

PLANNING BRANCH
DO NOT REMOVE

REGIONAL MANAGEMENT PLAN 1992 - 2002

South Coast Region



Department of Conservation
and Land Management



National Parks and Nature
Conservation Authority

SOUTH COAST REGION

REGIONAL MANAGEMENT PLAN

1992 - 2002

MANAGEMENT PLAN NO. 24

Department of Conservation and Land Management
for the
National Parks and Nature Conservation Authority
and the
Lands and Forest Commission
Western Australia

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 the Environment.

Regional plans are to be prepared for each of the 10 regions administered by the Department of Conservation and Land Management (CALM).

This plan for the South Coast Region covers all lands and waters 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 critical management issues, (the most serious of which is the spread of dieback disease in the Region); particular high value or high conflict areas, (such as some national parks); or for certain exploited or endangered species, (such as kangaroos and the Noisy Scrub-bird). These plans 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. Implementation will take place progressively over this period and there will be continuing opportunity for public comment.

This management plan was submitted by the Department of Conservation and Land Management and adopted by the Lands and Forest Commission on 12 June 1991 and the National Parks and Nature Conservation Authority on 19 July 1991 and approved by the Minister for the Environment on 23 December 1991.

ACKNOWLEDGEMENTS

The task of preparing the Draft Regional Plan was made easier by following closely the format structure of regional plans produced in 1987 for the three CALM forest regions.

Input and advice on the draft and final plans was obtained from throughout the Department and the controlling bodies, in particular:

- staff of the South Coast Region in Albany and Esperance;
- Various branches within the Department of Conservation and Land Management;
- the CALM Corporate Executive;
- the National Parks and Nature Conservation Authority and the Lands and Forest Commission

Further advice was received from all ten Local Government Authorities within the Region:

- Shire of Denmark
- Town of Albany (in particular Town Planner, Nic Ayton)
- Shire of Albany (in particular Shire Engineer, John Hull)
- Shire of Plantagenet (in particular Councillor Jack Adams)
- Shire of Cranbrook
- Shire of Gnowangerup
- Shire of Jeffamungup (in particular Councillor Ken Thomas and Councillor Pam Forbes)
- Shire of Ravensthorpe (in particular Councillor Alan Carmichael)
- Shire of Esperance (in particular members of Council Works Committee)
- Shire of Dundas (in particular Councillor Peter Brown of Arubiddy Station).

The final Regional Plan has benefited from the many comments received from those organisations and individuals who prepared submissions on the Draft Plan. Their time and attention to detail is greatly appreciated.

Also appreciated is the patience and perseverance of the typists who worked so cheerfully on the preparation of the draft and final documents. Thanks to Christina Pollard, Caroline Budd, Marian Hickson, Ann Burchell and Debbie Bowra of CALM and to those who undertook parts of this work on a contract basis.

NOMENCLATURE

Inclusion of a name in this publication does not imply its approval by the relevant nomenclature authority.

OBJECTIVES

The objectives of this plan are:

- To describe the land and wildlife resources managed by CALM in the South Coast Region.
- To present a land use plan for land managed by CALM in the Region.
- To outline policies and management guidelines on which day-to-day management of land, wildlife and resources in the Region is based.
- To provide a framework for protection of native flora from plant disease.
- To identify representative areas of land and seek their inclusion in the conservation estate.
- To provide for public involvement in land-use planning and management by CALM.
- To recognise that recreational opportunities on land managed by CALM should, where possible, be integrated with the opportunities existing on nearby land which is not managed by CALM.
- To provide a planning and management framework for CALM responsibilities in the Region, upon which detailed operational plans can be based, and into which policy changes or research findings can be readily incorporated.

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

CONTENTS

PREFACE	<i>i</i>
ACKNOWLEDGEMENTS	<i>ii</i>
NOMENCLATURE	<i>iii</i>
OBJECTIVES	<i>iii</i>
CONTENTS	<i>iv</i>
PART A. INTRODUCTION	<i>1</i>
1.0 THE DEPARTMENT AND THE CONTROLLING BODIES	2
1.1 ORIGIN OF THE DEPARTMENT AND THE CONTROLLING BODIES	2
1.2 OBJECTIVES OF THE DEPARTMENT (THE STRATEGIC PLAN)	2
1.3 LAND MANAGEMENT PLANNING	4
2.0 VESTING, TENURE AND PURPOSE OF LAND MANAGED BY CALM	6
2.1 CATEGORIES OF LAND CURRENTLY VESTED IN THE CONTROLLING BODIES AND MANAGED BY THE DEPARTMENT	6
2.2 VESTING AND MANAGEMENT	6
2.3 TENURE AND SECURITY	6
2.4 PURPOSE AND SECURITY OF PURPOSE	7
2.5 LAND CATEGORIES MANAGED BY CALM	8
2.6 CRITERIA FOR ALLOCATION TO LAND CATEGORIES	10
2.7 CALM RESPONSIBILITIES ON LANDS NOT VESTED IN THE CONTROLLING BODIES	11
3.0 LAND USE PLANNING AND MANAGEMENT	12
3.1 GENERAL PRINCIPLES	12
3.2 MULTIPLE USE PLANNING	12
PART B. THE SOUTH COAST REGION	<i>16</i>
4.0 THE REGION	17
4.1 PHYSICAL AND BIOLOGICAL RESOURCES	17
4.2 SOCIAL AND ECONOMIC RESOURCES	27
4.3 LAND TENURE	30
4.4 SURROUNDING LANDS	35
5.0 CALM ADMINISTRATION IN THE SOUTH COAST REGION	36
5.1 REGIONAL OBJECTIVES	36
5.2 DISTRICTS WITHIN THE REGION	37
5.3 PERSONNEL	38
5.4 MANAGEMENT CAPABILITY ZONES	38
5.5 OUTSIDE ASSISTANCE	41
PART C. LAND USE PROPOSALS	42
6.0 PRESENT USE OF LAND MANAGED BY CALM IN THE REGION	43
7.0 PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE	44
8.0 IMPLEMENTATION OF PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE	51
9.0 FUTURE RESERVE DEDICATION	52

PART D.	MANAGEMENT ISSUES	53
10.0	LANDSCAPE AND LANDFORM	55
10.1	LANDSCAPE	55
10.2	COASTLINE	56
10.3	UPLAND AREAS	57
10.4	CAVES	58
10.5	WETLANDS	59
11.0	CONSERVATION OF FLORA AND FAUNA	61
11.1	FLORA AND FAUNA	61
11.2	VEGETATION AND RESERVE "CORRIDORS"	67
11.3	MARINE AND ESTUARINE CONSERVATION	70
12.0	CULTURAL AREAS	72
12.1	ABORIGINAL CULTURAL RESOURCES	72
12.2	HISTORIC SITES	74
13.0	ENVIRONMENTAL MANAGEMENT	76
13.1	PLANT DISEASES	76
13.2	FIRE	78
13.3	WEEDS, FERAL ANIMALS AND PESTS	80
13.4	REHABILITATION	82
14.0	RECREATION	84
14.1	CAMPING	85
14.2	DAY USE	86
14.3	MOTORISED RECREATION	87
14.4	BICYCLE RIDING	88
14.5	HORSE RIDING	88
14.6	PETS	89
14.7	WATER-BASED RECREATION	90
14.8	ADVENTURE ACTIVITIES	91
14.9	DUCK HUNTING	94
14.10	VISITOR SAFETY	94
15.0	PUBLIC PARTICIPATION AND LIAISON	96
15.1	COMMUNITY EDUCATION AND INTERPRETATION	96
15.2	COMMUNITY INVOLVEMENT	97
15.3	INFORMATION AND ADVISORY SERVICES	98
16.0	PRODUCTION AND OTHER COMMERCIAL USE	100
16.1	WATER	100
16.2	NATIVE TIMBER	101
16.3	PLANTATION TIMBER	102
16.4	MINERAL RESOURCE DEVELOPMENT	103
16.5	GRAVEL AND INDUSTRIAL MINERALS	104
16.6	WILDFLOWERS	105
16.7	NURSERIES AND ARBORETA	108
16.8	APICULTURE	108
16.9	COMMERCIAL FISHING	109
16.10	TOURIST OPERATIONS AND OTHER CONCESSIONS	111
16.11	COMMERCIAL PRODUCTION ON LANDS NOT MANAGED BY THE DEPARTMENT	112
17.0	OTHER LAND USES	113
17.1	PUBLIC UTILITIES	113
17.2	RADIO COMMUNICATIONS FACILITIES	113
17.3	SUBDIVISIONS	115
17.4	ENCLAVE LANDS	116
17.5	ROAD RESERVES	117
17.6	GROUP TRAINING EXERCISES	118

PART E. RESEARCH	119
18.0 SOCIAL RESEARCH	120
18.1 ARCHAEOLOGICAL AND ETHNOGRAPHIC RESEARCH	120
18.2 HISTORICAL RESEARCH	120
18.3 VISITOR SURVEYS	120
19.0 NATURE CONSERVATION RESEARCH	122
19.1 BIOGEOGRAPHICAL RESEARCH	122
19.2 ENTOMOLOGICAL RESEARCH	123
19.3 FAUNA CONSERVATION RESEARCH	123
19.4 FLORA CONSERVATION RESEARCH	123
19.5 WETLAND AND WATER BIRD RESEARCH	123
19.6 MARINE RESEARCH	124
19.7 FIRE RESEARCH	124
19.8 PLANT DISEASE RESEARCH	125
20.0 SILVICULTURAL RESEARCH	126
21.0 MANAGEMENT RESEARCH	127
PART F. IMPLEMENTATION	128
22.0 SUBSEQUENT PLANNING	129
22.1 INTERIM GUIDELINES FOR NECESSARY OPERATIONS	129
22.2 PROPOSALS FOR COMPATIBLE OPERATIONS	130
22.3 AREA MANAGEMENT PLANS	130
22.4 ISSUE PLANS	134
22.5 WILDLIFE MANAGEMENT PROGRAMS	134
22.6 OPERATIONAL PLANS	135
22.7 DEPARTMENTAL MANUALS AND PRESCRIPTIONS	135
22.8 INPUT TO PLANNING BY OTHER DEPARTMENTS, AUTHORITIES AND ORGANISATIONS	136
23.0 PERSONNEL	138
23.1 TRAINING	138
23.2 VOLUNTEERS	138
24.0 LEGAL RESPONSIBILITIES	139
25.0 LIAISON REQUIRED	141
25.1 ADVISORY COMMITTEES	142
REFERENCES	144
GLOSSARY	
Glossary	150
GLOSSARY OF ABBREVIATIONS	156
APPENDICES	157
APPENDIX 1	158
PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE IN THE SOUTH COAST REGION	158
SHIRE OF DENMARK	159
SHIRE OF ALBANY	160
SHIRE OF PLANTAGENET	164

SHIRE OF GNOWANGERUP	165
SHIRE OF JERRAMUNGUP	166
SHIRE OF RAVENSTHORPE	170
SHIRE OF ESPERANCE	175
SHIRE OF DUNDAS	180
FIGURES	183

TABLES

Table 1	Compatibility of Land Uses
Table 2	Compatibility between Land Uses and Reserve Categories
Table 3	CALM Managed Public Lands in the South Coast Region as at 31 December 1990
Table 4	Proposed Changes to Tenure, Vesting and Purpose in the South Coast Region as at 31 December 1990
Table 5	Declared Rare Flora of the South Coast Region (as at 1 April 1991)
Table 6	Declared Rare Fauna of the South Coast Region (as at 1 April 1991)
Table 7	Fauna of the South Coast Region Declared in Need of Special Protection (as at 1 April 1991)
Table 8	National Estate Places in the South Coast Region
Table 9	Permits for Commercial Fishing in South Coast National Parks 1990 (Calendar Year)
Table 10	Priority for Preparation of Area Management Plans
Table 11	A Conceptual Opportunity Spectrum for Major South Coast National Parks

FIGURES

- Figure 1 CALM Regions
- Figure 2 South Coast Region Geology
- Figure 3 South Coast Region Landforms and Soils
- Figure 4 South Coast Region Botanical Provinces and Associated Districts
- Figure 5(a) CALM Managed Public Lands as at 31 December 1990 - Albany District (West)
- Figure 5(b) CALM Managed Public Lands as at 31 December 1990 - Albany District (East)
- Figure 6(a) CALM Managed Public Lands as at 31 December 1990 - Esperance District
- Figure 6(b) CALM Managed Public Lands as at 31 December 1990 - Esperance District (Enlargement)
- Figure 7 South Coast Region Districts, Staff Distribution and Management Capability Zones
- Figure 8(a) Proposed Changes to Tenure as at 31 December 1990 - Albany District (West)
- Figure 8(b) Proposed Changes to Tenure as at 31 December 1990 - Albany District (East)
- Figure 9(a) Proposed Changes to Tenure as at 31 December 1990 - Esperance District ...
- Figure 9(b) Proposed Changes to Tenure as at 31 December 1990 - Esperance District (Enlargement)
- Figure 10(a) CALM Managed Public Lands as Proposed by the R.M.P - Albany District (West)
- Figure 10(b) CALM Managed Public Lands as Proposed by the R.M.P - Albany District (East)
- Figure 11(a) CALM Managed Public Lands as Proposed by the R.M.P - Esperance District
- Figure 11(b) CALM Managed Public Lands as Proposed by the R.M.P - Esperance District (Enlargement)
- Figure 12 South Coast Region, Vegetation Corridors

PART A. INTRODUCTION

1.0 THE DEPARTMENT AND THE CONTROLLING BODIES

1.1 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 National Parks Authority, the Wildlife Section of the Department of Fisheries and Wildlife and the Forests Department were amalgamated to form the Department of Conservation and Land Management (CALM). The Act also established two controlling bodies: the National Parks and Nature Conservation Authority (NPNCA) in which national parks, nature reserves, conservation parks, marine parks and marine nature reserves are vested and the Lands and Forest Commission (LFC) in which State forests and timber reserves are vested.

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

Regions

The State is divided into 10 CALM Regions. They are Kimberley, Pilbara, Gascoyne, Goldfields, Greenough, Wheatbelt, South Coast, Southern Forest, Central Forest and Swan Regions, as shown in Figure 1.

1.2 OBJECTIVES OF THE DEPARTMENT (THE STRATEGIC PLAN)

The first section of the Strategic Plan of the Department of Conservation and Land Management states:

Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits. The natural environment is an essential component of the quality of life for Western Australians. The statement of mission adopted for the Department of Conservation and Land Management 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.

