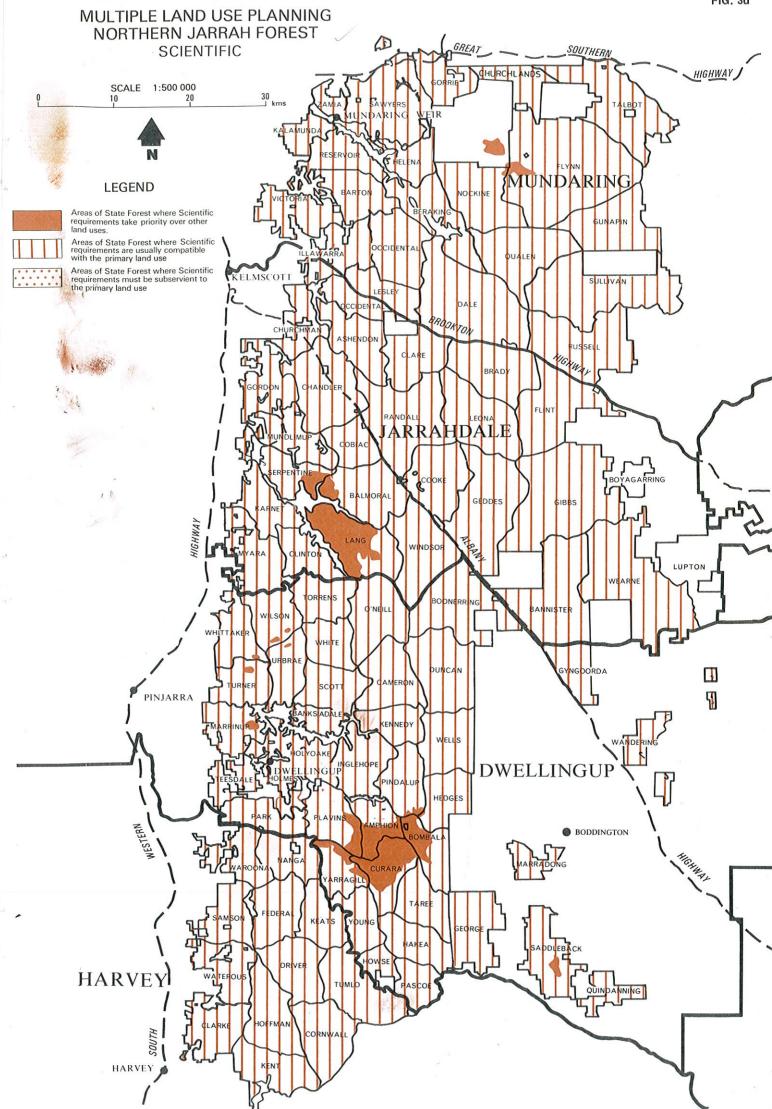
Final classification in this case will be reserved until draft plans are available for the central and southern forest regions where large areas of forest of a similar category exist in the Sunklands, along the south coast and along the eastern margin of the forest.

