

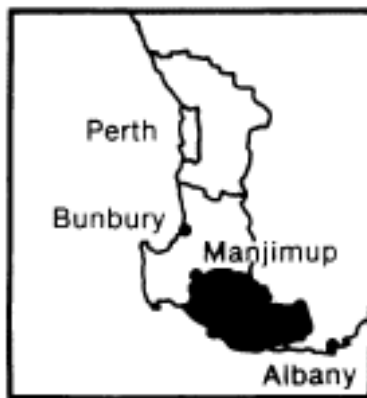
Southern Forest Region



Department of Conservation and
Land Management, Western Australia

DECEMBER 1987

**SOUTHERN FOREST REGION
REGIONAL MANAGEMENT PLAN
1987-1997**



MANAGEMENT PLAN NO. 11

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PREFACE

Regional management plans are prepared by the Department of Conservation and Land Management on behalf of the Lands and Forest Commission and the National Parks and Nature Conservation Authority. These two bodies submit the plans for final approval and modification, if required, by the Minister for Conservation and Land Management.

Regional plans will be prepared for each of the 11 regions administered by the Department of Conservation and Land Management (CALM).

This plan for the Southern Forest Region partly replaces the General Working Plan No. 87 (Forests Dept. W.A, 1982) which dealt with State forests in the south-west. In addition, this plan covers all land and water in the region vested under the CALM Act, together with wildlife responsibilities included in the Wildlife Conservation Act.

In addition to the regional plan, more detailed management plans will be prepared for certain high value or high conflict areas - e.g., some national parks - or for certain exploited or endangered species, e.g., kangaroos and the Noisy Scrub Bird. These 'area management plans' and 'wildlife management programs' will provide more detailed information and guidance for management staff.

The time frame for this regional plan is ten years, although review and restatement of some policies may be necessary during this period.

This management plan was submitted by the Department of Conservation and Land Management and adopted by the Lands and Forest Commission on 9 December 1987 and the National Parks and Nature Conservation Authority on 11 December 1987, and approved by the Hon. Minister for Conservation and Land Management on 14 December 1987.

OBJECTIVES AND PRINCIPLES

The objectives of this regional management plan are:

To describe the land and wildlife resources managed by CALM in the Southern Forest Region.

To present a land use plan for land managed by CALM in the region, based on the departmental system of land classification and the principles of multiple use.

To outline the departmental policies and management guidelines on which day-to-day management of land, wildlife and resources in the region are based.

To provide for public involvement in land-use planning and management by CALM.

To provide a planning and management framework for CALM responsibilities in the region, upon which more detailed operational plans can be based, and into which policy changes or research findings can be readily incorporated.

The principles upon which this plan has been prepared are:

The plan must comply with the requirements of the State Conservation Strategy for WA.

Land will be managed in such a way as to promote or achieve the purpose for which it was vested, e.g.,

in the case of indigenous State forest or timber reserves, to ensure multiple use and sustained yield of the resource for the satisfaction of long-term social and economic needs [CALM Act Section 56(1)(a)];

in the case of State forest or timber reserves planted with exotic species, to achieve the optimum yield in production consistent with the satisfaction of long-term social and economic needs [CALM Act Section 56 (1)(b)];

in the case of national parks, to fulfil as much of the demand for recreation by members of the public as is consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the

preservation of any feature of archaeological, historic or scientific interest [CALM Act Section 56(1)(c)];

in the case of nature reserves, to maintain and restore the natural environment and to protect, care for, and promote the study of indigenous flora and fauna [CALM Act Section 56 (1)(d)].

All management operations are to be economical and environmentally sensitive.

The processes of land use planning and wildlife and resource management are to be assisted by public participation, particularly at the regional level.

In addition, the following principles set down in the State's timber strategy apply also to the preparation of this regional management plan:

There is to be an equitable reservation of forest areas for conservation, recreation and production, and these areas are to have security of tenure and purpose.

All areas of forest managed for timber production are also to be managed to provide for other values of the forest and all areas harvested are to be regenerated.

ASSOCIATED DOCUMENTS

This regional management plan should be read in conjunction with two other key documents:

Timber Production in Western Australia - A Strategy to take W.A.'s South-West forests into the 21st Century (CALM 1987).

Strategies for Conservation and Recreation on CALM lands in Western Australia - the conservation, environmental protection and recreation strategies of W.A.'s Department of Conservation and Land Management (CALM 1987).

PART 1. THE DEPARTMENT OF CALM AND ITS PLANNING AND LAND USE MANAGEMENT PROCESSES

THE DEPARTMENT

Origin of the Department and the Controlling Bodies

The Conservation and Land Management Act, 1984, was proclaimed on 22 March 1985 and as a result the Forests Department, National Parks Authority and the Wildlife Section of the Department of Fisheries and Wildlife were amalgamated to form the Department of Conservation and Land Management (CALM). The Act also established two controlling bodies: the Lands and Forest Commission (LFC) in which State forest and timber reserves are vested.; and the National Parks and Nature Conservation Authority (NPNCA) in which national parks, nature reserves, marine parks and marine nature reserves are vested. It also established a Forest Production Council to advise the Minister on matters pertaining to production from State forest and timber reserves.

Administrative Structure

EXECUTIVE DIRECTOR

The Department is headed by an Executive Director who is also a member of the Lands and Forest Commission, an ex-officio member of the National Parks and Nature Conservation Authority and Chairman of the Forest Production Council.

POLICY DIRECTORATE AND OPERATIONS DIRECTORATE

The Policy Directorate is headed by the Executive Director and comprises the General Manager and Policy Directors who are responsible for forests, national parks and recreation, and nature conservation. Its major task is to devise policy and liaise with the Operations Directorate about policy implementation. The Operations Directorate comprises the General Manager and five Divisional Managers (research, administration and finance, services, forest resources, and operations) who are responsible for the Departmental branches and regions.

REGIONS

The State is divided into 11 CALM regions, each with a high degree of autonomy. They are Kimberley, Pilbara, Gascoyne, Goldfields, Greenough, Wheatbelt, South Coast, Southern Forest, Central Forest, Northern Forest and Metropolitan Regions, as shown in Map 1.

Objectives of the Department (The Corporate Plan)

The first section of the corporate plan of the Department of Conservation and Land Management states:

In recognising that Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits and that the natural environment is an essential component of the quality of life for West Australians, a statement of mission adopted for the Department of Conservation and Land Management as stated in the Departmental corporate plan 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.

The Department's 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.

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 seek a better understanding of the natural environment and to promote awareness and appreciation of its values.

Land Management Planning

The CALM Act (Section 33) requires the Department to manage land covered by the Act in accordance with a 'management plan'.

Management plans are the responsibility of the NPNCA and LFC, but are prepared through the agency of the Department.

Sections 55-58 of the CALM Act specify that management plans must:

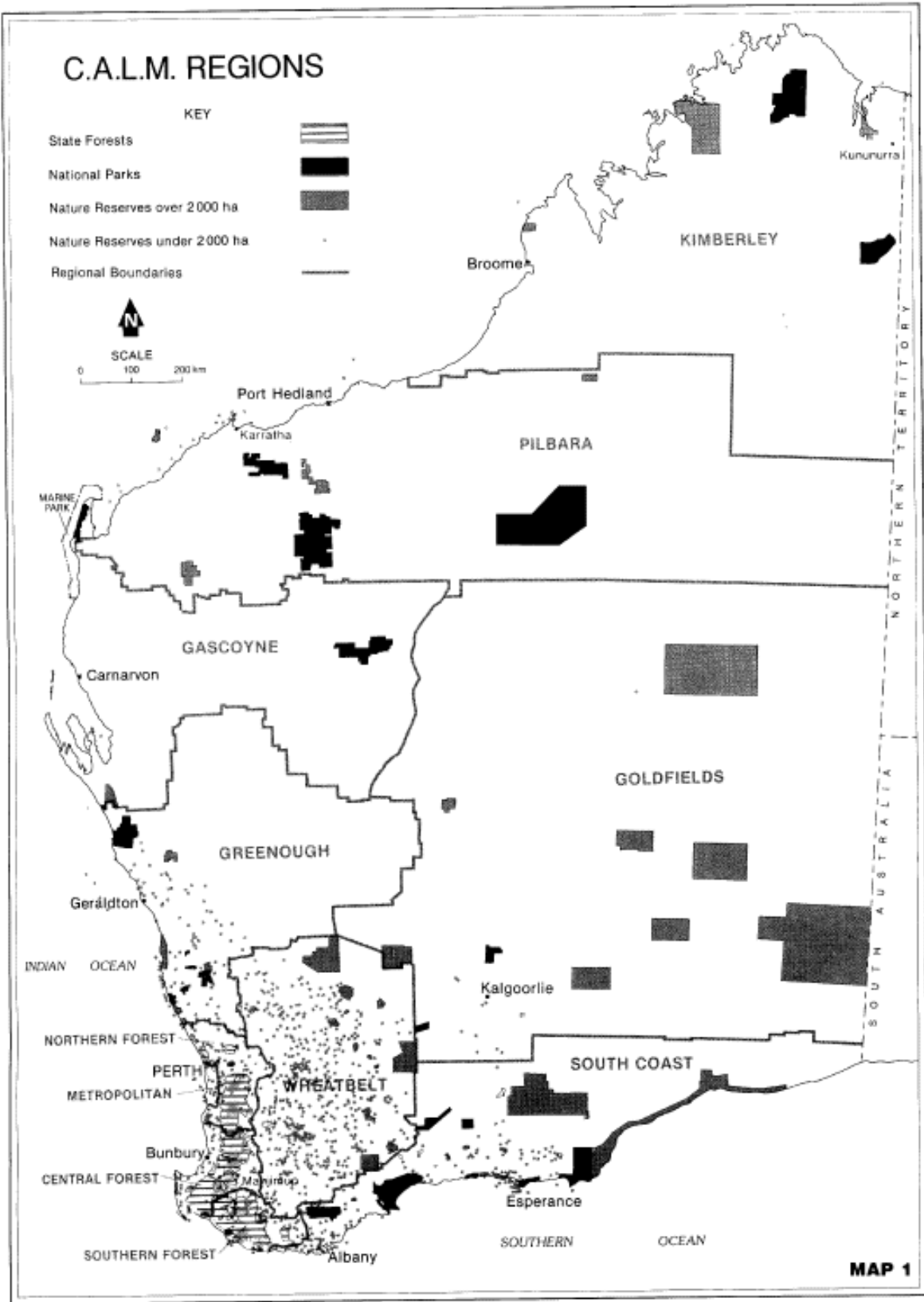
- contain a statement of policies or guidelines to be followed;
- provide a summary of proposed operations;
- not exceed a ten-year term;
- be open for public comment for a minimum of two months before submission to Government; promote the achievement of the purpose for which the land was vested;
- pursue particular objectives for each category of land.

The style and order of development of management plans is a matter determined by Departmental policy. CALM Policy Statement No. 1 (Planning) states that management plans will contain clear statements on:

- the purpose and background of the plan;
- the resource information on which the plan is based;
- management problems, and discussion of options where appropriate;
- management proposals, including sections on implementation and monitoring;

CALM has developed five main types of plans for management of its land. Their hierarchical relationship is shown as follows:





The Department's strategic plan (the first part of the corporate plan) establishes the link to land management plans.

It consists of broad policy statements (see Appendices 1 and 2) for all major aspects of land use for all land and water vested in the NPNCA, the LFC and the Executive Director of CALM in Western Australia.

Regional management plans deal with land management planning at a regional level. They will be prepared for each Departmental administrative region. Map 1 shows the CALM regional boundaries.

When a regional management plan is approved, it will conform to Section 55 of the CALM Act and provide sufficient information for all NPNCA, LFC and Executive Director land in the region to be adequately managed until more detailed area management plans are available.

Area management plans cover a specific area or set of areas, often of common purpose (vesting) such as one or more national parks, marine parks, nature reserves, marine nature reserves, State forest, or other reserves. These are the most detailed management plans prepared by CALM. Area management plans will be prepared where there are management details specific to an area that cannot be adequately covered by a regional management plan.

Regional and area management plans are subject to public review in the draft form.

In addition, the Department prepares issue plans, operational plans, manuals and prescriptions. These are used to implement regional and area management plans and are discussed in Part 5. Many of these documents are available for public reference in regional or district offices on request.

VESTING, TENURE AND PURPOSE OF LAND MANAGED BY CALM

This section describes the system of classification, reservation and vesting which applies to lands managed by the Department of Conservation and Land Management.

The Controlling Bodies and the Department

The proclamation of the Conservation and Land Management Act in 1985 established two controlling bodies (the National Parks and Nature Conservation Authority and the Lands and Forest Commission) in which land is vested. The Act also established the Department of Conservation and Land Management which is responsible for management of the land vested in the controlling bodies.

The membership of the controlling bodies is representative of the many community interests associated with the lands vested in them.

Categories of Land Currently Vested in the Controlling Bodies and Managed by the Department

The CALM Act currently (Sept 1987) lists seven categories of land to which the legislation applies. These are:

- State forest
- timber reserve
- national park
- nature reserve
- marine park
- marine nature reserve
- any other land vested in the Commission or the Authority

In addition, the Department also manages land held freehold in the name of the Executive Director.

Vesting and Management

State forests and timber reserves are vested in the Lands and Forest Commission. National parks and nature reserves are vested in the National Parks and Nature Conservation Authority. Miscellaneous reserves may be vested in either body.

The Department is responsible for management of lands vested in the Authority and the Commission. Management is carried out according to government policies, and as specified in management plans submitted by the controlling bodies and approved by the Minister for Conservation and Land Management.

Tenure

'Land tenure' is the term used to describe the form of right, or title to land. The two broad classes of land tenure are private land and Crown land. Crown lands which are managed by the Department fall into two broad categories: reserves and State forests.

Security of Tenure of Land

In Western Australia, the security of tenure of Crown land reserves varies, depending upon whether the reserve is Class A, B or C.

A Class reserve - tenure can be changed only by agreement of both Houses of the W.A. Parliament.

B Class reserve - tenure can be changed by the Governor of Western Australia without approval by Parliament. However, the reasons for any change must be reported to Parliament by the Minister for Lands.

C Class reserve - tenure can be changed by the Governor, without reference to Parliament. However, any changes must be published in the Government Gazette.

This system therefore determines the degree of difficulty involved in changing the tenure of Crown land.

Most national parks and nature reserves are A Class reserves. However, some parks and nature reserves were given B or C Class status when they were created many years ago and this status has persisted.

The security of tenure of State forest is the same as that of an A Class reserve. State forest is not a 'reserve', and therefore is not classed A, B or C. However, any change to the tenure of a State forest requires the agreement of both Houses of Parliament.

Purpose and Security of Purpose

There are a variety of purposes for which lands vested in the Authority or the Commission are managed. Different categories of land have a different purpose, for example, conservation, production or recreation.

Under existing legislation, secure purpose is already provided for lands managed for conservation and recreation (for example nature reserves and national parks). On the other hand, in State forest, which in the past has been zoned for a variety of purposes (i.e. multiple use), there has been no legislative mechanism to make these purposes secure.

Therefore, although State forest has security of tenure identical to an A Class reserve, the purpose for which a particular area of State forest is managed may be decreed at the level of a management plan prepared within the Department and approved by the Minister, but without approval of Parliament.

Changes to be Introduced

The current requirements for reservation, classification, and security of purpose for land managed by CALM have disadvantages.

For example:

- marine conservation is not adequately catered for;
- there is confusion where areas of different tenure are managed for the same purpose;
- some areas (especially small conservation and recreation reserves) are inappropriately classified;
- in some instances, the tenure of the land is secure, but the purpose of its management is not.

Subject to the amendment of the CALM Act, a new system is to be adopted. Under this system there will be seven categories of Crown land managed by CALM:

- nature reserve
- national park
- conservation park
- marine park
- State forest
- timber reserve
- miscellaneous reserves

In addition, the Department will continue to manage land held freehold in the name of the Executive Director.

Furthermore, it is proposed that State forests will have A Class security of purpose as well as tenure. This will mean that the procedure for removal of forest areas from public ownership will not change. In addition, the purpose for which they have been reserved (the multiple uses incorporating conservation, recreation, timber production and water catchment protection) will not be able to be changed without the agreement of both Houses of State Parliament.

The categories are defined in terms of vesting, tenure and purpose as follows:

NATURE RESERVE

Vesting: National Parks and Nature Conservation Authority

Tenure: A Class (B and C Class reserves will be progressively reviewed and changed to A Class where appropriate).

Purpose: Wildlife and landscape conservation, scientific study and preservation of features of archaeological, historic or scientific interest.

Comment: Nature reserves may be terrestrial or marine. These are areas in which wildlife values may not be commercially exploited and where forms of recreation which damage natural ecosystems are not permitted.

NATIONAL PARK

Vesting: National Parks and Nature Conservation Authority

Tenure: A Class (B or C Class parks will be progressively reviewed and changed to A Class where appropriate).

Purpose: Wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest, together with recreational enjoyment by the public.

Comment: National parks may be terrestrial or marine. With the exception of beekeeping in some parks, commercial exploitation of flora and fauna is not permitted. Only those recreational pursuits which do not adversely affect ecosystems and landscapes are permitted.

The classification of national park applies to areas which have national or international significance for scenic, cultural or biological values.

CONSERVATION PARK

Vesting: National Parks and Nature Conservation Authority

Tenure: A Class

Purpose: Identical to national park

Comment: Conservation parks differ from national parks only in their significance, size or condition. They are managed as if they were national parks. The difference is that these areas do not have major national or international significance, are relatively small in size or the landscape or biota has been affected by past land use. Conservation parks in forest areas will not be zoned to include areas where commercial timber production may occur.

MARINE PARK

Vesting: National Parks and Nature Conservation Authority.

Tenure: A Class

Purpose: Marine conservation and recreation, with areas zoned for commercial fishing on a sustained yield basis.

Comment: This classification is generally in accord with the internationally accepted concept of a managed resource area. It allows for management for conservation and recreation, plus controlled exploitation where appropriate.

STATE FOREST

Vesting: Lands and Forest Commission

Tenure: Identical to A Class, in that the agreement of both Houses of Parliament is required before tenure can be changed.

Purpose: Multiple use.

Comment: The major uses of State forest will be for water supplies, recreation, sustainable timber production and for wildlife conservation. State forests will also provide for public utilities and mineral production, where these activities are imposed.

TIMBER RESERVE

Vesting: Lands and Forest Commission

Tenure: Similar to C class

Purpose: Timber production

Comment: Timber reserve is a transitional classification. As timber reserves are evaluated, they will be reclassified as State forest, nature reserve or conservation park, as appropriate.

MISCELLANEOUS RESERVES

Vesting: Lands and Forest Commission or National Parks and Nature Conservation Authority

Tenure: Normally B or C Class

Purpose: These reserves have a wide variety of purposes, but normally are related to recreation or wildlife conservation. As with timber reserves, this classification is often transitional, and on further evaluation the classification can be changed to a more appropriate one.

Criteria for Allocation of Land to CALM Categories

Where land is acquired by CALM, or where the classification of a particular area is under review, the following criteria are applied:

NATURE RESERVE

Areas to be managed for wildlife conservation and scientific study.

Have important conservation value, either as part of a reserve system, as a remnant or because of particular species.

No historical commitments to inappropriate uses or activities.

NATIONAL PARK

Areas to be managed for wildlife conservation, scientific study and public enjoyment.

Have important conservation, cultural and scenic values.

Nationally or internationally unique, in terms of landscape and/or biota.

Size must be sufficiently great to accommodate recreation or historical uses without significantly detracting from conservation values.

CONSERVATION PARK

Purpose identical to national park.

Areas generally are not nationally or internationally unique, in terms of landscape and/or biota.

These are areas generally less than 1000 ha in size and/or where wildlife conservation values have been affected by past activities or land use decisions.

MARINE PARK

Marine areas managed for conservation, study, public enjoyment and commercial fishing on a sustained yield basis.

Where zoning includes commercial fishing, a marine park must be large enough to allow this fishing without detracting from the overall conservation and recreational value.

STATE FOREST AND TIMBER RESERVE

Areas to be managed for multiple use, with the primary uses in most cases being sustainable timber production and protection of water catchments.

CALM Responsibilities on Lands Not Vested in the Controlling Bodies

CALM is responsible for the conservation and protection of native flora and fauna on all land and waters within the State boundaries, under Section 6 of the Wildlife Conservation Act.

Vacant Crown land and unvested reserves are nominally controlled by the Department of Land Administration. However, forest produce on vacant Crown land is controlled by CALM under Section 88 of the CALM Act. Forest produce includes trees, timber, firewood, honey, seed, rocks, stone and soil, but excludes minerals under the Mining Act 1978. The Bush Fires Board is responsible for fire prevention measures on vacant Crown land and unvested reserves under Section 10 of the Bush Fires Act.

Under Section 45 of the Bush Fires Act, CALM may take responsibility for the suppression of bush fires threatening State forest. Under an agreement with the Department of Land Administration, the Agriculture Protection Board has responsibility for the control of vermin and declared plants on vacant Crown land and unvested reserves.

CALM has the responsibility of administering regulations made under the Wildlife Conservation Act for the protection, management and control of nature reserves. Under section 130 of the CALM Act those provisions also apply to those reserves created under the Land Act for the conservation of flora and/or fauna, which are not vested in the National Parks and Nature Conservation Authority.

Under Section 139 of the CALM Act the forest produce on road reserves through State forest and timber reserves is controlled by CALM. This also applies to all roads within Manjimup Shire. However, Shires have the right to the timber from trees felled in bona fide road clearing or widening.

Under Sections 137 and 138 of the CALM Act, CALM may control the timber on particular reserves or gazetted catchments if the Governor so directs. Timber royalties derived from such reserves are usually apportioned between CALM and the vesting authority.

Under arrangements ratified by Section 151 of the CALM Act, CALM controls forest produce on Land Act timber reserves and Timber for Settlers reserves. The Department of Land Administration controls the land.

Acquisition of Private Land

As part of the State's timber and conservation strategies, CALM has a policy of seeking to acquire suitable land for forest development and for conservation values. However, CALM will buy no more private land in the Manjimup Shire for afforestation, without prior approval of both Houses of Parliament.

Exchange of land is also considered when the Department's assets will benefit from the transaction e.g., when land can be obtained for addition to a national park, or for forest production or conservation, and when the land given up in the exchange has no conservation values.

MULTIPLE LAND USE PLANNING AND MANAGEMENT IN CALM

Sustained Yield and Multiple Use

A major value of the land and reserve system managed by CALM is that it can provide indefinitely for a wide range of demands, or land uses.

This is because management is based upon two fundamental philosophies: sustained yield, and multiple use, and the integration of these philosophies into a systematic approach to land use planning and practical management.

The concept of sustained yield applies when natural resources are harvested for particular products valued by the community, for example, trees for timber, wildflowers for blooms or catchments for water supplies. For natural resources to survive in the long term, the rate of harvest must not exceed

the rate of replenishment. There is both a statutory and a moral obligation on CALM to practise sustained yield management whenever natural resources are harvested.

All lands entrusted to CALM are managed for many uses. In other words, the management aim is to ensure that as wide a range of uses as possible are provided for, consistent with the designated purpose of the area. In most cases, different uses are compatible and it is a simple matter to ensure that they can take place on the same area at the same time.

For example, a nature reserve can provide harmoniously and simultaneously for wildlife habitat and some forms of recreation. Similarly, State forests can provide simultaneously for sustained yields of timber, fresh water, recreation, and most forms of wildlife habitat.

Multiple use planning becomes complex when demands on the same area of land conflict and cannot be practised simultaneously. When this occurs a priority use must be decided upon or activities rescheduled to prevent or minimise conflict.

General Principles for Land Use Planning in CALM

As a general principle, CALM attempts to provide for as many land uses as possible, so long as they are consistent with the primary purpose of the land. Most areas of land can be used simultaneously for many different purposes, without conflict or land degradation. Where this cannot be done, systematic land use planning is necessary. This involves:

- identification of demands and conflicts-
- decisions on priority use;
- allocation of priority uses to areas;
- the preparation of a map showing proposed land uses and priorities.

A land use plan and map has two important functions. First, it provides the public with information about, and the opportunity to comment on and seek changes to, land use decisions. Secondly, it provides a basis for day-to-day management by CALM staff.

Aspects of Multiple Use Planning in CALM

DEMANDS

The community requires that seven principal values are provided from the lands entrusted to CALM. These are:

wildlife (flora and fauna) conservation;
landscape (scenic beauty and amenity);
water;
timber;
recreation;
minor resources (e.g., honey, gravel, wildflowers);
historical or cultural factors.

In addition, a number of 'imposed' activities must be provided for, e.g. community services and public utilities (roads, reservoirs, power lines), and minerals, where mining on CALM land has been approved under the Mining Act or Special Agreement Acts.

Finally, lands managed by CALM are an important 'resource' for research, scientific study and education, and provision must be made to ensure these activities can proceed.

PRIORITY ZONES

Every area within a land use plan proposed by CALM is allocated a priority use. This is the value which is most favoured by:

the specific attributes of the ecosystem;
the location, or accessibility of the area;
public demand for various uses;
the purpose for which the area is vested.

An area will often be suited to a number of uses. Uses which can be carried out in addition to, and without conflicting with, the priority use are called compatible uses. Compatible uses can occur on the same area at the same time.

Uses that can be compatible with the priority use if practised under certain constraints (i.e., at certain periods or at very regulated levels) are referred to as conditional uses.

Uses which will always conflict with the priority use are referred to as incompatible uses. These cannot be permitted on the same area at the same time.

CALM follows two basic rules in the allocation of uses to an area:

any use allocated must be in accord with the tenure and purpose of the area; and
no use may be permitted which is detrimental to the priority use.

Within State forests, priority use areas were historically referred to as Management Priority Areas (MPAs). On other tenures, priority areas have been called zones. The term zone is now favoured for all tenures and will henceforth also be applied to State forests.

LAND USE PRIORITIES AND COMPATIBILITY

Six land use priorities (or zones) are recognised in the preparation of land use plans for CALM lands:

- Nature conservation;
- Recreation;
- Protection (of water catchments or other forest values);
- Production (zoned for water, timber or other products);
- Mining (where this is 'imposed');
- Public utility.

In Table 1 the compatibility between these uses is set out. Table 2 shows the broad relationships between land uses and reserve categories.

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:

- Vistas of forest for people driving through the region along major public roads;
- buffer zones between logging areas and major watercourses;
- a network of relatively undisturbed forest at the local level for fauna habitat, especially birds dependent on mature trees for nests, and as a source of fauna for the recolonisation of regrowth forest.

This system has been successful, but can be improved. Wildlife and hydrological research over the last ten years, together with more detailed knowledge about visitor patterns, have highlighted the need to consider a re-arrangement of some areas managed as road, river and stream zones. Preliminary analysis has shown that a restructure of the system, without any change in total area of zones, can be made so as to maximise the protective, conservation and aesthetic value of the system.

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 subjected to clearfelling. It had previously been considered that it may have been necessary to clearfell sections of the road, river and stream zones to compensate for timber volumes foregone as a consequence of the termination of timber production in the Shannon River Basin. However, 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.