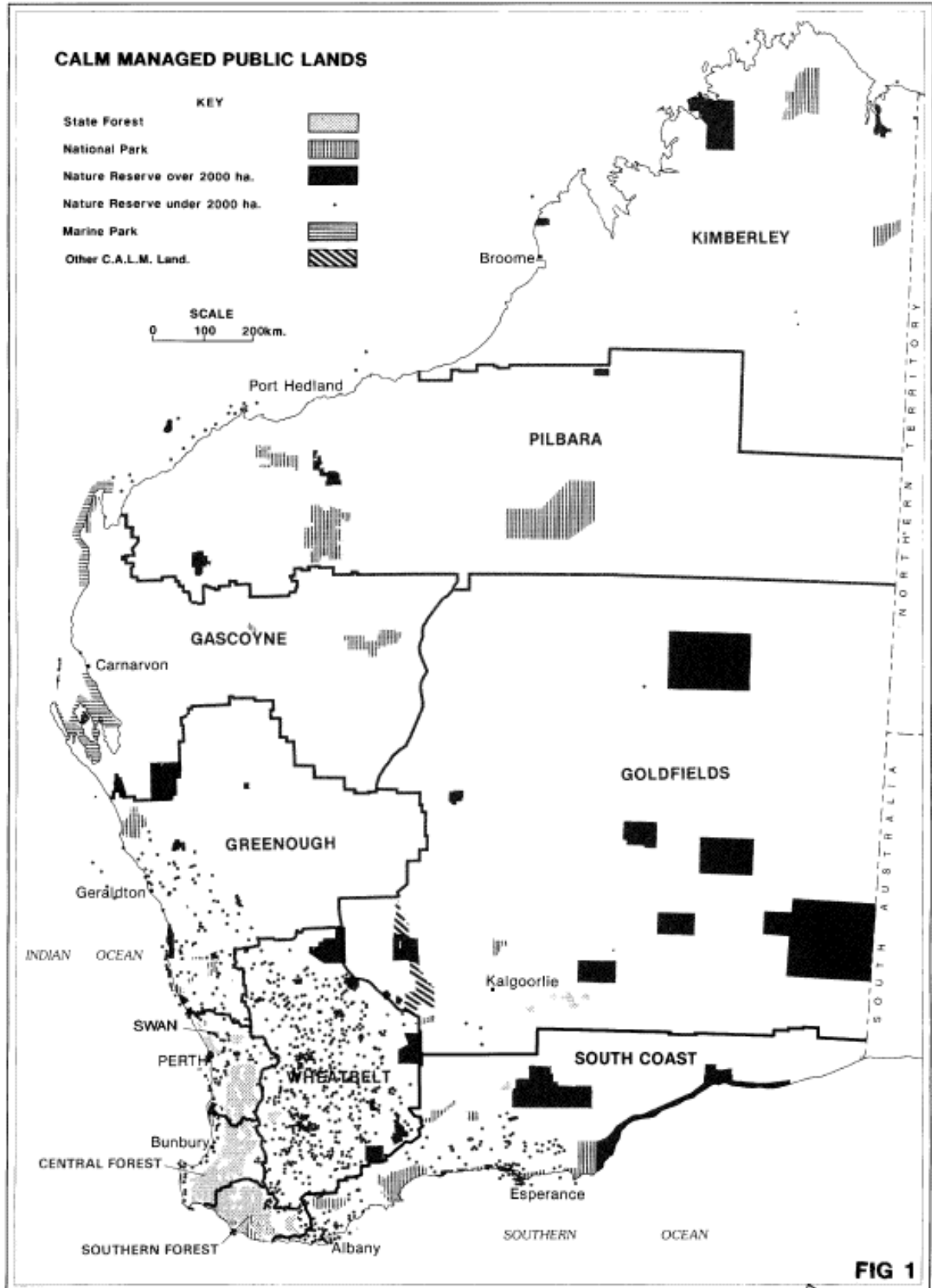
The Department's primary objectives are:

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 those renewable resources that Government decides should be used, on a sustained yield basis for the satisfaction of long term social and economic needs and in a manner that minimises impact on other values.

Recreation:

To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

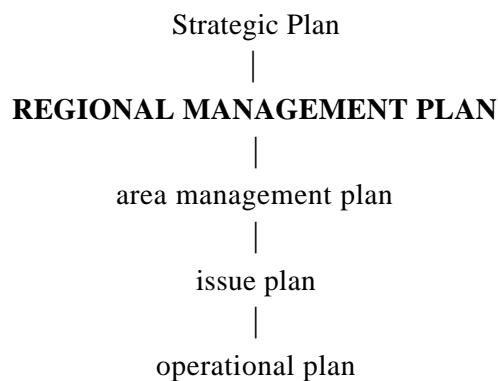
Knowledge:

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

1.3 LAND MANAGEMENT PLANNING

The CALM Act (Section 33) requires the Department to manage land* to which the Act applies in accordance with a "management plan".

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



The Department's Strategic Plan establishes the link to land management plans. It consists of broad policy statements for all major aspects of land use for all lands and waters vested in the NPNCA, the LFC and 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 Region.

* Under Section 53 of the CALM Act, "land" includes the waters comprised in a marine nature reserve or a marine park.

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 sensibly managed until more detailed area management plans, if required, 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, State forest, or other reserves. These are the most detailed management plans prepared by CALM. Once specific area management plans are prepared they will become the primary focus for management and use of the area in question. However, the overall strategies of this Regional Plan will continue to apply to the area unless specifically modified in the area management plan.

Regional and area management plans are subject to public review for a minimum period of two months in the draft form before submission to the Minister for the Environment. Public submissions are considered by Departmental officers as well as members of the NPNCA and LFC who represent a broad cross section of community interests.

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

2.0 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.

2.1 CATEGORIES OF LAND CURRENTLY VESTED IN THE CONTROLLING BODIES AND MANAGED BY THE DEPARTMENT

The CALM Act lists eight categories of land to which the legislation applies. These are:

State Forest

Timber Reserve

National Park

Conservation Park

Nature Reserve

Marine Park

Marine Nature Reserve

Any other land vested in the Commission or the Authority (Miscellaneous Reserves).

In addition, the Department manages land vested in the Executive Director or held freehold in the name of the Executive Director and sections of private land under pine and eucalypt sharefarming agreements.

2.2 VESTING AND MANAGEMENT

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

The Department is responsible for management of lands vested in the Authority, the Commission and the Executive Director. 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 the Environment.

2.3 TENURE AND SECURITY

"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 (also referred to as "Public" lands) fall into two broad categories: reserves and State forests.

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 WA 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 many 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. Such status has been reviewed using criteria for evaluation based on conservation and other values. Many B and C Class reserves are in the process of being upgraded to A Class.

The security of tenure of State forest is similar to 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.

2.4 PURPOSE AND SECURITY OF PURPOSE

There is a variety of purposes for which lands vested in the Authority or the Commission are managed. Different categories of land have different purposes, such as 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 (that is, multiple use), there has been no legislative mechanism to make these purposes secure.

2.5 LAND CATEGORIES MANAGED BY CALM

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

NATURE RESERVE / MARINE NATURE RESERVE

- Vesting:** National Parks and Nature Conservation Authority
- Tenure:** A Class (B and C Class reserves are being 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 no recreation which damages natural ecosystems is allowed.

NATIONAL PARK

- Vesting:** National Parks and Nature Conservation Authority
- Tenure:** A Class (B and C Class parks are being 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 are all terrestrial. 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 differences are 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 include zones for commercial timber production.

MARINE PARK

- Vesting:** National Parks and Nature Conservation Authority
- Tenure:** A Class
- Purpose:** Marine conservation and recreation. Areas may be 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 commercial use 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:** One or more of the following: conservation; recreation; timber production on a sustained yield basis; water catchment protection; or any other purpose prescribed by the regulations.
- 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 required under Government policy.

TIMBER RESERVE

- Vesting:** Lands and Forest Commission.
- Tenure:** Similar to C Class.
- Purpose:** Identical to State forest.
- 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 RESERVE ("OTHER LAND")

- Vesting:** Lands and Forest Commission or National Parks and Nature Conservation Authority (areas managed under Section 5g of the CALM ACT - "5g" Reserves).
- Tenure:** Class is determined on a case by case basis.
- Purpose:** These reserves have a wide variety of purposes, but normally are related to recreation, wildlife conservation and historical features. Appropriate uses will be determined by the purpose of each reserve. As with timber reserves, this classification is often transitional and on further evaluation the classification can be changed to a more appropriate one.
- Comment:** Miscellaneous reserves were referred to as "5g" reserves in the Draft Plan.

2.6 CRITERIA FOR ALLOCATION TO LAND CATEGORIES

The following criteria apply to categories of CALM managed land:

Nature Reserve / Marine 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 1 000 ha in size and/or where wildlife conservation values have been affected by past activities or land uses.

Marine Park

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

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

State Forest and Timber Reserve

Areas to be managed for one or more of the following purposes: conservation; recreation; timber production on a sustained yield basis; water catchment protection; or any other purpose prescribed by the regulations.

Miscellaneous Reserve

Lands which do not satisfy the criteria for the previous seven categories.

Areas to be managed for their natural values and which may accommodate a range of land uses that do not conflict with their purpose.

2.7 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 lands and waters within the State boundaries, under Sections 6 and 23F 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 Sections 39 and 45 of the Bush Fires Act, designated CALM officers may take responsibility for the suppression of bush fires on or threatening State forest or other Crown land. 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 responsibility for administering regulations made under the Wildlife Conservation Act for the 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.

3.0 LAND USE PLANNING AND MANAGEMENT

3.1 GENERAL PRINCIPLES

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. Many 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. Second, it provides a basis for day-to-day management by CALM staff.

3.2 MULTIPLE USE PLANNING

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 (such as honey, gravel, wildflowers)
- Historical or cultural factors.

In addition, a number of activities required under Government policy must be accommodated, for example, community services and public utilities (such as roads and power lines), mineral resource development, where this has been approved under the Mining Act or Special Agreements Acts and commercial fishing.

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

Priorities for Land Use

All lands entrusted to CALM are managed for many uses. In many 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 minimal impact 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. Every area within a land use plan proposed by CALM is therefore 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
- Potential for appropriate public use
- 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 in the same area at the same time,

Uses that can be compatible with the priority use if practised under certain constraints (for example, 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 in the same area at the same time.

CALM follows two basic rules in the allocation of uses:

- Any use allocated must be in accord with the tenure and purpose of the area
- No use may be permitted which is detrimental to the priority use.

Land Use Priorities and Compatibility

Six land use priorities are recognised in the preparation of, land use plans for CALM managed lands:

- Nature conservation
- Recreation
- Environmental management (of water catchments or other environmental values)
- Production (zoned for water, timber or other products)
- Mineral resource development (where this is required under Government policy)
- Public utilities.

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

TABLE 1. COMPATIBILITY OF LAND USES

PRIORITY USE ZONE	ALTERNATIVE USES			
	NATURE CONSERV- ATION	ENVIRON- MENTAL MGMNT	RECREATION	PRODUCTION
Nature Conservation	---	Compatible	Conditional	Incompatible
Environmental Management	Compatible		Conditional	Conditional
Recreation	Conditional	Conditional	---	Conditional
Production	Conditional	Conditional	Conditional	--

**TABLE 2.
COMPATIBILITY BETWEEN LAND USES AND RESERVE
CATEGORIES**

LAND USE	RESERVE CATEGORY				
	NATURE RESERVE MARINE NATURE RESERVE	NATIONAL PARK	CONSER- VATION PARK	MARINE PARK	STATE FOREST
Nature Conservation	/	/	/	/	/
Recreation	O	O	O	O	O
Catchment Management	/	/	/	N/A	/
Timber or Fishery Production	X	X	X	/	/
Water Production	O	O	O	N/A	/
Public Utility	X	O	O	O	O
Mineral Resource Development (see Section 16.4)	O	O	O	O	O
KEY	/	Compatible with objectives for reservation			
	O	Conditional to specific time, area or use constraints			
	X	Not compatible with objectives for reservation			
	N/A	Not applicable			

PART B. THE SOUTH COAST REGION

4.0 THE REGION

CALM's South Coast Region extends from Irwin Inlet (near Walpole) in the west to the South Australian border in the east and inland to include the Stirling Range, the Johnston Lakes area and the southern Nullarbor.

The Region includes all of the Shires of Jerramungup, Ravensthorpe, Esperance and Dundas, and the Town of Albany, and part of the Shires of Denmark, Plantagenet, Albany, Cranbrook and Gnowangerup. Albany and Esperance are the major towns.

The Region is renowned for its outstanding flora, its spectacular landscapes, including the southern coastline and most of the major mountain peaks of south-western Australia and its extensive cave systems on the Nullarbor, which are of international significance.

Tourism and primary production are the major industries in the Region. Several of the State's oldest and largest national parks are located within the Region in addition to an extensive system of nature reserves. Timber production is minimal when compared with the forested south-west of the State, however, establishment of tree plantations on private land around Albany is expanding rapidly.

4.1 PHYSICAL AND BIOLOGICAL RESOURCES

CLIMATE

The Region experiences a Mediterranean climate characterised by mild wet winters and hot dry summers.

Rainfall decreases northwards and eastwards across the Region from 939 mm. per annum in Albany to 274 mm at Norseman and 263 mm at Eucla. Over 50% of the yearly rainfall across the Region generally falls over the winter months, although there are occasional heavy falls in summer.

Yearly maximum and minimum temperatures are strongly influenced by distance from the coast with inland parts of the Region experiencing a far greater range in mean temperatures than the coastal areas. Frosts are relatively common inland during the winter months. In summer, temperatures in excess of 38°C (100°F) are widespread but on the coast the cooling effects of strong sea breezes generally provide relief from the heat.

Winds are generally from the west and north-west in winter. Over summer they are predominantly south-easterly and generally increase in strength in the afternoon.

The potential for long term changes in the climate of the Region must be recognised. Such changes could significantly affect management requirements on lands for which the Department is responsible. CALM is therefore keeping up to date with all developments in this field.

GEOLOGY

The rocks of the South Coast Region can be divided into three distinct geological units (see Figure 2).

Each of these units is characterised by distinctive landforms and scenic attractions and each has quite different potential as a source of minerals and groundwater. The rocks of all three units have been deeply weathered and are overlain in part by weathered profiles and relatively recent soils. The three major geological units are:

Yilgarn Craton

The rocks of the Yilgarn Craton, formed 2 600 to 3 100 million years ago, are amongst the oldest on the Earth and can be further subdivided into two very distinctive rock units.

The oldest rocks were originally deposited as layers of sediment (silt, sand, gravel) on an ancient sea bed. Layers of lava were also added from volcanoes rising from the sea floor. As the thickness of material increased, those parts at the bottom of the pile were changed by the heat and pressure to form new minerals and textures. These interbedded sediments and volcanic rocks were further deformed over time and, because of the colour of much of the sequence, are commonly referred to as "greenstones". Rocks of this type and age are important economically because they contain most of the gold and nickel in Western Australia. In the South Coast Region, greenstones may be seen mainly around Norseman and Ravensthorpe where they form a series of subdued parallel ridges and valleys.

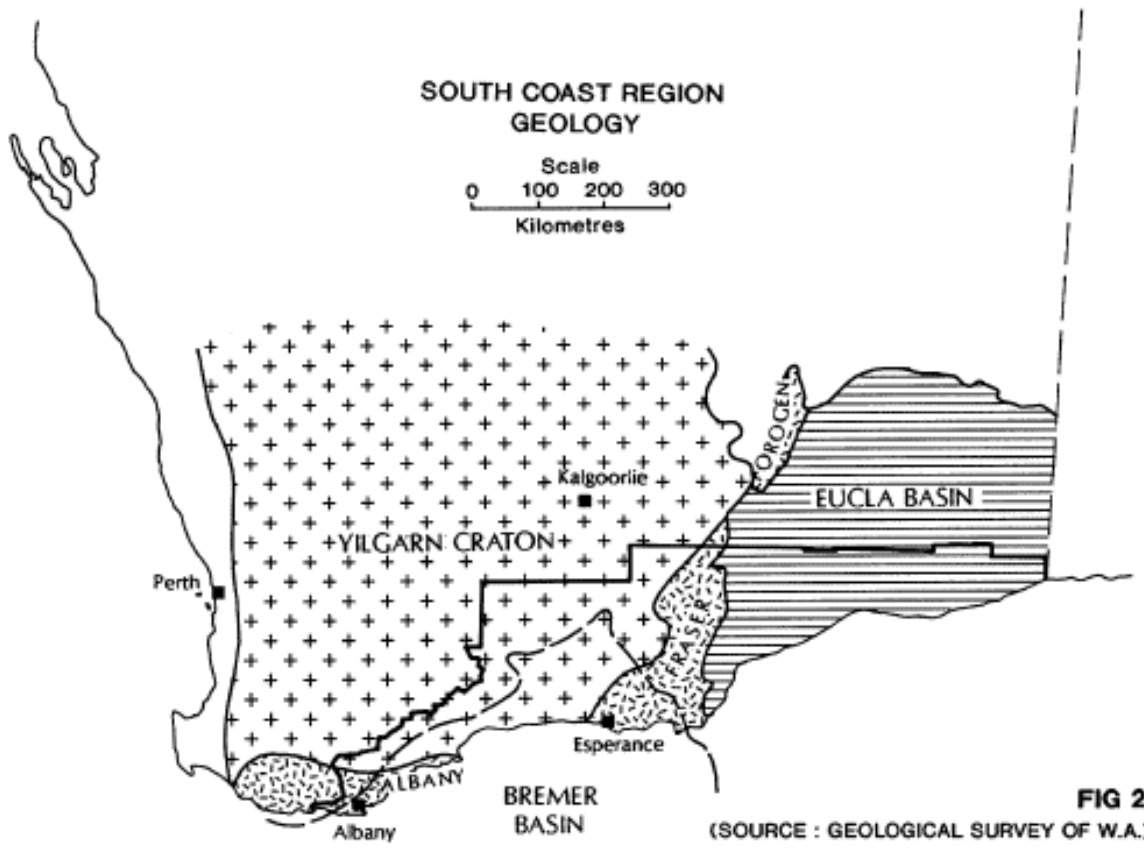
The second major unit in the Yilgarn Craton is granite which formed from the cooling and crystallisation of material intruded from great depth as molten rock. Granite is the predominant rock type in the Yilgarn Craton. However, in most areas it is covered by weathering products and soils and only appears at the surface as scattered, isolated hills with boldly rounded shapes.