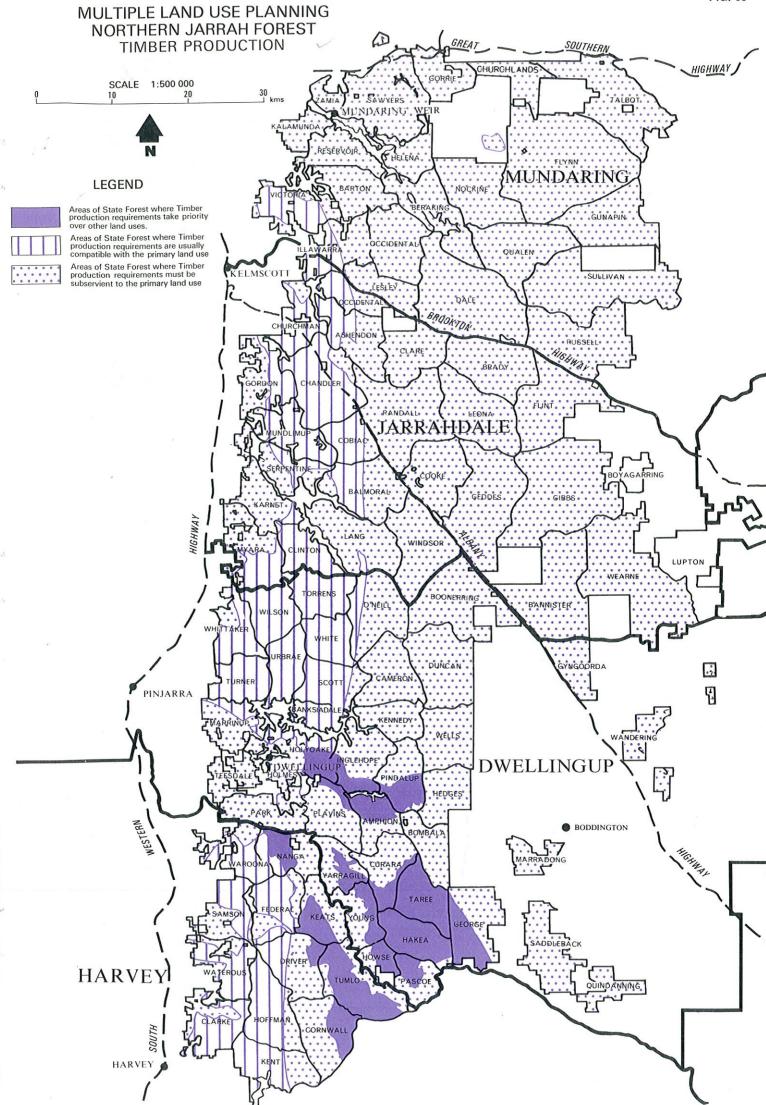
FIG. 3 MULTIPLE LAND USE PLANNING NORTHERN JARRAH FOREST MANAGEMENT PRIORITY AREAS These priorities will be renewed and updated at about five yearly intervals. NOCKINE LEGEND FOR PRIMARY LAND USES **BUFFER ZONES FOR MPAs** CATCHMENT PROTECTION MPAs QUALEN CONSERVATION OF FLORA AND FAUNA MPAs RECREATION MPAs SCIENTIFIC MPAs TIMBER PRODUCTION MPAs WATER PRODUCTION MPAs BAUXITE MINING (Least impact on catchments) Specific areas to be mined are subject to approval between the State and the Companies. CLARE RESERVOIRS BRADY PINE PLANTATIONS SCALE 1:250 000 WINDSOR LUPTON TABLE 2 ALLOCATION OF OTHER USES TO MANAGEMENT PRIORITY AREAS SECONDARY USES † MANAGEMENT PRIORITY TERTIARY USES ‡ **INCOMPATIBLE USES** Conservation of flora and fauna Activities which introduce dieback Catchment protection MPAs disease, remove native cover without the provision of successful regeneration or increase the risk of erosion and pollution. Timber production Bauxite mining Communication lines BANNISTER Honey production Wildflower management Water production Catchment protection Scientific Water production Recreation Timber salvage and regeneration Honey production Activities which alter structure or Conservation of Flora & Fauna or composition of the forest or introduce dieback disease. Activities which permanently destroy the aesthetic appeal of the landscape or require the cessation of recreational activities. Timber production Bauxite mining Communication lines Recreation MPAs Conservation of flora and fauna GYNGOORDA Honey production Catchment protection Scientific DUNCAN Water production Wildflower management Bauxite mining Recreation Scientific MPAs Catchment protection Wildflower management Water Production Activities detrimental to the scientific objectives of the study. Conservation of flora and fauna Honey production Communication lines Timber production WANDERING KENNEDY Activities which permanently destroy the productive capacity of the forest. Timber production MPAs Catchment protection Conservation of flora and fauna Communication lines Bauxite Mining Wildflower management Honey production Water production Catchment protection Timber production Bauxite mining Scientific Water production MPAs Activities which restore a dense deep rooted vegetative cover throughout the area or increase risk of erosion, siltation chemical or biological pollution. Conservation of flora and fauna Honey production Communication lines Wildflower management DWELLINGUP Activities which endanger the plantation especially those which could increase the frequency of Catchment protection Scientific Water production Pine plantations Recreation Communication lines Activities detrimental to water Water storage (domestic) Recreation e.g. fishing picnics Activities which cause serious Water storage (irrigation) erosion to banks or damage to engineering structures. e.g. power boating water skiing camping † Secondary uses are those which are largely compatible with the Primary use ‡ Tertiary uses may be permitted but only as long as there will be no significant harm to the Primary Use