TABLE 1 COMPATIBILITY OF LAND USES

Priority Use Zone	Alternative uses			
	Nature Conservation	Protection	Recreation	Production
Nature Conservation		Compatible	Conditional	Not Compatible
Protection	Compatible		Conditional	Conditional
Recreation	Conditional	Conditional		Conditional
Production	Conditional	Conditional	Conditional	

TABLE 2 COMPATABILITY BETWEEN LAND USES AND RESERVE CATEGORIES

Land Use	Reserve Category				
	Nature Reserve	National Park	Conservation Park	Marine Park	State Forest
Nature Conservation	/	/	/	/	0
Recreation	0	0	0	0	0
Catchment Protection	/	/	/	N/A	/
Timber or Fishery Production	x	x	x	/	/
Water Production	x	0	0	N/A	/
Public Utility	x	0	0	0	0
Mining (See Text)	0	0	0	0	0

KEY / Compatible with objectives for reservation
 0 Conditional to specific time, area or use constraints
 X Not compatible with objectives for reservation
 N/A Not applicable

PART 2. THE SOUTHERN FOREST REGION, ITS ADMINISTRATION AND RESOURCES

THE REGION

CALM's Southern Forest Region is bounded approximately by the Blackwood River in the northwest, Muir Highway in the north-east, Albany Highway and South Coast Highway in the south-east, the Southern Ocean in the south-west and Vasse Highway in the west.

The population of the region at the 1986 census was 15 000, and the four largest towns within the region are Manjimup, Pemberton, Walpole and Northcliffe. Bridgetown, Denmark and Mount Barker are on the regional boundaries, partly in the region.

The Southern Forest Region has an area of 1.44 million ha of which some 0.74 million ha (51 per cent) is CALM land and a further 0.19 million ha (13 per cent) is unvested land managed by CALM. The region includes all of one Shire (Manjimup) and parts of seven shires (Nannup, Bridgetown-Greenbushes, Boyup Brook, Cranbrook, Plantagenet, Denmark and Albany).

This region includes most of the State's karri forest and southern jarrah forest. About 50 per cent of the State's hardwood sawlog production and 85 per cent (in 1985/86) of its chiplog production comes from this region.

There are no large dams in the region (the largest Water Authority dams are Manjimup and Big Brook dams) but the Warren, Denmark and Kent Rivers are important water reserves, and subject to clearing restrictions to control salinity.

Tourism is an important and rapidly growing industry in the region. There are numerous recreation sites managed by CALM located throughout State forest and national parks.

ADMINISTRATION

Staff

REGIONAL RESPONSIBILITIES

The Southern Forest Regional office is located in Manjimup. Regional and District staff under the direction of the Regional Manager are responsible for:

the implementation of CALM policy;
the provision of regional plans;
the implementation and co-ordination of regional and district works programs to nominated priorities and standards;
the management of personnel and finance;
liaison with State and local government, private companies and the public;
research, monitoring and data collection.

DISTRICTS WITHIN THE REGION

The region is divided into three districts, as shown in Map 2.

Manjimup District is the most northerly district of the region. Its principal operations are concerned with management of jarrah, karri, wandoo and pine forests, water catchment, conservation and recreation. There is a number of nature reserves in the District, notably in the Lake Muir area.

Pemberton District is centred at Pemberton with a subdistrict head quarters at Northcliffe. Its responsibilities include management of jarrah, karri and pine forests, water catchment, conservation and recreation. D'Entrecasteaux, and the Pemberton National Parks are located in this district.

Walpole District is the most southerly district of the region. Prime responsibilities of the district include management of jarrah, karri and tingle forests, water catchment, conservation and recreation. Walpole- Nornalup National Park is located in this district.

SPECIALIST BRANCHES

Research Division and Inventory Branch have field stations at Manjimup. Also based in Manjimup are representatives of a number of other CALM Departmental branches including Engineering Services, Silviculture, Wildlife Protection, Communications, Information, Mapping, Timber Production Branch and Timber Industry Regulation.

PERSONNEL

At 1 July 1987 220 Departmental personnel were based in the region, as shown in Table 3.

DEPARTMENTAL VEHICLES, PLANT, BOATS AND AIRCRAFT

Table 4 summarises the above resources based in the region as at 1 July 1987.

1 Note that responsibility for wildlife and potential marine reserves extends for 3 nautical miles - i.e. the limit of State territorial waters.

TABLE 3 DEPARTMENT OF CALM PERSONNELEMPLOYED IN THE SOUTHERN FOREST REGION AS AT 1 JULY 1987

Professional staff	19
Field staff	72
Administration and Clerical Staff	11
Wildlife Officers	1
National Park Rangers	5
Wages Employees and Mechanics	99
Casual, seasonal, part-time	13
TOTAL	220

TABLE 4 DEPARTMENT OF CALM VEHICLES, PLANT, BOATS AND AIRCRAFT IN THE SOUTHERN FOREST REGION AS AT 1 JULY 1987

Motorcycles	2
Sedans and utilities 4 x 2	39
Sedans and utilities 4 x 4	66
Lightrucks	4
Heavy trucks	27
Prime movers	3
Graders	2
Tractors, loaders	15
Dozers	4
Buses	1
Caravans	4
Boats	2
Aircraft	3
TOTAL	172

**SOUTHERN FOREST REGION
CURRENT LAND TENURE**

-  NATIONAL PARK (D.F.L.M.)
-  NATURE RESERVE (D.A.L.M.)
-  STATE FOREST & OTHER (D.A.L.M.) LAND
-  TOWNSHIPS & LOCAL AUTHORITY LAND
-  VESTED IN OR OWNED BY SOVT DEPTS
-  UNVESTED CROWN LAND
-  PRIVATE PROPERTY
-  DISTRICT BOUNDARY



NORTHWAY
002415



MAP 2

OUTSIDE ASSISTANCE

Administrative and technical assistance and direction is provided as required from Departmental Directors, the General Manager, Divisional and Branch Managers and support staff based mainly in Perth and Bunbury.

Assistance normally is provided to other regions during emergencies such as large fires, and to assist with specific routine projects. Bulldozers, graders, trucks, tractors etc. are hired from outside sources for routine work as well as during emergencies.

Local people and other agencies frequently assist CALM with fire fighting.

Physical and Biological Resources

CLIMATE

The region experiences a mediterranean climate characterised by a cold wet winter and a warm summer.

Average annual rainfall within the region ranges from about 600 mm along the north-eastern boundary of the region to 1400 mm near Northcliffe, as shown in Map 3.

Detailed accounts of the key climatic features of the region are given by the Bureau of Meteorology (1962,1965). Some climatic data for Pemberton is presented in Map 3.

GEOLOGY AND GEOMORPHOLOGY

The region can be divided into three main geomorphic units or natural regions (Beard 1981, based on Clarke 1926). These are the Darling Plateau, Blackwood Plateau and Scott Coastal Plain, as shown in Map 3.

The Darling Plateau is an ancient erosion surface which is at an average elevation of about 200 m above sea level in this region, with a range from under 100 m up to 435 m at Mt Lindesay. Composed of Precambrian crystalline rocks, it has been extensively laterised. Dissection of the plateau by rivers has led to a variety of valley forms and soils including red and yellow earths, as described by Churchward and McArthur (1980) and Churchward *et al.* (1986).

The Blackwood Plateau (Donnybrook Sunklands) has a gently undulating surface covered by lateritic gravel and sand. It typically ranges from about 60 m to 140 m above sea level and is underlain by Mesozoic sediments.

The Scott Coastal Plain has an average elevation of about 40 m above sea level and is a swampy area traversed by remnants of linear sand dunes developed approximately parallel to the coastline.

There is an outcrop of limestone cliffs at Point D'Entrecasteaux and of 'Bunbury Basalt' at Blackpoint.

For further details about the geology of the region, see the 1:250 000 scale geological maps prepared by Biggs *et al.* (1980), Wilde and Walker (1982, 1984) and Muhling *et al.* (1985). Landform and soil information for parts of the region are available from Hosking and Burvill (1938), Smith (1951), Northcote *et al.* (1967), McArthur and Clifton (1975), Churchward and McArthur (1980) and Churchward *et al.* (1986).

HYDROLOGY

Major rivers passing through the region include the Warren-Tone, Donnelly, Gardner, Shannon, Deep, Frankland, Kent, Hay and Denmark Rivers. The Blackwood River is on the northern boundary of the region. Most of the flow on forested catchments is fresh. Agricultural clearing has increased the input of salts in many of the lower rainfall areas. There are no large dams in the region.

In the north-eastern part of the region, there is an extensive series of swamps and lakes in the broad valley floors. The largest of these is Lake Muir.

Because of the extensive surface water, there is only localised demand for ground water resources. Fresh ground water is common in shallow aquifers in the Scott Coastal Plain. On the Darling Plateau shallow ground water is limited, with best expressions present in the deeper Tertiary sands in valley floors.

VEGETATION

The vegetation of the region has been mapped by Smith (1972, 1974) and Beard (1981) and Map 4A is based on their work. Site-vegetation mapping by Heddle *et al.* (1980) is also available for part of the region. Vegetation maps or plant species lists for parts of the region have also been produced by Environmental Resources (1971), Christensen (1980), Griffin & Assoc. (1984), Christensen *et al.* (1985) and Annels (1986).

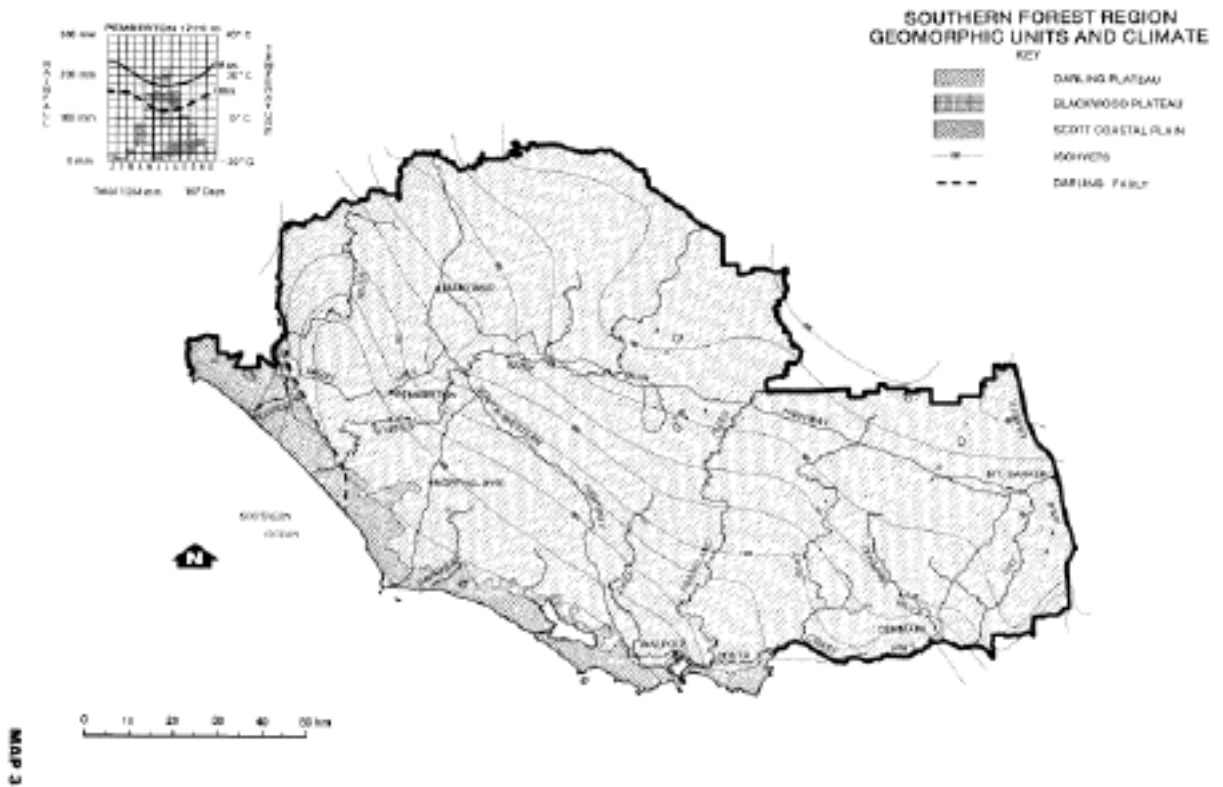
API MAPS

CALM air photo interpretation (API) forest type maps have been prepared for much of the region. Table 5A shows areas of the main site-vegetation types in the region, based on these maps and more recent work.

**TABLE 5A SITE-VEGETATION TYPES IN THE SOUTHERN FOREST
REGION AS AT 1 JANUARY 1986**

	State Forest(a) (ha)	Other Crown land(ha)	Private Property (ha)
Pure karri	51000	7000	3000
Karri (mixed)	101000	11000	9000
Jarrah, marri etc.	408000	94000	100000
Wandoo	1000	1000	1000
Exotic eucalypts	-	-	1000
Pine	1000	-	3000
Other native vegetation	94000	170000	48000
Cleared	1000	5000	308000
Sand	-	13000	1000
Lakes, water	1000	9000	1000
TOTAL	658000	310000	475000

Note: (a) 'State forest' includes CALM Act timber reserve and land held freehold in the name of the Executive Director. Townsites are included with other Crown land. Vegetation data for other Crown land and private property is indicative only.



**SOUTHERN FOREST REGION
VEGETATION**

-  KARRI / MARS / JARRAH FOREST
 -  JARRAH / MARS FOREST
 -  MARS / MANDOO / JARRAH WOODLAND
 -  SHEOAK / DAMBIA / JARRAH WOODLAND
 -  HEATH / SCUR / OYSTERBANK / ROCK
 -  BANKSIA / OYSTER LOX WOODLAND
 -  SWAMP WITH SOME SAND FIGS
- (Based on Beard (1981))



MAP 4A

TABLE 5B AREAS OF EACH PROPOSED LAND CATEGORY BY SITE-VEGETATION TYPE IN THE SOUTHERN FOREST REGION

	Site-Vegetation type (ha)			
	Pure Karri	Mixed Karri	Other Forest	Other
Nature reserve	400	1000	52200	15800
National park	16500	29600	73300	139800
Conservation park	500	700	300	-
State forest				
Road, river & stream zones (a)	8700	15600	42700	6700
Other State forest (a)	31700	62800	314600	119400

(a) These areas are likely to be changed by the proposed review of road, river and stream zones.

Within the main karribelt, karri forest does not occur in large continuous tracts but in discrete stands where favourable soils occur, as shown in Map 4B. Stands of karri are interspersed with jarrah and jarrah-marri forests and treeless flats and swamps.

VEGETATION MAPPING BY BEARD

Beard's 1981:1000 000 scale vegetation map of the south-west identifies 12 vegetation systems in this region, within two botanical subdistricts. A vegetation system is a particular series of plant communities recurring in catenary sequence or mosaic pattern, linked to topographic, soil or geological features. Brief descriptions of the 12 vegetation systems are as follows:

Warren Subdistrict: (Karri Zone)

Nornalup System

Extends from the Donnelly River Valley, north-west of Manjimup, south and south-east to Irwin Inlet. Karri (*Eucalyptus diversicolor*) forest is found mainly on red earths. Jarrah (*E. marginata*) and marri (*E. calophylla*) are prominent where soils are lateritic or sandy respectively. On poorly drained lower slopes there is often a sequence from yarri/blackbutt (*E.patens*) or bullich (*E. megacarpa*) to thickets then to reeds with increasing wetness. Red tingle (*E. jacksonii*) and yellow tingle (*E. guilfoylei*) are common in the Walpole - Nornalup area.

Denmark System

Extends from Irwin Inlet to Albany. Dominated by karri, often on upper slopes. Jarrah and marri are found on laterite and yellow podzolic soils; jarrah and sheoak (*Allocasuarina fraseriana*) on bleached sands; reed swamp in poorly drained areas.

Boranup System

Extends along the south coast. It includes large mobile sand dunes. On stabilised dunes karri and jarrah forest, woodlands of marri, yate (*E. cornuta*) or peppermint (*Agonis flexuosa*) woodland or scrub occur.

Scott River System

Located between the Boranup and Chapman or Nornalup Systems, just inland from the coast. Supports woodland of stunted jarrah, paperbark (*Melaleuca sp.*) and banksia with an understorey of shrubs and sedges. Flooded areas support sedges.

Menzies Subdistrict:

Bridgetown System

Extends north of the Nornalup System (karri zone) to the regional boundary and eastwards to the wandoo zone. Jarrah-marri forest is the major element. In the west, yarri/blackbutt occurs in some of the valleys and flooded gum (*E. rudis*) occurs along river banks. Low woodland of *Melaleuca* species, banksia and scrub is often found in swamps.

Chapman System

Occupies the Sunklands, west of the Darling Fault. The general cover is of jarrah-marri forest, frequently stunted.

Jingalup System

Found in the north-eastern part of the region. Jarrah woodland is found on lateritic hill tops, wandoo (*E. wandoo*) and marri on the slopes and flooded gum and *Melaleuca* species along the drainage lines.

Kwornicup System

Situated on a swampy plain north and east of Lake Muir, jarrah-marri forest dominates with numerous patches of jarrah low forest, paperbark low forest and reed swamps. Yate, swamp yate (*E. occidentalis*) and wandoo also occur.

Narrikup System

Found in the Mt Barker-Narrikup area. Lies on a lateritic plain, little dissected. Jarrah-marri forest was almost continuous before settlement. Swamp yate is often present along creeks.

Eucalyptus decipiens is found in wet places. Banksia woodland occurs on sand.

Kent System

Comprises an area along the upper Kent and Denmark Rivers. Characterised by shallow leached sands over rock or laterite. Numerous large swamps occur. Low jarrah forest dominates. Narrow swamps carry reeds and heath shrubs such as *Beaufortia sparsa* and *Kunzea ericifolia*. Broad swamps often carry reeds with scattered paperbark (*Melaieuca cuticulatis*).

Hay System

Lies east of - the Kent System mainly in the Hay River basin. More dissected than the Kent System with a catena of jarrah-marri forest on the upper slopes, jarrah-sheoak low forest on the lower slopes and swamps in the valley bottoms.

Albany System

Occurs in the south-eastern extremity of the region, north-west of Albany. Consists of a plain dissected by streams. The upland soils are leached and poorly drained, typically with sheoak and low forest on deep white sand, mixed with *E. staeri* over laterite.

NATIVE FAUNA

Information about the fauna of the region is available from CALM Information Sheets 5, 12, 27, 45 and Christensen *et al.* 1985).

Based on the above, some common vertebrate species in various vegetation types, are as follows:

Jarrah forest

Western grey kangaroo (*Macropus Miginosus*), western brush wallaby (*Macropus irma*), southern brown bandicoot (*Isoodon obesulus*), mardo (*Antechinus flavipes*), bush rat (*Rattus fuscipes*), dugite (*Pseudonaja affinis affinis*), black tiger snake (*Notechis ater occidentalis*), emu (*Dromaius novaehollandiae*), silvereye (*Zosterops lateralis*), western rosella (*Platycercus icterotis*), scarlet robin (*Petroica multicolor*), grey fantail (*Rhipidura Miginosa*), red wattle bird (*Anthochaera carunculata*), white-naped honeyeater (*Melithreptus lunatus*).

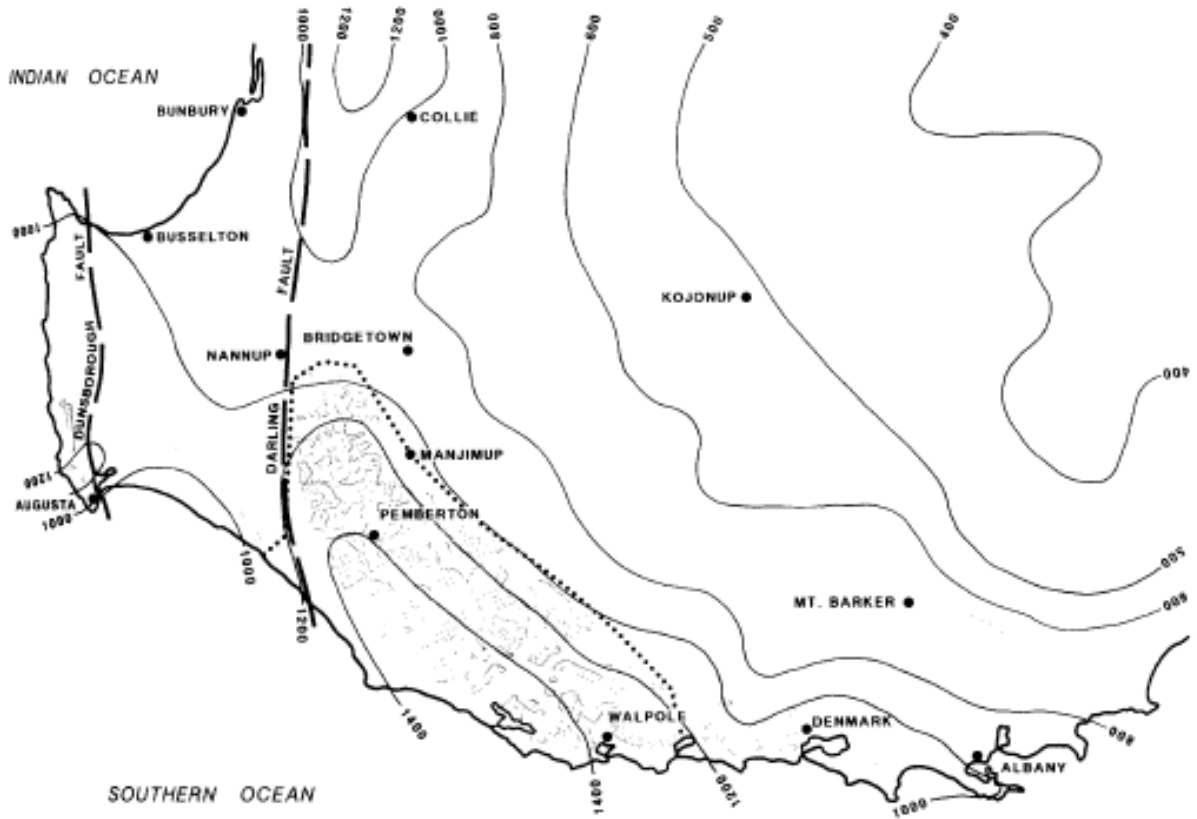
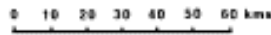
MAP 4B
KARRI OCCURRENCE

LEGEND

- MAIN KARRI BELT (dotted line)
- KARRI OCCURRENCE (stippled area)
- ISOHYET (mm) ——— (solid line)



SCALE



MAP 4B

Karri forest

Mardo, grey-bellied dunnart (*Sminthopsis gfiseoventer*), bush rat, black tiger snake, purple crowned lorikeet (*Glossopsittaporphyrocephala*), scarlet robin, white-naped honeyeater.

Wandoo woodland

Western grey kangaroo, western brush wallaby, common brush-tail possum (*Tichosurus vulpecula*), mardo, dugite, emu, whistling kite, purple crowned lorikeet, western rosella, Port Lincoln ringneck (*Bamardius zonafius*), golden whistler (*Pachycephala pectoralis*), grey fantail, red wattlebird, whitenaped honeyeater.

South coast communities (yate, peppermint, banksia, swamps)

Western grey kangaroo, southern brown bandicoot, mardo, common dunnart, bush rat, dugite, emu, whistling kite, purple crowned lorikeet, Port Lincoln ringneck, tree martin (*Cecropis nigricans*), scarlet robin, golden whistler, grey fantail, red wattlebird, white-naped honeyeater, silvereye.

Wetlands

Water rat (*Hydromys chrysogaster*), white faced heron (*Ardea novaehollandiae*), Australian shelduck (*Tadoma tadornoides*), Pacific black duck (*Anas superciliosa*), grey teal (*Anas gibtefifrons*), maned duck (*Chenonettajubata*), whistling kite.

Social and Economic Resources

HISTORY AND LAND USE

Aborigines

Aborigines occupied the area during at least the past 40 000 years; further details are provided later in the plan.

Exploration

European exploration of the coastline dates from the 1620s (Leeuwin 1622; Nuyts 1627). Terrestrial exploration dates from 1826, when Albany was settled.

Agriculture

The dates of the first European settlement in various locations are believed to have been as follows: Mount Barker area 1832, Manjimup area 1852 (Muir), Boyup Brook 1854, Bridgetown 1857 (Blechynden), Nannup 1859, Pemberton 1861 (Brockman), Denmark 1894, Nornalup 1910 (Bellanger) and Northcliffe 1921.

The first settlers were involved in grazing but practised subsistence farming around their homesteads. Agricultural development was at first slow with only about 3 000 ha of farming land alienated in the Manjimup area by 1900. Settlement accelerated with the arrival of the railway at Bridgetown in 1898 and its extension to Manjimup in 1910. The Group Settlement scheme of the 1920s also had a profound impact.

By 1939 large areas were being utilised for dairy and beef cattle, pigs, fruit and vegetables in the higher rainfall areas. In the lower rainfall eastern sector sheep farming predominated. In recent times the relative importance of dairy farming and fruit growing has diminished and that of horticulture increased.

Water production

Water production within this region is very limited apart from numerous farm dams. Small catchments have been developed to supply the few towns in the area. The first of these on Phillips Creek, developed to supply Manjimup, was constructed in 1936. Denmark Dam was constructed in 1961 and the most recent, Big Brook Dam, constructed to augment supplies to Pemberton Trout Hatchery, was completed in 1986. However, the development potential of rivers in the region is very large. There are recognized damsites on the Donnelly, Warren, Gardner, Shannon, Deep, Kent and Denmark Rivers and their tributaries which could yield in excess of 800 million cubic metres per annum, more than four times the current reticulated supply to the Perth metropolitan area. The protection of these resources for the future is an important part of the Department's land management in this region.

Timber production

The first southern sawmills operated near Torbay in 1884 and at Denmark from 1894. The first large sawmills in the Manjimup-Pemberton area opened during the period 1911-1913 (Jardee, Deanmill, Pemberton). The first State forest in the region was not dedicated until 1925 (Big Brook). By 1930 much of the current area of State forest was dedicated but this process was not completed until the mid 1950s. Until about 1970 virtually all of the State forest was available for timber production. Since then, substantial areas have been allocated to other uses.

Mining

The first oil wells in the State were sunk near the Warren River mouth in 1902-1904, but were dry. Further exploratory work has taken place elsewhere since then. Graphite was discovered near the Donnelly River in 1882 and some mining took place between 1895 and 1943. Minor tin mining took place in the Willow Springs area between 1907 and 1932. Some shallow shafts have been excavated for coal at Coal Mine Beach near Walpole but the deposit is uneconomic. Peat is mined at Cowerup Swamp near Lake Muir and limestone near Windy Harbour.

Conservation and Recreation

The first national parks gazetted in the region were parts of Warren, Beedelup and Walpole-Nornalup in the period 1911-1924. The first nature reserves were gazetted in 1924 in the Plantagenet area. Forests Department General Working Plan No. 85 of 1972 was the first to formally propose State forest areas for conservation and recreation.

LOCAL GOVERNMENT AND POPULATION

The region includes all of one shire (Manjimup) and parts of seven shires (Nannup, BridgetownGreenbushes, Boyup Brook, Cranbrook, Plantagenet, Denmark and Albany), as shown in Map 5.

The town of Bridgetown is on the northern boundary of the region. Mount Barker is on the eastern boundary and Denmark is on the south-eastern boundary.

The main towns within the region and their populations as at the census of 30 June 1981 were as follows (Australian Bureau of Statistics 1982):

Manjimup	4150
Pemberton	871
Walpole	291
Northcliffe	200

As the regional boundaries do not follow shire boundaries the population of the region is difficult to determine, but is estimated to be 15 000 from the 1986 census (Australian Bureau of Statistics 1987).