Albany-Fraser Orogen

During the period 1200 to 1400 million years ago, sediments were deposited along the southern flank of the Yilgarn Craton. These sediments were derived from the erosion of granites and greenstones of the Yilgarn Craton and were then deformed and intruded by bodies of molten granite. Some of the older Yilgarn Craton rocks near the Orogen were also caught up in the movements and became part of the Albany-Fraser Orogen. The deformed sediments now form the peaks and ridges of the Stirling Range and the mountains to the north of Doubtful Island Bay which culminate in Mount Barren. The granites which intruded these sediments now form the Porongurup Range and ranges near Two Peoples Bay.

Bremer and Eucla Sedimentary Basins

About 135 million years ago, the sea encroached over the land in the South Coast Region, inundating valleys which had been eroded into the older rocks (in the area now known as the Bremer Basin), and forming a broad gulf, which is referred to as the Eucla Basin, in the area of the Nullarbor Plain.



In these two basins, sand, silt and organically rich clay were initially deposited, followed by layers of silt containing beds of massed sponge skeletons (spicules). The sponge spicule beds formed rock called spongolite and the organically rich clay now forms beds of low quality coal called lignite. Because these sediments were deposited on a flooded land surface, the thickness varies markedly depending on the topography of the old land surface. The sediments have been consolidated to form sedimentary rocks, but because they are still relatively soft, they are easily eroded and only give rise to subdued relief. In the Eucla Basin, the sediments are dominantly limestone (calcium carbonate), and in places contain huge numbers of fossil shells.

Around 10 million years ago, the land rose above the sea level and subsequently the limestones have been dissolved along major lines of weakness by rain water, to form the limestone caves for which the Nullarbor Plain is renowned.

Surficial Deposits

Over the last 30 million years or so, soils, the product of weathering of rock, have blanketed most of the land surface. Reworking by wind and water has deposited thick alluvial deposits in valleys and produced local dune sands.

Near the coast, beach sands have been blown into extensive high dunes. Many of the dunes consist of lime sand which can be rapidly cemented to form a very porous limestone referred to as eolianite. Prominent hills and coastal cliffs of eolianite can be seen especially at King George Sound, Torbay Bay, Foul Bay and William Bay.

During the past 65 million years there have been several periods during which the climate was hot and wet. This climate resulted in weathering of the rocks to a depth of up to tens of metres and the formation of a characteristic series of weathered layers referred to as a laterite profile. The profile grades down into unweathered rock. Because of the strength of the capping, laterite blankets very large areas, although it is uncommon at the coastline.

LANDFORM AND SOILS

Geology has been a major factor in landform development, with different geologic formations producing different characteristic landforms. Weathering intensity, local relief and climate also influence landform and soil development.

Five landform regions can be identified in the South Coast Region (Figure 3). Moving from west to east these are the Avon, Stirling, Kalgoorlie and Nullarbor regions, with the Coastal region following the southern coastline.

Avon Region

In the South Coast Region the Avon landscape is dominated by laterised plateaux with dissected edges. Inland the drainage lines become saline. There is substantial variation in soil types including red earths, red duplex soils, yellow sands and red and yellow duplex soils.

Stirling Region

The Stirling region consists of a narrow belt along the south coast, from Denmark in the west to Israelite Bay in the east.

The Stirling landscape is characterised by laterised plateaux, with dissected edges and emergent quartzite ranges, specifically the Stirling Range, the Barren Ranges and Mount Ragged. The Stirling Range topography is controlled by the dip-slope of quartzite units. Abrupt faces often form at the steep limbs of overturned folds. The Porongurup Range, of granitic origin, lies to the south of the Stirling Range. This region is dominated by yellow duplex soils on the plains and dissected areas and by shallow sandy soils on the mountain ranges.

Kalgoorlie Region

The Kalgoorlie region is isolated from the coast and consists of vast plains interspersed with low rugged ranges and hills. The Kalgoorlie landscape has no integrated drainage system, there being instead elongated salt lake beds surrounded by loamy calcareous soils. East-west sand dunes with intervening salt lakes and clay pans are a notable feature. This region has three different soil types with yellow sands on laterite residuals, red earths in the broad valleys and calcareous loams around lakes.

Nullarbor Region

The Nullarbor is a vast plain, stretching some 800 kilometres from Israelite Bay in the west, well into South Australia in the east and some 300 kilometres inland. It has no external drainage and no permanent surface water. The soils of this region are dominated by shallow calcareous loams. The southern third of this region lies within the CALM South Coast Region.

Coastal Region

The Coastal region is dominated by maritime influences. Along the southern coastline three very different landscapes prevail. From Peaceful Bay to Israelite Bay the coastline is dominated by granitic and gneissic headlands and intervening curved sandy beaches. The form of the coastline here is controlled predominantly by either the orientation of gneissic layering or faults and joints, due to the younger deformation events described above. From Israelite Bay to Twilight Cove, high limestone cliffs limit access to the ocean and beaches are narrow or absent. To the east of Twilight Cove, the sandy beaches appear again, although here they are accompanied by extensive areas of unstable sand. The soils of this region are either unconsolidated sands or thin skeletal soils on granite and limestone headlands and cliffs.

HYDROLOGY

Surface Water: Most of the rivers extend up to 60-70 kilometres inland, the notable exception being the Pallinup River which extends over 150 kilometres inland to the Katanning area. The rivers all discharge into inlets or "harbours" (most of which are semi-permanently or permanently closed to the ocean). Working from west to east the major rivers and inlets are:

- Kent River, draining into Owingup Swamp and then into the Irwin Inlet
- Denmark River and Hay River draining into Wilson Inlet 23
- Kalgan River, draining into Oyster Harbour (Albany)
- Pallinup River, draining into the Beaufort Inlet
- Bremer River draining into the Wellstead Estuary (Bremer Bay)
- Gairdner River, draining into the Gordon Inlet
- Fitzgerald River, draining into the Fitzgerald Inlet
- Hamersley River, draining into the Hamersley Inlet
- West River, Phillips River and Steere River draining into Culham Inlet (Hopetoun)
- Jerdacuttup River, draining into the Jerdacuttup Lakes
- Oldfield River and Munglinup River, draining into the Oldfield Estuary
- Young River and Lort River draining into Stokes Inlet
- Dalyup River draining into Lake Gore

There are only a few small rivers to the east of Esperance.

Around Albany and Esperance there are several freshwater lakes, often interconnected, with other more isolated lakes scattered elsewhere throughout the Region. There are small groups of salt lakes along both the north-west and south-east boundaries of the Stirling Range. A broad zone of salt lakes extends from the Johnston Lakes area, through the Peak Charles area and to the northeast of Esperance.

Beyond Israelite Bay there are occasional rock holes along the top of the Baxter Cliffs and onto the Hampton Tablelands.

Virtually all rivers in the Region have high salinity and after heavy rainfall, sediment loads are also high. There is evidence (Hodgkin, 1988b) that many of the inlets are silting up quite rapidly.

Groundwater: Groundwater can be found in all the geological units of the Region (refer to Figure 2), but the size and salinity of supplies depends on factors such as rainfall, topography and the nature of the surficial, as well as the underlying geological units. In general, fresh groundwater is scarce and supplies are small, but there is much scope for desalination of brackish groundwater to give potable water.

In the Yilgarn Craton and Albany-Fraser Orogen, groundwater can be obtained from fractured rocks, weathered rock and patches of Bremer Basin and alluvial valley sediments preserved within the older geological units. Groundwater is generally brackish to saline and fresh water is generally available only in a few areas. Slightly more potential exists in the Albany-Fraser Orogen because of the numerous large fault zones which contain fractured rocks.

Sediments of the Bremer Basin contain lenses of sand within the silty and clayey sediments. The sands generally contain brackish to saline groundwater, but locally contain fresh groundwater from which large supplies have been developed. Sands near the base of the Werillup Formation have

supplied groundwater for the Albany Town Water Supply Scheme since 1969. The production bores, about 6 kilometres west to south-west of Albany, gave an average of 1.75 million cubic metres of water each year between 1983 and 1986.

The Eucla Basin contains large, brackish to saline groundwater resources in cavernous limestone at depths of 100 to 700 metres. However, small fresh groundwater resources are believed to occur extensively in coastal dunes on the Roe Plains and in minor areas of local recharge.

Groundwater is also available from buried alluvial valleys incised into the Yilgarn Craton, the Albany-Fraser Orogen and the Eucla Basin. Most water from these sources is brackish to saline and some bores have very high supply rates. In addition, fresh groundwater occurs as a veneer overlying saline water within the coastal dune sands and eolianite. The few known bores yield moderate supplies, but the resource awaits assessment.

A number of potential future water resources exist within the Region. Large supplies of brackish to saline groundwater may be obtained from the Werillup formation, southeast of the Stirling Range and from sands within the buried alluvial valleys throughout the area. Small supplies of fresh to brackish groundwater, primarily suitable for stock, may be obtained where thick superficial sand is developed over less permeable Pallinup Siltstone, or bedrock. Weathered bedrock, or fractured zones in fresh bedrock, contain groundwater supplies, but most supplies are small, with salinity ranges from fresh to saline. Moderate supplies of fresh groundwater may be obtained locally from coastal sands and eolianite throughout the South Coast Region.

Public water supplies in the Region are based primarily on groundwater near the coast and on artificial catchments for inland towns. There are no major water supply dams in the Region.

Many of the caves on the Nullarbor extend to the groundwater level and below providing the most extensive cave diving opportunities in Australia with water filled passages currently explored for several kilometres.

VEGETATION

Parts of three of the four botanical provinces identified in Western Australia fall within the South Coast Region - approximately a third of the South-West Province (includes part of the Darling, most of the Roe and all of the Eyre Districts), about half of the South-Western Interzone (Coolgardie is the only District in this zone) and the southern tip of the Eremaean Province (includes the southern half of the Eucla District) occur within the Region. These Provinces and associated Districts are shown in Figure 4.

South-West Botanical Province

This province occupies the wetter south-west corner of Western Australia. Characteristic vegetation includes heath, thicket, mallee, woodland and forest.

Darling Botanical District

Warren Subdistrict - tall forests of karri, with forests of jarrah and marri on leached sands. Paperbarks and sedge swamps occur in the valleys.

Menzies Subdistrict - jarrah forest on ironstone gravels and marri and wandoo woodlands on loamy soils.

Avon Botanical District

Only the southern tip of this District extends into the South Coast Region. Vegetation sequences include scrub-heath on sandplain, *Acacia-Allocasuarina* thickets on ironstone gravels, woodlands of york gum, salmon gum and wandoo on loams and salt tolerant species on saline soils.

Eyre Botanical District

This District forms a narrow strip along the south coast from west of Albany east to Esperance. It overlies much of the Stirling landform-soil region. Scrub and mallee heath occur on the sandplains. Tallerack (*Eucalyptus tetragona*) is a characteristic species. Mallees particularly *E. redunca* and *E. incrassata* occupy valleys. Banksia scrub is also a feature.

Roe Botanical District

This District lies to the north of the Eyre Botanical District and includes Lake Grace in the west and Peak Charles to the east. Mallees, particularly *E. eremophila*, predominate. They generally occupy the valleys. Scrub-heath and *Allocasuarina* thickets occur on the plateaux.

South-Western Interzone

This province is an interzone between the South-West and Eremaean Provinces.

Coolgardie Botanical District

Norseman and Eyre lie within this District which is dominated by eucalypt woodlands. These woodlands become more open and a saltbush-bluebush understorey appears on more calcareous soils. Scrub-heath and *Allocasuarina* thickets occur on the sandplains.

Eremaean Botanical Province

This is the and central portion of the State characterised by hummock grassland, scrub and low woodland.

Eucla Botanical District

This District occupies the eastern quarter of the South Coast Region. Low trees of *Acacia papyrocarpa*, *A. aneura* and *Allocasuarina cristata* occur on the periphery of this District, with a bluebush steppe of perennial *Maireana sedifolia* and annual grasses and forbs, grading to a treeless centre.



(BASED ON BEARD, J.S., 1979)

FIG 4

NATIVE FAUNA

Some common vertebrate species in various vegetation types are as follows:

Jarrah Forest

Western grey kangaroo (*Macropus fuliginosus*), western brush wallaby (*Macropus irma*), southern brown bandicoot (*Isodon obesulus*), yellow footed antechinus (*Antechinus flavipes*), bush rat (*Rattus fuscipes*), dugite (*Pseudonaja affinis*), tiger snake (*Notechis scutatus*), moaning frog (*Heleioporus eyrei*), western banjo frog (*Limnodynastes dorsalis*), emu (*Dromaius novaehollandiae*), silvereeye (*Zosterops lateralis*), western rosella (*Platycercus icterotis*), New Holland honeyeater (*Phylidonyris novaehollandiae*), grey fantail (*Rhipidura fuliginosa*), red wattle bird (*Anthochaera carunculata*) and tawny frogmouth (*Podargus strigoides*).

South Coast Communities (yate, peppermint, banksia swamps)

Western grey kangaroo, southern brown bandicoot, yellow footed antechinus, bush rat, honey possum (*Tarsipes rostratus*), dugite, tiger snake, bardick (*Notechis curtus*), whistling kite (*Haliastur sphenurus*), nankeen kestrel, Port Lincoln parrot, western rosella, elegant parrot (*Neophema elegans*), grey fantail, red wattle bird, New Holland honeyeater, kookaburra (*Dacelo gigas*), moaning frog and banjo frog.

Wetlands

White faced heron (*Ardea novaehollandiae*), Australian shellduck (*Tadorna tadornoides*), pacific black duck (*Anas superciliosa*), grey teal (*Anas gibberifrons*), maned duck (*Chenonetta jubata*), little pied cormorant (*Phalacrocorax melanoleucos*), black swan (*Cygnus atratus*), moaning frog and banjo frog.

Karri Forest

Yellow footed antechinus, grey bellied dunnart (*Smithopsis griseoventer*), bush rat, tiger snake, purple crowned lorikeet (*Glossopsitta porphyrocephala*), western rosella, New Holland honeyeater, moaning frog and western banjo frog.

Wandoo Woodlands

Western grey kangaroo, western brush wallaby, short-beaked echidna (*Tachyglossus aculeatus*), dugite, emu, brown falcon (*Falco berigora*), nankeen kestrel (*Falco cenchroides*), western rosella, Port Lincoln parrot (*Barnardius zonarius*), grey fantail, red wattle bird and New Holland honeyeater.