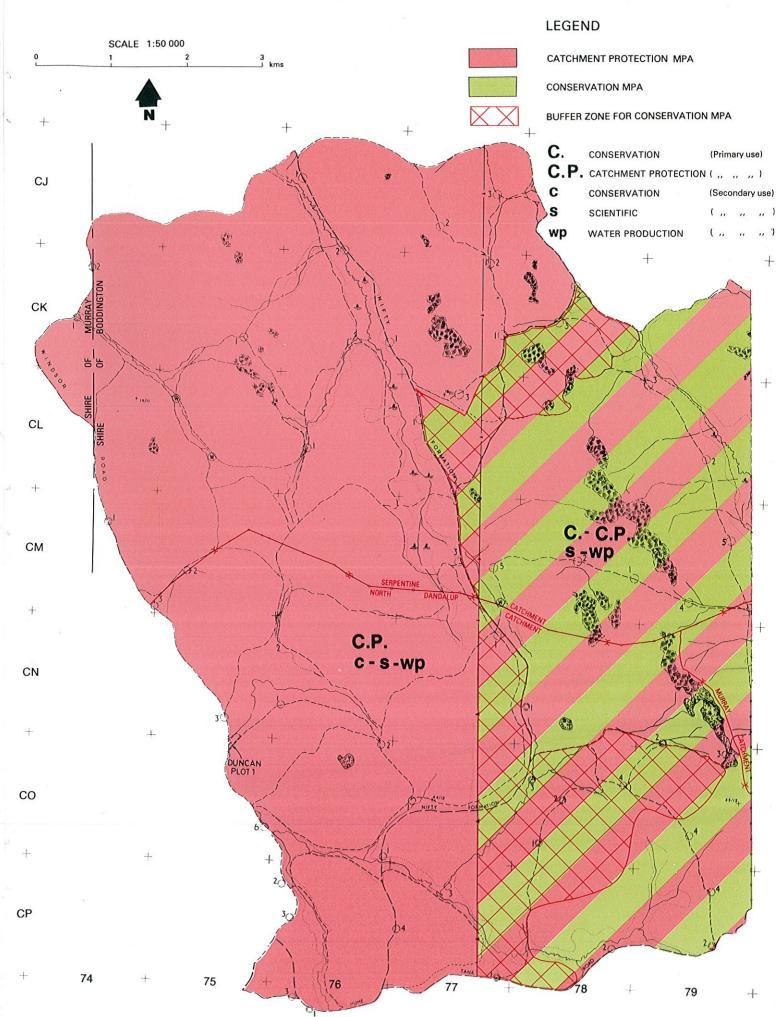






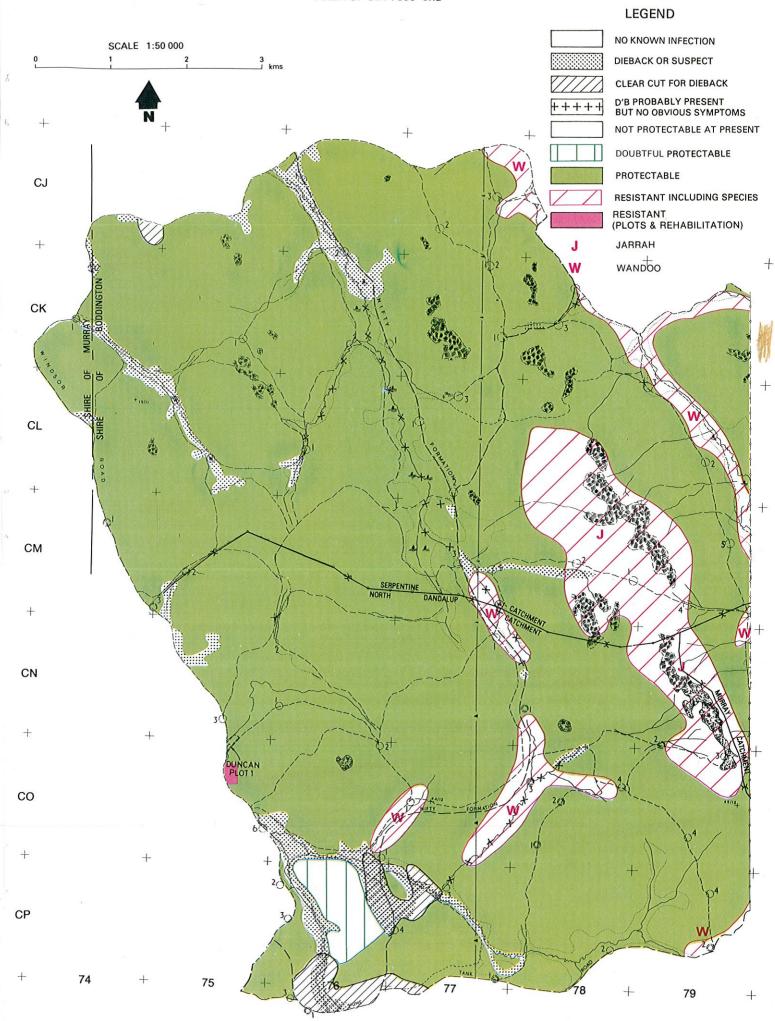
HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS) MANAGEMENT PRIORITY AREAS