Land Tenure

AREA STATEMENT

Table 6 summarises land tenure in the region as at 1 January 1987.

CALM ESTATE

Map 6 shows the current extent of CALM land.

**SOUTHERN FOREST REGION
LOCAL GOVERNMENT BOUNDARIES**

----- LOCAL GOVERNMENT BOUNDARIES
----- STATISTICAL DIVISION BOUNDARIES
CALM 0/1/02



MAP 5

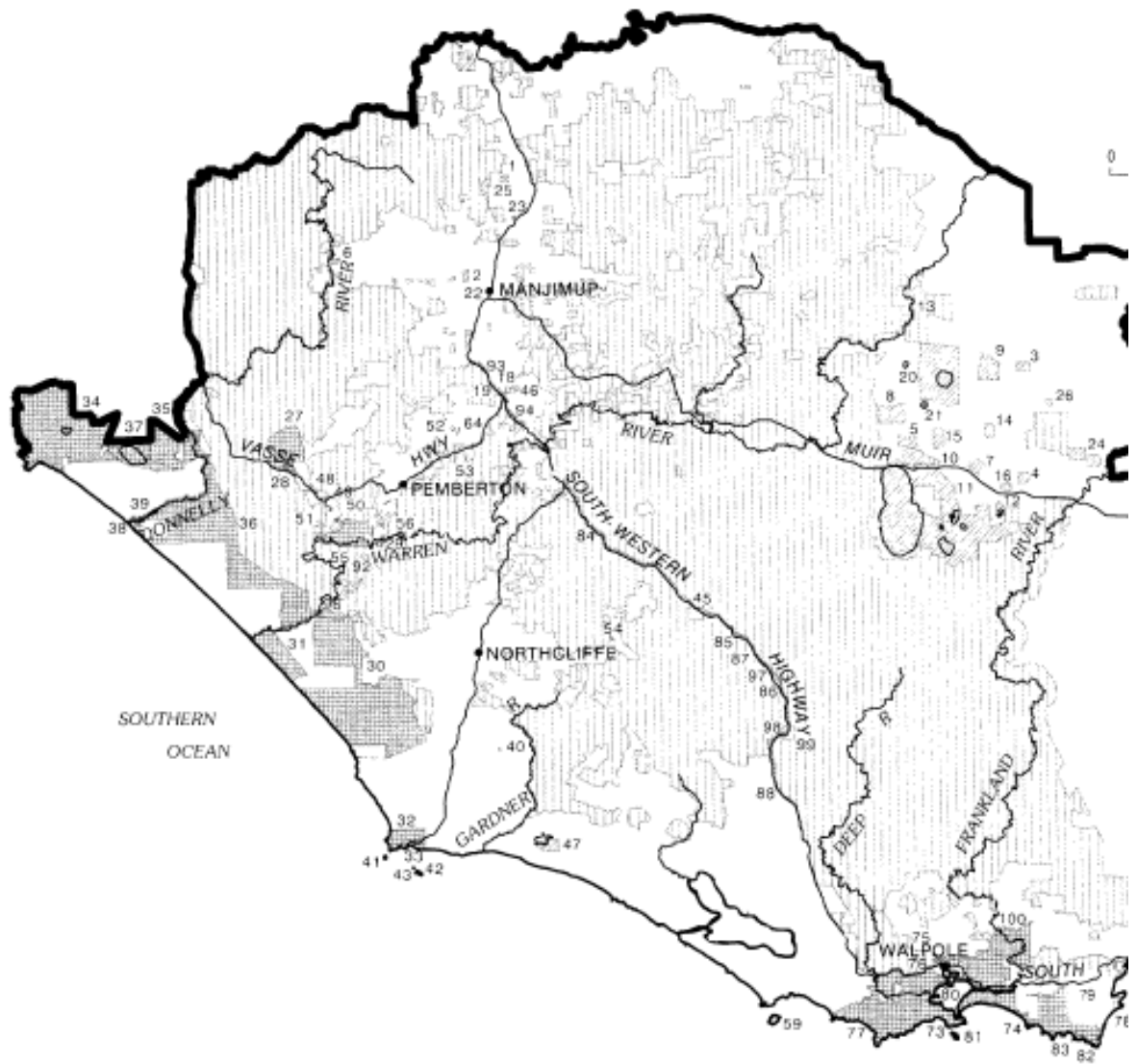
TABLE 6 LAND TENURE STATEMENT FOR THE SOUTHERN FOREST REGION AS AT 1 JANUARY 1987

		Area (ha)	%
CALM LAND			
-vested	State forest	625980	
	CALM Act timber reserve	23040	
	National Parks	58750	
	Nature reserves	24250	
	Other reserves	500	
owned	- Executive Director	8920	
	Sub Total	741440	51%
UNVESTED LAND			
	- Land Act timber reserves	14210	
	- National Parks	20	
	- Nature reserves	4580	
	- Other reserves	109340	
	- Vacant Crown land	81040	
	Sub Total	209170	15%
OTHER GOVT.LAND (a)			
	- Land Act timber reserve	110	
	- National Parks	60	
	- Nature reserves	90	
	- Other reserves(b)	16790	
	Sub Total	17050	1%
PRIVATE PROPERTY		475110	33%
	TOTAL(c)	1442770	100%

Note: (a) Other Government land includes Commonwealth, State and local government land.

(b) Townsites are included under 'other reserves'.

(c) Excludes State territorial waters.



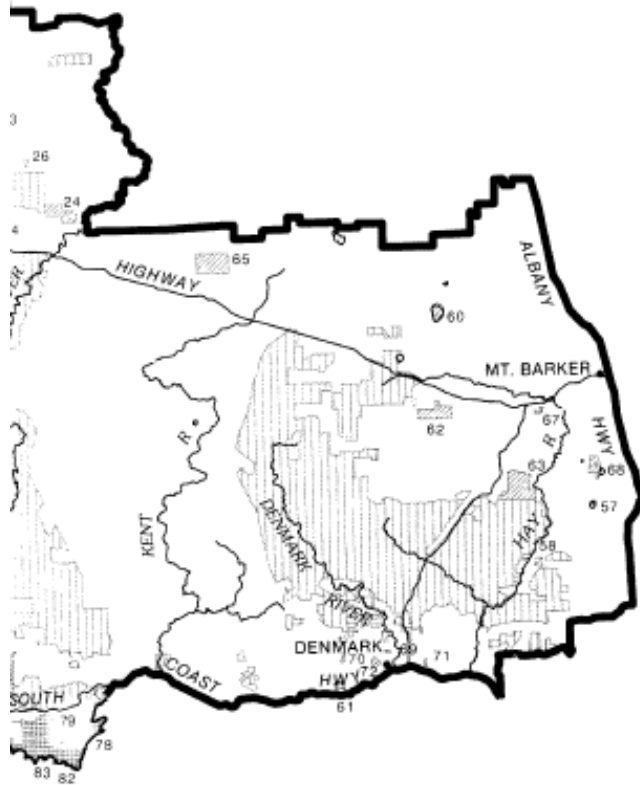
SOUTHERN FOREST REGION

C.A.L.M. ESTATE AS AT 1987

-  STATE FOREST, TIMBER RESERVE, EXECUTIVE DIRECTOR LAND
-  NATIONAL PARK
-  NATURE RESERVE
-  5(g) C.A.L.M. ACT RESERVES



0 10 20 30 40 50 km

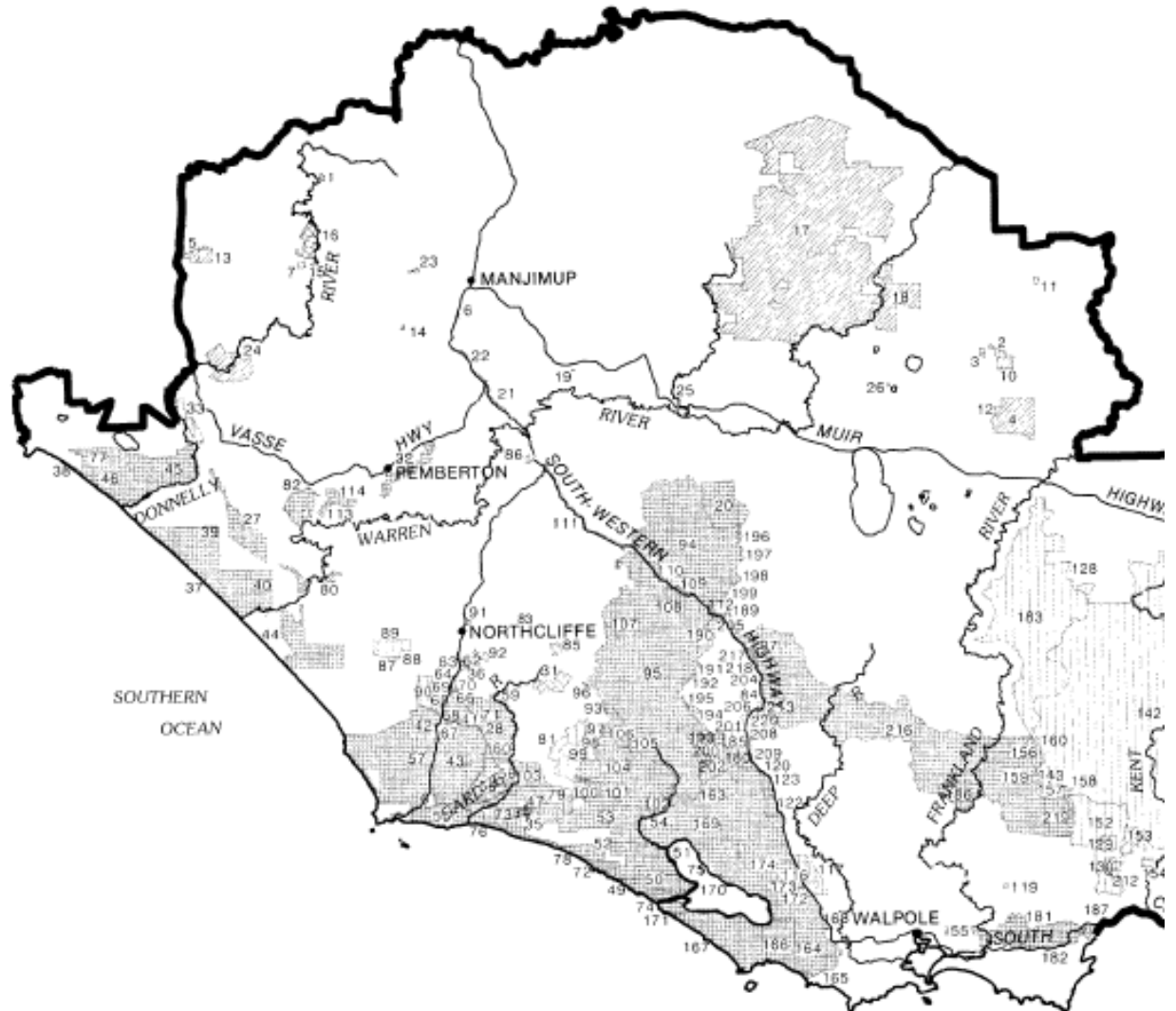


ID. No.	NAME	RESERVE No.
DISTRICT: MANJIMUP		
1	(WILGARUP N.R.)	C 12381
2	BIG BROOK N.R.	C 15750
3	BOKAIRUP N.R.	A 14739
4	COBERTUP N.R.	A 26661
5	COWERUP N.R.	C 33455
6	DONNELLY RIVER N.R.	C 20810
7	DALAMUP N.R.	A 3549
8	KODJUP N.R.	A 26678
9	KULUNUP N.R.	A 26677
10	LAKE MUIR N.R.	C 31880
11	LAKE MUIR N.R.	C 31880
12	LAKE MUIR N.R.	C 31880
13	MORDALUP N.R.	A 30018
14	NOOBIUP N.R.	A 26880
15	PINDICUP N.R.	A 26679
16	PINDICUP N.R.	A 26682
18	(SMITH BROOK N.R.)	A 14083
19	(SMITH BROOK N.R.)	A 14083
20	UNICUP N.R.	A 25796
21	UNICUP N.R.	A 25796
23	(PALBARRUP NORTH N.R.)	A 24715
24	(QUINDINUP N.R.)	A 25006
25	(WILGARUP N.R.)	A 32142
26	YARNUP N.R.	A 28601
93	SIR JAMES MITCHELL N.P.	A 18705
94	SIR JAMES MITCHELL N.P.	A 18705

ID. No.	NAME	RESERVE No.
DISTRICT: PEMBERTON		
27	BEEDLUP N.P.	A 7092
28	BEEDLUP N.P.	A 17519
29	BROCKMAN N.P.	A 19424
30	D'ENTRECASTEAUX N.P.	A 36996
31	D'ENTRECASTEAUX N.P.	A 36996
32	D'ENTRECASTEAUX N.P.	A 17495
33	D'ENTRECASTEAUX N.P.	A 17495
34	D'ENTRECASTEAUX N.P.	A 36996
35	D'ENTRECASTEAUX N.P.	A 36996
36	D'ENTRECASTEAUX N.P.	A 36996
37	D'ENTRECASTEAUX N.P.	A 26503
38	D'ENTRECASTEAUX N.P.	A 28478
39	D'ENTRECASTEAUX N.P.	A 28478
40	(D'ENTRECASTEAUX N.R.)	A 29681
41	FLAT ISLAND N.R.	A 25027
42	SANDY ISLAND N.R.	A 25027
43	SANDY ISLAND N.R.	A 25027
45	SIR JAMES MITCHELL N.P.	A 18705
46	(SMITH BROOK N.R.)	A 14083
47	(D'ENTRECASTEAUX N.R.)	C 31367
48	WARREN N.P.	A 17519
49	WARREN N.P.	A 7091
50	WARREN N.P.	A 17519
51	WARREN N.P.	A 17519
52	(EASTBROOK ROAD N.R.)	C 33192
53	(EASTBROOK ROAD N.R.)	A 27310
54	JANE BLOCK	C 31621
55	WARREN N.P.	A 7091
56	WARREN N.P.	A 17519
64	(EASTBROOK ROAD N.R.)	C 33192
84	SIR JAMES MITCHELL N.P.	A 18705
85	SIR JAMES MITCHELL N.P.	A 18705
92	BROCKMAN N.P.	A 19424
96	D'ENTRECASTEAUX	A 36996

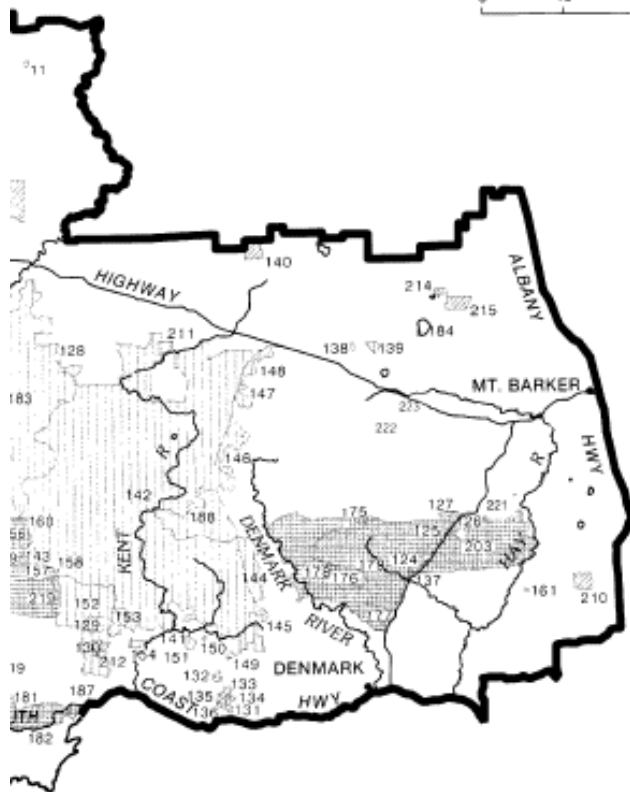
ID. No.	NAME	RESERVE No.
DISTRICT: WALPOLE		
57	(LAKE EYRE N.R.)	C 5692
58	BLUE GUM CREEK N.R.	A 19673
59	CHATHAM ISLAND N.R.	A 31504
60	KWORNICUP LAKE N.R.	C 32284
61	MT. SHADFORTH N.R.	C 18340
62	PARDELUP N.R.	C 23171
63	SHEEPWASH CREEK N.R.	C 25168
65	TOOTANELUP N.R.	A 22442
67	(ONERUP LAGOON N.R.)	C 798
68	(LAKE BARNES ROAD N.R.)	C 14493
69	(SCOTSDALE ROAD N.R.)	C 23325
70	(REDMOND ROAD N.R.)	C 31561
71	(McINTOSH ROAD N.R.)	C 23068
72	(McCLEAN ROAD N.R.)	C 32621
73	WALPOLE-NORNALUP N.P.	A 31362
74	WALPOLE-NORNALUP N.P.	A 31362
75	WALPOLE-NORNALUP N.P.	A 31362
76	WALPOLE-NORNALUP N.P.	A 31362
77	WALPOLE-NORNALUP N.P.	A 31362
78	WALPOLE-NORNALUP N.P.	A 31362
79	WALPOLE-NORNALUP N.P.	A 31362
80	(WALPOLE-NORNALUP N.P.)	A 19175
81	WALPOLE-NORNALUP N.P.	A 31362
82	WALPOLE-NORNALUP N.P.	A 31362
83	WALPOLE-NORNALUP N.P.	A 31362
86	SIR JAMES MITCHELL N.P.	A 18705
87	SIR JAMES MITCHELL N.P.	A 18705
88	SIR JAMES MITCHELL N.P.	A 18705
89	SIR JAMES MITCHELL N.P.	A 18705
96	SIR JAMES MITCHELL N.P.	A 18705
99	SIR JAMES MITCHELL N.P.	A 18705
100	WALPOLE-NORNALUP N.P.	A 31362

MAP 6

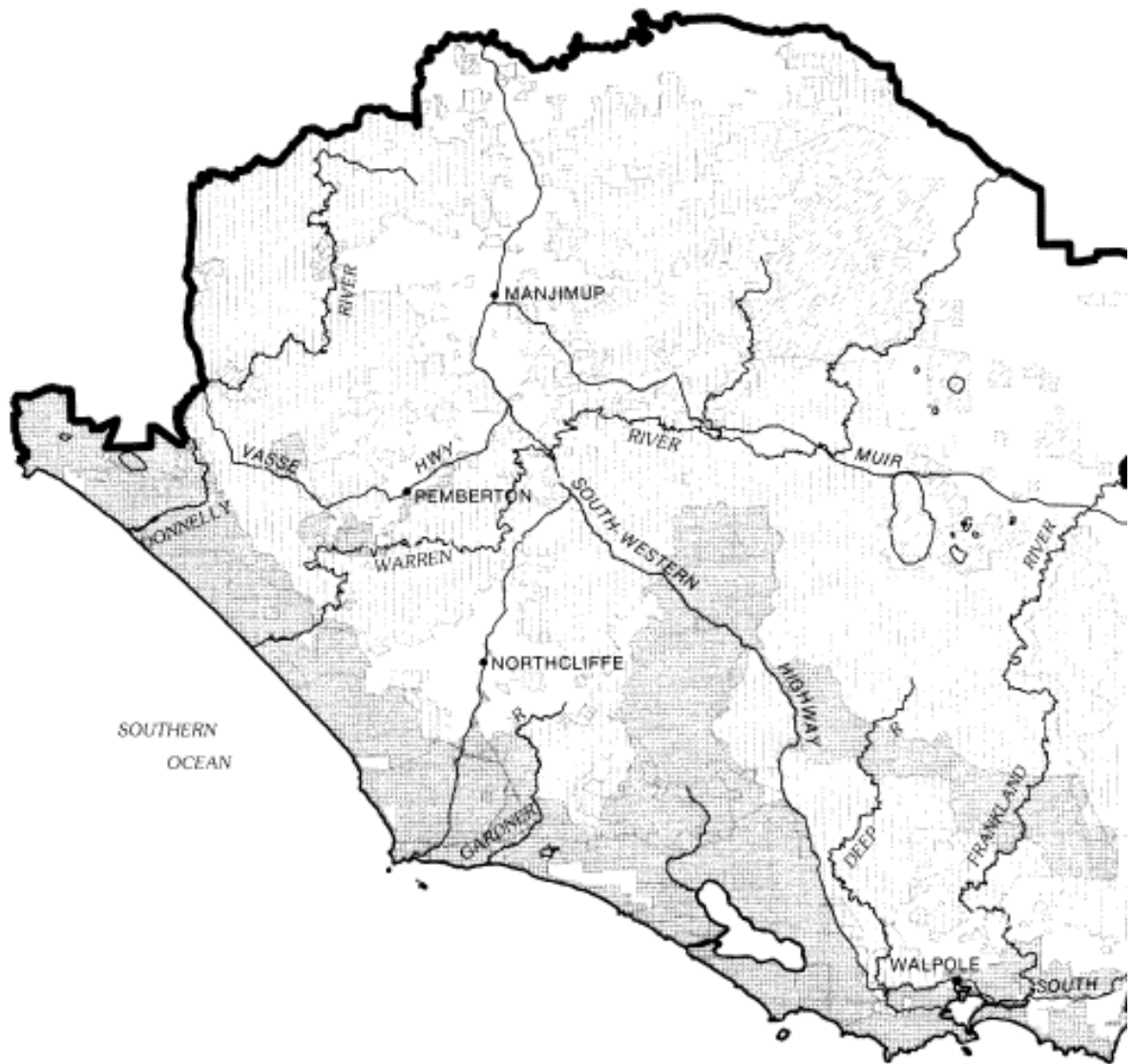


SOUTHERN FOREST REGION
PROPOSED CHANGES IN TENURE VESTING OR PURPOSE

-  TO NATIONAL PARK
-  TO NATURE RESERVE
-  TO CONSERVATION PARK
-  TO S(g) C.A.L.M. ACT RESERVES
-  TO STATE FOREST

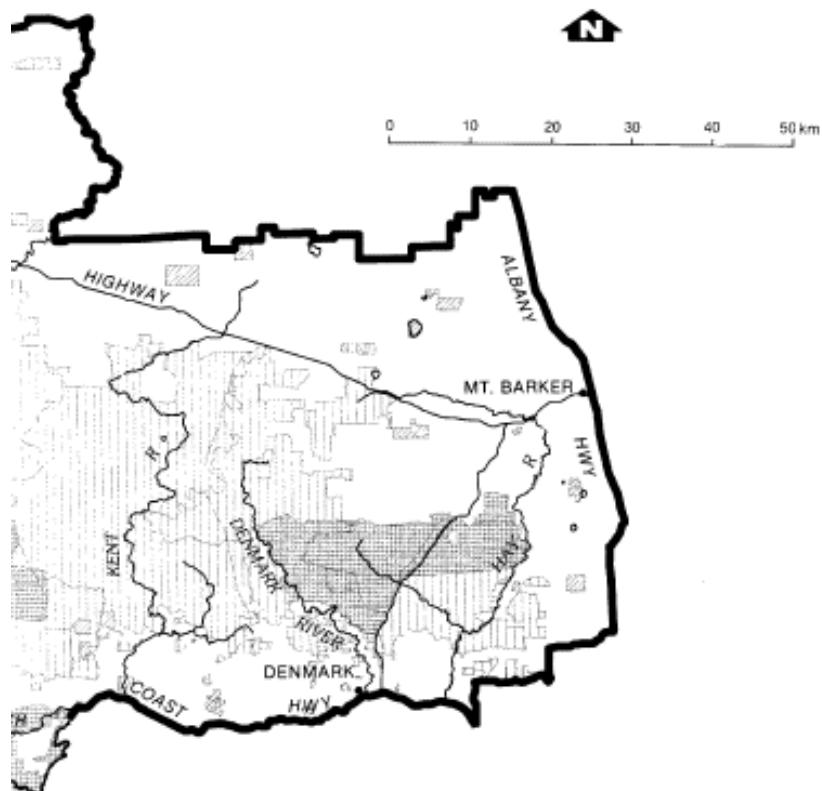


MAP 7



SOUTHERN FOREST REGION
C.A.L.M. ESTATE AS PROPOSED BY THIS PLAN

-  NATIONAL PARK
-  NATURE RESERVE
-  CONSERVATION PARK
-  S(g) C.A.L.M. ACT RESERVES
-  STATE FOREST



MAP 8

PART 3. LAND USE CLASSIFICATION AND MANAGEMENT.

LAND USE PROPOSALS

Present Land Use in the Region

The present land use plan for the region derives from the former Forests Department's General Working Plan No. 87 for State forests and timber reserves, and from management plans prepared by the former National Parks Authority and Department of Fisheries and Wildlife.

A number of changes to the previous plans are proposed in this regional plan. These changes will allow the introduction of proposed new categories, will improve the security of purpose for many areas and will change the name and vesting of other areas to better reflect the purpose for which they are managed.

Changes in Tenure, Vesting or Purpose

In accordance with the changes to the system of land vesting, tenure and purpose described in Part 2 of this plan, and subject to Parliamentary agreement, a number of changes are proposed to areas of land managed by CALM. These are shown in Table 7 and on Map 7.

The changes derive from the following sources:

Conservation reserve proposals. Relates to recommendations by the Conservation Through Reserves Committee (CTRC) as reviewed by the EPA (reports: 1974, 1975, 1976, 1977, 1980, 1981,1983).

Land proposed for State forest or timber reserve (CALM Act). Involves areas still under consideration by the Department of Land Administration.

Unvested nature reserves being considered for vesting in the NPNCA.

Changes proposed by CALM in this management plan

Map 8 shows the CALM estate proposed by this plan.

Although the majority of the areas which are proposed for reservation already have been designated in one form or another as conservation or recreation reserves, some are subject to existing mineral leases and others may contain mineral resources. It is proposed that these mineral claims be progressively evaluated by an appropriately constituted committee. The Reserves Review Committee will continue to progressively evaluate areas within the EPA System 6 area.

All proposals to change land tenure or to reserve vacant Crown land will be referred to the Lands and Forest Commission and the National Park and Nature Conservation Authority, and will be subject to the normal review processes by the Department of Land Administration. This will involve consultation with affected government and local government authorities. Furthermore, it will be necessary for both Houses of Parliament to agree to any changes involving A class reserves or State forest.

The boundaries of the proposed parks and reserves and additional State forest areas shown on Map 8 are not final and may be adjusted during the consultation and legislative processes described above. In addition, boundary modifications may be recommended in future area management plans.