Nullarbor / Southern Goldfields

Western grey kangaroo, red kangaroo (*Macropus rufus*), fat tailed dunnart (*Smithopsis crassicaudata*), dugite, gwardar (*Pseudonaja nuchalis*), wedge tail eagle (*Aquila audax*), brown falcon, nankeen kestrel, emu, New Holland honeyeater, Australian pipit (*Anthus novaeseelandiae*) and brown songlark (*Cinclorhamphus cruralis*).

Islands

Australian sea lion (*Neophoca cinerea*), New Zealand fur seal (*Arctocephalus forsteri*), fleshy footed shearwater (*Puffinus carneipes*), great winged petrel (*Pterodroma macroptera*), little penguin (*Eudyptula minor*), pied oyster catcher (*Haematopus ostralegus*), sooty oyster catcher (*Haematopus fuliginosus*) and death adder (*Acanthopis antarcticus*).

4.2 SOCIAL AND ECONOMIC RESOURCES

HISTORY AND LAND USE

Aboriginal Use

Aboriginal people have occupied the south-west of Western Australia for at least 40 000 years. The earliest dates for the South Coast Region are around 13 000 years for a site near Cape Arid and around 19 000 years near Albany.

Language groups include the Nyungar in the west and the Mirning, Ngadjumaya and WudJarTi further to the east (see Von Brandenstein, 1988; Tindale, 1974; Berndt, 1979).

The Aboriginal population of the south-west is thought to have reached at least 6 000 prior to white settlement (Berndt, 1979). Due to the winter climate along the south coast, Aboriginal people constructed bark huts and also wore buka (cloaks) made of kangaroo skins, similar to those recorded from south-east Australia. Early journals (for example, Nind, 1832), suggest that Aboriginal people did not have permanent settlements all year round but instead tended to have a seasonal migration between coastal areas and the inland woods and forests.

Howard (1979) maintains that Aboriginal populations in the region decreased dramatically after European settlement which caused forced displacement of people to missions and death due to factors such as disease and murder. Despite this depopulation, however, Nyungar tradition survives in many ways to the present (Tilbrook, 1983).

Exploration

European contact began in the 17th century when the Dutch began exploring the south coast. In 1627 Thyssen in the "Gulden Zeepaerd" explored the coast from 116 to 133 degrees longitude and named it "Nuytsland". There was little further official interest in the area for 150 years when rivalry between the French and the British led to several important expeditions including that of Vancouver who explored the coast from around Chatham Island (near Walpole) to King George Sound in 1791.

Following further visits to the King George Sound area by Flinders (1801) and D'Urville (1826) the British decided to establish a settlement under Major Lockyer at King George Sound. This occurred in December 1827 and was the first official white settlement (Frederickstown, now Albany) in Western Australia. Two years later (1829) the Swan River Colony was also established.

Exploration of the hinterland followed with important expeditions being:

1829	Captain Wakefield	Porongurup Range
1829	Dr Wilson	Mount Barker area
1832	Ensign Dale	Stirling and Porongurup Ranges

and Bannister in 1830-31 who travelled between the two settlements along a route which is now followed fairly closely by the Albany Highway.

Interest in the area east of the colony was generated by John Eyre's epic journey from Adelaide to Albany along the coast in 1841, searching for an overland stock route. Around 1848, Roe spent two years exploring the western part of the South Coast Region and he also visited the Hampton Tablelands on the southern Nullarbor. In 1870 John Forrest travelled from Perth to Adelaide. It was on the basis of Forrest's report that an overland telegraph link was established between Albany and Adelaide in 1877.

Settlement

Even though the first settlement in the west was at Albany in 1827, subsequent development was slow due to the infertility of the surrounding land. There were numerous pastoral enterprises established, for example, the Moirs at Fanny Cove and the Dempsters at Esperance, but the majority of farming country was not opened up until the turn of the century. The first major areas to be developed were north of the Stirling Range, around Bremer Bay and around Esperance.

Since the Second World War there has been a dramatic expansion in farming areas within the South Coast Region, with new releases being based on both war service settlement schemes and civilian settlement programs. This rapid expansion occurred mainly in the Shires of Gnowangerup, Jerramungup, Ravensthorpe and Esperance, together with war service schemes in the Plantagenet and Albany Shires.

Timber Production

The first southern sawmills (Millars) operated at Torbay in 1884 and at Denmark from 1894, with export through the port of Albany. There is now little trace of the Torbay operation. However, sawmills are still in operation at Denmark and at Albany.

Mineral Resource Development

Historically, the major mining developments in the Region have been around Ravensthorpe (Phillips River field) and Norseman (Dundas Mineral field). Both have produced significant quantities of precious metals (mainly gold) since operations began last century. Base metals (such as copper) have also been produced, particularly at Ravensthorpe. Minor production of heavy mineral, from mineral sands occurred in the Region in 1949-1950. Considerable exploration has occurred throughout the Region and a number of mineral deposits are considered prospective.

Transport

The main transport links in the Region are by road. Highway I runs parallel to the coast from Albany to Esperance, then north to Norseman and east to Eucla. Other major highways link Albany with Perth and with the Lake Grace area. By 1890 Albany and Perth were connected by rail and by 1939

so too were Kalgoorlie and Esperance. These rail links continue but currently use is restricted to goods and services with no passenger facilities. Daily air services connect Albany and Esperance with Perth. More limited services connect Esperance with Norseman and Kalgoorlie. Overseas, intrastate and interstate cargo is exported through the ports of Albany and Esperance.

Fishing

Commercial fishing occurs along much of the south coast and comprises estuarine, in-shore and off-shore industries. Commercial ocean fish and oyster farming have also commenced at Albany. Management of the commercial fishing industry is undertaken by the Fisheries Department. The fishing industry can impact upon lands managed by CALM which lie adjacent to estuaries and the coastline. The coastline of the Region has also long been a popular recreational fishing destination. This use also impacts upon many of the lands managed by the Department.

Tourism

Tourism is a major growth industry throughout the Region and the south coast is actively promoted as part of the State's "Leeuwin Way". As many tourists seek out spectacular scenery and wildflowers, there is heavy reliance by the tourism industry on lands managed by CALM.

LOCAL GOVERNMENT AND POPULATION

The Region includes all or part of ten Local Government areas with populations estimated at June 30, 1989, as follows.

	Area (km2)	Population
Denmark (Part)	960	3034
Albany (Part)	4902	9251
Town of Albany	37	14998
Plantagenet (Part)	4792	4138
Cranbrook (Part)	3390	1240
Gnowangerup (Part)	4745	1979
Jerramungup	6515	1354
Ravensthorpe	12872	1422
Esperance	43190	10074
Dundas	.92795	2190
	<u>174198</u>	<u>49680</u>

As the CALM regional boundaries do not follow Shire boundaries the population of the Region cannot be determined accurately, but is estimated to be around 47 000 (Australian Bureau of Statistics)

From the figures above it is apparent that the Shires become larger and much more sparsely populated working from west to east. Overall the population density of the western section of the

Region from Denmark to Jerramungup is about ten times greater than that of the remainder of the Region to the east.

4.3 LAND TENURE

Table 3 details the Public Land managed by CALM as at 31 December 1990. Approximately 15% of the Region by area is managed by the Department.

Figures 5(a), 5(b), 6(a) and 6(b) at the back of this Plan show the extent of Public Land managed by CALM within the Region as at 31 December 1990.

TABLE 3. CALM MANAGED PUBLIC LANDS IN THE SOUTH COAST REGION AS AT 31 DECEMBER 1990

Map Ref.	Reserve No.	Name	Tenure	Area ha
1	33842	Quarram	Nature Reserve	3825.4
1a	41010	(Owingup)	Nature Reserve	2430.3
2	175/25	(Mehinup)	Timber Reserve	97.9
3	20381	Mehinup	Nature Reserve	285.3
4	24482	William Bay	National Park	1705.0
5	12046	William Bay	National Park	33.0
5a	37196	William Bay	Misc. Reserve	1.8
6	23120	(Rudyard Beach)	Nature Reserve	38.3
7	26177	(West Cape Howe)	National Park	3517.0
8	16136	(Tennessee North)	Nature Reserve	15.8
9	217/25	(Tennessee North block)	Timber Reserve	19.8
10	31908	Shelter Island	Nature Reserve	10.0
11	24891	Marbelup	Nature Reserve	103.7
11a	20948	(Down)	Nature Reserve	717.7
12	25809	Lake Powell	Nature Reserve	192.0
13	619	Phillips Brook	Nature Reserve	48.6
13a	25965	-----	Nature Reserve	27.1
14	18739	Millbrook	Nature Reserve	1 483.8
15	24258	Torndirrup	National Park	3 881.1
16	5225	Torndirrup	National Park	55.2
17	22058	(Lake Seppings)	Nature Reserve	17.1
18	30463	Bakers Junction	Nature Reserve	1090.1
18a	30791	-----	Nature Reserve	2.7
19	30469	(Bon Accord)	Nature Reserve	10.4

Map Ref.	Reserve No.	Name	Tenure	Area ha
20	18772	(Napier)	Nature Reserve	219.1
21	25705	(Porongurup)	National Park	60.6
22	26564	(Takenup)	Nature Reserve	9.8
23	28689	(Mt.Mason)	Nature Reserve	192.5
24	40101	(Granite Hill)	Nature Reserve	127.0
25	27956	Two Peoples Bay	Nature Reserve	4744.7
26	27139	South Sister	Nature Reserve	338.3
27	26385	North Sister	Nature Reserve	1 007.7
28	36550	(White Lake)	Nature Reserve	174.1
29	15107	Lake Pleasant View	Nature Reserve	267.1
30	26688	South Stirling	Nature Reserve	1710.5
31	36028	Mount Manypeaks	Nature Reserve	1 330.0
31a	25865	(Waychinicup)	National Park	803.7
31b/31c	27502	(Waychinicup)	National Park	3 178.6
32	26650	Hassell	National Park	1 264.6
33	27157	Cheyne Road	Nature Reserve	367.5
34	36719	(Arpenteur)	Nature Reserve	88.9
35	26234	Tinkelelup	Nature Reserve	575.5
36	144	Mistaken Island	Nature Reserve	13.7
37	32199	Seal Island	Nature Reserve	2.8
38	30049	Michaelmas Island	Nature Reserve	91.9
39	27614	Breaksea Island	Nature Reserve	103.0
40	25869	Bald Island	Nature Reserve	809.4
41	188/25	(Hunwick)	Timber Reserve	357.0
42	26894	Mettler Lake	Nature Reserve	401.6
43	29128	Basil Road	Nature Reserve	1 162.2
44	14792	Stirling Range	National Park	115661.4
45	18987	Porongurup	National Park	2511.2
46	25583	(Kalgan Plains)	Nature Reserve	52.2
47	25386	Chillinup	Nature Reserve	329.7
48	30774	Tenterden	Nature Reserve	80.9
49	18468	Balicup, Lake	Nature Reserve	687.1
50	25812	Salt Lake	Nature Reserve	151.2
51	26160	Jebarjup	Nature Reserve	1 015.6
52	26161	Camel Lake	Nature Reserve	3214.8
53	9159	(Formby)	Nature Reserve	37.9
54	39971	(Toompup)	Nature Reserve	29.8
55	26264	(Mailalup)	Nature Reserve	768.2
56	17298	(Greaves)	Nature Reserve	251.4
57	26792	-----	Nature Reserve	1 038.9

Map Ref.	Reserve No.	Name	Tenure	Area ha
58	26793	(Corackerup)	Nature Reserve	4334.0
59	28687	(Pallinup)	Nature Reserve	424.6
60	14039	(Needilup)	Nature Reserve	622.5
61/63 ¹	31737	Fitzgerald River	National Park	320614.8
62	31909	Glasse Island	Nature Reserve	4.0
64	31738	Fitzgerald River	National Park	8424.1
65	23516	Doubtful Islands	Nature Reserve	(129.5)
66	31881	Long Creek	Nature Reserve	322.1
67	31425	(Koomong)	Nature Reserve	250.8
68	27525	Overshot Hill	Nature Reserve	430.9
68a	39566	-----	Misc. Reserve	4.0
69	29184	(Hayes)	Nature Reserve	1 309.3
70	31128	(Kundip)	Nature Reserve	2 170.2
71	40156	Jerdacuttup Lakes	Nature Reserve	6619.8
72	27023	Frank Hann	National Park	61420.0
73	32339	Lake Shaster	Nature Reserve	10504.5
74	31754	Cheadanup	Nature Reserve	6813.0
74a	31755	East Naemup	Nature Reserve	824.6
75	26410	(Munglinup)	Nature Reserve	157.5
75a/81	30583	(Griffiths)	Nature Reserve	5417.7
76	32590	Stokes	National Park	9726.5
77	31744	(Cascade group)	Nature Reserve	288.3
78	31743	(Cascade group)	Nature Reserve	95.7
79	31742	(Fields)	Nature Reserve	1 179.4
80	32601	Moir Homestead	National Park	16.2
82	36183	(Speddingup West)	Nature Reserve	357.5
83	32419	(Lake Gore)	Nature Reserve	792.4
84	29012	(Bishops)	Nature Reserve	1 403.6
85	8019	(Swan Lagoon)	Nature Reserve	346.7
86	19628	(Dalyup)	Nature Reserve	57.1
87	35557	(Lake Mortijinup)	Nature Reserve	486.3
88	3042	(Jeffrey Lagoon)	Nature Reserve	121.4
89	29680	(Red Lake Townsite)	Nature Reserve	76.1
90	16801	(Truslove North)	Nature Reserve	194.1
91	27985	(Truslove Townsite)	Nature Reserve	6065.8
91a	28846	Kendall Road	Nature Reserve	56.0
91b	25958	(Speddingup East)	Nature Reserve	66.3
92	23527	(Helms Forestry Reserve)	Misc. Reserve	3747.9
93	27768	(Ridley South)	Nature Reserve	1 105.9
94	28300	(Ridley North)	Nature Reserve	393.1

Map Ref.	Reserve No.	Name	Tenure	Area ha
95	31197	(Shark Lake)	Nature Reserve	16.1
96	32257	(Lake Warden)	Nature Reserve	709.7
97	15231	(Woody Lake)	Nature Reserve	565.0
98	23825	(Mullet Lake)	Nature Reserve	1 917.4
99	27386	(Mt Ridley group)	Nature Reserve	1417.2
100	27384	(Mt Burdett)	Nature Reserve	604.7
101	22795	Cape Le Grand	National Park	31 578.2
102	27387	(Burdett North)	Nature Reserve	812.2
103	27388	(Burdett South)	Nature Reserve	4467.1
104	27385	(Burdett)	Nature Reserve	70.7
105	27354	(Coolinup)	Nature Reserve	215.6
106	32776	(Kau Rock group)	Nature Reserve	4732.1
107	32777	(Kau Rock group)	Nature Reserve	8 550.8
108	32780	(Kau Rock group)	Nature Reserve	1485.1
109	32779	(Kau Rock group)	Nature Reserve	1045.8
110	32782	(Mt Ney)	Nature Reserve	609.8
111	32783	(Beaumont group)	Nature Reserve	7082.1
112	32130	(Beaumont group)	Nature Reserve	2480.5
113	32129	(Beaumont group)	Nature Reserve	1 751.6
114	32128	(Beaumont group)	Nature Reserve	444.5
115	27086	(Alexander)	Nature Reserve	807.1
116	32131	-----	Nature Reserve	1 057.7
117	31799	(Muntz)	Nature Reserve	3617.5
118	32784	(Neredup)	Nature Reserve	1708.9
119	38334	-----	Nature Reserve	407.8
120	32800	(Bebenorin)	Nature Reserve	20.3
121	38545	(Clyde Hill)	Nature Reserve	1 670.5
122	38544	(Niblick)	Nature Reserve	839.0
123	24047	Cape Arid	National Park	278 120.0
124	14234	(Cape Arid)	National Park	1 295.0
125 ¹	27632	Nuytsland	Nature Reserve	625343.6
126	36002	Israelite Bay Reserve	Misc. Reserve	48.2
127	36056	Rocky Islets	Nature Reserve	40.9
128	39435	(Woody Island)	Nature Reserve	195.0
129	22796	Recherche Archipelago	Nature Reserve	(6495.2)
130	28168	(Springdale)	Nature Reserve	25.5
131	36004	Peak Charles	National Park	39959.0
132	36608	(Dowak)	Nature Reserve	80.6
133	197/25	(Brockway)	Timber Reserve	3724.4
134	33113	-----	Nature Reserve	8 859.6

Map Ref.	Reserve No.	Name	Tenure	Area ha
135	33501	-----	Nature Reserve	203.4
136	36957	(Dundas)	Nature Reserve	780883.0
137	36205	Eucla	National Park	3341.7

- 1 CALM calculated area for Nuytsland Nature Reserve is significantly lower than the gazetted area. This discrepancy will be investigated during the tenure validation program currently in progress.