DUNCAN FOREST BLOCK AREA OF S.F. 7895 · 5ha



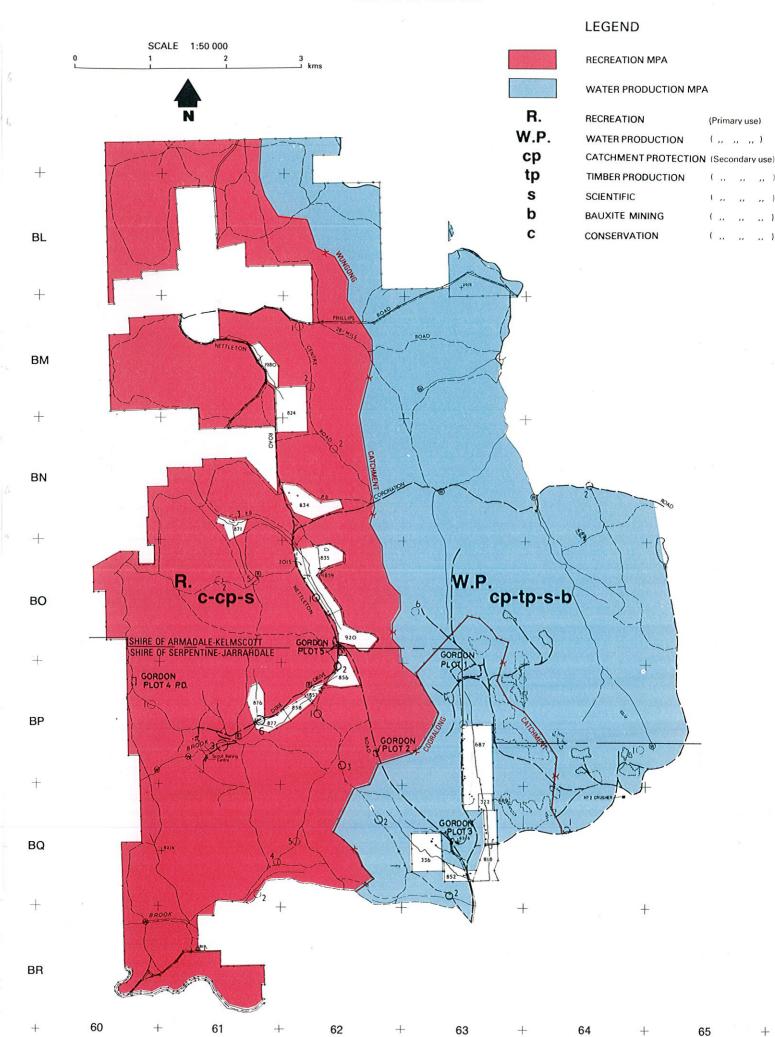
HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS) DIEBACK RISK DUNCAN FOREST BLOCK