TABLE 7 PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE IN THE SOUTHERN FOREST REGION

ID No.	Area Name(<i>a</i>)	Current Classification	Proposed Classification
MANJIMUP DISTRICT			
1	(Blackbutt reserve)	State forest	NR vested in NPNCA
2-3	(Bokarup)	VCL	NR vested in NPNCA
4	Bolbelup	timber reserve	NR vested in NPNCA
5,13	Dickson	State forest	NR vested in NPNCA
6	(Jardee)	national park	conservation park
7	(Lewin)	VCL	State forest
8-9	(Wournbelup)	VCL	State forest
10	(Bokarup)	other reserve	NR vested in NPNCA
11	Bolbelup	other reserve	State forest
12	Bolbelup	timber reserve	NR vested in NPNCA
14	(Jervik Park)	national park	conservation park
15	One Tree Bridge(<i>c</i>)	other reserve	conservation park
16	One Tree Bridge(<i>c</i>)	State forest	conservation park
17	Perup	State forest	NR vested in NPNCA
18	Perup	timber reserve	NR vested in NPNCA
19	Quillben	other reserve	State forest
20	Shannon(<i>d</i>)	State forest	national park
21-22	Sir James Mitchell	national park	State forest
23	Solai	other reserve	State forest
24	Strickland	State forest	NR vested in NPNCA
25	Topanup	VCL	State forest
26	Unicup	other reserve	NR vested in NPNCA
PEMBERTON DISTRICT			
27	(D'Entrecasteaux)	State forest	national park
28	(D'Entrecasteaux)	NR(NPNCA)	national park
31	Boorara	State forest	conservation park
32	Brockman	State forest	national park
33	Cleave	VCL	State forest
34	(D'Entrecasteaux)	VCL	national park
35	(D'Entrecasteaux)	NR(NPNCA)	national park
36	(D'Entrecasteaux)	other reserve	national park
37-78	(D'Entrecasteaux)	VCL	national park
79	Gardner	VCL	State forest
80	Dombakup	State forest	conservation park
81	Gardner	VCL	State forest
82	Hawke	State forest	national park
83	Jane	VCL	State forest
84	Mossop	VCL	State forest
85	Muirillup	State forest	conservation park

ID No.	Area Name(a)	Current Classification	Proposed Classification
86	Nairn	VCL	State forest
87-88	Northcliffe	other reserve	State forest
89-92	Northcliffe	VCL	State forest
93-103	Shannon(<i>d</i>)	State forest	national park
104-109	Shannon(<i>d</i>)	VCL	national park
111-112	Sir James Mitchell	national park	State forest
113-114	Treen	State forest	national park

WALPOLE DISTRICT

116-11.7	Burnett	other reserve	State forest
118	(Chorkerup)	NR unvested	NR vested in NPNCA
119	Collis	other reserve	State forest
120-123	(D'Entrecasteaux)	VCL	national park
124-126	(Denbarker)	NR unvested	national park
127	(Denbarker)	timber reserve	national park
128	Gully	other reserve	State forest
129-130	(Gum Link Rd)	NR unvested	NR vested in NPNCA
131	(Kordabup)	other reserve	NR vested in NPNCA
132-136	(Kordabup)	timber reserve	NR vested in NPNCA
137	(Mitchell River)	other reserve	national park
138-139	(Pardelup)	other reserve	State forest
140	(Randell Rd)	NR unvested	NR vested in NPNCA
141-151	Styx	other reserve	State forest
152	Thames	VCL	State forest
153	Thames	NR unvested	NR vested in NPNCA
154	Thames	other reserve	State forest
155	(Wal pole- Nornalup)	VCL	national park
156-157	Wattle-Soho	other reserve	national park
158-160	Wattle-Soho	VCL	national park
161	(Blue Gum Creek)	other reserve	NR vested in NPNCA
163	(D'Entrecasteaux)	State forest	national park
164-166	(D'Entrecasteaux) (<i>e</i>)	VCL	national park
167-174	(D'Entrecasteaux)	VCL	national park
175-177	(Mt Lindesay) (<i>b</i>)	other reserve	national park
178-179	(Mt Lindesay)(<i>b</i>)	State forest	national park
180	Dixie	VCL	State forest
181-182	Giants	State forest	national park
183	Hiker-Crossing	VCL	State forest
184	(Kwornicup Lake)	other reserve	NR vested in NPNCA
185	Mossop-Sutton	VCL	State forest
186	Mt Frankland	State forest	national park
187	(Quarram)	VCL	State forest
188	Rate-Clear Hills	VCL	State forest
189-199	Shannon(<i>d</i>)	State forest	national park
200-202	Shannon(<i>d</i>)	VCL	national park

ID No.	Area Name(a)	Current Classification	Proposed Classification
203	Sheepwash(b)	State forest	national park
205-209	Sir James Mitchell	national park	State forest
210	Sleeman Creek	NR unvested	NR vested in NPNCA
211	Table Hill	other reserve	State forest
212	Thames	other reserve	State forest
213-214	Wamballup	NR unvested	NR vested in NPNCA
215	Wattle-Soho	VCL	national park
216-218	Wattle-Soho	State forest	national park
219	Wattle-Soho	VCL	national park
220	Wye	VCL	State forest
221	Sheepwash Creek	NR(NPNCA)	national park
222	(Pardelup)	NR unvested	NR vested in NPNCA
223	(Pardelup)	other reserve	NR vested in NPNCA

- Note:**
- NR nature reserve
 - VCL vacant Crown land
 - (a) Names in brackets are unofficial.
 - (b) Inclusion of the central zone of this proposal will be investigated during the period of this plan.
 - (c) It is intended to eventually add nature reserve C20810 to One Tree Bridge conservation park.
 - (d) Since this plan was drawn up, Parliament has agreed to gazettal of the Shannon area as national park.
 - (e) Since this plan was drawn up these areas west of Walpole have been gazetted as national park.

Details of Proposed Major Changes

All proposed changes in tenure, vesting or purpose are listed in Table 7.

The most important or significant proposals are:

NEW OR EXPANDED NATURE RESERVES

It is proposed to vest a number of unvested nature reserves, other reserves and vacant Crown land as nature reserves with the NPNCA.

Three areas of State forest (the Dickson, Perup and Strickland management priority areas) will be converted to nature reserve vested in the NPNCA.

A yarri/blackbutt forest in the Donnelly Valley and part of Bolbelup timber reserve are also proposed to become nature reserve.

NEW OR EXPANDED NATIONAL PARKS

A new national park incorporating the Wattle, Johnston-O'Donnell, Mitchell Crossing, Soho and Mt Frankland State forest management priority areas is proposed to be created along with a new national park for the Mt Lindesay - Sheepwash area.

D'Entrecasteaux National Park will be enlarged to include large areas of vacant Crown land and reserves.

Crown land in the Shannon Basin will become national park.

Hawke-Treen State forest management priority area is proposed for addition to Warren National Park and Giants State forest is proposed for addition to Walpole- Nornalup National Park. Brockman State forest management priority area is proposed as national park.

CONSERVATION PARKS

Four areas of State forest (Boorara, Dombakup, Muirillup and One Tree Bridge) and two small unvested national parks (Jardee and Jervik Park) are proposed to become conservation parks.

ADDITIONAL STATE FOREST

A substantial area of vacant Crown land on the Kent River Catchment is proposed to become State forest.

Origin of Conservation and Recreation Priority Areas in State Forest.

All of the conservation and recreation priority areas set aside in State forest by the Forests Department in its General Working Plans 86 and 87 (Appendices 3 and 4, and Map 8 in GWP 87) are proposed for reclassification in this plan, either to nature reserve, national park, conservation park, or to stay as State forest.

The reserve system developed by the Forests Department was based on the objectives of

- (i) setting aside representative ecosystems in all the main forest types, and
- (ii) ensuring that recreational demands in the forest could be met in the long term.

The reserve system was reviewed and endorsed by the Environmental Protection Authority in its land use studies of Systems 1, 2, 4 and 6 published in the period 1975-1983.

Fate of Conservation and Recreation Priority Areas in State Forest

The Forest Department's General Working Plan 87 (Appendix 3) listed 64 flora, fauna and landscape MPAs. These fall within the Northern Forest, Central Forest and Southern Forest regions of CALM.

It is proposed that these areas be reclassified as follows:

- 16 will become national parks
- 14 will become nature reserves
- 34 will become conservation parks

General Working Plan 87 (Appendix 4) listed 7 recreation MPAs in State forest.

It is proposed that these be reclassified as follows:

- 2 will become national parks
- 5 will become conservation parks

The Department will in time produce 'area management plans' for each of these areas.

Zoning of State Forest, Parks and Reserves

In addition to the proposed allocation of lands to the categories of nature reserve, marine park, national park, conservation park or State forest, areas may further be zoned to give priority to certain land uses in selected areas.

Areas may be zoned to emphasise conservation, protection, recreation or production. This process will be developed in detailed management plans for specific areas.

Priority zones have not yet been allocated for national park, nature reserve or conservation park in the region. The zoning system for these areas will be determined later when individual management plans for each area are developed. At this time, pending changes to the CALM Act to permit this to be done, the possibility of giving zones A class security of purpose will be considered.

RESOURCES, ISSUES AND STRATEGIES

The topics covered are:

- Land Dedication and Acquisition
- Conservation of Flora, Fauna and Landscape
- Cultural Areas
- Protection
- Recreation
- Public Participation and Liaison
- Production
- Public Utilities

The format is:

Background information on resources and issues.

Regional strategies, which add specific details to the Departmental policy guidelines presented in Appendix 2.

Regional strategies are not ranked in order of priority. This is partly because it is intended that all strategies listed will eventually be implemented. But it also reflects the absence of a policy on ranking priorities on resource allocation within CALM. It is intended that such a policy be developed during the period of this plan.

Land Dedication and Acquisition

The classes of land controlled under the CALM Act are described in Part 1 and areas within the region listed in Table 6. CALM also manages some unvested land (proposed for CALM Act tenure) as shown in Map 7.

Some CALM land is leased for grazing or other purposes under historical agreements. There are currently some 90 CALM Act leases covering about 2 900 ha in the region.

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:

- (i) monitor the availability of private land advertised for sale and if high priority for acquisition, seek to acquire funds for the purchase of the land;
- (ii) oppose grazing or other leases which do not benefit the designated land use;
- (iii) support EPA (CTRC) recommendations and other proposals for additions to CALM Act tenure, subject to provision of adequate additional funds and staff for management.
- (iv) use land exchange to rationalize and improve the management boundary of CALM land, provided a balance of resource values is maintained.

Conservation of Flora, Fauna and Landscape

Conservation is defined as

.... the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. Thus, conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment. Living resource conservation is specifically concerned with plants, animals and micro-organisms, and with those non-living elements of the environment on which they depend. Living resources have two important properties the combination of which distinguishes them from non-living resources: they are renewable if conserved; and they are destructible if not. (I. U. C. N. 1980 in Dept. of Conservation & Environment 1987.)

CALM manages 932 300 ha of land in the region, of which 330 100 ha or 35 per cent has a nature conservation priority, as shown in Map 8. (Map 8 does not show road, river and stream zones and wetland areas which occur within State forest and are also managed for their conservation values.) The question of whether this area was adequate was examined by the Conservation Through Reserves Committee. This culminated in the release of the EPA's 'Systems Red Books' in 1975-83. Numerous recommendations were made to improve the reserve system. Most of these recommendations have been implemented. A comparison between the EPA, Forests Department and CALM recommendations for these areas is provided in Appendix 3.

Security of purpose of conservation reserves, particularly those that do not have an A class reserve classification, is a major issue. Greater security of purpose for State forest conservation areas can be provided by making them A class reserves vested in the NPNCA. This is proposed in this plan.

LANDSCAPE

Land management can result in substantial changes to the landscape. Undesirable visual effects

can be avoided or minimised through understanding and application of landscape management principles.

Attractive landscape features of the region include:

- River valleys, e.g. Warren, Donnelly, Frankland;
- Lakes, e.g. L. Muir, L. Unicup, L. Jasper, L. Maringup;
- Mountains, e.g. Mounts Lindesay, Frankland, Burnside;
- Cliffs and beaches, e.g. D'Entrecasteaux, Walpole- Nornalup;
- Sand dunes, e.g. Yeagarup, Callcup, Meerup;
- Islands, e.g. Flat Is., Sandy Is., Chatham Is.;
- Karri forest;
- Jarrah forest;
- Tingle forest;
- Wandoo woodland;
- Coastal plain.

Agencies which may have a deleterious effect on landscapes include:

- insect and fungal diseases;
- logging;
- roadworks;
- prescribed burning;

wildfires;
public utilities;
some private developments.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) classify landscape features on CALM lands according to the Departmental system;
- (ii) identify and protect important landscapes in the region;
- (iii) provide advice to private landholders and other agencies to minimise the visual impact of operations;
- (iv) carry out a research program into landscape perceptions and preferences;
- (v) conduct training courses in landscape management for Departmental staff and other organisations who operate on CALM land.

FLORA AND FAUNA

The Department is responsible for flora and fauna on CALM land and for the protection of native flora and fauna throughout the State under the Wildlife Conservation Act. This Act gives the Department responsibilities on private property as well as Crown land. Liaison is required with private landholders and other land management agencies to inform them of their obligations and offer advice and assistance on matters of conservation.

A major aim of management in areas whose primary function is wildlife conservation, is to maximise diversity and species richness. In some reserves, management is directed to providing habitat for particular species or communities. Such reserves in the Southern Forest Region will be progressively defined by CALM staff.

In lands managed by the Department where wildlife conservation is not the primary purpose, management practices will aim to maximise wildlife values, as far as this is consistent with the primary land use.

Knowledge of the existence and distribution of the thousands of species of native plants and animals in the region is considerable, but not complete. High priority is given to investigating and protecting rare and endangered species and their habitat.

Currently (November 1987) eleven plant species known to occur within the region are gazetted as rare or in need of special protection (Table 8A). During the life of the plan the list will be amended from time to time. There are 1.3 species of rare vertebrates (Table 813). The Noisy Scrub Bird (*Atrichornis clamosus*) does not naturally occur in the region, but translocation has been carried out from the populations at Two Peoples Bay to Walpole-Nornalup National Park under CALM Wildlife Management Program No. 2 (Burbidge *et al.* 1986).

TABLE 8A
GAZETTED RARE FLORA SPECIES KNOWN TO OCCUR WITHIN
THE SOUTHERN FOREST REGION AS AT NOVEMBER 1987

<i>Asplenium obtusatum</i>	
<i>Caladenta dorrienii</i>	
<i>Caladenia integra</i>	
<i>Caladenia plicata</i>	
<i>Caladenia sp.</i> (southern forest)	S.D. Hopper 3553
<i>Caladenia sp.</i> (Muir)	S.D. Hopper 3521
<i>Conostylis misera</i>	
<i>Diufis drummondii</i>	
<i>Drakea sp.</i> (south-west)	S.D. Hopper 3566
<i>Grevillea cirsiifolia</i>	
<i>Kennedia glabrata</i>	

TABLE 8B
GAZETTED RARE FAUNA SPECIES KNOWN TO OCCUR WITHIN THE
SOUTHERN FOREST REGION OR ADJOINING WATERS (AT MARCH
1987)

Common name	Scientific name
Blue whale	<i>Balaenoptera musculus</i>
Woylie	<i>Bettongia pencillata</i>
Western quoll or chuditch	<i>Dasyunis geoffrod</i>
Red eared firetail finch	<i>Embletna oculatum</i>
Southern right whale	<i>Eubaleana australis</i>
Peregrine falcon	<i>Falco peregrinus</i>
Crested shrike tit	<i>Falcunculusftontatus</i>
Tammar	<i>Macropus eugenti</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Numbat	<i>Myrmecobius fasciatus</i>
Western ringtail	<i>Pseudocheinis peregrinus occidentalis</i>
Carpenter snake	<i>Python spilottus</i>
Freckled duck	<i>Stictonetta naevosa</i>

Harvesting, hunting or culling of endemic species, particularly kangaroos, ducks, parrots and wildflowers is another issue. Some fauna species have been favoured by land clearing and have become agricultural pests. Other species have been harvested commercially or hunted for decades.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) continue research to test hypotheses leading to an understanding of pattern and process in ecosystems;
- (ii) develop management procedures for conservation reserves to maximise wildlife (flora and fauna) diversity and to maintain representative habitats;
- (iii) maintain close liaison with landholders, other agencies and the public regarding their responsibilities under the Wildlife Conservation Act and regulations;

- (iv) review the adequacy of conservation lands in the region in the light of research findings;
- (v) continue surveys to record the distribution, abundance and other details of gazetted rare species;
- (vi) assist research staff to develop and implement strategies for each rare species to ensure continued survival and expansion of populations;
- (vii) monitor populations of rare species;
- (viii) continue to implement the Department's Kangaroo Management Program.

WETLANDS AND ESTUARIES

Wetlands occur as lakes, swamps, rivers, reservoirs and estuaries. Many of the wetlands in the region occur on the Scott Coastal Plain and Lake Muir area. They have a high conservation value.

Major wetland areas managed by CALM are listed in Table 9. Numerous areas also exist which, although small individually, are large cumulatively.

Wetlands are threatened by pollution from farm runoff water, spread of weeds and recreational use.

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:

- (i) list wetland resources in the region and identify key values for each wetland;
- (ii) oppose the alienation of wetlands on CALM lands;
- (iii) rehabilitate degraded wetlands;
- (iv) liaise with private landholders and other agencies, e.g. Department of Agriculture, WAWA, local government bodies, to promote wetland conservation;
- (v) monitor the condition of wetlands.

MARINE CONSERVATION

There are currently no formal marine reserves under CALM management in the region, but there are marine parts of national parks. About 16 ha of D'Entrecasteaux National Park and about 32 ha of Walpole- Nornalup National Park are between high and low water mark. The conservation of marine mammals and seabirds is a CALM responsibility under the Wildlife Conservation Act.

TABLE 9
MAJOR WETLANDS MANAGED BY CALM IN THE SOUTHERN
FOREST REGION

LAKES AND SWAMPS	TENURE
Lake Muir	nature reserve
Lake Unicap	" "
Kulunilup Lake	" "
Noobijup Lake	" "
Pindicup Lake	" "
Lake Quitjup	national park
Lake Jasper	" "
Yeticup Swamp	State forest
Poorginup Swamp	nature reserve
Pinticup Swamp	" "
Lake Maringup	vacant Crown land (a)
 RIVERS (PARTS OF)	
Donnelly River	State forest/national park
Warren River	" " " "
Shannon River	State forest
Deep River	" "
Frankland River	" "
Denmark River	State forest
 ESTUARIES ETC.	
Some CALM land adjoins estuaries, e.g.	
Walpole Inlet	national park
Nornalup Inlet	national park
Irwin Inlet	national park/nature reserve

In addition vacant Crown land (a) adjoining Broke Inlet is managed by CALM.

(a) = proposed for CALM tenure

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2) during the period of this plan CALM staff in the region will:

- (i) evaluate marine areas adjoining the region as possible marine reserves;
- (ii) protect and assist marine fauna, e.g. stranded whales, seals.

Cultural Areas

Areas of cultural importance occur on all CALM lands. Historic and Aboriginal sites are scattered throughout, while limestone caves are confined to D'Entrecasteaux and Walpole- Nornalup National Parks. Issues and strategies for these areas are discussed below:

ABORIGINAL SITES

Aboriginal people occupied the region for at least 40 000 years, and many sites have been identified. These are most plentiful on the coastal plain. All Aboriginal sites are protected by the Aboriginal Heritage Act.

Records of Aboriginal sites are not held by CALM, but by the W.A. Museum.

Jarvis (1979) refers to a number of sites in the region. Dortch and Gardner (1976) report a number of Aboriginal sites in the Northcliffe area. These include stone artefacts, a quarry, fish traps and middens (shells, bones) near Windy Harbour, Malimup Spring, Gardner River, Mt. Chudalup, Dombakup Brook and Northcliffe.

Further sites are known to occur near Broke Inlet and Point Nuyts.

Aboriginal sites can be threatened by a variety of activities. CALM operations need to be carefully planned to ensure disturbance to Aboriginal sites is avoided.

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:

- (i) collate existing information on Aboriginal sites in the region and ensure that sites are known by the Registrar of Aboriginal Sites at the WA Museum. Seek to maintain a confidential register in the regional office and each district;

- (ii) train staff in the recognition of Aboriginal sites and update registers when new sites are found;
- (iii) develop and implement management guidelines for Aboriginal sites in liaison with the W.A. Museum, tertiary institutions and Aboriginal organisations.

HISTORIC SITES

There are numerous sites of historic interest and value on CALM land in the region. These include old homesteads, stockyards, wells and examples of early fencing, mines, railway formations and bridges, townships, sawpits, mills, log landings and special trees.

There are no detailed records of historic sites in the region. Considerable work would be required to set up complete records for CALM lands in the region.

The locations of some sites are shown on Departmental maps. Existing management plans refer to sites within the area of interest. The National Trust (W.A.) and Heritage Commission (Commonwealth) both maintain registers of significant sites.

Below is a list of some historic sites identified on CALM land to date. The ones with asterisks are classified by the National Trust.

- *Brockman sawpit (c. 1865), Dombakup Block;
- Old sawpit (c. 1865), Walpole-Nornalup National Park;
- *St Erney homestead (1908), Quininup Block;
- Gloucester Tree (1947), Pemberton;
- Railway bridges, Donnelly Valley and Warren River;
- Old wells, e.g. Blackwater Well, Williams Well;
- One Tree Bridge;
- Old tin mines near Willow Springs;
- Abandoned oil wells near Warren River mouth;
- Coal mining shafts at Coal Mine Beach, Walpole;
- Old fire lookout towers and trees;
- Remains of old sawmills and/or settlements (Glenoran, Heartlea, Pimelia, Shannon, Strachan, Wheatley, Willow Springs, Yornup);
- Old campsites, huts;
- Abandoned group settlement locations in the Northcliffe area;
- Tree arboreta.

There are many threats to the preservation of historic sites, including visitors to CALM lands.

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:

- (i) collate existing information on historic sites in the region and maintain a register of sites in the regional office and in each district. Liaise closely with the Heritage Commission and National Trust in the preparation and maintenance of registers;
- (ii) develop management guidelines for historic sites in the region in liaison with the Heritage Commission, National Trust, W.A. Museum, tertiary institutions and historical societies;
- (iii) with local historical societies, maintain and restore historic sites by volunteer projects. Develop facilities and visitor information where appropriate.

CAVES

Caves are found in limestones along the south coast, including some near Windy Harbour. They are small and undeveloped for visitors.

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:

- (i) maintain an inventory of caves in the region including a record of condition. All caves are to be inspected periodically to update these records;
- (ii) restrict access to caves where necessary to protect the safety of visitors or the cave system;
- (iii) liaise with speleologist groups to ensure that use of caves does not adversely affect cave systems.

Protection

The Department is responsible for the protection of CALM lands and resources from fire, disease, weeds, pests and pollution and for the rehabilitation of harmful effects from these or other agencies.

FIRE

Fire is a natural phenomenon of the environment because of summer drought and lightning storms. It was used deliberately by Aboriginals before European settlement, but since the advent of European

settlement, fires seem to have become more common, especially in the moister southern forests. Certainly, over the last 150 years values have changed and it is considered generally undesirable for uncontrolled wildfires to burn on or out of CALM lands.

The Departmental policy on fire is given in detail in Appendix 2. In essence it requires that:

- all possible steps will be taken to prevent wildfires;
- an effective organization will be maintained to detect and suppress fires; liaison will be maintained with local Bush Fire Brigade Control Officers;
- where appropriate, fire suppression will be made easier and safer by the practice of cyclic prescribed burning;
- a continuing research program into fire ecology and fire control will be given high priority.

Fire management, particularly in heavy forest country, is a controversial issue. The Department expects that all of its fire policies and practises will be the subject of public debate.

All the Department's resources within the region are available for fire suppression. These are supported, when necessary, by resources from other regions.

In addition, there are considerable resources available through the volunteer bush fire brigades in the region (generally where wildfires threaten private property or life values), and the co-ordination and communication resources of the Bush Fires Board. Assistance from the Police and State Emergency Service has also been provided when life and property have been threatened.

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:

- (i) continue to maintain an efficient fire detection system and fire fighting force;
- (ii) wherever appropriate, reduce fuels by prescribed burning;
- (iii) consistent with the requirement to protect life, property and ecological values, introduce diversity into prescribed burning fire regimes. Use fire to develop or favour habitat for specific flora and fauna species;
- (iv) implement inter-agency agreements with brigades for fire management in remote areas;
- (v) develop fire protection plans for all land managed by CALM;

- (vi) develop more neighbour and public knowledge about community fire protection needs.

DISEASE

The major plant disease of concern to the Department is dieback caused by the introduced soilborne fungus *Phytophthora cinnamonti*. This disease is fatal to many native plant communities on lateritic or poorly drained soils in the south-west of the State. However, in general, the impact of the disease is less serious in the Southern Forest Region.

The effects of dieback can include:

- destruction of native plants including jarrah;
- increased salinity, degraded fauna habitat and aesthetic values;
- reduction in forest productivity of jarrah.

Dieback cannot be eradicated once it is established at a specific site. Control measures, therefore, concentrate on preventing the disease from establishing or spreading. The principal methods involved have included:

- proclamation of Disease Risk Areas (DRA) in State forests (currently 237 000 ha within the region is in DRA);
- a sophisticated photography and survey program for disease recognition and mapping;
- research;
- devising and implementing, often in association with forest users, disease hygiene measures;
- training of staff and forest and park users in disease management;

Numerous other minor plant disorders are present on CALM lands, including diseases caused by other species of *Phytophthora* and *Armillatia*. These are monitored.

The area infected by dieback in the region is estimated to be about 35 000 ha, some 6 per cent of the total of State forest. Map 9 shows Disease Risk Areas and progress with dieback mapping.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) minimise the artificial spread of dieback disease;
- (ii) assess all operations with a 7-way test;

- (iii) improve self-policing of dieback hygiene by industry (e.g. logging, mining), when operating on CALM lands;
- (iv) continue research into site vegetation and dieback impacts, and apply new information appropriately;
- (v) continue to develop practical hygiene monitoring systems for all operations;
- (vi) improve public understanding of the dieback problem on CALM land.

WEEDS AND PESTS

Weeds are plants (usually self-sown exotics) growing where they are not wanted. Pests are troublesome or destructive animals (including insects), either exotic (feral) or native.

Weeds are often introduced on to public lands from adjoining private property, public roads or other areas of public use. They can affect native plants and animals ' Departmental operations and neighbours. The Department has the responsibility to eradicate, control or contain declared weeds and animals on CALM lands in specified shires or areas, under Section 37 of the Agriculture and Related Resources Protection Act. The main weed of concern is the blackberry (*Rubus fruticosus*). Other declared weeds in the region include apple of sodom (*Solanum hermanni*) and St John's Wort (*Hypeficum perforatum*).

Feral animals such as the cat (*Felis catus*), fox (*Vulpes vulpes*), rabbit (*Oryctolagus cuniculus*) and pig (*Sus scrofa*) cause widespread environmental problems on CALM lands.

Native fauna such as the red capped parrot (*Purpureicephalus spurius*) and grey kangaroo (*Macropus fuliginosus*) can be pests to CALM neighbours.

The larva of the native moth, the jarrah leaf miner (*Perthida glyphopa*) is the most damaging insect pest of jarrah in the region. However, substantial areas of jarrah forest have recently been attacked by caterpillars of the gum leaf skeletoniser moth (*Uraba lugens*). Currently there are no economically feasible methods of controlling these insect pests.

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:

- (i) in conjunction with the Agriculture Protection Board, develop programs to control declared weeds and pests;
- (ii) carry out monitoring and control programs, as resources allow;
- (iii) assess the efficiency of control.

REHABILITATION

Rehabilitation includes the processes necessary to return disturbed land to a predetermined surface, land use or productivity.

Rehabilitation may be required after any site disturbance such as mining, gravel pit working, roadworks, logging, clearing, disease, or pest attack. Rehabilitation may also be required after recreation activity or fire. In the broader sense, historic buildings may require rehabilitation.

SOUTHERN FOREST REGION
D.R.A. AND DIEBACK MAPPING

DISEASE RISK AREA
MAPPED FOR DIEBACK
FOREST SOAK



MAP 9

The need for rehabilitation of disturbed sites depends upon the capacity of the site to restore itself and/or the degree of acceptable departure from natural processes.