KEY: Gazetted area - 3747.9
 Calculated area - (6495.2)
 Approved Name - Quarram
 Unapproved Name - (Mehinup)

SUMMARY OF CALM MANAGED PUBLIC LANDS

Land Tenure	Albany District	Esperance District	Region Totals
National Park	461710	425460	887 170
Nature Reserve	48280	1508040	1556320
Timber Reserve	475	3720	4200
Misc. CALM Act Res	6	3800	3800
	510 470	1 941 020	2 451 490

Note: Under Section 130 of the CALM Act, the Department also has some management responsibilities on unvested Nature Reserves

4.4 SURROUNDING LANDS

The South Coast Region is bordered by three other CALM regions: the Southern Forest Region based at Manjimup, the Wheatbelt Region based at Narrogin and the Goldfields Region based at Kalgoorlie (Figure 1). It is bordered in the east by the Far West Region of the South Australian National Parks and Wildlife Service based at Ceduna.

To the west of the Region, land use is largely based on forest production (with major timber production centres located at Manjimup and Pemberton) and conservation and recreation in forest parks and reserves. To the north-west lies the major section of the Western Australian Wheatbelt. To the north-east, from the Rabbit Proof Fence east, the Region is bordered by uncleared land, mainly mallee heaths and woodlands, which extend into the southern Goldfields and the treeless plains of the Nullarbor. These then extend into desert country north of the Trans Australian Railway and into South Australia.

Significant conservation reserves bordering the South Coast Region are the Lake Magenta Nature Reserve north-east of Jerramungup and extensions to the Nullarbor National Park along the boundary with South Australia.

5.0 CALM ADMINISTRATION IN THE SOUTH COAST REGION

5.1 REGIONAL OBJECTIVES

The objectives of the South Coast Region (not necessarily in priority order) are:

- 1. To establish and maintain a system of secure reserves which protect viable representative samples of the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas suitable for recreation and the production of renewable natural resources.**
- 2. To ensure protection of native species on lands not managed by the Department.**
- 3. To ensure that conservation and land management is carried out according to sound, well-researched scientific principles.**
- 4. To prevent the establishment of plant disease in new areas and to minimise additional spread where plant disease already occurs.**
- 5. To develop opportunities for appropriate recreational use of lands and waters entrusted to the Department.**
- 6. To provide public education and information programs designed to increase community enjoyment, understanding of and support for nature conservation and park and reserve management.**
- 7. To encourage and assist the public to participate in the development of conservation and land management policies and the implementation of management and research programs.**
- 8. To prepare and implement management plans for lands and waters entrusted to the Department.**
- 9. To prepare and implement wildlife management programs.**
- 10. To prepare and implement timber production strategies which help to meet the objectives of the State.**
- 11. To prepare and implement strategies for the management of the utilisation of designated natural resources.**
- 12. To provide an effective administrative framework for the management of lands, waters and natural resources entrusted to the Department and for the conservation of wildlife throughout the Region. This involves:**

- **The establishment of a system of regional and district management, where staff convert plans and policies into work programs, carry out the work, provide feedback on progress and priority of planning needs, and maintain close, constructive relationships with local communities.**
- **The development and maintenance of corporate information systems to facilitate the sharing of data, efficient communication and decision making.**
- **The maintenance of a well motivated and competent staff.**
- **The provision of programs for staff development and training.**
- **Ensuring liaison, co-operation and co-ordination with branches of the Department and with other agencies or people having a function or interest in conservation and land management.**
- **The maintenance of a safe working environment.**

The above objectives will be discussed in more detail elsewhere in this Plan.

5.2 DISTRICTS WITHIN THE REGION

The Region is divided into two Districts as shown in Figure 7.

The Albany District extends from Irwin Inlet in the west, to the Rabbit Proof Fence. Its operations are concerned with the management of national parks, nature reserves and softwood (pine) and hardwood (eucalypt) sharefarming schemes. District administration is located in Albany.

The Esperance District extends from the Rabbit Proof Fence east to the South Australian border. Prime responsibilities of the District include management of national parks and nature reserves and, in conjunction with other organisations, advisory services regarding the planting of trees on farms for amenity, shelter and small scale production. Administration is located in Esperance.

5.3 PERSONNEL

At April 1991 Departmental personnel were based in the Region, as follows:

DEPARTMENT OF CALM PERSONNEL EMPLOYED IN SOUTH COAST REGION AS AT APRIL 1991

Professional Staff	7
Field Staff	6
Administration and Clerical Staff	7
Wildlife Officers	4
National Park Rangers	18
Field Workers	5
Casual Employees	3
Total	50

The location of personnel throughout the Region is illustrated in Figure 7. Most national parks and one nature reserve in the Region are permanently staffed.

5.4 MANAGEMENT CAPABILITY ZONES

Due to the size of the Region, the small number of staff and the location of staff in the field, the onsite management capability of CALM varies markedly across the Region. Therefore three broad zones of management capability have been recognised (Figure 7):

- Zone A** Management capability good. Ability to plan operations programs such as fire protection and to respond to emergencies such as wild fires.
Generally high public use.
- Zone B** No immediate staff presence, but generally accessible within 2 hour's drive. Limited ability to plan operations programs and to respond to emergencies.
Generally medium public use.
- Zone C** Occasional staff presence only. More than 2 hour's drive from nearest CALM office or outstation. Can only plan operations programs in exceptional circumstances and at high financial and staff time cost. No ability to respond to emergencies.
Generally low public use except in the vicinity of major highways.

Response times refer to times required for the provision of initial resources. Additional resources will obviously require more time.

These zones of management capability are incorporated in the Fire Control Plan for the Region and the South Coast Region Dieback Protection Plan 1989-1993 (CALM, 1989).

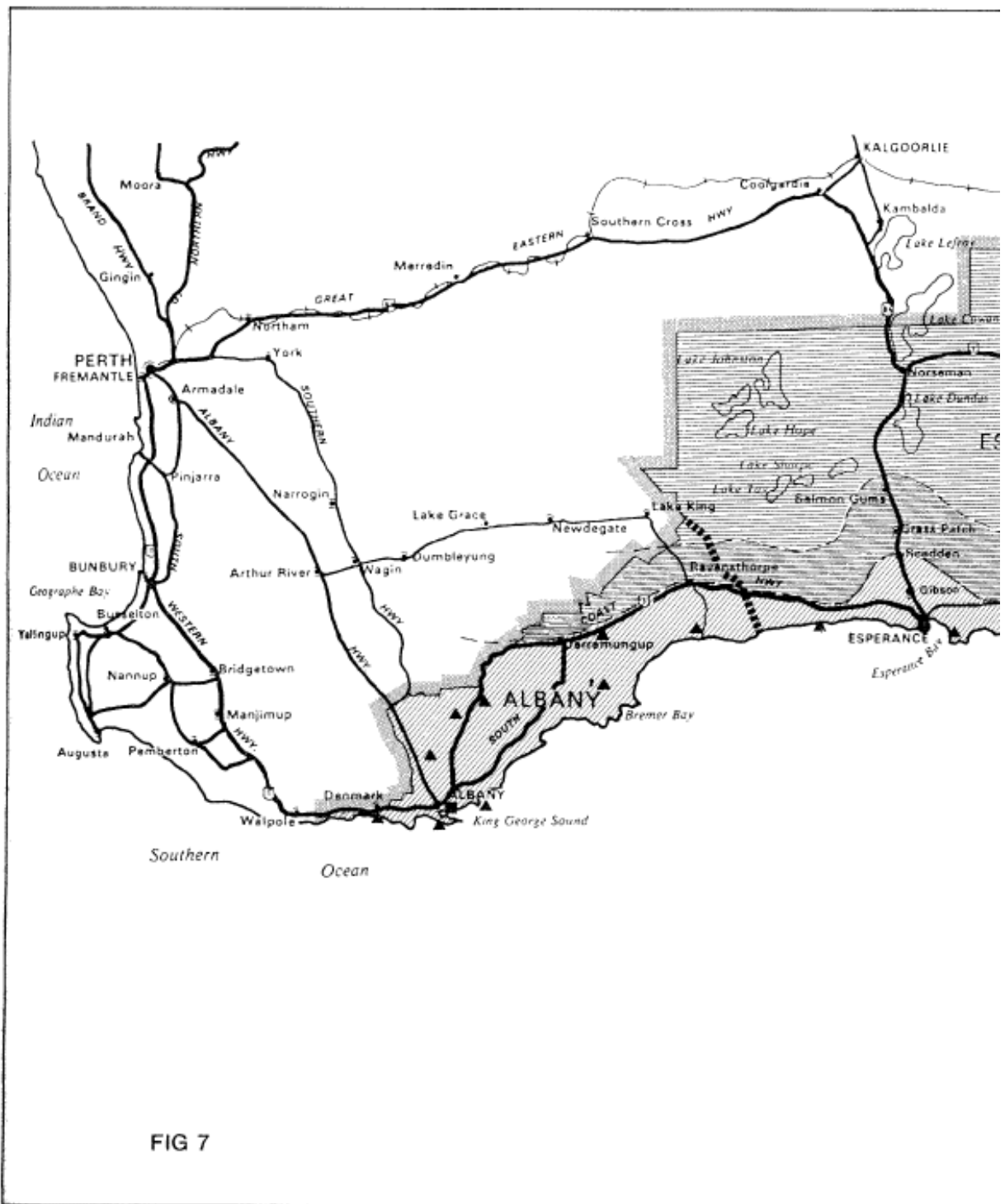
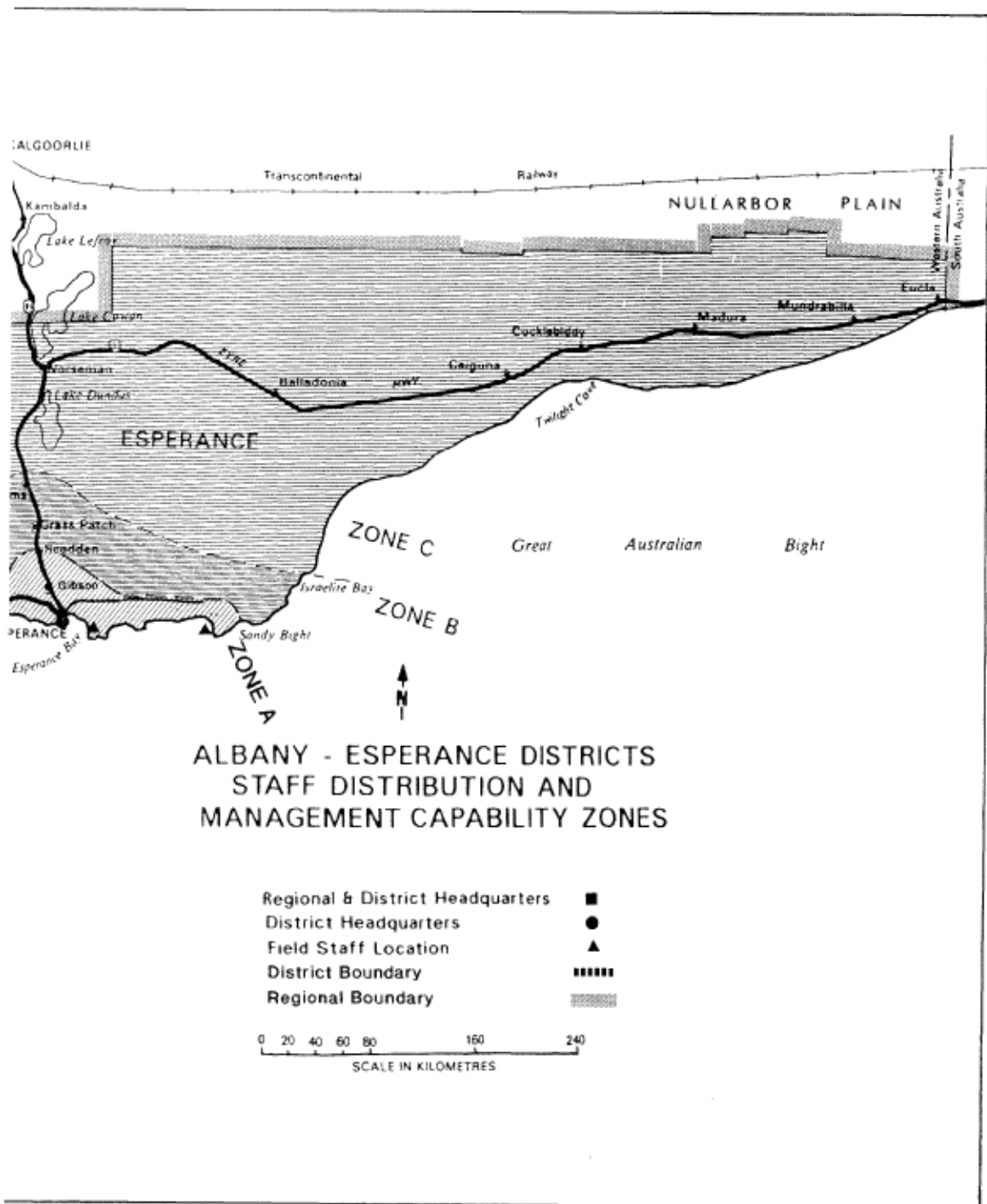


FIG 7



5.5 OUTSIDE ASSISTANCE

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

Local people and other agencies frequently assist CALM with fire fighting and in emergencies. Excellent liaison is maintained with many local organisations and Government agencies, particularly Bush Fire Brigades.

From 1981 - 1985 a highly successful "Volunteer Conservation Program" provided opportunity for members of the public, including local groups and schools, to assist State and Local Government agencies in projects which would enhance the environment (Watson, 1985). This program was the first of its kind in Australia. It was coordinated in a voluntary capacity by the former National Parks Authority and subsequently by CALM.

Other assistance is provided through the activities of bona fide external research workers and through groups such as the Albany Branch of the WA Wildflower Society, the Fitzgerald River and West Cape Howe National Park Associations and the Friends of Esperance National Parks. A herbarium containing plant specimens from throughout the Region is maintained by the Wildflower Society Branch in Albany.

Significant contributions are also made by volunteers in the translocation program for the Noisy Scrub-bird from Two Peoples Bay. In addition, over 60 volunteers assisted CALM with the cleanup operation after the bulk carrier Sanko Harvest spilled oil into the waters off Esperance in 1991.

A program known as Community-CALM Link was commenced in 1989 in the area of the Fitzgerald River National Park. This group, comprising nine local community members, aims to facilitate effective liaison between CALM and the local community in the area.

Other volunteer programs are conducted throughout the Region as opportunities arise.