DUNCAN FOREST BLOCK AREA OF S.F. 7895 · 5ha



HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS) MANAGEMENT PRIORITY AREAS

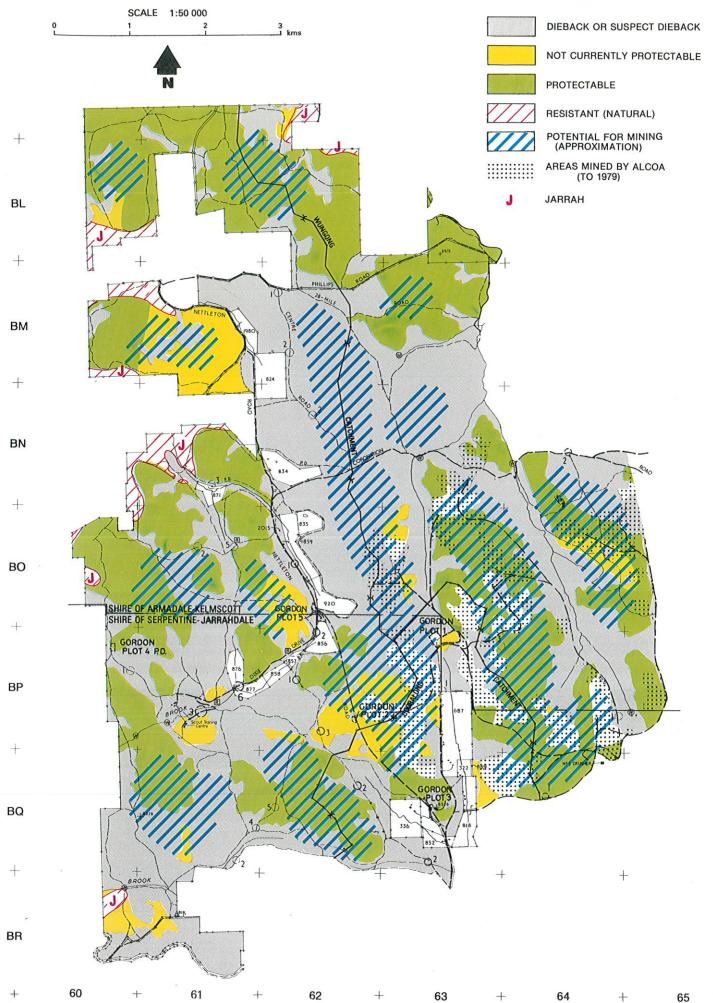
GORDON FOREST BLOCK AREA OF S.F. 5238 · 5ha



HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS) DIEBACK RISK & BAUXITE MINING

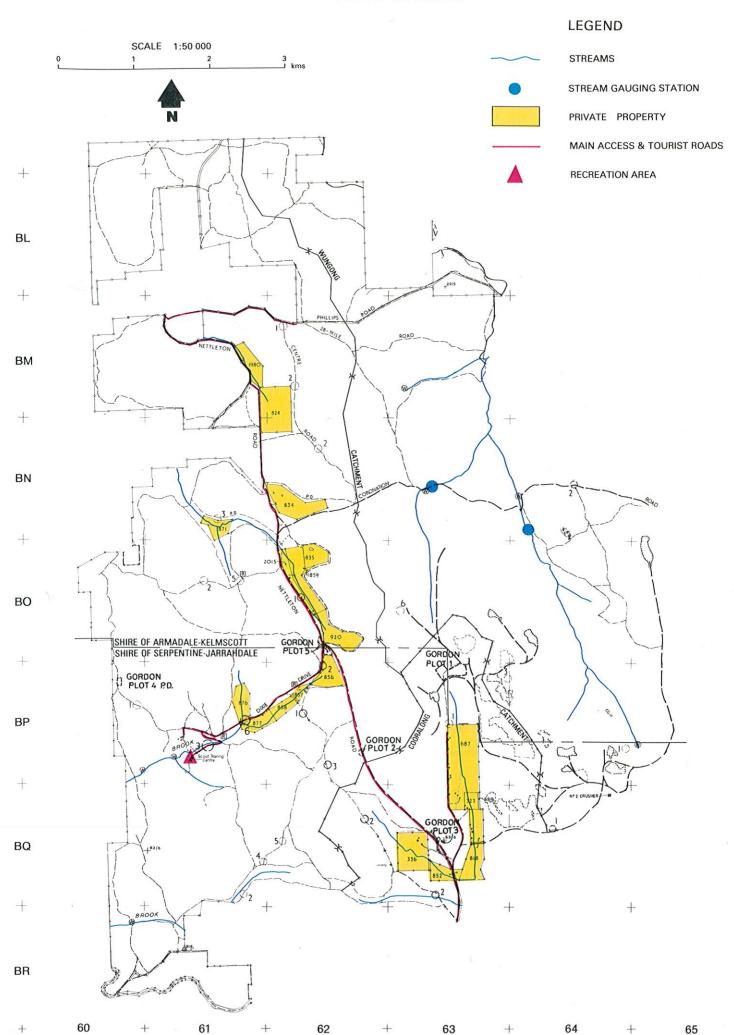
GORDON FOREST BLOCK AREA OF S.F. 5238 5ha (SIMPLIFIED)