The plant species used for rehabilitation should be local species wherever possible, and preferably have resistance to dieback, fire, and environmental stresses, e.g. drought and nutrient deficiencies. Integration with the aesthetics and the operations of surrounding lands is necessary.

Most of the rehabilitation site works on CALM land is undertaken by the agency responsible for the site disturbance, e.g. gravel pit rehabilitation by Main Roads Department, timber industry and shires.

The Department also owns or hires machines for rehabilitation work.

Plants and/or seed are often supplied and planted by the Department.

In recent years, rehabilitation work on CALM land in this region has been of the following order:

- rehabilitation of gravel pits, 30 ha/year;
- rehabilitation of landings and snig tracks after logging, 170 ha/year;
- rehabilitation of degraded forest (e.g. former farmland, millsites), 80 ha/year.

Many areas of CALM land disturbed long ago remain unrehabilitated, e.g. old gravel pits. These areas will remain in a degraded condition until resources can be provided for their rehabilitation.

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:

- (i) survey CALM lands and quantify the areas and locations of disturbance that require rehabilitation;
- (ii) prepare rehabilitation prescriptions for all disturbances;
- (iii) where rehabilitation is the responsibility of the user, establish a schedule of conditions between the user and CALM.

Recreation

The direct expenditure by tourists in Western Australia in .1984/85 was \$342 million including \$51 million in the South West statistical division (W.A. Tourism Commission 1985). The number of

recreational visits to national parks and State forests in the region probably exceeds 300 000 per year, and is expanding each year. Recreation opportunities on CALM land are shown on Map 10.

Important aspects for management are:

- camping;
- day use;
- motorised recreation;
- horse riding;
- pets;
- swimming, fishing and boating;
- hunting.

CAMPING

Camping is a traditional activity on many CALM lands and in many of the areas proposed for addition to the D'Entrecasteaux National Park.

CALM campsites are shown on Map 10. Camping may be either as an adjunct to back packing or vehicle based. Back pack camping is permitted in almost all 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. Vehicle based camping is allowed at designated sites.

The Department has a caravan park at Coal Mine Beach in Walpole- Nornalup National Park. In 1986/87, 4 400 people used this caravan park.

Issues of importance to managers with respect to camping are:

- provision of suitable camping areas;
- minimising conflicts with day users;
- managing and maintaining campsites.

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:

- (i) identify and develop sites where camping can occur;
- (ii) cater for a range of camping requirements, e.g. small or large group camping;

- (iii) maintain campsites in good condition;
- (iv) liaise with Local Government and local tourism organisations over the need for, and location of campsites;
- (v) evaluate and, if appropriate, allow larger and more formal camp sites to be developed as concessions.

DAY USE

Most recreational pursuits on CALM land are carried out during the course of one day. These include picnicking, barbecuing, bushwalking, running, jogging, cycling, photography, painting.

Recreation developments such as golf clubs, rifle ranges and motorcycle clubs also occur on leases on CALM lands.

CALM recreation sites are shown on Map 10.

Major issues with respect to day use recreation are:

- location and design of facilities such as toilets, walking trails, barbecues, parking areas;
- provision of facilities for the disabled;
- maintenance of recreation areas, including litter disposal;
- visitor safety;
- provision of recreation facilities for commercial tourist operations;

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices 1 and 2), during the period of the plan CALM staff in the region will, either directly or with assistance from commercial sources as appropriate:

- (i) assess requirements for developed recreation sites;
- (ii) evaluate existing sites in terms of location, design and suitability, and restore or redevelop as appropriate;
- (iii) provide new recreation areas, including provision of facilities and walking trails, where appropriate as resources for their development and maintenance become available;
- (iv) minimise conflicts between the general public and commercial tourist operators;

SOUTHERN FOREST REG
RECREATION OPPORTUNITIE



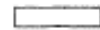
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BIBBULMUN TRACK
(existing and proposed)



C.A.L.M. ESTATE



NOTE: This map shows C.A.L.M. managed recreation sites only. Other recreation sites and leases on C.A.L.M. land, but controlled by other authorities are listed below.

- Donnelly Mill/Wheatley
- Manjimup Motorcycle Course
- Walpole Yacht Club
- Northcliffe Rifle Range
- Pimella Recreation Camp
- Pioneer Park
- Rest Point Caravan Park

REGIONS
ITIES

90 km



RECREATION OPPORTUNITIES	C.A.L.M. RECREATION SITES														
	PICNIC/BARBECUES	FISHING	SWIMMING	CANOEING	MARKED WALK TRAIL	TOILETS	DRINKING WATER	CAMPING	LOCKOUT	HANDICAPPED FACILITIES	INFORMATION	BOAT LAUNCHING	SCENIC DRIVE	CAMERA	MARKED HORSE TRAIL
1 SHANNON	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2 MT. BURNSIDE	•														
3 SHANGHAI GULLY	•														
4 WYE PLAINS	•														
5 FERNHOOK FALLS	•	•	•	•			•								•
6 MT. FRANKLAND	•				•	•	•	•	•	•					•
7 BURNETT	•								•						
8 CENTRE ROAD	•	•		•					•						
9 CRYSTAL SPRINGS	•					•		•							
10 MANDALAY BEACH/BANKSIA CAMP	•	•			•										
11 LONG POINT	•														
12 NUYTS WILDERNESS	•				•			•							
13 NEWDEGATE ISLAND	•	•	•												
14 HILLTOP/CIRCULAR POOL	•	•	•	•					•				•	•	
15 COALMINE BEACH/KNOLL DRIVE	•	•	•	•			•	•	•			•	•	•	
16 CONSPICUOUS CLIFF	•	•			•	•									
17 VALLEY OF THE GIANTS	•									•					•
18 MT. LINDESAY	•				•				•						
19 FISH CREEK/WEST CLIFF POINT	•	•	•												
20 COODAMURRUP BEACH	•	•	•												
21 GARDNER BEACH	•	•													
22 MT. CHUDALUP	•			•					•						•
23 PT. D'ENTRECASTEAUX	•								•				•	•	
24 SALMON BEACH	•	•													
25 CALLCUP HILL	•								•						
26 CALLCUP HORSE YARDS	•														•
27 WARREN BEACH	•	•	•												
28 YEAGARUP BEACH	•	•													
29 JASPER BEACH	•	•													
30 BLACK POINT	•														•
31 LAKE JASPER	•	•	•	•											•
32 DONNELLY RIVER BOAT LANDING	•	•	•	•							•				
33 LAKE YEAGARUP	•	•	•	•											
34 BEEDELUP NATIONAL PARK	•						•						•	•	
35 BROCKMAN NATIONAL PARK	•														
36 WARREN NATIONAL PARK	•	•	•	•				•	•				•	•	
37 BROCKMAN SAWPIT	•						•			•					
38 BOORARA TREE/LANE POOLE FALLS	•						•								•
39 MOONS CROSSING	•						•								
40 ROONEYS BRIDGE	•	•	•	•			•								
41 COLLINS' PULLOVER	•														
42 EAST BROOK	•														
43 GLOUCESTER TREE	•						•			•					•
44 CASCADES	•	•					•								•
45 RAINBOW TRAIL	•						•								•
46 KARRI OAK	•	•													•
47 BIG BROOK DAM AND ARBORETUM	•	•	•	•	•	•	•			•			•	•	•
48 HUNDRED YEAR FOREST	•						•								•
49 DIAMOND TREE	•									•					•
50 ONE TREE BRIDGE AREA	•	•	•	•	•	•	•			•	•		•	•	•
51 FOUR ACES	•						•								•
52 KING JARRAH	•						•								•
53 CHINDILUP POOL	•	•	•	•											

MAP 10

- (v) eliminate or reduce hazards and bring them clearly to the attention of the visiting public;
- (vi) maintain recreation sites in a clean and tidy condition;
- (vii) minimize impacts of recreation activities on ecological and aesthetic values.

MOTORISED RECREATION

CALM lands in the Southern Forest Region (particularly D'Entrecasteaux National Park) are in great demand for motorised recreation. This includes 4-wheel drives, trail bikes, unlicensed off-road vehicles, pleasure driving and rallying.

Licensed vehicles are permitted on public roads on CALM lands and normal road traffic rules apply. Exceptions are restricted access roads in Disease Risk Areas and parts of some national parks or nature reserves. There are numerous 'management tracks' on CALM lands. These tracks are not maintained for public use.

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 reserves.

Information about off-road vehicles is presented in the Department of Conservation and Environment poster 'Off-Road Vehicles and the Environment' (1985) and pamphlet 'Joining a Club' (1986).

There are two main issues associated with motorised recreation. The first of these is physical damage to the environment, by causing erosion, spreading dieback disease, damaging vegetation and disturbance to wildlife.

The second is conflict with other user groups, Many recreational activities require peace and solitude in natural environments and are not compatible with intensive vehicular use of the same areas.

Visitor safety is also important.

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:

- (i) identify areas of CALM land currently being used for motorised recreation and examine impacts on the environment and on other users;

- (ii) direct motorised recreation to the most appropriate areas and prescribe conditions of use which will minimize environmental impacts;
- (iii) develop potentially suitable sites in the region to which displaced activities can be relocated.

HORSE RIDING

Horse riding and horse exercising are common recreational pursuits on CALM lands. The demand for areas where horse riding is permitted is generally increasing.

Horses can create some problems. They may spread weeds (through their droppings), trample native vegetation or erode trails. They may also spread dieback.

Conflicts between horse riders and other recreators can occur.

Horses are generally not permitted on developed water catchments, DRAs, nature reserves, national parks and conservation parks except in specially designated areas.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) identify and develop areas for horse riding;
- (ii) identify areas within the region where horse riding is not permitted;
- (iii) monitor horse riding in other areas;
- (iv) develop ways of minimising the environmental impacts of horse riding;
- (v) liaise with equestrian groups to seek co-operation in the maintenance of horse trails.

PETS

Many recreationists and people who work on CALM land take their pets with them when they travel. The most common pets are dogs.

They can cause problems, particularly by annoying other people in camping grounds or picnic areas, as well as disturbing native animals and vegetation.

Pets under control are normally allowed on CALM land which is managed for multiple use, but are not permitted on developed catchments (WA Water Resources Council 1985) and nature reserves. Subject to provisions below, they may be allowed in specified zones of national parks and conservation parks.

Seeing-eye dogs accompanying blind persons are allowed in national parks.

Licensed gun dogs are allowed on the ten game reserves in the region during the period when duck shooting is permitted.

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:

- (i) identify and publicise areas where pets (under control) are permitted;
- (ii) explain the Departmental policy to the public and enforce it if necessary.

SWIMMING, BOATING AND FISHING

Swimming, wading, boating, fishing and marroning are all activities which occur in the region.

Details of permitted activities are given in Table 10.

Further information about various water-based recreation activities is available from:

- Fisheries Department 'Recreation Fishing. A Guide to the Rules' (1985);
- Fisheries Department 'Trout in Western Australia' (1982);
- Department of Sport and Recreation 'Canoeing Guides Nos. 1-9' (n.d.);
- Department of Marine and Harbours - boating regulations.

Important issues with respect to the management of water-based recreation are:

- minimising conflicts between user groups;
- protecting the environment from damage through over-use or inappropriate use.

TABLE 10
WATER-BASED RECREATION PERMITTED ON CALM LAND
IN THE SOUTHERN FOREST REGION

Recreation Activity	Nature Reserve	National Park Conservation Park	Other State forest
POWER BOATING(f)	No Except(b)	No Except Donnelly River(g)	Yes Except catchments(a)
CANOEING, ROW BOATS, SAILING	No Except(b)	Yes Except catchments(a), parts of D'Entrecasteaux and Shannon(g)	Yes Except catchments(a)
FRESH WATER FISHING, MARRONING(d)	No Except(b)	Yes Except catchments(a) and as determined by area management plans	Yes Except catchments(a)
SWIMMING, WADING	No Except (b) (c)	Yes Except catchments(a)	Yes Except catchments(a)
DUCK SHOOTING	No Except(e)	No	No

Note:

- (a) Some of these activities are permitted on certain catchments, e.g. dams from which the water is treated. Refer to local WAWA office for details.
- (b) Recreational activity and professional fishing are not permitted in nature reserves. However, some traditional activities may continue as set out in the management plan for a particular reserve.
- (c) Wading is permitted in game reserves to retrieve ducks.
- (d) Fishing is permitted only under the relevant Fisheries Act Regulations, unless restricted or prohibited under a management plan.
- (e) Permitted only in designated game reserves, during season.
- (f) Power boating is generally permitted in marine, river and estuary waters adjoining CALM land. These waters are controlled by the Department of Marine and Harbours under boating regulations.
- (g) The draft management plan for Shannon Park and D'Entrecasteaux National Park (1986) proposed that power boats be permitted only on the Donnelly River below Boat Landing Road and canoes be permitted only on Shannon Dam, Lake Maringup, Lake Jasper, Warren River, Donnelly River, and the lower reaches of Shannon River and Gardner River.

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:

- (i) list sites at which water-based recreation may occur;
- (ii) determine which activities are appropriate for each site;
- (iii) develop plans to separate potentially conflicting uses at a single site;
- (iv) publicise alternative sites for users whose traditional recreation is considered to be inappropriate at a particular location;
- (v) monitor the effects of water-based recreation on the environment in and around the water body and modify plans as necessary;
- (vi) continue liaison with the WAWA on the issue of recreation in catchments.

HUNTING

Shooting of ducks and quail on designated game reserves is the only form of recreational hunting permitted on CALM lands.

The rules for duck shooting are summarised in the latest edition of CALM 'Duck Shooter's Guide' (1987). There are currently ten game reserves in the region. They are a south-west part of Lake Muir and Kodjinup Swamp in Manjimup Shire, and Lake Unicup, Lake Pindicup, Lake Noojibup, Lake Mordalup, Lake Kulunilup, Pinticup Swamp, East Pinticup Swamp and Yarnup Swamp in Cranbrook Shire.

The length of the game shooting season and duck and quail species able to be taken in any season are determined annually by the Minister for Conservation and Land Management.

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:

- (i) monitor the condition of game reserves to determine the effects of hunting;
- (ii) enforce regulations on game reserves.

Public Participation and Liaison

There is high public interest and concern for the management of public land and ecosystems in the State. CALM promotes this through education, interpretation, public participation and extension services.

COMMUNITY EDUCATION AND INTERPRETATION

CALM wishes to promote community awareness of conservation and public land management. This is done by the provision of information, use of the media, educational programs for schools and community interest groups, and the provision of interpretive facilities such as self-guiding information tours.

Most CALM staff have some involvement in community education and interpretation work. There is a Regional Information Officer, Regional Parks and Reserves Officer and a part-time Recreation Officer in each district.

Education facilities are provided at the Donnelly River School, the Perup Forest Ecology Field Study Centre, Shannon River (Information centre), and Northcliffe and Walpole visitor centres, and Manjimup Timber Park and Museum.

A range of printed material on recreation facilities, camping, maps, and technical information is available at Departmental offices.

Arbor Day is promoted at schools, to increase the awareness of the value of trees. Tree planting and maintenance activities are often conducted.

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:

- (i) develop interpretive material at high use areas such as Manjimup Timber Park, Shannon River, Gloucester Tree;
- (ii) develop comprehensive Regional and District libraries, to cover information and extension needs;
- (iii) develop the herbarium at Manjimup research centre for public access;
- (iv) prepare and distribute information through media outlets, printed material and on film.

COMMUNITY INVOLVEMENT

The CALM Act (Sections 14, 57-59) makes statutory provision for public participation in the preparation of management plans. A range of less formal public involvement in other Departmental planning matters is also desirable. The Department wishes to be involved in local communities and provide assistance where appropriate.

Examples of community involvement include:

staff involvement on local tourist bureaux and with agricultural shows;
advice about landscaping and tree planting in townsites; co-operating with schools, e.g. work experience, Arbor Day; advisory committees, 'Friends of the Park', and volunteer groups;
liaison with bushfire brigades and State Emergency Service.

However, public participation requires considerable staff resources to plan, implement, review and follow-up. Volunteer programs require staff time for supervision, and materials for the implementation of works programs.

The D'Entrecasteaux National Park has had an Advisory Committee for many years, with representation from local government, Government departments and community groups. Recently this committee has been replaced by a Karri Region Advisory Committee, which deals with all issues relevant to the Southern Forest Region,

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) continue to implement a range of public participation programs;
- (ii) seek regular 'feed back' from the public on Departmental policies and management practices through both informal and formal contacts;
- (iii) develop interpretive trails in parks and forests.

INFORMATION AND ADVISORY SERVICES

The public, public utilities, farmers and business people are provided with a wide range of information and advice from the Department on matters of conservation and land management.

Information and advice can be provided at district, regional or Departmental level. Enquiries can be referred to other departments or authorities when appropriate to do so.

Regional Strategy

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:

- (i) Prepare and implement a plan for an efficient information and extension service in the region,

Production

Numerous activities associated with the production of natural resources occur on CALM lands. For example: forest produce (timber, wildflowers, seed and honey); basic raw materials such as gravel, water.

WATER

Catchments are managed to optimise both the quantity and quality of water produced. CALM land on gazetted catchments and water reserves is jointly administered by CALM and WAWA.

The quantity of water collected varies according to seasonal rainfall, soil storage and natural use of forests and agricultural crops. Clearing and forest thinning operations increase water yield.

Water quality is assessed by colour, turbidity, salinity, chemical pollutants, bacteria and viruses. Increased salinity is regarded as the most serious threat. In low rainfall zones, clearing releases soil stored salts. Water quality in the Warren, Frankland, Kent and [lay Rivers has been seriously degraded in this way.

The Resource

Surface water supplies on the main catchments in the region are shown in Table 11. Significant underground water supplies also exist, notably on the Scott Coastal Plain. However, underground resources are not well known due to the adequacy of surface supplies.

Details about the principal dams in the region are presented in Table -12. The Water Authority's latest proposals for developments in the region are presented in their Sources Development Plan.

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 and D.

In addition there is an area between the Wellington and Kent River catchments within which no further Crown land can be released for development, under a Cabinet directive of January 1.978. This directive greatly restricts land exchanges in the area.

Map 11 shows some of the catchments within the region.

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, in conjunction with the Water Authority:

- (i) evaluate the impact of any new 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 the Water Authority of W.A.;
- (v) as required, develop management plans for catchments jointly with the Water Authority of W.A.

SOUTHERN FOREST REGION CATCHMENTS AND DAMS



C.A.L.M. ESTATE



50km
└─┘

CATCHMENT CLASSIFICATIONS

Surface catchments and ground water management areas in the south-west of the State have been classified as follows by the Water Authority for management purposes. Restrictions on recreation are indicated.

- Type 1a** Public Water Supply Area
- Type 1b** Groundwater Area
- Type 1c** Water Reserve
- Type 2a** Active catchment area—domestic supply.
 - (i) Small diversion dam. Access is only permitted, if at all, along open roads, marked walk trails, designated picnic areas, but not to the water area.
 - (ii) Large dam. Pedestrian access within 2 km from the water area is only permitted along open roads, marked walk trails and at designated picnic areas. Pedestrian access beyond 2 km is unrestricted.
- Type 2b** Active catchment area—irrigation. Access is permitted to all of the catchment, the water area, and to the dam wall.
- Type 2c** Active catchment area—domestic and irrigation. All are currently as for 2a (ii) large dams.
- Type 3** Water reserve. Potential water resource that has been gazetted.
- Type 4** Important potential surface water catchment area (not gazetted).
- Other** Not classified.



No.	CATCHMENT	TYPE	No.	CATCHMENT	TYPE
1	UPPER BARLEE BROOK	3	17	DENMARK RIVER	2a(ii)
2	FLY BROOK	4	18	MITCHELL RIVER	4
3	CAREY BROOK	4	21	WALPOLE RIVER	2a(ii)
4	PEMBERTON	2a(ii)	22	SLEEMAN RIVER	4
5	DONNELLY RIVER	3	23	QUICKUP BROOK	4
6	FOUR MILE BROOK	2a	24	SCOTSDALE BROOK	2a(i)
7	LEFROY BROOK	2a	25	KORDABUP RIVER EAST	4
8	MANJUMUP	2a(i)	26	KORDABUP RIVER WEST	4
9	WILGARUP RIVER	3	27	COLLER RIVER	4
10	WARREN RIVER	3	28	BUTLERS CREEK	2a(i)
11	DOMBAKER BROOK	4	29	LOWER SHANNON	4
12	GARDNER RIVER EAST	4	30	GARDNER RIVER WEST	4
13	UPPER SHANNON RIVER	4	31	NORTHCLIFFE W.S.	2a(i)
14	DEEP RIVER	3	32	BIG BROOK	2a
15	BOW RIVER	4	33	PHILLIPS CREEK	2a(i)
16	KENT RIVER	3			

TABLE 11
HYDROLOGICAL DETAILS FOR SOME OF THE CATCHMENTS
IN THE SOUTHERN FOREST REGION

River	Catchment area above likely dam site		Mean annual flow	Mean annual salinity level
	km²	% Cleared	m³ x 10⁶	mg/L TDS
Blackwood	19300	85	620	1150
Donnelly	850	18	154	230
Warren	3890	33	365	725
Shannon	337	0	94	215
Deep	1250	15	1-72	200
Frankland	5800	60	183	1700
Kent	1650	33	84	1100
Denmark	650	16	44	570
Hay	1400	70	71	2000

Data from Public Works Department (1979).

The data refers to the whole catchment, some of which may extend outside this region.

TDS = total dissolved solids.

TABLE 12
SOME DETAILS ABOUT THE PRINCIPAL DAMS IN THE SOUTHERN
FOREST REGION

Dam	Capacity m³ x10³	Supplying water to
Manjimup	743	Manjimup
Phillips Creek	274	Manjimup
Big Brook	530	Pemberton
Pemberton	69	Pemberton
Denmark	449	Denmark

Data from Public Works Department (1984).

HARDWOOD TIMBER

The forest based industries are one of the State's major industries, employing more than 20 000 people directly and indirectly and having an annual turnover in timber and timber products of \$330 million as at June 1985.

The timber industry began in the earliest days of European settlement when forested areas were cleared for settlement and agriculture. The industry grew rapidly in the 1890s as export markets were developed. High levels of cutting continued after the turn of the century. This period of heavy exploitation earned the State valuable export income, led to township development in the region and provided the roads and basic infrastructures that assisted the development of other industries.

Forest exploitation highlighted the need for organised forest management which took effect when the Forest Act was passed in 1918. From that time areas of prime forest were permanently dedicated as State forest and conservation policies were developed and implemented.

Silviculture

Karri forests in the region were logged from about 1912-14 when large sawmills were constructed at Jardee, Dearimill and Pemberton. Regeneration began in the 1920s after the dedication of State forests.

The earliest karri forest silviculture in the region took place at Big Brook and Treen Brook in the 1930s and was under a clearfelling system. The burning of logging debris when there was seed on the remaining trees resulted in the high quality even-aged stand found in these areas today. After the late 1930s the karri clearfelling system was superseded by a group selection system. However, in these areas, regeneration development was generally poor owing to competition from retained trees. The clearfelling regeneration system was re-introduced in the karri forests in 1967. The existence of markets for chipwood and small karri sawlogs from the mid 1970s has allowed commercial thinning operations in immature forest.

Jarrah silviculture has been described by Bradshaw (1985). The jarrah forest is now largely unevenaged, as a consequence of early exploitation and selection logging. Forest structure is variable, ranging from old growth stands to pole and sapling stands. Silviculture is aimed at encouraging regeneration or increasing growth rates of selected crop trees. Silvicultural benefits are obtained from being able to utilise marri for chipwood. High quality stands receive follow-up stand improvement after logging, such as the removal of logging residue from the trunks of retained trees and the removal by cutting and poisoning of suppressed trees and competing species.

The Resource

The hardwood forests of this region can be broadly categorised into jarrah, karri, wandoo and exotic eucalypts. The areas of these forest types are indicated in Tables 5A and 5B. The broad extent of forests in the region is shown in Map 4A and of karri in Map 4B.

The major hardwood timber production area of the State is located in this region. The level of first grade sawlog cut for the last five years has averaged over 320 000 m³/annum, with about half karri and half jarrah. At least 20 sawmills have been supplied with logs. Eight large mills each cut over 20 000 m³/annum. These mills are located at Deanmill, Pemberton, Nyamup, Northcliffe, Jardee, Greenbushes, Denmark and Nannup.

Apart from first grade sawlogs, other hardwood products utilised from jarrah and karri forests include chipwood, second grade sawlogs, SEC poles, bridge timbers, peeler logs, rails, fenceposts and firewood. Most logging operations are now integrated with one contractor harvesting all the products (excluding minor products such as fenceposts and firewood) which are then segregated on bush landings.

The only hardwood woodchip plant in the State (operated by W.A. Chip and Pulp Pty Ltd) has been operating at Diamond, south of Manjimup, since 1975 under the terms of the Wood Chipping Industry Agreement Act. The chip plant is currently using over 500 000 m³/annum of logs which are unsuitable for sawlogs from Crown land (of which about 85 per cent is karri and the remainder jarrah). In addition karri and jarrah sawmill waste is also chipped.

All important issues are addressed in the paper 'Timber Production in Western Australia' CALM (1987).

For further details about timber resources, future yields, the level of the cut, allocation of the cut and log pricing, see the above paper.

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:

- (i) implement the strategies in 'Timber Production in Western Australia. A strategy to take W.A.'s South-West Forests into the 21st Century' (1987), and strategies stemming from the Government's decision to create a Shannon River National Park (Shea, 1987);
- (ii) maximise the sale of elite logs (i.e. poles, bridge timbers, peeler logs) consistent with good silviculture;

- (iii) maximise the utilisation of first grade sawlogs to sawmills by reducing length, diameter and quality standards;
- (iv) offer logs which cannot be sold to general purpose sawmills to salvage sawmills before offering them to residue (chipwood) buyers;
- (v) regularise the sale of speciality timbers (e.g. shcoak, Warren River cedar, peppermint, banksia);
- (vi) progress towards totally integrated logging operations for all log products including minor forest produce (e.g. fenceposts, strainers);
- (vii) ensure that all logging and related operations conform to the 'Code of Logging Practice';
- (viii) develop opportunities for CALM to assume responsibility for road construction for logging purposes;
- (ix) develop the ethic of 'self regulation' by the timber industry;
- (x) control logging under logging plans.

SOFTWOOD TIMBER

In line with Government policy, pine planting in the region recommenced in 1984 after a break of many years. The current regional target is 500 ha of pine planting per year. The aim is to establish a large softwood industry in the Manjimup region.

Land for pine planting will be obtained by:

- lease of agricultural land (e.g. Softwood Sharefarming Scheme);
- purchase of agricultural land (However, CALM will buy no more private land in the Manjimup Shire for afforestation, without prior approval of both Houses of Parliament);
- acquiring agricultural land suitable for pine growing in exchange for Crown land.

The Resource

The area of State pine forests established in the region to December 1985 was 1060 ha. Ninety-five per cent of this is *P. radiata*.

For further details about timber resources, future yields, the level of the cut, allocation of the cut and log pricing, see the paper 'Timber Production in Western Australia', CALM (1987).

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:

- (i) seek to obtain the necessary land and funds to plant the target area of pine forest each year;
- (ii) review the planting rate, establishment, tending and other silvicultural techniques annually and implement appropriate changes;
- (iii) maximise utilisation of softwood timber and enforce environmental controls through the 'Code of Logging Practice';
- (iv) undertake public education programs on softwood forestry by holding information tours, developing demonstration forests and agroforestry trials;
- (v) control logging under logging plans.