PART C. LAND USE PROPOSALS

6.0 PRESENT USE OF LAND MANAGED BY CALM IN THE REGION

At present, land managed by CALM in the South Coast Region comprises national parks, nature reserves and some small State forest blocks and timber reserves. Over the past ten years, management plans were prepared for several individual national parks and other reserves, but no planning review of the type being addressed in this Regional Plan has been done previously.

This Plan involves not only the first regional overview of each type of reserve managed by CALM in the South Coast Region, but also the first assessment of the total area managed by CALM. A number of changes of purpose and additions to the reserve system are proposed. The objective is to allow the introduction of proposed new categories of reserve, improve the security of purpose for many areas and change the name and vesting of other areas to better reflect the purpose for which they are managed.

7.0 PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE

In accordance with the changes to the system of land vesting, tenure and purpose described in Part A of this Plan, a number of changes are proposed to areas of land managed by CALM. These are shown in Table 4, Figures 8(a), 8(b), 9(a) and 9(b) at the back of this Plan and in Appendix 1.

The changes derive from the following sources:

- (1) Conservation reserve proposals. Relates to recommendations by the Conservation Through Reserves Committee (CTRC, 1974) as reviewed by the EPA ("Red Book" reports: 1975, 1976) and endorsed by Cabinet in 1976.
- (2) South Coast Reserve Working Group proposals. Relates to recommendations by a series of EPA working groups established during 1980 to 1984 to assess coastal reserves in the Shires of Esperance, Ravensthorpe, Jerramungup, Albany and Denmark as reviewed by the EPA and subsequently endorsed by Cabinet in 1985.
- (3) Recommendations made in coastal management plans for the following areas:
 - Shire of Denmark (Dept Conservation and Environment and Denmark Shire Council, 1987).
 - Pallinup / Beaufort Inlet Area (Newbey, 1987).
 - Ravensthorpe (Craig et al., 1984).
 - Starvation Boat Harbour (Van Steveninck and Burkin, 1984).
 - Esperance District (Chape and Sansom, 1983).
 - Esperance Eastern Coast (Craig and Oma, 1984).
 - Oldfield Inlet (Chalmers, 1983).
- (4) Unvested national parks and nature reserves being considered for vesting in the NPNCA.
- (5) Changes proposed by CALM in the Draft Management Plan.

In some cases, circumstances have changed since the initial reports were released. Changes have been caused by factors such as new Government policies covering particular land uses. Where original recommendations would have been unable to proceed due to these changed circumstances, modifications have been made in this Plan.

For historical reasons, some degraded areas occur within the existing conservation estate. Resources required for the management of these areas could in some cases be more appropriately directed to lands of higher value. Thus some recommendations for reduction in the existing estate have been made.

**TABLE 4. PROPOSED CHANGES TO TENURE, VESTING AND
PURPOSE IN THE SOUTH COAST REGION AS AT 31 DECEMBER
1990**

Map Ref.	Reserve N o.	Existing Tenure	Proposed Change	Vested In	Area (ha)
DENMARK SHIRE					
D1	175/25	Timber Reserve	Nature Reserve	NPNCA	97.9
D3	---	Vacant Crown Land	Nature Reserve	NPNCA	(13.7)
ALBANY TOWN AND SHIRE					
A1	217/25	Timber Reserve	Nature Reserve	NPNCA	19.8
A3	---	Vacant Crown Land	Nature Reserve	NPNCA	(8.5)
A6	801	Other Reserve	Nature Reserve	NPNCA	30.4
A8	24000	Other Reserve	State Forest	LFC	55.6
A10	28503	Other Reserve	National Park	NPNCA	19.6
All	23923	Unvested National Park	Nature Reserve	NPNCA	40.5
A14	33308	Other Reserve	National Park	NPNCA	403.0
A15	27107	Unvested National Park	National Park	NPNCA	2 131.6
A16	28690	Unvested National Park	Nature Reserve	NPNCA	8.8
A17	22058	Nature Reserve	Other Reserve	Other Authority	17.1
A17a	24991	Other Reserve	Nature Reserve	NPNCA	297.8
A18	25705	National Park	Nature Reserve	NPNCA	60.6
A19	23850	Unvested National Park	Nature Reserve	NPNCA	348.0
A22	31888	Other Reserve	National Park	NPNCA	0.1
A23	29883	Other Reserve	National Park	NPNCA	7914.0
A23a	36719	Nature Reserve	National Park	NPNCA	88.9
A23b	36028	Nature Reserve	National Park	NPNCA	1328.1
A23c	27157	Nature Reserve	National Park	NPNCA	367.5
A24	26650	National Park	Conservation Park	NPNCA	1264.6
A25	14944	Other Reserve	Nature Reserve	NPNCA	20.2
A26/J8	31240	Other Reserve	Conservation Park	NPNCA	9442.2
A27	14943	Other Reserve	Conservation Park	NPNCA	199.2
A28	---	Vacant Crown Land	Conservation Park	NPNCA	(109.1)
A29	1998	Unvested National Park	Nature Reserve	NPNCA	37.6
A30	5205	Unvested National Park	Nature Reserve	NPNCA	3.6

Map Ref.	Reserve N o.	Existing Tenure	Proposed Change	Vested In	Area (ha)
PLANTAGENET SHIRE					
P4	10003	Unvested National Park	Nature Reserve	NPNCA	235.8
P5	17644	Other Reserve	National Park	NPNCA	2.4
P6	800	Other Reserve	Nature Reserve	NPNCA	31.1
P7	27605	Other Reserve	Nature Reserve	NPNCA	22.3
P8	27607	Other Reserve	Nature Reserve	NPNCA	64.7
P9	1090	Other Reserve	National Park	NPNCA	259.0
GNOWANGERUP SHIRE					
G1	15756	Unvested National Park	Nature Reserve	NPNCA	209.5
JERRAMUNGUP SHIRE					
11	22343	Other Reserve	Nature Reserve	NPNCA	110.2
J2	33257	Other Reserve	Nature Reserve	NPNCA	1008.9
B	29500	Other Reserve	Nature Reserve	NPNCA	6529.7
Ba	---	Vacant Crown Land	Nature Reserve	NPNCA	(1680.0)
J4	14986	Other Reserve	Conservation Park	NPNCA	526.1
J5	14987	Other Reserve	Conservation Park	NPNCA	1092.7
Ba	14988	Other Reserve	Conservation Park	NPNCA	32.4
J6	22353	Other Reserve	Conservation Park	NPNCA	875.0
J7	27102	Other Reserve	Conservation Park	NPNCA	(2857.0)
J8a	28283	Other Reserve	Nature Reserve	NPNCA	101.1
Fitzgerald Area					
J9	26172	Other Reserve	Nature Reserve	NPNCA	964.5
J10	36207	Other Reserve	Nature Reserve	NPNCA	409.7
ill	1028	Other Reserve	Nature Reserve	NPNCA	239.7
J12	---	Vacant Crown Land	Nature Reserve	NPNCA	(32.8)
J13	35398	Other Reserve	Nature Reserve	NPNCA	50.5
J14	32666	Other Reserve	National Park	NPNCA	(3013.8)
J14a	31737	National Park	Other Reserve	Other Authority	(1 127.7)
J15	1029	Other Reserve	National Park	NPNCA	239.3
J17	20393	Other Reserve	National Park	NPNCA	40.5
J18	---	Vacant Crown Land	National Park	NPNCA	(341.4)
J19	10132	Other Reserve	Nature Reserve	NPNCA	80.9
J20	---	Vacant Crown Land	Nature Reserve	NPNCA	(4795.8)
J21	5051	Other Reserve	National Park	NPNCA	429.0
J22	---	Vacant Crown Land	National Park	NPNCA	(4003.4)
J23	33258	Other Reserve	National Park	NPNCA	(1741.9)
J24	33258	Other Reserve	National Park	NPNCA	(8 861.6)

Map Ref.	Reserve N o.	Existing Tenure	Proposed Change	Vested In	Area (ha)
J25	31737	National Park	Other Reserve	Other Authority	(814.4)
J26	1406	Other Reserve	National Park	NPNCA	259.0
J27	10133	Other Reserve	National Park	NPNCA	129.5
J28	12121	Other Reserve	National Park	NPNCA	4.0
J29	12122	Other Reserve	National Park	NPNCA	2.0
J30	12123	Other Reserve	National Park	NPNCA	2.0
J31	10135	Other Reserve	National Park	NPNCA	121.4
J32	5055	Other Reserve	National Park	NPNCA	435.0
J36	23060	Other Reserve	National Park	NPNCA	46.9
J37	31737	National Park	Other Reserve	Other Authority	(1 426.1)
J38	22355	Other Reserve	National Park	NPNCA	(195.6)

RAVENSTHORPE SHIRE

R1a	31424	Unvested National Park	Nature Reserve	NPNCA	2936.4
R2	39566	Misc. Reserve	Other Reserve	Other Authority	4.0
R3	7853	Other Reserve	Nature Reserve	NPNCA	(139.7)
R4	28438	Other Reserve	Nature Reserve	NPNCA	(270.3)
R5a	8457	Other Reserve	Nature Reserve	NPNCA	4.0
R6	11577	Other Reserve	Nature Reserve	NPNCA	473.1
R6a	---	Vacant Crown Land	Misc. Reserve	NPNCA or LFC	(130.6)
R8	27177	Unvested National Park	Nature Reserve	NPNCA	20.6
R11	7580	Other Reserve	Nature Reserve	NPNCA	(936.1)
R12	9393	Other Reserve	Nature Reserve	NPNCA	1405.8

Fitzgerald Area

R13	34410	Unvested National Park	Nature Reserve	NPNCA	(1 529.9)
R14	---	Vacant Crown Land	Nature Reserve	NPNCA	(4089.8)
R15	30795	Other Reserve	State Forest	LFC	(5451.7)
R16	---	Vacant Crown Land	State Forest	LFC	(2 178.0)
R17	30795	Other Reserve	Nature Reserve	NPNCA	(3 384.3)
R20	12124	Other Reserve	National Park	NPNCA	8.1
R21	512	Other Reserve	National Park	NPNCA	10.1
R22	10865	Other Reserve	National Park	NPNCA	63.7
R23a	---	Vacant Crown Land	Nature Reserve	NPNCA	(13616.2)
R23b	---	Vacant Crown Land	Nature Reserve	NPNCA	(28403.9)
R24	20510	Other Reserve	Nature Reserve	NPNCA	40.1
R25	20509	Other Reserve	Nature Reserve	NPNCA	51.8
R26	26662	Other Reserve	Nature Reserve	NPNCA	106.5
R27	9559	Other Reserve	Nature Reserve	NPNCA	97.2

Map Ref.	Reserve N o.	Existing Tenure	Proposed Change	Vested In	Area (ha)
Ravensthorpe Range					
R29	32047	Other Reserve	Nature Reserve	NPNCA	3260.9
R30	18460	Other Reserve	Nature Reserve	NPNCA	60.7
R31	17880	Other Reserve	Nature Reserve	NPNCA	758.4
R32	---	Vacant Crown Land	Nature Reserve	NPNCA	(10206.7)
R33	17384	Other Reserve	Nature Reserve	NPNCA	56.7
R34	16119	Other Reserve	Nature Reserve	NPNCA	(3 124.9)
R35	10021	Other Reserve	Nature Reserve	NPNCA	20.2
R36	12201	Other Reserve	Nature Reserve	NPNCA	3.4
R37	---	Vacant Crown Land	Nature Reserve	NPNCA	(7757.1)
R38	31979	Other Reserve	Nature Reserve	NPNCA	43.1
R9	---	Vacant Crown Land	Nature Reserve	NPNCA	(43301.4)
R9a	19866	Other Reserve	Nature Reserve	NPNCA	101.2
R9b	9926	Other Reserve	Nature Reserve	NPNCA	258.9
R9c	13527	Other Reserve	Nature Reserve	NPNCA	(166.7)
R9d	13526	Other Reserve	Nature Reserve	NPNCA	259.0
R9e	21168	Other Reserve	Nature Reserve	NPNCA	259.0
R11	7580	Other Reserve	Nature Reserve	NPNCA	(1760.3)
R39	---	Vacant Crown Land	Nature Reserve	NPNCA	(6212.5)
ESPERANCE SHIRE					
E1.	32339	Nature Reserve	Other Reserve	Other Authority	(111.2)
E1a	32339	Nature Reserve	National Park	NPNCA	(4601.2)
E2	25376	Other Reserve	Nature Reserve	NPNCA	91.4
E3	35659	Unvested National Park	Nature Reserve	NPNCA	1008.9
E4	31745	Unvested National Park	Nature Reserve	NPNCA	87.5
E5	31762	Other Reserve	Nature Reserve	NPNCA	3478.0
E6	31751	Other Reserve	Nature Reserve	NPNCA	2909.0
E7	31750	Other Reserve	Nature Reserve	NPNCA	2956.0
E8	31749	Other Reserve	Nature Reserve	NPNCA	1279.0
E9	31739	Other Reserve	Nature Reserve	NPNCA	11 963.0
E10	26913	Other Reserve	Nature Reserve	NPNCA	1214.1
E11	31761	Other Reserve	Nature Reserve	NPNCA	809.0
E12	27888	Other Reserve	National Park	NPNCA	4122.0
E13	26885	Other Reserve	National Park	NPNCA	5 199.5
E14	30672	Other Reserve	National Park	NPNCA	(76.1)
E15	24486	Unvested National Park	Nature Reserve	NPNCA	(2 191.5)
E16	19628	Nature Reserve	Other Reserve	Other Authority	57.1
E18	14543	Other Reserve	State Forest	LFC	2.0
E19	34788	Other Reserve	State Forest	LFC	10.1

Map Ref.	Reserve N o.	Existing Tenure	Proposed Change	Vested In	Area (ha)
E19a	23527	NEsc. Reserve	State Forest	LFC	3747.9
E20	24511	Unvested National Park	Nature Reserve	NPNC A	181.1
E21	4182	Other Reserve	Nature Reserve	NPNC A	121.4
E25	28170	Other Reserve	Nature Reserve	NPNC A	(1988.4)
E25a	28170	Other Reserve	National Park	NPNC A	(2802.4)
E28	27087	Unvested National Park	Nature Reserve	NPNC A	37.7
E28a	---	Vacant Crown Land	Nature Reserve	NPNC A	(13 113.5)
E32	27632	Nature Reserve	National Park	NPNC A	(425471.4)
E33/Ds4	---	Vacant Crown Land	National Park	NPNC A	(116295.1)
E33a	Vacant Crown Land		National Park	NPNC A	(402.3)

DUNDAS SHIRE

Ds1	Vacant Crown Land		Nature Reserve	NPNC A	(25725.1)
Ds2	Vacant Crown Land		Nature Reserve	NPNC A	(30774.6)
Ds3	---	Vacant Crown Land	Nature Reserve	NPNC A	(50907.2)
Ds5	8029	Unvested National Park	Nature Reserve	NPNC A	1019.8
Ds5a	---	Vacant Crown Land	State Forest	LFC	(1973.3)
Ds5a	197/25	Timber Reserve	State Forest	LFC	3724.4
Ds8	---	Vacant Crown Land	Nature Reserve	NPNC A	(78 189.6)
Ds9	---	Vacant Crown Land	National Park	NPNC A	(770566.4)
Ds10	---	Vacant Crown Land	Nature Reserve	NPNC A	(114620.8)
Ds11 ¹	---	Vacant Crown Land	Misc. Reserve	NPNC A	*
Ds12	---	Vacant Crown Land	National Park	NPNC A	(393593.3)
Ds13	19713	Other Reserve	National Park	NPNC A	1036.0
Ds14	27632	Nature Reserve	National Park	NPNC A	(178080.1)

KEY: Gazetted area - 1 019.8
Calculated area - (130.6)

1 Area unavailable at this time.

SUMMARY OF PROPOSED CHANGES IN LAND TENURE

	Albany District (ha)	Esperance District (ha)	Region Totals (ha)
National Park	+27770	+1902250	+1930020
Conservation Park	+16400	0	+16400
Nature Reserve	+98550	-211300	-112750
State Forest	+7640	+9450	+17090
Timber Reserve	-120	-3720	-3840
Miscellaneous CALM Act Res	+130	-3750	-3620
	+ 150 370	+ 1 692 930	+ 1 843 300

8.0 IMPLEMENTATION OF PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE

All proposals to change land tenure or to reserve vacant Crown land will also be referred to the NPNCA or to the Lands and Forest Commission and will be subject to the normal review processes by the Department of Land Administration. This involves further consultation with affected Government and Local Government Authorities. Furthermore, it will be necessary for both Houses of Parliament to agree to changes involving A Class reserves or State forest.