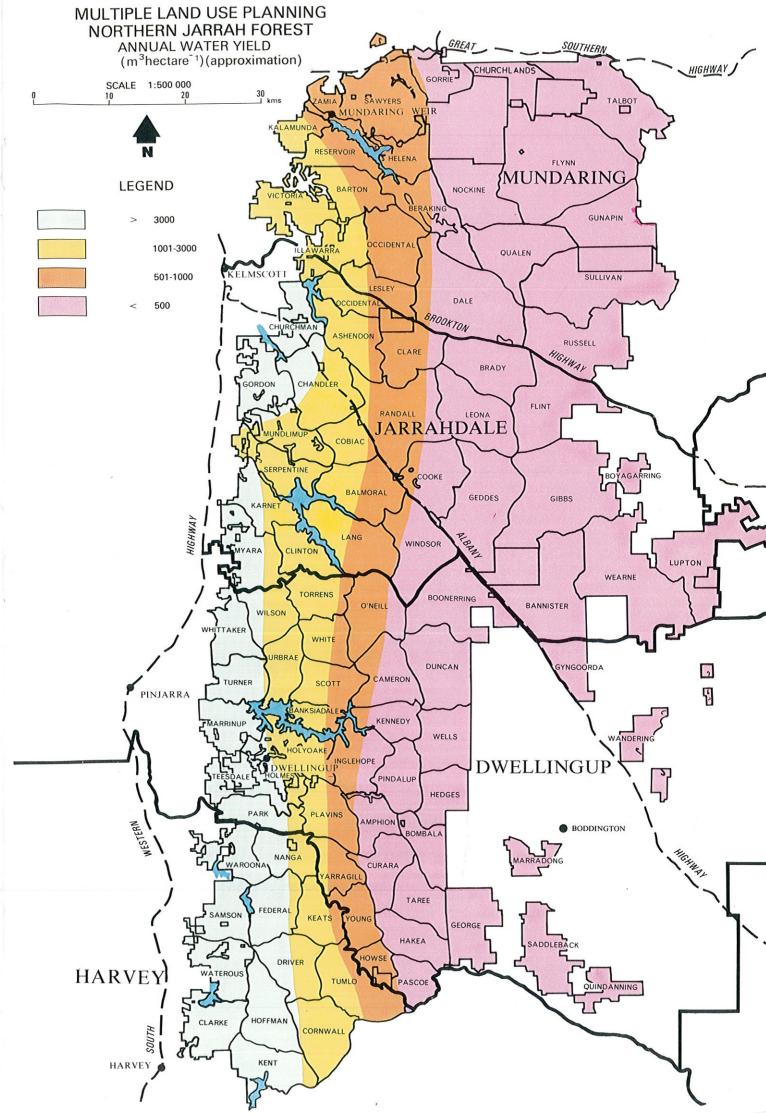




HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS) **INFLUENCE ZONES GORDON FOREST BLOCK**

AREA OF S.F. 5238-5ha





HARDWOOD OPERATIONS CONTROL SYSTEM (HOCS)

INFLUENCE ZONES

MARRINUP FOREST BLOCK AREA OF STATE FOREST 4141 6 ha

LEGEND