MINING

Unlike the Northern and Central Forest Regions, this region has few exploited mineral deposits, Minor deposits of tin and graphite have been mined in the Donnelly River area. There has been some recent exploration for oil, coal, peat, tin, bauxite, nickel and mineral sands.

Mining (including exploration) is regulated by the Mining Act. It is through this Act that the Minister for Conservation and Land Management consents to, or does not consent to new mining activity.

The largest current mining activity in the region is peat mining at Cowerup Swamp. This mine is not on CALM land but nearby nature reserves have been subject to exploration activity for peat deposits. Limestone mining continues near Windy Harbour and some other areas have been pegged for mineral sand mining in the proposed D'Entrecasteaux National Park.

Exploration activity on Crown land is subject to environmental protection conditions including dieback hygiene prescriptions.

The Resource

Map 12 shows approved mining leases and claims and current and proposed mining operations. The known mineral resources of the region are discussed in the explanatory notes provided with the geological maps produced by Wilde and Walker (1984), Muhling et al. (1985) and for the System 6

study (Biggs et al. 1980). Access to minerals is provided under Special Agreements or the Mining Act.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) where exploration and mining occur on CALM land, prepare (in conjunction with companies) agreed working arrangements for planning, clearing, mining, rehabilitation, monitoring, maintenance and fire protection.

BASIC RAW MATERIALS (GRAVEL, SAND AND STONE)

Natural lands within the region offer a range of basic raw materials for land management and community use, including gravel, quartzite, sand and limestone. Many of these basic raw materials are also defined as minerals under the Mining Act, and are subject to mineral exploration and/or mining leases.

The Departments of Mines and CALM have procedures for joint administration of mineral and basic raw material resources.

In recent years over 200 000 M³ of basic raw materials have been extracted from CALM land in the region each year.

The major demand is for gravel for road construction and maintenance.

Basic raw material leases are provided from CALM land to other Government departments and local authorities if alternative supplies do not exist on other Crown land or private property, providing that there are no conflicts with the land use priority.

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:

- (i) develop basic raw material plans for CALM lands;
- (ii) develop working arrangements with agencies extracting basic raw materials from CALM lands.

WILDFLOWERS

Wildflower production is an important industry in this State and was valued at over \$2 million in 1980/81.

All native flora is protected and a licence is required before any wildflowers can be picked on private property as well as on Crown lands. Three forms of licence are issued by CALM, which controls wildflower picking under the Wildlife Conservation Act:

commercial purposes licences, which allow the sale of protected flora taken on Crown land;
commercial production licences, which allow the sale of protected flora taken on private land;
scientific or prescribed purposes licences, issued to those people intending to take native plants, but not to sell them.

These licences allow the picking of all but gazetted rare flora. Usually no picking is allowed within 50 m of public roads. Commercial picking is allowed on State forest, but not on nature reserve, national park or conservation park.

The main species collected in this region include *Agonisparviceps*, *Podocalpus drouytilana*, *Beaufortia sparsa*, *Dryandra formosa*, *Adenanthos obovatus*, *Beaufortia decussata*, *Boronia megastigma*, *Melaleuca lateritia*, *Melaleuca vitinea*, *Kunzea recurva*, and *Kunzea efificifolia*.

Commercial wildflower picking can have an adverse effect on conservation values, through overpicking, trampling or disease spread if not managed properly.

Regional Strategies

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) identify the commercial wildflower resource and determine appropriate levels of harvest;
- (ii) develop and implement management controls to prevent adverse effects;
- (iii) monitor costs of administration and supervision of the industry;
- (iv) develop and implement a monitoring system and adjust management according to measured impacts on conservation values;
- (v) relocate wildflower picking to appropriate areas if necessary.

SOUTHERN FOREST REGION
MINING

KEY

▨	APPROXIMATE LEASES AND CLAIMS
*	MINE IN PROGRESS
○	MINE PROPOSED
□	CALIBRE STATE



MAP 12

NURSERIES

The Department runs a number of nurseries to supply tree and shrub seedlings.

There is one Departmental nursery in the region, located at West Manjimup. This nursery was developed primarily to meet Departmental needs for timber production and rehabilitation plantings, but now also supplies seedlings for rehabilitation plantings in the Wellington catchment.

West Manjimup nursery contains areas for raising open-rooted, container stock and cuttings. Developed structures include watering facilities, sterilising and sowing equipment, greenhouses and storage sheds. Also at West Manjimup are pine seed orchards and a seed extraction installation.

In recent years about 1000 000 container stock and 1200 000 open rooted seedlings have been raised annually. In 1986, 40 000 pine cuttings were also produced.

Regional Strategy

In addition to implementing Departmental policies and guidelines (see Appendices I and 2), during the period of this plan CALM staff in the region will:

- (i) continue to manage a cost efficient nursery to produce seedlings for Departmental needs.

APICULTURE

In 1985/86 annual production from apiary sites in this State was of the order of 2 600 t of honey and 47.3 t of beeswax with a gross value of over \$2.4 million. Much of this production was from apiary sites on CALM lands. The Department acts as the central registration authority for apiary sites on all Crown lands.

Currently apiarists hold over 310 registered sites within this region, most of which are on CALM land. The number of sites available is limited. In addition, there are numerous sites on adjoining private property with the bees using CALM land. Feral bees are present throughout the region (Moore et al. 1983). Their environmental effects are the subject of current research.

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:

- (i) improve the administration of the honey production industry on CALM lands by the promotion of self-regulation, e.g. for notification, site security, hygiene;
- (ii) continue research into environmental effects;

- (iii) continue liaison with beekeepers to ensure most efficient use of sites;
- (iv) relocate sites to appropriate areas where necessary.

FISHING

Fishing (both amateur and professional) is controlled by the Fisheries Department. However, CALM has responsibility for the conservation and protection of wildlife under the Wildlife Conservation Act and can control access by fishermen on CALM land and waters. The region's Wildlife Officer is also an honorary Fisheries Inspector and exercises responsibilities under the Fisheries Act.

Commercial fishing is not permitted in waters currently managed by CALM in this region. However, fishermen do require access through CALM land for parking or transporting their vehicles, boats, fishing gear or produce. A small number camp on CALM land on occasions. Amateur fishing is permitted on CALM lands except nature reserves, under conditions established through the Fisheries Act, unless restricted or prohibited under a management plan. The rules for amateur fishermen are summarised in 'Recreational fishing, a guide to the rules' Fisheries Department (1985).

Access for fishing (and other recreational activities) in the existing and proposed D'Entrecasteaux National Park are matters to be addressed in the final version of the management plan for that Park,

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:

- (i) identify and encourage access routes to fishing spots which cause least impact on the environment;
- (ii) identify areas where vehicle access for fishing is not permitted;
- (iii) bring together known data on amateur and professional fishing on CALM lands and waters in the region, e.g. spots fished, target species, fishing effort, with a view to minimising impacts and maintaining populations;
- (iv) involve fishing clubs and interested community groups in planning fishing access;
- (v) Develop working arrangements with the Fisheries Department.

Public Utilities

The main public utility organizations with responsibilities affecting CALM lands are:

Water Authority;
State Energy Commission;
Local Government authorities;
Westrail;
Telecom;
Main Roads Department.

The major public utilities on CALM land are shown in Map 13. In addition, public utility agencies currently hold 13 forest leases and 11 gravel leases on CALM land within the region.

Public utilities provide essential community needs, but can have serious visual effects, and cause permanent loss of natural land estate and resources. Existing public utilities will be maintained and new developments will take place during the period of this plan.

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:

- (i) liaise with Officers in Charge of key public utilities to obtain information on any proposals likely to affect CALM land;
- (ii) negotiate to obtain relocation or rescheduling of operations to minimise impact on CALM land.

**SOUTHERN FOREST REGION
PUBLIC UTILITIES**

- C.S.L.M. STATE
- TRANSMISSION LINES 66KV, 110KV and 330KV
- RAILWAY
- LANDING GROUND - PUBLIC
- LANDING GROUND - C.S.L.M.
- LANDING GROUND - C.S.L.M.
(SOUTHWEST TOWNSHIP ONLY)



MAP 13

PART 4. RESEARCH

Organisation of the Division

The Division of Research is one of five divisions in the operations wing of the Department, under the overall control of the General Manager. The division is led by the divisional manager and a corporate team consisting of two senior principal research scientists and two principal research scientists. Internal organisation is on the basis of research programs, each led by a program leader. Staff are located at five research centres (Busselton, Como, Dwellingup, Manjimup, Woodvale), each under the administrative control of research centre manager and at two regional headquarters (Kalgoorlie, Karratha), which are administered by Woodvale. Some Como research centre staff are located at Narrogin and Wanneroo district offices.

The program structure for the division has only recently been adopted. It was designed to achieve the following objectives:

to integrate the two research groups that came together with the formation of CALM;

to foster better review and planning of research between workers in related subjects;

to achieve better co-ordination with other CALM divisions and with external research organisations;

to enable clearer definition of priorities and greater mobility of resources across the research spectrum.

Twelve programs have been established. Four are ecosystem based, six are process or goal based and two are service based. The programs are as follows:

Ecosystem based:

- jarrah forest
- karri forest
- pine
- wetlands and waterbirds

Process/goal based:

- biogeography
- fauna conservation
- flora conservation
- fire

plant disease
rehabilitation

Services: computing
executive and administrative support

Major Areas of Research

Each region is serviced primarily by centres located within that region working on problems which are relevant to that region. However, research on such topics as wood utilisation, fauna, fire and dieback, service wider Departmental needs as well as the region in which it is based.

The Southern Forest Region is primarily serviced from the Manjimup research centre. Research at this centre concentrates on problems to do with karri (*Eucalyptus diversicolor*), fire behaviour and fire effects and forest ecology. A little work is also being done on jarrah silviculture and it is intended to base a forest entomologist at Manjimup in the very near future.

Research in karri is concentrating on the development of a site classification system for use in the management of karri forest timber production areas. On completion of this work further research on thinning and fertilizing of regrowth stands will commence based on the site classification. Work is also being done in conjunction with the Inventory Branch on a karri growth model which will be used to predict the effect of various management treatments on the growth of karri regrowth stands.

Research also has a role in developing future karri seed supplies by developing techniques for maximising seed production in karri seed orchards. Investigation into genetic variation and breeding systems of karri across its entire range with the object of aiding the selection of seed for regeneration is being conducted by staff from Woodvale research centre.

A major role of the forest ecology research is to investigate the effects of forest operations on the forest ecosystems. In particular the effects of karri forest management practices on bird populations is being studied. Work is also being done on a system of site classification in the Walpole-Nornalup National Park. Research into aspects of management of reserves using fire is also continuing in the Perup forest where the fire ecology of tammar thickets (*Gastrolobium bilobum*) is being studied. Studies are also being carried out into the conservation of the chuditch (*Dasyurus geoffroii*) and fox control, the latter by staff based at Woodvale research centre.

Fire behaviour work in karri regrowth stands is coming to a close and this section will in future concentrate its efforts on coastal heathlands and the inland desert areas.

Work is being carried out from Como on jarrah leafminer (*Perthidia glyphopa*) in the southern forests and on the karri wood borers. The new entomologist will concentrate on further aspects of leaf miner studies as well as the leaf skeletoniser (*Uraba lugens*).

Some work will also be done on the defoliation of yate (*E. occidentalis*) trees caused by the lerp *Cardiaspina*.

Research is also being done by the CSIRO on nutrient cycling in the karri. This work is likely to be linked with thinning and fertilizer studies planned by Research Division in regrowth karri.

Studies on karri forest floristics, including the identification of rare flora, are carried out by staff from Woodvale Research Centre. Long term monitoring of waterbird populations, specially on the Lake Muir Wetlands, is being carried out in conjunction with the Royal Australasian Ornithologists Union.

PART 5. PLAN IMPLEMENTATION

The regional management plans provide a framework for more detailed area and operational plans and link these to the corporate, strategic and other plans. Regional plans do not present detailed management proposals on an area basis, but they provide a structure within which more detailed planning can take place.

LEGAL RESPONSIBILITIES

In both the preparation and implementation of management plans, Departmental staff must comply with the various Acts and legislation which impinge on operations. These are:

Acts Administered by this Department:

Conservation and Land Management Act, 1984 as amended

Timber Industries Regulation Act, 1926 as amended

Wildlife Conservation Act, 1950 as amended

Sandalwood Act, 1929 as amended

Acts under which the Department has specific responsibilities are:

Alumina Refinery Agreement Act, 1961 as amended

Alumina Refinery (Pinjarra) Agreement Act, 1969 as amended

Alumina Refinery (Wagerup) Agreement and Acts Amendment Act, 1978 as amended

Alumina Refinery (Worsley) Agreement Act Amendment Act, 1978 as amended

Bush Fires Act, 1954 as amended

Land Tax Assessment Act, 1976 as amended

Mining Act 1978 as amended

Wesply (Dardanup) Agreement Authorization Act, 1975 as amended

Wood Chipping Industry Agreement Act, 1969 as amended

Wundowie Charcoal Iron Industry Sale Agreement Acts, 1974 as amended

Other Acts which affect the Department's land management responsibilities include:

Aboriginal Heritage Act, 1972 as amended

Aerial Spraying Control Act, 1966 as amended

Agriculture and Related Resources Protection Act, 1976 as amended

Agriculture Protection Board Act, 1950 as amended

Beekeepers Act, 1963 as amended
Control of Vehicles (Offroad Areas) Act, 1978 as amended
Country Areas Water Supply Act, 1947 as amended
Environmental Protection Act, 1986 as amended
Fisheries Act, 1905 as amended
Land Act, 1933 as amended
Local Government Act, 1960 as amended
Main Roads Act, 1930 as amended
Mining Act, 1978 as amended
Metropolitan Water Supply Sewerage and Drainage Act, 1909 as amended
Mineral Sands (Western Titanium) Agreement Act, 1975 as amended
Public Works Act, 1902 as amended
Rights in Water and Irrigation Act, 1914 as amended
Soil and Land Conservation Act, 1945 as amended
South West Development Authority Act, 1984 as amended
State Energy Commission Act, 1979 as amended
State Planning Commission Act, 1985 as amended
Water Authority Act, 1984 as amended

International treaties signed by the Commonwealth Government which may impinge on the Department's responsibilities are:

CITES - Convention on International Trade in Endangered Species

Ramsar Agreement - Convention on Wetlands of International Importance especially as Waterfowl Habitat

JAMBA - Japan Australia Migratory Birds Agreement

LIAISON REQUIRED

Effective liaison is required at appropriate levels between CALM and State and Commonwealth departments and authorities, local government, organisations and individuals affected by Departmental operations, particularly the following:

Associated Statutory Authorities - Commonwealth Government include the following:

CSIRO

Department of Defence

Telecom Australia

Associated Statutory Authorities - State Government include the following:

Agriculture Protection Board
Bush Fires Board
Department of Agriculture
Department of Industrial Development
Department of Land Administration
Department of Marine and Harbours
Department of Sport and Recreation
Education Department
Environmental Protection Authority
Fisheries Department
Main Roads Department
Police Department
South West Development Authority
State Energy Commission
State Government Insurance Office
State Planning Commission
Valuer Generals Office
Waterways Commission
Water Authority of Western Australia
W.A. Tourism Commission
Westrail

Local Government

All cities and shires which contain CALM land.

SUBSEQUENT PLANNING

The regional plan will be implemented by a series of area management plans, issue plans, operational plans, manuals and prescriptions prepared at district or branch level.

Issue plans

Issue plans are either a follow-up to an approved management plan, or are for necessary operations where there is not yet an approved management plan. Issue plans cover all relevant topics such as:

- bauxite rehabilitation
- dieback
- fire protection
- logging
- recreation
- research
- wildlife management

Operational plans

The operational plan for a region is the sum of the annual works programs for the districts within the region. An operational plan shows where operations are to be carried out in a financial or calendar year. Intended works over a three-to-four year period may also be indicated. An operational plan has identifiable targets and criteria for measuring performance. It is prepared annually to incorporate any change in priorities.

The following works programs, covering the topics listed, will continue to be prepared during the period of this regional management plan:

- fire control
- hardwood regeneration
- hardwood silviculture
- hardwood logging
- noxious weed eradication
- prescribed burning
- pine silviculture
- pine planting
- pine logging
- regional and district recreation
- road construction and maintenance

Wildlife Management Programs

These present historical and scientific data and details of strategies and management options for particular fauna or flora species. Examples include:

The Noisy Scrub Bird Management Program (Burbidge, Folley and Smith 1986).

Kangaroo management in Western Australia (McNamara and Prince 1986).

Wildlife management programs are prepared by specialist staff to guide management of specific species.

Departmental Manuals and Prescriptions

Manuals provide guidelines on how operations are to be carried out, whereas prescriptions are job specific. Prescriptions may include details such as a map of the work area, personnel required, cost estimate, safety rules, environmental protection specifications and liaison requirements.

Written job prescriptions are used for most jobs carried out by Departmental gangs and for some jobs carried out by staff and contractors.

The following manuals will continue to be used and others will be drawn up as necessary:

- Foresters Manual (to be progressively incorporated into a CALM Operations Manual)
- Pine management guide
- Working arrangements
- Code of hardwood logging practice
- (Hardwood) industry control manual
- (Hardwood) operations manual
- Dieback hygiene manual (1986)
- Rare flora register for forest regions (1986)
- District managers guide (1986)
- Code of softwood logging practice (1986)
- Recreation operations manual
- Signs manual
- Chemicals manual

Guidelines for Necessary Operations

The CALM Act (Section 33) provides that certain operations can be carried out when there is no management plan. For national parks and nature reserves, these are defined as those actions necessary for the preservation or protection of persons, property, land, flora or fauna, or for the preparation of

a management plan. For indigenous State forest they are defined as those actions that ensure multiple use and sustained yield of that resource for the satisfaction of long term social and economic needs.

Guidelines for 'necessary operations' are prepared by district and specialist staff for approval by the directors.

Regional, District, Branch Strategic Plans

Each year, or as required, Regional Managers draw up a strategic plan detailing such matters as:

- responsibilities;
- objectives and key strategies;
- priorities for the period, including reference to work deferred because of insufficient resources;
- liaison requirements;
- administrative structure and arrangements;
- update of resources (personnel, etc);
- targets and/or performance indicators and control systems to measure success or failure;
- reports required, such as annual reports by districts.

Planning by other Departments, Authorities and Organisations

Many other departments, authorities and organisations produce management plans. It is the intention of this Department to conform with the appropriate Acts, Regulations, By-laws and plans of other organisations providing that these do not conflict with our Acts, Regulations and responsibilities. This Department also intends that other departments should conform with our Acts and Regulations.

Our plans are discussed with organisations and individuals likely to be affected by them and we seek input into other organisations plans that are likely to affect us.

Examples of the types of plans which may affect this Department are:

Commonwealth Government

Telecom: microwave link proposals, telephone cable developments.

State Government

Environmental Protection Authority: Coastal management plans, conservation reserve proposals for Systems.

Main Roads Department: Proposals for major roadworks etc.

State Energy Commission: Proposals for new electricity or gas lines.

State Planning Commission: Regional or area plans.

Water Authority: Proposals for major new developments. Catchment recreation plans.

Waterways Commission: Inlet/estuary management programs.

Local Government

Town (shire) plans, proposals for major new developments.

Private Enterprise

Mining Companies: Proposals including ERMP for major new developments.

WORKS PROGRAMS AND FINANCE

The Departmental objective for financial management is to prepare budgets which reflect Departmental goals and priorities and to manage works programs according to approved budgets.

PERSONNEL

Increase in personnel numbers is justified in a number of areas. In the current economic situation, however, personnel numbers are likely to decrease in line with Government policy.

CALM aims to develop and maintain a system of management that will give full scope to individual capacity and ability, and encourage teamwork. High priority is given to the safety of CALM personnel and other people who recreate or work on land managed by CALM.

Training

In accordance with the Departmental training policy (See Policy Statement No. 6 'Staff Training and Career Development') training needs for staff and employees will be evaluated each year, included in annual works programs and budget submissions, and implemented on a priority basis as resources permit.

RESEARCH, INVENTORY AND MONITORING

Research, inventory and monitoring requirements are continually reviewed by Regional and Research staff, Inventory Branch and other Departmental Branches. Depending on factors such as urgency, likely cost and priority the required work is either carried out, programmed or deferred, depending on existing resources and workloads.

REPORTS AND RECORDS REQUIRED

Management records will continue to be kept in the manual Hardwood Operations Control System (HOCS) and Pine Operations Control System (POCS) and the computerised Conservation and Land Management Information System (CALMIS). Specified area and volume data will be provided for inclusion in the Departmental annual report and continuously for management requirements.

Standard reports will be produced by the computerised hardwood and pine logging systems and financial reports by the general ledger system.

Comments on progress in implementing the regional management plans will be incorporated in the Departmental Annual Report as appropriate.

REFERENCES

- ANNELS, A.R. (1986). 'Plant species list for the Shannon and D'Entrecasteaux National Parks'. In: Walker, A. *et al.* 'Shannon Park and D'Entrecasteaux National Park. 'Draft Management Plan.
- AUSTRALIAN BUREAU OF STATISTICS (1982). 'Persons and dwellings in local government areas and urban centres, Western Australia.'
- AUSTRALIAN BUREAU OF STATISTICS (1987). 'Agriculture Western Australia season 198586' Catalogue No 7113.5 ABS. Perth W.A.
- AUSTRALIAN BUREAU OF STATISTICS (1987). Data from census of June 1986. Unpublished.
- BEARD, J.S. (1981). 'Vegetation survey of Western Australia. Swan. 1: 1000 000 Vegetation Series.'
- BIGGS, E.R., WILDE, S.A. and LEACH, R.E.J. (1980). 'Geology, mineral resources and hydrogeology of the Darling System, Western Australia.' In: 'Atlas of natural resources Darling System, Western Australia.' Department of Conservation and Environment.
- BRADSHAW, F.J. (1985). 'Treemarking and silviculture in the jarrah forest. A training brief for operational staff.' Department of Conservation and Land Management.
- BURBIDGE, A.A., FOLLEY, G.L. and SMITH, G.T. (1986). 'The Noisy Scrub Bird.' Department of Conservation and Land Management Wildlife Management Program No. 2.
- BUREAU OF METEOROLOGY (1962). 'Climatological Survey. Region 12 - Albany Western Australia.'
- BUREAU OF METEOROLOGY (1965). 'Climatic survey. Region 16 - South West Western Australia.'
- CHRISTENSEN, P.E.S. and KIMBER, P.C. (1977). 'Mammals of Western Australian forests.' Forests Department Information Sheet 5.
- CHRISTENSEN, P. (1980). 'A forest worth preserving.' (Denbarker) Forests Department unpublished report.
- CHRISTENSEN, P.E.S., ANNELS, A., LIDDELOW, G. and SKINNER, P. (1985). 'Vertebrate fauna in the southern forests of Western Australia. A survey.' Forests Department Bulletin No. 94.

CHRISTENSEN, P.E.S. and LIDDLELOW, G. (n.d.). 'Reptiles, amphibia and fishes of South Western Australian forests.' Forests Dept. Information Sheet 45.

CHURCHWARD, H.M. and McARTHUR, W.M. (1980). 'Landform and soils of the Darling System Western Australia.' In: 'Atlas of natural resources Darling System, Western Australia.' Department of Conservation and Environment.

CHURCHWARD, H.M., McARTHUR, W.M., SEWELL, P.L. and BARTLE, G.A. (1986). 'Landforms and soils of the south coast and hinterland, W.A..' CSIRO Division of Groundwater Resources (in Press). Included as appendix 12 in Gobby and Associates (1986). 'The McLean forest project. Environmental Review and Management Program.'

CONSERVATION THROUGH RESERVES COMMITTEE (1974). 'Conservation reserves in Western Australia.' Department of Conservation and Environment.

DEPARTMENT FOR SPORT AND RECREATION (n.d.)'Canoeing guides No's 1-9.'- pamphlets

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (I 975). 'Conservation reserves for Western Australia. As recommended by the Environmental Protection Authority 1975. Systems 4,8,9,10,11,12.

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1976). 'Conservation reserves for Western Australia.' As recommended by the Environmental Protection Authority 1976. Systems 1, 2, 3, 5.'

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1982). 'Karri forest conservation. Report and recommendations by the Environmental Protection Authority.' Bulletin 123.

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1983). 'Conservation reserves for Western Australia.' As recommended by the Environmental Protection Authority. The Darling System - System 6.

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1985). 'Off Road Vehicles and the Environment.'- pamphlet

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1986). 'Joining a Club.' - pamphlet

DEPARTMENT OF CONSERVATION AND ENVIRONMENT (1987). 'A State Conservation Strategy for Western Australia.' Bulletin 270.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT (1987). 'Duck Shooters Guide 1987.'

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT (1987). 'Timber production in Western Australia. A strategy to take W.A.'s south-west forests into the 21st century.'

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT (1987). 'Strategies for conservation and recreation on CALM lands in Western Australia - the conservation, environmental protection and recreation strategies of W.A.'s Department of Conservation and Land Management.'

DORTCH, C.E. and GARDNER, G. (1976). 'Archaeological investigations in the Northcliffe district, W.A.' West Australian Museum Rec. 4: 257-293.

ENVIRONMENTAL RESOURCES PTY LTD (1971). 'Environmental effect of the proposed peat removal from lagoons in the Lake Muir area, W.A.' Cladium Mining Pty Ltd.

FISHERIES DEPARTMENT (1982). 'Trout in W.A.'- pamphlet

FISHERIES DEPARTMENT (1985). 'Recreational fishing, a guide to the rules.'- pamphlet

FORESTS DEPARTMENT (1972). 'General Working Plan for State Forests in Western Australia.' Working Plan No. 85; 1972, Part 1.

FORESTS DEPARTMENT (1977). 'Fauna of the forest floor in the South West of Western Australia.' Information Sheet 27.

FORESTS DEPARTMENT (1982). 'General Working Plan for State forests in Western Australia.' Working Plan No. 87; 1982, Part 1.

GRIFFIN, E.A. & ASSOCIATES (1984). 'Vegetation survey of three nature reserves in the Lake Unicup complex (Lake Unicup, Kulunilup Lake and Yarnup Swamp.' Prepared for Department of Fisheries and Wildlife.

HEDDLE, E.M., LONERAGAN, O.W. and HAVEL, J.J. (1980). 'Vegetation complexes of the Darling System Western Australia.' In: 'Atlas of natural resources Darling system, Western Australia.' Department of Conservation and Environment.