The boundaries of the proposed parks and reserves and additional State forest areas shown in Figures 8(a), 8(b), 9(a) and 9(b) at the back of this Plan 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.

About 170 proposed changes in tenure, vesting or purpose were listed in Table 4 and briefly summarised in Appendix I of the Draft Plan. Some changes proposed in the Draft Plan have subsequently been implemented via normal administrative processes while others have been amended due to public comment.

Appendix I indicates the action to be taken by CALM in pursuing implementation of the landuse proposals in this document. Where concerns have been raised by interested parties, further contact will be made. In many cases this contact will need to take place prior to the pursuit of implementation of the changes. Such cases are indicated in the Appendix.

Local Authorities, Government agencies, community groups and individuals and industry organisations will be involved in this contact which will be structured to ensure that all points of view and concerns are considered. Additional information (such as rangeland surveys of areas covered by some proposals) may be required before decisions are finalised.

Implementation of certain "EPA Red Book" (1975, 1976) proposals affecting the South Coast Region is occurring independently of the regional planning process as outlined in the Government's "Resolution of Conflict" document released in 1990.

9.0 FUTURE RESERVE DEDICATION

The system of national parks, nature reserves, conservation parks, miscellaneous reserves and State forest proposed for the South Coast Region in this Plan is based upon existing lands managed by CALM and proposals for incorporation of various areas of vacant Crown land or other Crown land. There are, throughout the Region, numerous instances where private land or leasehold land has potential either for addition to existing CALM managed estate or for establishment of new reserves in their own right.

As a general rule the Government does not actively seek the purchase of such lands unless extremely high conservation, landscape or other values are involved (for example, habitat of species declared rare or specially protected). Rather, the Department will monitor the availability for purchase of such lands and subject to funds being available, will negotiate with the owners in the usual manner.

Staff will continue to assess outstanding EPA (CTRC) recommendations and any other proposals for addition to the lands managed by CALM in the Region. In addition, the conservation estate in the Region will be constantly reviewed in the light of new biogeographical findings. This will include consideration of areas for reservation as marine reserves covering both marine and estuarine environments. It will also include evaluation of the potential for reserve links with adjacent Regions as part of CALM's overall nature conservation strategy. Such links are particularly likely to be sought with the Goldfields and Wheatbelt Regions (for example, in the vicinity of the Johnston Lakes and Bremer Range).

Land exchange may on occasions be used to rationalise and improve the management boundary of land managed by CALM, provided a balance of reserve values is maintained.

The purpose of existing reserves managed by the Department will be kept under review during the life of this Plan. Any proposed changes will be made in a way which allows the appropriate public involvement. Following that process, changes may be recommended to the Government and, where required (State forest, national parks and other A Class reserves), to Parliament.

PART D. MANAGEMENT ISSUES

Key management issues affecting CALM managed lands in the South Coast Region may be grouped under one of eight major headings:

- Landform and Landscape features
- Conservation of Flora and Fauna
- Cultural Areas
- Environmental Management
- Recreation
- Public Participation and Liaison
- Production and other Commercial Use
- Other Land Uses

Each of these issues will be dealt with as follows:

- Background information on resources and issues;
- Regional strategies, which add specific detail to existing Departmental policy guidelines, for example, on conservation and recreation (CALM, 1987a) and on timber production (CALM, 1987b). Although policy guidelines are prepared for internal Departmental use they are available for reference at CALM offices throughout the State.

The issues presented and strategies proposed are not ranked in order of priority. While it is intended that all strategies listed will be eventually implemented, the priority for addressing outstanding strategies will need to change as circumstances change. Regional staff will review all strategies annually to ensure that the priorities are achievable within the resources available. Furthermore, the implementation of Regional strategies will often be dependent upon the outcome of area or issue plans.

10.0 LANDSCAPE AND LANDFORM

10.1 LANDSCAPE

The South Coast Region has high scenic beauty much of which occurs within or near to lands managed by CALM. Major features of the Region include:

- Coastline and offshore islands
- Mountain peaks and ranges such as Stirling Range, Peak Charles, Mount Ragged
- Inlets and estuaries
- Karri forest such as at West Cape Howe, Porongurup National Parks
- River valleys such as Fitzgerald and Hamersley Rivers
- Southern Nullarbor.

The vistas offered of mountains and particularly from them, mean that any scars upon the landscape are widely visible. Such scars may result for example, from roads, recreation sites, firebreaks and gravel pits.

Other factors which may impact upon landscape values include:

- Mining
- Timber production
- Insect and fungal diseases
- Fires
- Public utilities
- Some private developments.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Classify landscape features on lands managed by CALM according to the Departmental system.**
- (ii) Identify and protect important landscapes in the Region.**
- (iii) Ensure that any developments on lands managed by CALM, such as road construction, recreation sites and establishment of plantations, are undertaken with due regard to their potential impact upon visual qualities of the environment.**
- (iv) Provide advice to private landholders and other agencies on minimising the visual impact of operations, especially on lands adjacent to or within the viewshed of lands managed by CALM.**

- (v) Carry out a research program into landscape perceptions and preferences in the community.**
- (vi) Conduct training courses in landscape management for Departmental staff and other organisations who operate on lands managed by CALM.**

10.2 COASTLINE

A significant proportion of the Region's coastline is managed by CALM as national parks and nature reserves. The fragile nature of much of Western Australia's coastline has long been recognised. There is now general community awareness of the care which is required in the provision of facilities and their subsequent maintenance within the coastal zone.

Many areas of coastal land managed by CALM within the Region were developed with facilities such as roads, carparks and "ad hoc" footpaths prior to gazettal as national park or nature reserve and prior to the recognition of coastal management principles. The result is a legacy of coastal management problems including dune blowouts, incorrectly sited facilities and landscape scars.

Whilst major rehabilitation measures have been undertaken, a number of serious coastal management problems remain especially around Albany (West Cape Howe National Park, Torndirrup, National Park and Two Peoples Bay Nature Reserve), in the Fitzgerald River National Park and to the east of Esperance (Cape Le Grand National Park).

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Establish and maintain an inventory of the condition of the coastal zone within lands managed by CALM.**
- (ii) Identify and rank the main problem areas and prepare and implement works programs to arrest erosion and provide safe access routes for visitors.**
- (iii) Continue to provide advice to neighbours or other agencies, such as Local Authorities, regarding coastal zone management.**
- (iv) Maintain liaison with other agencies who have particular interest or expertise in coastal management including the Environmental Protection Authority, the Department of Planning and Urban Development, the Department of Agriculture and the Department of Marine and Harbours.**

10.3 UPLAND AREAS

Although small by international standards, there are numerous hills, peaks and mountains distributed throughout the Region. Upland areas have particularly significant nature conservation values due to the persistence of species of flora and fauna which were formerly widespread but now occur only in these areas.

Such areas have traditionally attracted visitors (for example, Bluff Knoll in the Stirling Range National Park is visited by more than 20 000 people each year) and many have footpaths to their summits. Some roads and management tracks are also present in upland areas. Subsequent erosion is a major management problem.

Furthermore, where dieback disease occurs on upland areas it has potential to infect all lands downslope. In the case of mountain peaks, the extent of downslope areas under threat is generally considerable. It is therefore essential to minimise the spread of dieback disease in these areas and to ensure that footpaths, tracks and roads are well drained and if possible do not cross in and out of areas which are infected by dieback disease.

Whereas the problems of coastal zone management have long been formally recognised by other agencies (as described in the preceding Section), this is generally not the case with erosion of access routes in upland areas.

Experience in national parks overseas indicates that the maintenance of upland footpaths is a demanding task. Nevertheless, well planned and properly constructed footpaths can provide safe and enjoyable experiences for park visitors. A detailed inventory of the condition of all major footpaths in upland (and some coastal) areas in the Region was prepared in 1989-90.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Identify and rank problems on footpaths, roads and tracks in upland areas and prepare and implement works programs to prevent the establishment of dieback disease in new areas, minimise the additional spread of dieback disease where it already occurs, arrest erosion and provide safe access.**
- (ii) Develop and maintain footpaths to appropriate standards to provide safe and enjoyable walking for park visitors.**
- (iii) Close footpaths which are beyond the scope of known rehabilitation techniques, or which impose an unacceptable risk of dieback disease spread.**

- (iv) Maintain the inventory of the condition of all footpaths in upland (and other) areas of the Region.**
- (v) Obtain records of techniques and maintain direct liaison with agencies interstate and overseas who are involved in footpath construction and maintenance work.**
- (vi) Encourage research into the special nature conservation significance of upland areas and make any necessary modifications to management practices in the light of research findings.**
- (vii) Establish research to evaluate ways of reducing footpath erosion, to investigate the most cost effective and environmentally acceptable methods of stabilising damaged footpaths and to clarify the extent to which use of footpaths may exacerbate spread of dieback disease.**

10.4 CAVES

A few shallow caves are found in the limestone, quartzites and granites along the coast as far east as Hopetoun. They are small and undeveloped for visitors.

By contrast, the vast Nullarbor Plain which spans from Western Australia into South Australia, contains many thousands of blowholes, caves, collapse dolines and other karst features. Many of the caves are among the most outstanding in Australia and some, such as Mullamallang Cave, are accredited with international recognition by speleologists (for example, Waltham 1974).

Caves have special aesthetic and recreational values (Watson, 1978) and the speleothems (decorations) they contain are effectively non-renewable resources. Once broken or damaged they may take thousands of years to reform. Caves also possess extremely high scientific values. These include biological values such as flora, fauna, fossil deposits and palynological (ancient pollen) records as well as geological, hydrological and geomorphological significance. Culturally, caves are also important because of their archaeological, ethnographic and historical associations.

Recognised speleological societies operate within a strict code of conservation and safety ethics developed by the Australian Speleological Federation. However, damage continues to occur at the hands of vandals, casual visitors and the occasional "clumsy" caver.

Caves can be visited for a range of purposes from the purely scientific, to recreational uses which include adventure activities, casual visits and commercial tours. The aim of cave management must be to protect caves from damage of any kind. Different uses will require different degrees of regulation.

The sport of diving within the long water filled passages of Nullarbor caves has recently developed, mainly due to activity by cave divers with experience derived from the Mt Gambier area of South Australia. This specialised use of caves is addressed as a separate issue later in this Plan in the Section on recreation, although scientific research is also conducted on dives.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Maintain an inventory of all caves and major karst features within the Region.**
- (ii) Classify each cave on lands managed by CALM according to a standard cave classification system such as that developed by the WA Working Group on Cave Protection and Management (Watson, 1978).**
- (iii) Maintain contact with recognised speleological groups and seek their assistance when necessary. Adopt a code of ethics (based on the ASF code) for entry to caves by all persons, including CALM personnel.**
- (iv) Prepare and implement cave management plans to provide the basis for improved protection of caves and to ensure the safety of visitors.**
- (v) Plan Departmental management operations to ensure that they do not damage caves, their lifeforms, or their environments.**
- (vi) Permit entry to caves on lands managed by CALM where there is no likelihood of unavoidable damage to caves, their life forms or their environments.**
- (vii) Promote research into the scientific aspects of karst topography, caves and cave life forms and environments.**
- (viii) Provide information to the public on caves, their significance and their management.**
- (ix) Seek to keep confidential the locations of "non-tourist" caves by having them excluded from publicly available maps.**

10.5 WETLANDS

Wetlands occur as lakes, swamps, rivers, inlets and estuaries. Many of the wetlands in the Region occur on or near the coast. They have high conservation values which include their importance as feeding and nesting areas for migratory and other birds (see for example, the Royal Australasian Ornithological Union publication "Water Birds in Nature Reserves" Report No. 30, 1988).

Major wetlands are threatened by activities in their catchments causing pollution from farm runoff water, algal growths, increasing salinity and the spread of weeds. Inappropriate types of recreational use and pressures from adjacent urban developments also pose threats.

Research into wetlands is being conducted by CALM as well as a number of other organisations including the Water Authority of WA, Waterways Commission, EPA and tertiary institutions.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) List wetland resources in the Region and identify key values for each wetland.**
- (ii) Attempt to secure representative wetland areas within lands managed by CALM.**
- (iii) As far as possible seek to prevent actions within the catchments of wetlands managed by CALM, which will have an adverse effect on nature conservation values.**
- (iv) Where appropriate, rehabilitate degraded wetlands on lands managed by CALM.**
- (v) Where appropriate, consider the creation of new wetland areas to replace those which have been destroyed.**
- (vi) Monitor the condition of wetlands and the management of wetland catchments in conjunction with other key organisations.**
- (vii) Provide information to the public on the values, significance and management of wetlands.**

11.0 CONSERVATION OF FLORA AND FAUNA

11.1 FLORA AND FAUNA

The Department is responsible for flora and fauna on lands managed by CALM 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. This includes involvement with implementation of the Government's Remnant Vegetation Protection Scheme which provides assistance to private landholders wishing to protect areas of native vegetation with fencing. In addition, the Department manages the commercial harvesting of species such as kangaroos and emus.

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

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

Knowledge of the existence and distribution of the many species of native plants and animals in the Region is considerable, but not complete. High priority is given to investigating and protecting species declared rare and specially protected and their habitat.

As at April 1991, 73 plant species known to occur within the Region were declared rare (Table 5

This represented 30% of all declared rare flora species in the State. During the life of the Plan the list will be amended from time to time.

There are 26 species of vertebrates declared rare and 9 species declared specially protected in WA. (Tables 6 and 7). The Noisy Scrub-bird (*Atrichornis clamosus*) occurs naturally at Two Peoples Bay Nature Reserve and has been translocated to Mount Manypeaks and Quarram. Nature Reserves and to the Walpole-Nornalup National Park located in the CALM Southern Forest Region under CALM Wildlife Management Program No 2 (Burbidge et al., 1986).