- HOSKING, J.S. and BURVILL, G.H. (1938). 'A soil survey of part of the Denmark Estate, Western Australia.' CSIRO Bulletin 115.
- INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES (1980), 'World Conservation Strategy: Living Resource Conservation for Sustainable Development.' Switzerland In Department of Conservation and Environment (1987). 'A State Conservation Strategy for Western Australia.' Bulletin 270.
- JARVIS, N.T. (Editor, 1979). 'Western Australia. An atlas of human endeavour 1829-1.979.' Education and Lands & Surveys Depts.
- KIMBER, P. and CHRISTENSEN P., *et al.* (1983). 'Birds of Western Australian forests.' Forests Department Information sheet 12.
- McNAMARA, K.J. and PRINCE, R.I.T. (1986). 'Kangaroo Management in Western Australia.' Dept. of C.A.L.M. Wildlife Management Program No 3.
- McARTHUR, W.M. and CLIFTON, A.L. (1975). 'Forestry and agriculture in relation to soils in the Pemberton area of Western Australia.' CSIRO Soil and land use series 54.
- MOORE, S.A., WILLIAMS, A.E. and CROOK, I.G. (1983). 'Beekeeping on the nature reserves of Western Australia.' Department of Fisheries and Wildlife Nature Reserve Management Plan Supplement No. 1.
- MUHLING, P.C., BRAKEL, A.T. and MONCRIEFF, J.S. (1985). '1:250 000 geological series - explanatory notes. Mount Barker - Albany.' Geological Survey, Western Australia.
- NORTHCOTE, K.H., BETTENAY, E., CHURCHWARD, H.M. and McARTHUR, W.M. (1967). 'Atlas of Australian Soils. Explanatory data for sheet 5. Perth-Albany-Esperance Area.' CSIRO and Melbourne University Press.
- PUBLIC WORKS DEPARTMENT (1979). 'Clearing and stream salinity in the South-West of Western Australia.' Document No. MDS 1/79.
- PUBLIC WORKS DEPARTMENT (1984). 'Engineering returns and statistics.' To be read in conjunction with the Annual Report for the year ending June 30, 1984.
- SHEA, S.R. (Chairman) (1987). 'Committee of inquiry on the Shannon River Basin. A report to the Hon. Minister for Conservation and Land Management. October 1987.

SMITH, R. (1951). 'Pedogenesis in the Frankland River Valley, Western Australia.' CSIRO Bulletin 262.

SMITH, F.G. (1972). 'Vegetation map Pemberton, Irwin Inlet.' Department of Agriculture.

WALKER, A. (Coordinator, 1986). 'Shannon Park and D'Entrecasteaux National Park.' Draft Management Plan, Department of Conservation and Land Management.

W.A. WATER RESOURCES COUNCIL (1985). 'Recreation on reservoirs and catchments in Western Australia.' Publication No. WRCI/85.

WILDE, S.A. and WALKER, I.W. (1982). '1: 250 000 geological series. Explanatory notes. Collie.' Geological Survey, Western Australia.

WILDE, S.A. and WALKER, I.W. (1984). '1:250 000 geological series. Explanatory notes. Pemberton-Irwin Inlet.' Geological Survey, Western Australia.

GLOSSARY

Aquifer: A zone of soil or subsoil material that allows the passage of water faster than adjoining zones.

Basic raw materials: Gravel, sand, rocks, limestone, clay used for fill and for roads and buildings.

Bedrock: Barren formation underlying the exploitable part of a mining deposit.

Buffer: An area of land managed in such a way as to protect another area from outside influences.

Catchment: The surface area from which water runs off to a river or any other collecting reservoir, e.g. swamps, groundwater.

Catena: A gradual succession of soil types over an area, usually due to variation in relief (topography).

Cave: A natural underground cavity formed in rock, usually with an opening to the surface. Significant caves are large enough to be entered by humans.

Clearfelling: The felling and removal of the standing crop. The subsequent crop is even-aged.

Compatible uses: Uses that do not conflict with the priority use.

Conditional uses: Uses that conflict to an extent with the priority use and are only permitted so long as there is no significant harm to the priority use.

Conservation: Management of human use of the environment so that it may yield the greatest sustainable benefit to present generations while maintaining the potential to meet the needs and aspirations of future generations.

Corporate plan: A document expressing an organisation's direction and commitments, e.g. in terms of its mission, charter, objectives and strategies.

Cretaceous: Period of geological time from about 65 million to 135 million years ago.

Crystalline rocks: Igneous rocks (formed by the cooling of hot fluid material - magma) or metamorphic rocks (originally igneous or sedimentary but altered by heat and/or pressure).

Day use recreation: Recreational use of an area for a period of one day or less.

Disease: A disorder which results in a morbid (sickly) condition of a plant or animal.

Ecosystem: A specific environment, e.g. lake including all its biological, chemical and physical components.

Endangered: Flora or fauna in danger of extinction and whose survival is unlikely if the causal factors continue operating.

Endemic: Flora or fauna that is confined in its natural occurrence to a particular region.

Environment: The physical surroundings in which an organism or group of organisms live.

Erosion: Wearing away of the land surface by natural forces.

Estuary: A partially enclosed coastal body of water either permanently or periodically open to the sea.

Exotic: A plant introduced from another locality. Not indigenous.

Fauna: Animal life.

Feral: An introduced or domestic animal now living in the wild.

Flora: Plant life.

Forest: An ecosystem characterised by a more or less dense and extensive tree cover.

Geology: The science which investigates the history of the earth's crust, from the earliest times to the commencement of the historical period.

Geomorphology: The description and interpretation of landforms.

Group Selection: A silvicultural system in which the crop is felled in small groups either to permit regeneration to develop or to release advance growth.

Hardwood: The timber of broadleaved trees, and the trees themselves, belonging to the botanical group Angiosperms, e.g. Eucalypts.

Hydrology: The study of water movements, quality, distribution and utilisation, above, on and below the ground.

Interpretation: The process of communicating the significance (bringing out the meaning) of an area by describing and explaining its characteristics.

Jurassic: Period of geological time, from about 135 million to 195 million years ago.

Landform: All the physical, recognizable, naturally formed features of land, having a characteristic shape; includes major forms such as a plain, mountain, or plateau, and minor forms such as a hill, valley or alluvial fan.

Landing: A site at which logs have been accumulated for the purpose of loading on to a hauling vehicle.

Laterise: The weathering of rock/soil which leads to the removal of silica and alkalies, resulting in a soil or rock with high concentrations of iron and aluminium oxides (laterite).

Mature forest: The stage at which a stand best fulfils the (main) purpose for which it was maintained e.g. produces the best possible supply of specified products.

Mesozoic: Era of geological time from about 65 million to about 245 million years ago.

Monadnock: An isolated hill or mass of rock which stands above the surrounding country because its rock has been more resistant to erosion than the rock of the area.

Multiple use management: The use of land, especially forest land, for several different purposes. Some types of use are compatible with each other, but others may not be compatible, in which case it is necessary to set a priority or even exclusive use for a particular area.

Objective: A specific statement of measurable results to be achieved within a specific time period.

Permian: Period of geological time from about 240 million to about 280 million years ago.

Pests: Troublesome or destructive animals, including insects, either introduced or native.

Plain: An extensive area of level or gently undulating land, usually of low altitude.

Plateau: An extensive, level or mainly level area of elevated land.

Podzolic: A soil with a very thin organic-mineral layer (horizon) above a bleached layer which rests upon a clay enriched dark coloured horizon. Podzols are acid soils with clearly defined boundaries between horizons.

Policy: The courses of action to be followed to achieve an organisation's objectives.

Pollution: Any direct or indirect alteration of the environment by discharging, emitting or depositing wastes or substances which are harmful or potentially harmful.

Precambrian: The oldest period of geological time, from about 550 million years ago to the time of consolidation of the earth's crust about 4 500 million years ago.

Prescribed Burning: The application of fire to land under such conditions of weather, soil moisture, time of day and other factors that will result in the controlled spread and intensity of heat required to accomplish specific silvicultural, environmental or fire hazard reduction objectives.

Priority use: The use which will prevail in any situation of conflict between various uses.

Quaternary: The most recent period of geological time, from the present to about 1.8 million years ago.

Rare species: Less than a few thousand reproductively mature specimens are known to exist in the wild.

Rehabilitation: Process necessary to return disturbed land to a predetermined surface, land use or productivity.

Restricted: Flora or fauna that occurs only in a confined area.

Rutile: A reddish-brown tetragonal mineral common in acid igneous rocks, in metamorphic rocks, and as residual grain in beach sand.

Salinity: The measure of total soluble (dissolved) salt, i.e. mineral constituents, in water. Water containing more than 500 parts per million (mg/L) is not considered desirable for domestic use.

Scarp: An inland cliff or steep slope, often formed as a direct result of a geological fault.

Sedgeland: Areas of coarse, grassy, rush-like or flag-like plants growing in wet places.

Sedimentary rocks: Formed from pre-existing rocks by the action of erosion (e.g. sandstone), chemical precipitation (e.g. rock salt) or the activity of organisms (e.g. limestone).

Silviculture: The art and science of establishment and tending of forest.

Snig Track: Track on which a log is hauled from tree stump to a loading point (or landing).

Softwood: The timber of trees, and the trees themselves, belonging to the botanical group Gymnosperms, e.g. Pines.

Strategy: Explains how policy is intended to be achieved.

Sustained Yield: As applied to forest policy, a method or plan of management (sustained yield management) that implies continuous production with the aim of achieving, at the earliest practicable time and at the highest possible level, an approximate balance between net growth and yield.

Tertiary: Period of geological time, from about 1.8 million to 65 million years ago.

Thinning: A felling made in an immature stand for the purpose of improving the growth of trees that remain without permanently breaking the canopy.

Topography: The delineation of the natural and artificial features of an area.

Turbidity: Discolouration of water due to suspended silt or organic matter.

Underground water: Water which occupies the pores and crevices of rock and soil.

Virgin forest: Forest which has not been cut over (logged).

Weeds: Plants (often self-sown exotics) growing where they are not wanted.

Welland: Any lowland covered by shallow and sometimes temporary or intermittent waters, e.g. swamps, creeks, rivers, lakes, estuaries.

Woodland: A plant community in which trees form only an open canopy, the intervening area being occupied by lower vegetation, usually grass or scrub.

GLOSSARY OF ABBREVIATIONS

A.	Acacia
B.	Banksia
CALM	(Department of) Conservation and Land Management
CSIRO	Commonwealth Scientific and Industrial Research Organization
CTRC	Conservation Through Reserves Committee
DRA	Disease Risk Area
E.	Eucalyptus
EPA	Environmental Protection Authority
ERMP	Environmental Review and Management Program
<i>et al.</i>	and others
ha	hectares
ID no.	Identity number
IUCN	International Union for the Conservation of Nature and Natural Resources
km	kilometre
L.	Lake
LFC	Lands and Forests Commission (a controlling body established under Section 20 of the CALM Act, 1984).
M.	Melaleuca
MPA	Management Priority Area
P.	Pinus
M	metre
m ²	square metres
m ³	cubic metres
mg/L	milligrams per litre
n.d.	No date
NPNCA	National Parks and Nature Conservation Authority (a controlling body established under Section 21 of the CALM Act, 1984)
SEC	State Energy Commission
TDS	Total dissolved solids
VCL	vacant Crown land
WAWA	Water Authority of Western Australia
10 ³	1 000
10 ⁶	1 000 000

APPENDIX 1. DEPARTMENTAL POLICY STATEMENTS

CALM inherited policies from the three agencies amalgamated to form the Department, and is currently developing new policies covering the complete range of Departmental management responsibilities.

Policies are published and distributed throughout the Department as Policy Statements. They can be made available to any member of the public who wishes to read them.

Policy statements issued or in final stages of drafting (at 1 July 1987) are as follows:

No.	Title	Date of issue or amendment
1	Planning	Jan 1986
2	Basic Raw Materials	Nov 1985
3	Dieback and Logging	Sep 1986
4	Departmental Advisory Committees	Dec 1985
5	Research and Technical Publications	Jan 1986
6	Staff Training & Career Development	Jan 1986
7	Recreation in Nature Reserves	Jan 1986
8	Financial Management	May 1986
9	Conservation of Endangered Flora in the Wild	-
10	Rehabilitation of Disturbed Land	Nov 1986
11	Protection of Aboriginal Sites	-
12	Arbor Day	Aug 1986
13	Taking of Protected Flora in the Kimberley Region	Dec 1986
14	Weeds on CALM land	Nov 1986
15	Public Participation	Apr 1987
16	Computer Purchase and Use	Dec 1986
17	Housing	Feb 1987
18	Recreation	Apr 1987
19	Fire Management	May 1987
-	Reporting, Monitoring and Re-evaluation of Ecosystems	-
-	Management of Conservation Lands	-
-	Communications	-
-	Marine and Estuarine Reserve System (W.A.)	-

Policies are being developed for a further 20 issues relevant to CALM activities and responsibilities.

Until the full range of policies is available, Departmental management guidelines (see Appendix 2) are used as a basis for operations. These provide managers with day-to-day guidelines for planning

and management. They are based upon new CALM policies, or policies inherited by CALM from the former agencies.

THE TIMBER STRATEGY FOR WESTERN AUSTRALIA

A comprehensive statement on the timber strategy for W.A. has been released i.e. 'Timber production in Western Australia. A strategy to take W.A.'s south-west forests into the 21st century' (CALM, 1987).

The timber strategy is a component of the land management plans, and is consequently a statutory document.

The timber strategy covers:

- the demand for wood;
- W.A.'s forest resources;
- the forest-based industries in W.A.;
- forest management;
- setting the allowable cut;
- allocation of the cut;
- log pricing;
- timber utilisation;
- timber marketing.

THE CONSERVATION AND RECREATION STRATEGY

A statement on the policies and management guidelines used by CALM in areas of conservation and recreation has been released i.e. 'Strategies for Conservation and Recreation on CALM lands in Western Australia. The conservation, environmental protection and recreation strategies of W.A.'s Department of Conservation and Land Management.' It covers:

- wildlife conservation;
- recreation;
- landscape management;
- environmental protection;
- fire; mining;
- wildflower picking.

dedication of land;
cultural areas;
community education and interpretation;
apiculture;
public utilities.

APPENDIX 2 DEPARTMENTAL MANAGEMENT GUIDELINES

Note:

Management guidelines are continually under review and may change during the period of this plan, particularly as new CALM policies are developed.

Each Management guideline comprises:

A broad objective - a broad statement of what the Department expects to achieve.

Specific objectives - the courses of action to be taken to achieve the broad objective.

Strategy - which explains how the objectives are intended to be achieved.

DEDICATION OF LAND

Objective

To reserve natural ecosystems and other significant land areas of the State within appropriate definition of purpose and security of tenure to meet conservation needs and public demands for use.

Specifically the aim is to:

assess the potential of land within the State to meet the requirements of the Conservation and Land Management Act;

advise Government on the value of vacant Crown land for forestry, national parks and nature reserves;

pursue dedication of vacant Crown land suitable for Departmental management;

purchase suitable areas of private property as they become available and ensure suitable vesting, or make agreements for joint management, as appropriate;

oppose alienation of State forests, national parks, nature reserves and marine reserves;

consolidate existing reserves by negotiation to ensure that boundaries are manageable with respect to adjacent land uses.

Strategies

- (i) Continue survey of all non-dedicated land (and waters) which could be of value to the public estate.
- (ii) Exchange land where the Department's assets will benefit from the transaction.
- (iii) Issue leases for activities not opposed to the purpose of the land, where this will assist management objectives.
- (iv) Continue biogeographical studies and research to identify further areas or ecosystems for inclusion in the reserve system.

WILDLIFE CONSERVATION

Objective

To manage forest, parks and reserves for conservation of native wildlife (flora and fauna); to ensure long-term maintenance of species' diversity and genetic resources; and provide for the persistence of those habitats, species and ecological processes which comprise natural ecosystems.

To protect and manage wildlife populations throughout the State, and provide special protection for species declared to be rare and endangered.

Specifically, the Department will aim to:

Develop a Reserve system

Establish and manage a system of parks and reserves dedicated to a primary purpose of wildlife conservation which:

is broadly representative of the region's natural habitats and contains viable populations of plants and animals representative of the indigenous flora and fauna; and is sufficiently and appropriately spaced to provide refuge for migratory and nomadic species as well as habitat for sedentary species.

Manage parks and reserves whose primary function is wildlife conservation to:

maximise diversity and species- richness, or provide habitat for particular species or communities.

Manage those State forests and reserves whose primary function is not wildlife conservation to meet wildlife conservation objectives to the maximum extent possible without compromising the area's primary purposes.

Maintain habitat for those species of indigenous plants and animals which are rare or endangered.

Undertake ecological research and monitor change in reserve environments and species populations to develop a knowledge-base appropriate to reserve management objectives.

Strategies

Protect Wildlife

- (i) Ensure that wildlife protection regulations are adhered to throughout the State.
- (ii) Ensure that protected flora and fauna are taken for private or commercial purposes only in accordance with regulations and permits, and that the numbers taken do not endanger the long term sustainability of populations in the wild.
- (iii) Ensure that any native species taken for private or commercial purposes are treated as humanely as possible.
- (iv) Provide assistance to other land-holders for protection of populations of rare and endangered species, where appropriate.
- (v) Maintain an information system pertaining to the location, condition and management needs of populations of rare and endangered plants and animals.
- (vi) Maintain an effective enforcement unit and inspectorial programs.
- (vii) Monitor the status of wild populations, habitat and seasonal conditions and ensure that permits to take are consistent with the long-term maintenance of population numbers.
- (viii) Monitor the take of wildlife subject to permit and ensure that conditions are adhered to.

Establish a representative reserve system

- (ix) Assess and characterise the qualities of existing conservation reserves to determine conservation values and particular management problems in each one.
- (x) Evaluate the extent to which conservation reserves act as a system, both internally and in the extent to which they need to be integrated with other land whose primary function is not wildlife conservation.
- (xi) Assess the extent to which the existing conservation reserves are representative of the biota of Western Australia and develop a strategy for acquisition of additional land for reservation where the existing reserve system is shown to be deficient.
- (xii) Develop a set of priorities for each region for the allocation of resources to research, planning, and management of conservation reserves.

Management of conservation reserves

- (xiii) Develop and maintain an inventory of conservation reserves containing information on vesting and management history, location, size and shape, landscape, biotic diversity, environmental **condition, and the** presence of species in need of special protection.
- (xiv) Prepare management plans for individual conservation reserves or groups of similar reserves with clearly defined objectives for protection and, where necessary, restoration of identified conservation values, and with special emphasis as appropriate on:
 - maintenance of species - richness and continuance of natural ecological processes;
 - protection of rare or endangered species;
 - protection of unique habitats or communities;
 - maintenance of habitat for migratory species.
- (xv) Exclude from conservation reserves, as far as possible, species of plant and animal not native to the area. Where exotic organisms have been introduced, take measures to eradicate them from the reserve or, where that is not possible, to control their populations to levels where they do not damage the conservation values of the reserves.
- (xvi) Provide facilities to service those recreational or educational activities in the reserve which are prescribed in an approved management plan.

LANDSCAPE MANAGEMENT

Objective

To ensure that all land uses and activities on CALM land are planned and carried out in ways that complement the inherent visual qualities of the natural environment.

Specifically, the aim is to:

employ staff trained in landscape architecture and related design disciplines to promote sound landscape management practices within CALM planning and operations;

develop a landscape classification system which will assist in the identification, evaluation and amelioration of visual impacts, and which is applicable to and compatible with both broad scale and detailed project planning;

prepare a comprehensive manual and set of landscape management guidelines covering all operations that have an effect on the landscape;

conduct training courses covering visual resource and landscape management and planning concepts for Departmental staff and other interested groups who work on CALM lands.

Strategies

- (i) Harvest State forest areas designated for timber production in ways that are sympathetic to existing landscape patterns and within the limits imposed by sound silvicultural and management techniques.
- (ii) Establish pine forests in accordance with accepted landscape design principles so that possible intrusive effects on the landscape are minimised.
- (iii) Plan and design facilities for recreation that are in harmony with the natural environment.
- (iv) Locate and design roads and utility corridors to minimise both environmental and social impacts on the areas they traverse.
- (v) Ensure that major disturbances imposed on CALM lands (dams, mines) are planned and implemented to minimise the impact on existing landscape values.
- (vi) Locate and design all new buildings and structures using materials and colours compatible with the surrounding landscape.

- (vii) Develop and implement a standard system of signs to cater for the various sign requirements of the Department.
- (viii) Evaluate land use proposals on adjacent lands in terms of their potential impact on landscape and recommend how these can be mitigated.

CULTURAL AREAS

Objective

To ensure the preservation and enhancement of significant cultural areas (modified landscape, historic sites, Aboriginal sites, caves) on land controlled by the Department.

Specifically the aim is to:

locate and record the presence of significant sites;

liaise with the Museum, universities, historic societies, National Trust and other relevant bodies to ensure suitable classification, registration, protection and management of sites;

manage the sites as appropriate;

encourage further research where required;

liaise with industry, local government and public utilities to ensure the protection of these sites.

Strategies

- (i) Where necessary, ensure protection by suitable tenure and provision within management plans for the area or region concerned.
- (ii) Employ regional committees to assist in site location and evaluation.
- (iii) Facilitate site location and classification by concentrating on areas in which potentially damaging operations are to be carried out.
- (iv) Maintain the necessary degree of confidentiality where required to protect values.

- (v) Record as required in Departmental information systems to prevent inadvertent damage by Departmental operations.

ENVIRONMENTAL PROTECTION

Objective

To protect CALM lands from environmental degradation caused by natural agencies (e.g. insects, fungi, dieback), exotic agencies (e.g. weeds, feral animals) and human activities (e.g. mining, pollution, litter, roading).

Specifically, the aim is to:

- manage land, wherever possible, to avoid disturbance that degrades natural ecosystems;
- develop appropriate environmental controls for all CALM activities;
- monitor the extent and severity of physical disturbances and infestations on CALM lands;
- classify CALM land on the basis of sensitivity to disturbances and pollution;
- develop appropriate environmental and legal controls to minimise environmental damage by other agencies and private individuals;
- encourage research into harmful natural and exotic agencies.

Strategies

- (i) Include environmental guidelines and controls in all management proposals and prescriptions.
- (ii) Ensure that landscape management and rehabilitation procedures are considered in planning all operations that can cause disturbance.
- (iii) Ensure that all staff are adequately informed and trained in aspects of environmental management.
- (iv) Disseminate information about environmental factors to other agencies and members of the public.
- (v) Allocate appropriate resources (staff, money, training) to ensure that the policies can be implemented.

FIRE

Objectives

To protect community and environmental values on lands managed by the Department from damage or destruction by wildfire.

To use fire as a management tool to achieve land management objectives, in accordance with designated land use priorities.

Specifically, the aim is:

Fire Suppression

The Department will:

Respond to fires occurring on or near CALM land to a degree that is appropriate to the values at risk.

Assess its response to a fire in the light of potential damage to the following values in order of priority:

- (i) Human life;
- (ii) Community assets, property and environmental values;
- (iii) Cost of suppression in relation to values threatened.

Where values dictate:

- (i) provide a detection system which will give timely warning of the presence of a fire threatening community or environmental values;
- (ii) provide a well-trained and equipped suppression organisation capable of containing several simultaneous unplanned fires under extreme weather conditions in conjunction with other firefighting organisations.

Use of Fire

The Department will:

Use planned fire only where this use is in accordance with an approved management plan, or, where such a plan does not exist, to protect and maintain the designated priority land use.

Prepare written prescriptions in advance, for approval by senior designated officers, before any planned fires are undertaken.

Use fire conservatively in areas where information about the impacts of fire is limited, and in areas where the primary land use is conservation of flora and fauna.

In such areas, the use of fire will be restricted to:

- (i) protection of neighbouring community assets; and
- (ii) providing a diversity of fuel and vegetation ages, but ensuring as much as possible of each major vegetation association is maintained in the mature condition.

Use prescribed fire or other methods to reduce fuels on CALM lands, where it can be demonstrated that this is the most effective means of wildfire control, and where undesirable ecological effects do not result.

The frequency of fuel reduction measures will be governed by the rate of build-up of fuels, the value of the assets to be protected, and the resources available to carry out the work.

Liaison

The Department will:

Ensure effective liaison with neighbours, bush fire brigades, shires, Bush Fires Board and other fire control organisations.

Support the concept of shire district fire plans and promote mutual aid interagency agreements for fire control of lands of mixed tenure with common fire problems.

Public Awareness

The Department will provide for public education in relation to the prevention of fire, and the role and use of fire in ecosystem management, and hazard and risk reduction.

Research

The Department will undertake research into fire prevention and control, and fire effects and fire behaviour on CALM lands to improve the scientific basis for, and effectiveness of, fire management programs.

DISEASES

Objective

To minimise the damage caused by plant and animal diseases on Departmental lands.

Specifically, the aim is to:

maintain a record of all plant and animal diseases of significance to management of CALM lands;

classify land and populations according to disease presence, susceptibility of habitats and resistance to disease;

investigate the cause and effect of diseases and prescribe effective control measures, where warranted;

ensure that all management practices for an area are in accord with effective disease control;

inform the public of the nature and significance of disease on CALM land and request their co-operation in prevention and control;

rehabilitate infected areas or populations where appropriate.

Strategies

(i) Maintain effective expertise on pathogens within the Department.

(ii) Ensure that disease effects are considered in all ecological studies.

(iii) Use quarantine and hygiene methods for control, as necessary.

(iv) Provide for staff training in disease detection and control.

WEEDS AND PESTS

Objective

To achieve a safe and systematic management of weeds and pests of ecological significance, on CALM lands.

Specifically, the aim is to:

direct management to eradication, control or containment depending on land management objectives, and the nature of the weed or pest;

monitor the extent or severity of infestations on Departmental lands;

control declared weeds and animal pests on Departmental land where it is economically feasible to do so;

ensure conservation values are not prejudiced in control work;

carry out research to determine the most effective method of control to meet priority use objectives;

liaise with other departments, authorities, shires, industry and neighbours involved in weed and pest control and related matters.

Strategies

- (i) Ensure that all artificial control programs are carried out with safety of the operator and public a priority.
- (ii) All chemical controls must conform with prescribed techniques and have the approval of the district or regional manager.
- (iii) Wherever possible expert control teams will be employed for hazardous control procedures.
- (iv) Biological control of exotic weeds or pests must be approved by the Director of Nature Conservation.

REHABILITATION

Objective

To regenerate degraded land with self-regulating ecosystems consistent with the purpose of the land and, where possible, to restore indigenous biological communities.

Specifically, the aim is to:

rehabilitate land managed by the Department which has been degraded by disturbance so that it will best meet the needs of the designated land use for the area;

apply restoration techniques which favour natural values, wherever possible;

ensure that the cost of rehabilitation is borne by the agency responsible for site degradation, wherever possible;

ensure that rehabilitation provides for as many secondary land uses as possible;

monitor regeneration programs and encourage research to ensure that the aims are being achieved and that techniques are continually being improved;

liaise with other Government departments, miners, industry and other land users to continue the exchange of ideas, techniques and standards for rehabilitation.

Strategies

- (i) Ensure that agreements and planning for disturbances on CALM land make provision for rehabilitation.
- (ii) Employ species and genotypes native to the original site in restoration, whenever possible.
- (iii) Encourage natural regeneration of indigenous vegetation.
- (iv) In the absence of natural regeneration, planting or seeding procedures should be planned to simulate the original vegetation with respect to species diversity, composition and spacing.

(v) For areas where nature conservation is not the priority use, if naturalness cannot be achieved, rehabilitation should enhance priority uses or maintain them at an acceptable level as determined by landscape architects.

RECREATION

Objective

To cater for the widest range of recreational activities giving the most satisfying experience for users, through the planning and managing of activities and facilities on land controlled by the Department.

This is to be done having regard to the preservation of natural land values, consistency of recreational activity with purpose of vesting, equity, and the capacity of the Department to manage the proposed activity.

Specifically, the aim is to:

Provide and allow for the widest range of recreational opportunities consistent with:

the purpose and vesting of 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.

Provide facilities and information to enhance use and enjoyment of recreation sites.

Plan facilities to involve users (both individuals and groups) to the fullest possible extent.

Where appropriate, obtain assistance in the provision of services from non-public sources. This may be by way of commercial concessions or voluntary help.

Recoup costs through charges to users where recreational opportunities create a management cost, and where it is practical to do so.

Ensure safety, through planning, maintenance, information and signs.

Strategies

(i) Identify opportunities for recreation when regional and area management plans are being prepared.

- (ii) Monitor existing activities and facilities and collect data on use to ensure that the quality of opportunities is maintained; the current use is appropriate to the primary objectives of land reservation; and resources are allocated based on need.
- (iii) Consult with individuals and organisations about management of recreational opportunities and further requirements.
- (iv) Plan the most appropriate recreational use of areas, based on preservation of natural values and anticipated recreation demands. Anticipate the need to minimise maintenance and management costs and reduce conflicts between users.
- (v) Regularly review fees to ensure that they are equitable, and reflect management costs incurred.
- (vi) Continually and effectively inform the public of:
 - recreational opportunities available to them and the positive efforts made by the Department to provide them;
 - the reasons for management decisions regarding restrictions on use;
 - behaviours which maximise the retention of natural values;
 - requirements for safety of all users.

COMMUNITY EDUCATION AND INTERPRETATION

Objective

To promote community awareness and understanding of the natural environment and encourage public attitudes and behaviour compatible with, and supportive of, conservation of flora and fauna and the management of forests, parks and reserves.

Specifically, the aim is to:

encourage people to learn about State forests, parks, reserves and wildlife;

foster the desire in people to experience the natural environment and its management;

interpret the environment in forests, parks and reserves for visitors;

co-ordinate and assist public participation in management planning and implementation through advisory committees and 'friends' groups;

research and evaluate methods and techniques available for achieving effective community education and interpretation;

liaise with associated agencies, organisations and interest groups to integrate education and interpretation programs.

Strategies

- (i) Provide an education/interpretation section within the Information Branch.
- (ii) Provide facilities such as self-guided walk trails, visitor centres, displays and brochures.
- (iii) Train regional and district staff in interpretation and effective communication with the public.
- (iv) Provide the Education Department and private school system with appropriate advice and assistance in curriculum development, and assist with in-service training of teachers, teacher-trainers and relevant community group leaders.
- (v) Produce and market appropriate educational films, videos, slides, sound tapes, pamphlets, brochures and other audio visual material and publications.
- (vi) Promote the use of planned tours, seminars, workshops, field days and lectures to explain conservation and land management, at the regional level.
- (vii) Ensure public inquiry into CALM's activities is satisfied.

SUPPORT SERVICES

Objective

To assist in achieving the goals of resource management under the responsibility of CALM in an effective manner.

Specifically, the aim is to:

provide information, advice, trained personnel and equipment necessary to achieve resource management objectives;

acquire knowledge and skills so that management decisions are based on the most up-to-date information and expertise;

review management techniques, information, staff finance and equipment needs at regular intervals;

promote public understanding of natural ecosystems, conservation and CALM policy.

Strategies

- (i) Maintain sufficient support staff to provide information, advice and equipment to allow resource management goals to be achieved.
- (ii) Ensure management systems and controls are effective.
- (iii) Maintain training and recruiting programs to ensure that the expertise necessary to achieve resource management goals is always available.
- (iv) Prepare statements indicating the technical value of projects in a way that allows a financial priority to be allocated.
- (v) Provide information on conservation matters for the public, using appropriate means such as publications, talks and field visits.
- (vi) Maintain contact with Government departments and other organisations with interest in areas managed by CALM.

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 deterioration 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.

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.
- (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.
- (ix) Plan recreational activities on catchments according to guidelines prepared by the Western Australian Water Resources Council.

WOOD PRODUCTION

Objective

To produce the maximum range and type of wood products, so as to provide long term economic and social benefits to the people and to sustain the forests of W.A.

Specifically, the aim is to:

adjust the cut from the native forest progressively to a level consistent with the growth of the forest, having due regard for associated regional economic stability;

ensure wood production areas are dedicated and protected, to permit long term forecasting and effective silvicultural. management;

ensure that the wood products from the forest are used conservatively in conversion and in marketing to favour the highest value product;

provide softwood plantations to supplement the hardwood cut, to meet demand, wherever it is economically and socially desirable to do so, and in accord with effective land use management;

continue research to ensure the best possible inventory, protection, silvicultural, utilisation and harvesting techniques are employed in management;

expand the hardwood sawlog resource base by encouraging use of lower quality logs, smaller logs and residues;

monitor wood production operations to ensure they are environmentally sound and favour multiple use management of the forest;

liaise with local government and the timber industry concerning environmental protection, future availability of the resource, and utilisation standards.

Strategies

- (i) Regulate log sale agreements and royalties to favour conservative use of timber and stability of the timber industry.
- (ii) Integrate harvesting operations to favour the best extraction and use of all log and round wood materials.
- (iii) Provide direction to industry through research into the use and marketing of timber resources.
- (iv) Control and direct wood use from the forest through regional management and operational plans.
- (v) Encourage private involvement in hardwood and softwood production.

MINING

Objective

To ensure that approved exploration and mining operations proceed according to conditions specified to minimise environmental damage and to rehabilitate in conformance with the purpose of vesting.

Specifically, the aim is to:

abide by the Mining Act which allows for proposals to be rejected or approved subject to conditions by the Hon Minister for Conservation and Land Management on national parks, State forest and A class reserves;

ensure that when any proposal for exploration or mining is submitted involving land and waters under CALM management that the land values affected by the proposal are fully considered;

where conditions applying to exploration and mining are being considered by Government, ensure the development of the most appropriate conditions to preserve the values for which the land was reserved;

liaise with Mines Department, the Department of Resources Development and the Environmental Protection Authority to ensure that the most appropriate conditions for exploration and/or mining on parks, reserves and forests, are developed;

ensure that conditions applied to exploration and mining are complied with;

continue research into techniques aimed at minimising environmental damage and land use conflict;

liaise with exploration companies to ensure they are aware of the effects of mining on the environment and other land uses, and of rehabilitation techniques;

liaise with authorities responsible for administering mining agreements and with other organisations authorised to study mining effects and rehabilitation techniques;

rehabilitate areas affected by mining to suit the designated land use, and in accordance with conditions imposed by State Government under the various special agreement Acts and Mining Act.

Strategies

- (i) Seek the inclusion of appropriate conditions governing environmental protection into the mineral leases issued under the Mining Act.
- (ii) Ensure that exploration on CALM land is conducted in strict adherence to conditions stipulated by the relevant departments.
- (iii) Seek to direct mining operations into areas where there will be least conflict with other land uses.
- (iv) Where possible obtain realistic compensation from companies mining on CALM land to cover loss of conservation values, land purchase and the continuing cost of rehabilitation and management of areas affected by mining.

BASIC RAW MATERIALS

Objective

To minimise the effect of the extraction of gravel, stone and sand on conservation values on Departmental land.

Specifically, the aim is to:

lease sites to Government and semi-government bodies for gravel, stone and sand for use on roads on or within 5 km of land controlled by this Department, where economic sources are unavailable outside CALM land;

prohibit gravel, stone and sand extraction by the Department or its authorised agents from Departmental land over which a mining tenement (for gravel) has been granted;

control supplies for other purposes (for commercial use, for other Departments) under the Mining Act on approved Mining Act tenements/or extractive industry licences under the Local Government Act;

ensure appropriate environmental measures are taken with all operations.

Strategies

- (i) Locate borrow pits, wherever possible, outside stream and road reserves, and where they are not in view from the public roads.
- (ii) Rehabilitate borrow pits according to the designated land use.
- (iii) Minimise pits in national parks, conservation parks and nature reserves.
- (iv) Review extractive industry plans prepared by local authorities where these affect CALM land.

WILDFLOWER PICKING

Objective

To control the commercial harvesting of flora on Crown land and private property within sustainable levels, to minimise detrimental effects on conservation values on Crown land, and to maintain a supply of seed from native flora.

Specifically, the aim is to:

permit picking and seed collection on State forest and Crown land other than nature reserves, conservation parks and national parks, subject to land use priorities and management conditions;

ensure royalties or collection fees are paid to re-imburse service charges and control collection, wherever it is practicable to collect them;

license picking on private property;

collect data on the range of occurrence of species in commercial demand and investigate their management requirements;

identify, protect and manage species of rare flora that occur on both Crown land and private land;

encourage commercial interests to meet the demand for blossom and plants from private nurseries and orchards;

provide suitable seedlings and seed from Departmental nurseries and seed stores for rural conservation projects where these materials are not satisfactorily available from private sources.

Strategies

- (i) Monitor distribution and management of protected flora and those species declared as rare flora.
- (ii) Ensure pickers are licensed in accordance with the provision of the Wildlife Conservation Act, and are familiar with the conditions and endorsements applicable to their licences.
- (iii) Establish and maintain seed orchards for species that are of limited supply or are difficult to collect.

APICULTURE

Objective

To facilitate beekeeping subject to the need to minimise conflict with other land use objectives.

Specifically, the aim is to:

ensure apiary sites are sited to optimise the use of available areas, consistent with the primary land use requirements;

control apiculture on the Department's land, other reserves and Crown land by the issuing of permits and allocation of apiary sites;

advise registered beekeepers of proposed CALM activity that could conflict with the location of their hives or honey production from a site;

investigate the allocation and use of apiary sites with respect to nectar and honey production.

Strategies

(i) Locate apiary sites at acceptable intervals, taking account of constraints such as:

existence of suitable vehicular access to the apiary site;
need to avoid transference of disease, including dieback;
effects of European honey bees on high conservation value ecosystems and rare flora/fauna which are strongly dependent on nectar and pollen;
proximity of current or proposed activity by CALM and other authorised users;
risk of water pollution caused by beekeepers' activities;
requirements of other Authorities controlling Crown land or Government reserves;
location in relation to private property;
relevant Acts and Regulations.

(ii) Notify the Government Apiculturist of the Department's prescribed burning program each year.

(iii) Continue liaison with other authorities that control Crown land on which apiary sites are located.

- (iv) Gather data on resource use and honey production by a system of annual returns.
- (v) Support research into the affect of European bees on native flora and fauna.

FISHING

Objective

To provide for fishing, permitted under the Fisheries Act and Regulations, in locations where access is consistent with land management objectives.

The aim is to:

permit fishing in non-reserved tidal waters in inlets and off the coast as regulated by the Department of Fisheries;

permit recreational freshwater fishing on CALM land under conditions established through the Fisheries Act;

prohibit fishing on CALM land under any conditions where it can be shown that it could be a threat to sustenance of the species or populations concerned;

liaise with Local Government, special interest groups and the public to improve planning for fishing on CALM lands and waters;

encourage monitoring and research to determine acceptable limits to resource use on CALM lands.

Strategies

- (i) Control fishing operations through the operations of the Department of Fisheries and within the provisions of the Fisheries Act.
- (ii) Regulate use of favourable sites on CALM land through control of access.
- (iii) Plan for fishing within recreational programs, wherever applicable.

PUBLIC UTILITIES

Objective

To limit development of public utilities that result in loss of reserve area and conservation values on CALM land to those considered essential by Government and for which there is no reasonable alternative location.

The aim is to:

retain as much as possible of the land managed by the Department free of public utilities.

guide the location of public utilities on CALM land into areas where land use conflict and environmental damage are minimised;

rehabilitate redundant sites to suit the designated land use;

liaise with, and advise, service authorities to ensure their operations are in sympathy with the environment and other land uses.

Strategies

- (i) Liaise with shires to avoid the use of CALM land for access to new subdivisions.
- (ii) Obtain compensation, where appropriate, to offset loss of Departmental land and associated values.
- (iii) Guide public utilities into areas where risk of dieback disease spread, salinity, and aesthetic impact are minimised. Encourage the use of landscaping.
- (iv) Encourage the use of the same sites for more than one utility.
- (v) Ensure management practices do not endanger public utilities.
- (vi) Develop procedures for rehabilitation of redundant sites in conjunction with and, where appropriate, at the expense of, the agency responsible.
- (vii) Ensure that proposals for public utilities are provided for in management plans for CALM lands.

APPENDIX 3. COMPARISON BETWEEN EPA, FORESTS DEPARTMENT AND CALM REGIONAL PLAN PROPOSALS FOR EPA SYSTEMS 1,2,4 AND 6

These tables indicate the way individual areas have been dealt with by the EPA in its Systems reports, the Forests Department in its last General Working Plan and CALM in the draft and final regional plans.

Note:

1. All proposals by CALM to change land tenure will be subject to the normal review processes by the Controlling Bodies, Department of Land Administration and affected government and local government authorities. Both Houses of Parliament must agree to any changes of tenure of State forest or A Class Reserves.
2. No boundaries are final. Final boundaries will only be established after all consultative processes have been completed.

APPENDIX 3.
COMPARISON BETWEEN EPA, FORESTS DEPARTMENT AND CALM
REGIONAL PLAN PROPOSALS FOR EPA SYSTEMS 1,2,4 AND 6

EPA no.	Locality	EPA proposal	Forests Department GWP 87 (1982) App.3,4,5	Draft Regional Plan (Apr'87)	Final Regional Plan
System 1					
1.1.2	Ludlow	SF	FFL	NP/SF	NP/SF
1.3	Whicher-Bovell	FP	FFL	NR	NR
1.4	Leeuwin-Naturaliste	NP	-	NP	NP
1.4	Boranup	FP	FFL	FP	NP
1.5	Milyeannup	FP	FFL	NR	NR
1.5	Rapids	FP	R	FP	CP
1.5	Chester	FP	FFL	NR	NR
-	Mowen	-	FFL	FP/SF	NR/SF
-	Blackwood	-	R	FP	CP/SF
-	Witchcliffe	-	SF	SF	SF
System 2					
2.1	Scott NP	NP	-	NP	NP
2.2	Pemberton NP	NP	-	NP	NP
2.3	D'Entrecasteaux	NP	-	NP	NP
2.4	Shannon basin	SF/FP	FFL/SF	NP	NP
2.4	Dickson	FP	FFL	NR	NR
2.4	Iffley	FP	S	SF	SF
2.4	One Tree Bridge	FP	R	FP	CIP
2.4	Brockman	FP	R	NP	NP
2.4	Dombakup	FP	FFL	-	CP
2.4	Lindsay	FP	S	SF	SF
2.4	Johnston O'Donnell	FP	FFL	NP	NP
2.4	Soho	FP	FFL	NP	NP
2.4	Beavis-Giblett	FP(a)	SF	SF	SF
2.4	Strickland	FP(a)	FFL	NR	NR
2.4	Hawke-Treen	FP	FFL	NP	NP
2.4	Boorara	FP	FFL	FP	CP
2.4	Curtin	FP	FFL	NP	NP
2.4	Wattle	FP	FFL	NP	NP
2.4	Lower Shannon	FP	FFL	NP	NP
2.4	Mitchell Crossing	FP	FFL	NP	NP
2.4	Muirilup Rock	FP	R	FP	CP
2.5	Perup	FP	FFL	FP	NR
2.6	Lake Muir	NR	-	NR	NR
2.12	Gingilup Swamp	CFF	-	NR	NR
2.13	Islands	CFF	-	NR	NR

EPA no.	Locality	EPA proposal	Forests Department GWP 87 (1982) App.3,4,5	Draft Regional Plan (Apr'87)	Final Regional Plan
2.15	Kent-Denmark	SF	SF	SF/SP	SF/NP
-	Mt Frankland MPA	-	R	NP	NP
-	Keystone- Swarbrick	-	S	FP	SF
-	Giants	-	SF	FP	NP
-	Paget MPA	-	FFL	NR	NR
-	One Tree Bridge NR	-	-	FP	NR
-	Jardee NP	-	-	5g	CP
-	Jervik Park NP	-	-	5g	CP
-	Sheepwash	-	SF	NP	NP
-	Mt Lindesay	-	SF	SP	NP
-	Sir James Mitchell NP	-	-	NP/SF	NP/SF
System 4					
-	Chowerup VCL	-	-	SF	SF
-	Wournbelup VCL	-	SF	NR	SF
-	Bolbelup	-	SF	NR/SF	NR/SF
System 6					
C 2	Moore River NP	NP/CFF/RP	-	NR	NR
C 6	Yurine Swamp	CFF	-	NR	NR
C 9	Gingin- Boonanarring	CFF	-	NR	NR
C 10	L. Wannamal	CFF	-	NR	NR
C 12	Caraban MPA	FFL	FFL	NR	NR
C 13	Wabbling MPA	FFL	FFL	NR	NR
C 14	L. Muckenburra	CFF	-	NR	NR
C 15	Gin Gin	CFF	-	NR	NR
C 17	L. Chandala	CFF	-	NR	NR
C 18	Burroloo Well	CFF	-	NR	NR
C 19	Needonga-Chittering	CFF/RP	-	NR	NR
C 20	Mt Byroomanning	CFF/RP	-	NR	NR
C 21	Julimar MPA	RP	FFL	FP	CP
C 23	Culharn	CFF	-	NR	NR
C 26	Bullsbrook	CFF	-	NR	NR
C 27	Beelaring-Goonaring	CFF	-	NR	NR
C 28	Wundowie	CFF	-	NR	NR
C 29	Clackline	CFF	-	NR	NR
C 30	Inkpen Rd	CFF	-	NR	NR
C 32	Dale MPA	FFL	FFL	FP	CP
C 33	Russell MPA	RP	FFL	FP	CP
C 34	Gunapin MPA	FFL	FFL	FP	CP
C 35	Sullivan MPA	FFL	FFL	FP	CP
C 36	Eagle Hill MPA	FFL	FFL	FP	CP
C 37	Brookton and Albany Hwy	RP	SF/FFL	SF/FP	SF/CP

EPA no.	Locality	EPA proposal	Forests Department GWP 87 (1982) App.3,4,5	Draft Regional Plan (Apr'87)	Final Regional Plan
C 38	Cooke MPA	RP	FFL	FP	CP
C 39	Windsor MPA	RP	FFL	FP	CP
C 40	Boyagarring MPA	FFL	FFL	FP	CP
C 41	Lupton MPA(b)	FFL	FFL	FP	FC
C 42	Duncan MPA	FFL	FFL	FP	CP
C 43	Gyngoorda MPA	FFL	FFL	FP	CP
C 44	Wandering MPA(b)	FFL	FFL	FP	CP
C 47	North Dandalup	CFF/RP	-	NR	NR
C 48	North Dandalup	CFF/RP	-	NR	NR
C 49	North Dandalup	CFF/RP	-	NR	NR
C 50	Peel Inlet	CFF/AR/RP	-	NR	NR
C 51	Harvey Estuary	CFF/AR/RP	-	NR	NR
C 52	McLarty-Mealup	CFF/RP	-	NR	NR
C 54	Yalgorup NP	RP	-	NP	NP
C 55	Clifton MPA	RP	FFL	NP	NP
C 56	McLarty MPA	RP	FFL	NP	NP
C 57	Myalup MPA	FFL	FFL	NP	NP
C 59	Wagerup	CFF	-	NR	NR
C 60	Harvey	CFF/W	-	NR	NR
C61	L.Preston	CFF	-	NR	NR
C 62	Harvey	CFF	-	NR	NR
C 63	Myalup-Mialla	protect	-	FP	CP
C 65	Benger Swamp	CFF	-	NR	NR
C 72	Teesdale MPA	RP	FFL	FP	CP
C 73	Murray Valley MPA	RP	R	FP	5g
C 74	Plavins MPA	RP	FFL	FP	CP
C 75	Samson MPA	RP	FFL	FP	CP
C 76	Federal MPA	RP	FFL	FP	CP
C 77	Bell MPA	RP	FFL	FP	CP
C 80	Reserves, Harvey	CIFF	-	NR	NR
C 82	Surface MPA	RP	FFL	FP	CP
C 83	Nalyerin MPA	RP	FFL	FP	CP
C 84	Trees MPA	RP	FFL	FP	CP
C 85	Stene MPA	RP	FFL	FP	CP
C 86	Dardanup MPA	RP	FFL	FP	CP/SF
C 87	Lennard MPA	RP	FFL	FP	CP/SF
C 88	Westralia MPA	RP	FFL	FP	CP
C 90	Preston MPA	FFL	FFL	FP	CP/SF
C 91	Noggerup MPA	FFL	FFL	FP	CP/SF
C 92	Goonac MPA	FFL	FFL	FP	CP
C 93	Muja MPA(b)	FFL	FFL	FP	CP
C 94	Bennelaking MPA(b)	FFL	FFL	FP	CP
C 95	Mullalyup MPA	RP	FFL	FP	CP/SF

EPA no.	Locality	EPA proposal	Forests Department GWP 87 (1982) App.3,4,5	Draft Regional Plan (Apr'87)	Final Regional Plan
C 96	Wilga	CFF	-	NR	NR
C 97	St John Brook MPA	RP	FFL	FP	CP
C 98	Blackwood R.	RP	-	NR	NR
C 99	Greenbushes MPA	RP	FFL	FP	NR
C100	Dalgarup MPA	RP	FFL	NR/SF	NR/SF
C101	Nollajup MPA	FFL	FFL	FP	NR
M 3	Yanchep NP	RP	NP	NP	-
M 4	Ridges	RP	FFL	NP	NP
M 5	Yeal NR	CFF	NR	NR	-
M 6	Neerabup NP	RP	SP	CP	-
M 8	Wanneroo	RP	NR	NR	-
M 9	Melaleuca MPA	FFL	FFL	NR	NR
M 14	Bullsbrook	CFF	-	NR	NR
M 16	Avon Valley NP	NP/CFF	-	NP	NP
M 18	Walyunga NP	RP	-	NP	NP
M 21	John Forrest NP	RP	-	NP	NP
M 25	L. Leschenaultia	RP	R	FP	CP
M 27	L. Manaring	CFF	-	NR	NR
M 28	Wooroloo	CFF	-	NR	NR
M 29	Greenmount NP	RP	-	SP	CP
M 34	Gooseberry Hill NP	RP	-	SP	CP
M 34	Kalamunda NP	RP	-	SP	CP
M 34	Kalamunda SF	FFL/W	SF	FP	CP
M 34	Burkinshaw Rd NP	RP	-	SP	CP
M 80	Lesmurdie Falls NP	RP	-	SP	CP
M 84	Gooralong MPA	RP	FFL	SP	NP
M 85	Serpentine NP	RP	-	SP	NP
M 86	Karnet MPA	RP	FFL	SP	NP
M 87	Serpentine MPA	RP	FFL	SP	NP
M108	Goegrup Lakes	CFF	-	NR	NR
-	Marradong	-	R	FP	CP
-	Araluen-Canning	-	-	SP	CP
-	Yanchep SF	-	SF	NR	NR
-	Kemerton	-	-	FP	CP/5g
-	Camballan	-	SF	SF	SF
-	Wagerup NP	-	-	SP	CP
-	Gwindinup NP	-	-	SP	CP
-	Bridgetown NP	-	-	SP	CP

Note

Some areas considered in the EPA Systems reports are vested in authorities other than CALM, or are outside the boundaries of the Northern, Central and Southern Forest Regions and are therefore not listed above.

Legend

- AR aquatic reserve
- CFF conservation of flora and fauna reserve
- CP conservation park
- FFL flora, fauna and landscape MPA
- FP forest park
- MPA management priority area
- NP national park
- NR nature reserve
- R recreation MPA
- RP regional park
- S scientific study, education MPA
- SF State forest
- SP State park
- VCL vacant Crown land
- W water reserve
- 5g reserve under Section 5g of CALM Act.
- (a) The EPAs 1982 report on Karri forest conservation amended the EPAs earlier recommendation for these areas to FFL MPAs.
- (b) These areas are located within System 4.

APPENDIX 4. CONSERVATION RESERVES PROPOSED BY THIS PLAN SOUTHERN FOREST REGION

Name (or locality)	Area (ha) (a)	Vegetation type and/or Special Features
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NATURE RESERVES

Manjimup District

(Wilgarup)	80	paperbark, banksia, jarrah, marri
Big Brook	90	jarrah, marri
Bokarup	660	paperbark, sedges, jarrah, marri
Cobertup	140	paperbark, sedges, jarrah, marri
Cowerup	270	paperbark, sedges, jarrah, marri
Donnelly R.	60	karri, marri
Galamup	220	paperbark, sedges, jarrah, marri
Kodjinup	620	jarrah, marri, paperbark
Kulunilup	610	sedges, paperbark, jarrah
Lake Muir	11400	Lake Muir, water birds
Mordalup	110	wandoo, jarrah, marri
Noobijup	190	Noobijup Lake, jarrah, wandoo
Pindicup	370	Pindicup Lake, paperbark, sedges
(Smith Br.) (part)	50	karri, marri, jarrah
Unicup	3300	Lake Unicup, jarrah, marri
(Quindinup)	560	paperbark, banksia, jarrah, marri
(Palgarrup North)	10	jarrah, marri
(Wilgarup)	200	paperbark, banksia, jarrah, marri
Yarnup	70	jarrah, marri, banksia, paperbark
(Dickson)	550	virgin jarrah, marri
(Strickland)	1700	virgin karri, marri, jarrah
(Bolbelup)	2100	jarrah, marri
(blackbutt reserve)	40	blackbutt
Perup	40200	fauna, jarrah, wandoo
	<u>63600</u>	

Name (or locality)	Area (ha) (a)	Vegetation type and/or Special Features
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Pemberton District

Flat and Sandy Is.	20	Flat and Sandy Islands
Smith Br. (part)	50	karri, jarrah, marri
(Eastbrook Rd)	20	karri, marri
(East Brook)	60	jarrah, marri
(Jane Block)	10	boronia

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Walpole District

L. Eyrie	20	paperbark, reeds, jarrah, marri
Blue Gum Ck	100	paperbark, reeds, jarrah, marri
Chatham Is.	80	Chatham Island
Kwornicup L.	250	Kwornicup Lake, reeds
Mt Shadford	80	karri
(Pardelup)	690	jarrah, marri, paperbark, reeds
Tootanellup	98	jarrah, marri
(Onerup Lagoon)	50	jarrah, marri
(L. Barnes Rd)	280	paperbark, reeds, jarrah, marri
(Scotsdale Rd)	20	jarrah, marri
(Redmond Rd)	60	jarrah, marri, karri
(McIntosh Rd)	30	jarrah, marri
(McLean Rd)	10	jarrah, marri, karri
(Randell Rd)	460	jarrah, marri, wandoo, yate
Wamballup	510	jarrah, marri, yate, paperbark
(Chorkerup)	30	jarrah, marri
Sleeman Ck	410	jarrah, marri, paperbark, reeds
(Gum Link Rd)	600	jarrah, marri
Thames	470	jarrah, marri, karri
(Kordabup)	480	jarrah, marri

5610

Name (or locality)	Area (ha) (a)	Vegetation type and/or Special Features
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NATIONAL PARKS

D'Entrecasteaux	123200	coastline, dunes, karri, jarrah
(Mt Lindesay-Sheepwash)	27000	Mt Lindesay, wildflowers
Pemberton	5900	karri, marri, jarrah
Shannon	54000	Shannon Basin, jarrah karri
Walpole- Nornal up	188(0	coastline, karri, tinges
(Wattle-Soho)	30300	karri, tinges, jarrah
	<u>259200</u>	

CONSERVATION PARKS

Boorara	610	virgin karri, marri
Dombakup	110	virgin karri, marri
Muirillup	160	Muirillup Rock, karri
One Tree Bridge	640	One Tree Bridge, Four Aces
(Jervik Park)	20	karri, marri
(Jardee)	10	karri, marri, jarrah
	<u>1550</u>	

Note

(a) Areas under 1000 ha are to nearest 10 ha
Areas over 1000 ha are to nearest 100 ha