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Continue research to test hypotheses leading to an understanding of patterns and processes in ecosystems.**
- (ii) Develop and implement interim guidelines for necessary operations, proposals for compatible operations and management plans for conservation reserves which aim to maintain 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 and ensure the protection of native species on lands not managed by the Department.**
- (iv) Review the adequacy of conservation lands in the Region in terms of their representativeness and in the light of research findings.**
- (v) Continue surveys to record the distribution, abundance and other details of flora and fauna including species declared rare or specially protected.**
- (vi) Seek to control feral predators and weeds.**
- (vii) Where appropriate, manage habitat to favour declared rare or specially protected fauna.**
- (viii) Assist in the development and implementation of strategies for each declared rare or specially protected species to ensure continued survival and expansion of populations and develop wildlife management programs when desirable.**
- (ix) Protect and monitor populations of declared rare and specially protected species.**
- (x) Manage wildlife harvesting activities according to the Department's Wildlife Management Programs and policies.**
- (xi) Implement the Department's Wildlife Management Programs for the Noisy Scrub-bird and any other species for which they are prepared during the life of this Plan.**

**TABLE 5. DECLARED RARE FLORA OF THE SOUTH COAST REGION
(AS AT 1/4/91)**

SPECIES	DISTRICT
<i>Acacia argutifolia</i>	Albany
<i>Acacia simulans</i>	Albany
<i>Adenanthos cunninghamii</i>	Albany
<i>Adenanthos dobagii</i>	Albany
<i>Adenanthos ellipticus</i>	Albany
<i>Adenanthos eyrei</i>	Esperance
<i>Adenanthos ileticos</i>	Esperance
<i>Adenanthos pungens</i>	Albany
<i>Anigozanthos bicolor</i> subsp. <i>minor</i>	Esperance
<i>Apiumprostratum</i> subsp. (Porongurup) G.J. Keighery 8873	Albany
<i>Asplenium obtusatum</i>	Albany / Esperance
<i>Baeckea arbuscula</i>	Albany
<i>Banksia brownii</i>	Albany
<i>Banksia goodii</i>	Albany
<i>Banksia verticillata</i>	Albany
<i>Billardiera mollis</i>	Albany / Esperance
<i>Caladenia Bryceana</i>	Albany
<i>Caladenia integra</i>	Albany / Esperance
<i>Caladenia</i> sp. (Esperance) D.R.Voigt 36	Esperance
<i>Caladenia</i> sp. (Southern Forest) S.D.Hopper 3553	Albany
<i>Conostylis lepidospermoides</i>	Esperance
<i>Conostylis misera</i>	Albany
<i>Cooperhookea georgei</i>	Albany
<i>Corybas</i> sp. (Albany) L.Byrne 10	Albany
<i>Darwinia collina</i>	Albany
<i>Darwinia macrostegia</i>	Albany
<i>Darwinia meeboldii</i>	Albany
<i>Darwinia oxylepis</i>	Albany
<i>Darwinia squarrosa</i>	Albany
<i>Darwinia wittwerorum</i>	Albany
<i>Darwinia</i> sp. (Stirling Range) G.J.Keighery 5732	Albany
<i>Daviesia</i> sp. (Norseman) M.D.Crisp 5943	Esperance

SPECIES**DISTRICT**

<i>Daviesia sp.</i> (Ravensthorpe) M.D.Crisp 6065	Albany
<i>Daviesia sp.</i> (Stirling Range) K.R.Newbey 5113	Albany
<i>Drakaea sp.</i> (South-West) S.D.Hopper 3566	Albany
<i>Drakaea sp.</i> (Great Southern) S.D.Hopper 3461	Albany
<i>Droserafimbriata</i>	Albany
<i>Drwnnwndita hassellff var. longifolia</i>	Esperance
<i>Dryandra sp.</i> (Kamballup) M. Pieroni 20.9.88	Albany
<i>Dryandra sp.</i> (Stirling Range) F.Lullfitz 3379	Albany
<i>Eremophila denticulata</i>	Albany / Esperance
<i>Eremophila serpens</i>	Albany / Esperance
<i>Eucalyptus bennettiae</i>	Albany
<i>Eucalyptus burdettiana</i>	Albany
<i>Eucalyptus cerasiformis</i>	Esperance
<i>Eucalyptus coronata</i>	Albany
<i>Eucalyptus erectifolia</i>	Albany
<i>Eucalyptus goniantha</i> (subsp goniantha)	Albany
<i>Eucalyptus insularis</i>	Esperance
<i>Eucalyptus merrickiae</i>	Esperance
<i>Eucalyptus sp.</i> (Norseman) S.D.Hopper 2736	Esperance
<i>Grevillea infundibularis</i>	Albany
<i>Hibbertia bracteosa</i>	Albany
<i>Isopogon uncinatus</i>	Albany
<i>Kennedia becxiana</i>	Esperance
<i>Lambertia echinata</i>	Esperance
<i>Latnbertiafairalld</i>	Albany
<i>Laxrnannia jwnesii</i>	Albany
<i>Leschenaultia superba</i>	Albany
<i>Microtis globula</i>	Albany
<i>Myoporum cordifolium</i>	Albany
<i>Myoporwn turbinatum</i>	Esperance
<i>Rhizanthella gardneri</i>	Albany / Esperance
<i>Stylidium galioides</i>	Albany
<i>StyUdiwn plantaginewn</i>	Albany
<i>Thelymitra psanunophild</i>	Albany
<i>Verticordiafimbrialepis</i>	Albany

SPECIES	DISTRICT
<i>Verticordia helichrysantha</i>	Albany
<i>Verticordia sp.</i> (Fitzgerald)	
C.A.Gardner 9148	Albany
<i>Villarsia calthifolia</i>	Albany
<i>Xyris sp.</i> (Stirling Range)	
G.J.Keighery 7951	Albany

NB. Location phrase names such as "(Stirling Range) G.J. Keighery 7951" are to be replaced by approved manuscript names where they exist in future gazettes.

**TABLE 6. DECLARED RARE FAUNA OF THE SOUTH COAST REGION
(AS AT 1/4/91)**

SCIENTIFIC NAME	COMMON NAME
MAMMALS	
<i>Benongiapenicillata</i>	Woylie (Brush tailed bettong)
<i>Isoodon obesulus</i>	Quenda or Southern Brown Bandicoot
<i>Macropus eugend</i>	Tammar
<i>Pseudocheirus peregrinus occidentalis</i>	Western ringtail possum
<i>Dasyurus geoffrod</i>	Chuditch
<i>Phascogale calura</i>	Red-tailed warnbenger
<i>Petrogale lateralis</i>	Black-footed Rock Wallaby or Warru.
<i>Parantechinus apicalis</i>	Dibbler
<i>Pseudomys australis</i>	Plains rat
<i>Pseudomys shortridgei</i>	Heath rat
<i>Balaenoptera musculus</i>	Blue whale
<i>Megaptera novaeanghae</i>	Humpback whale
<i>Eubalaena australis</i>	Southern right whale
BIRDS	
<i>Stictonetta naevosa</i>	Freckled duck
<i>Cereopsis novaehollandiae grisea</i>	Recherche Cape Barren goose
<i>Falco hypoleucus</i>	Grey falcon
<i>Pezoporus wallicus</i>	Ground parrot
<i>Neophema splendida</i>	Scarlet-chested parrot
<i>Atrichornis clwnosus</i>	Noisy scrub-bird
<i>Falcunculusfrontatus</i>	Crested shrike-tit
<i>Psophodes nigrogularis</i>	Western whip-bird
<i>Dupetor rubricauda</i>	Black bittern
<i>Botaurus poiciloptilus</i>	Australasian bittern
<i>Ninox connivens</i>	Barking owl
<i>Cinclosorna alisteri</i>	Nullarbor quail-thrush
<i>Dasyornis longirostris</i>	Western bristlebird

**TABLE 7. FAUNA OF THE SOUTH COAST REGION DECLARED
SPECIALLY PROTECTED (AS AT 1/4/91)**

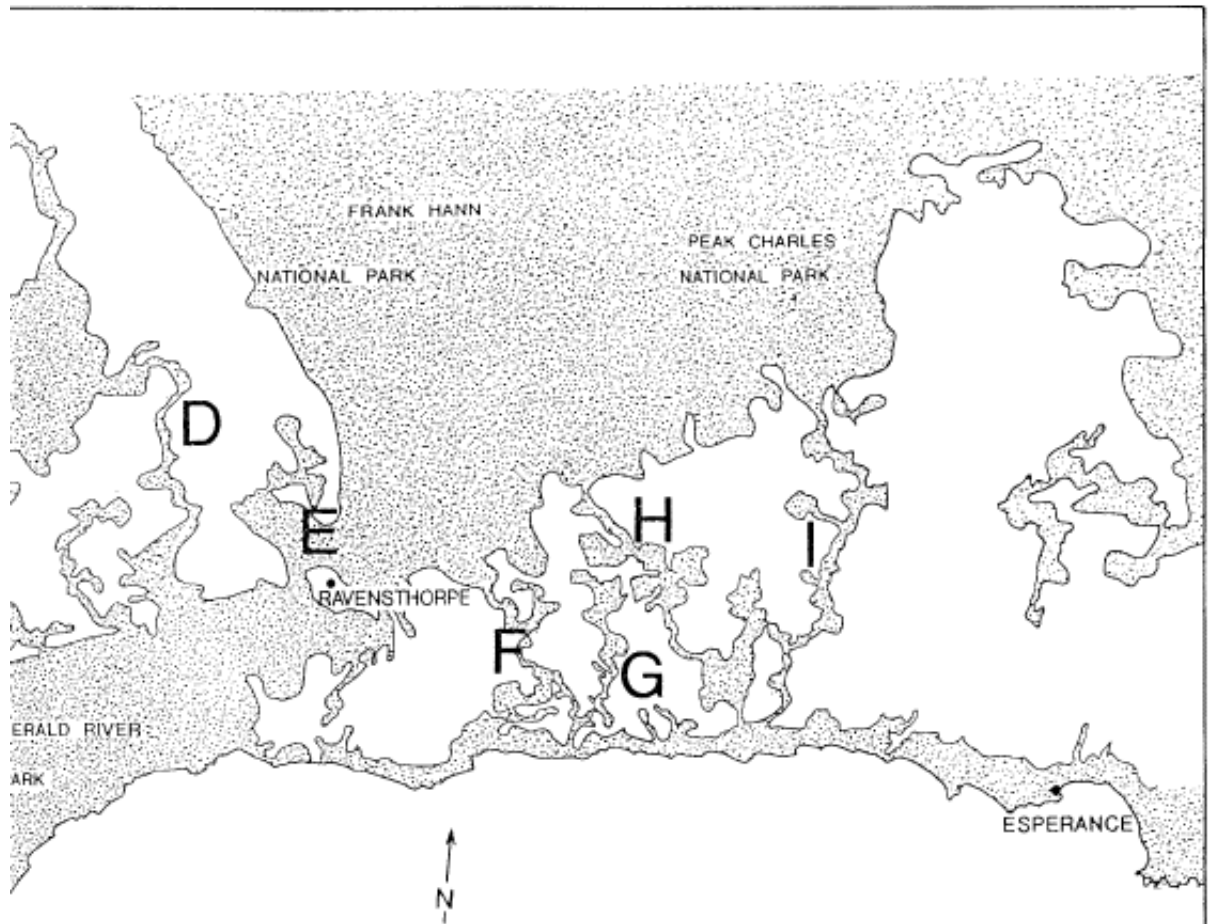
SCIENTIFIC NAME	COMMON NAME
MAMMALS	
<i>Artocephalus forsteri</i>	New Zealand fur-seal
<i>Neophoca cinerea</i>	Australian sealion
BIRDS	
<i>Falco peregrinus</i>	Peregrine falcon
<i>Calyptorhynchus funereus latirostris</i>	Carnaby's black cockatoo
<i>Calyptorhynchus baudinii</i>	Baudin's black cockatoo
<i>Cacatua leadbeateri</i>	Pink or Major Mitchell's cockatoo
<i>Northiella haentatogaster narethae</i>	Naretha blue bonnet
<i>Emblema oculata</i>	Red-eared firetail
REPTILES	
<i>Morelia spilota imbricata</i>	Carpet python

11.2 VEGETATION AND RESERVE "CORRIDORS"



In the western section of the Region and on the Esperance sandplains there has been considerable clearing of native bushland for agriculture. Recently, the rate of clearing new land has declined due to the moratorium on new land releases imposed in 1983 and the implementation of the Soil and Land Conservation Act (1985) which restricts clearing where deleterious effects on soil stability or water salinity might subsequently occur.

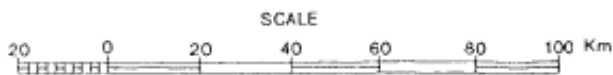
The system of nature reserves and national parks in these areas comprises a series of vegetation "islands" within a largely cleared landscape. However, in some cases well defined "corridors" of uncleared vegetation and/or natural features such as salt lakes remain linking major reserve systems (Watson, 1991). Important examples are the Fitzgerald River system linking the Fitzgerald River National Park with Lake Magenta Nature Reserve, the Ravensthorpe Range linking the Ravensthorpe coastline with the southern Goldfields and the Lort and Young River systems which link the west Esperance coastline with the Peak Charles area and southern Goldfields (Figure 12).





**SOUTH COAST REGION
VEGETATION CORRIDORS**

- | | |
|---|--|
|  Mainly cleared landscape containing vegetation "islands" only |  Uncleared natural vegetation |
| Source: Landsat M.S.S. 1984(June) - 1985(April) | |
| A Hassell National Park Corridor | F Oldfield River Corridor |
| B Pallinup River Corackerup Creek Corridor | G Munglinup River Corridor |
| C Fitzgerald River Corridor | H Young River Corridor |
| D Phillips River Corridor | I Lort River Corridor |
| E Ravensthorpe Range Corridor | |



Smaller corridors occur along the lower reaches of the Pallinup River and the Beaufort Estuary. Corridors also occur along some roadside verges, notably Hassell National Park.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) In consultation with neighbours and Local Authorities seek to establish and ensure protection of vegetation corridors between major reserves.**
- (ii) Maintain contact with the Roadside Conservation Committee and with Land Conservation District Committees.**
- (iii) Evaluate rivers in the Region for their wild and scenic qualities and seek reservation and/or special zoning for any which meet appropriate criteria.**
- (iv) Undertake detailed surveys of biological values of vegetation corridors and use information obtained as the basis for management programs.**
- (v) Provide information to the public on the value of vegetation corridors and on their protection.**

11.3 MARINE AND ESTUARINE CONSERVATION

There are currently no formal marine reserves in the Region but there are marine parts of most coastal national parks and nature reserves between high and low water marks. Most offshore and inshore islands (including some islands within inlets or estuaries) are vested in the NPNCA as nature reserves. In the Recherche Archipelago, there are around 1500 separate islands, rocks and reefs.

The conservation of marine flora and fauna is a CALM responsibility under the Wildlife Conservation Act. Many Western Australian whale strandings involving both single animals and large groups, have occurred in the South Coast Region. Other distressed marine fauna also come ashore periodically. Censuses of marine mammals are carried out regularly on the south coast.

Protection from oil spills is also a serious consideration along the south coast. The Department's oil spill response was tested when a bulk carrier ran aground off Esperance in February 1991, spilling a significant quantity of oil into the sea and polluting the coastline and offshore islands in the area.

In many cases islands represent important fauna refuges because they are largely undisturbed by the activities of humans. They therefore warrant the preparation of management plans.

CALM has legal responsibilities in marine areas under the WA Maritime Archaeology Act and the Commonwealth Historic Shipwreck Act.

The South Coast Region incorporates a considerable number of estuaries, many of which occur within the coastal lands managed by the Department. Most, if not all of these estuaries were flooded

6 000 to 8 000 years ago when the sea level rose after the last Ice Age (Hodge, 1987). Sand bars now block the entrances to most estuaries which are only briefly and irregularly open to the sea. For most of the time, there is no mixing of sea water and water from the land which is in many cases saline.

Runoff water in the rivers of the south coast is often laden with sediment and is contributing to the silting up of many estuaries. Excessive nutrient loads also cause severe impacts in some areas (Hodgkin and Clark, 1987, 1988a, 1988b, 1989, 1990a, 1990b).

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Evaluate marine and estuarine areas of the Region as possible reserves.**
- (ii) Prepare emergency plans covering protection of marine fauna, (for example, stranded whales and seals) and action to be taken in the event of an oil spill. These plans will include the training of staff.**
- (iii) Continue to carry out censuses of marine mammals on the south coast.**
- (iv) As far as possible, seek to prevent actions within the catchments of estuaries managed by CALM, which will have an adverse effect on nature conservation values.**
- (v) Monitor the condition of estuaries and the management of estuary catchments in conjunction with other key organisations.**
- (vi) Prepare management plans for islands, coastal reserves and future marine reserves within the Region.**

12.0 CULTURAL AREAS

Areas of Aboriginal and European cultural importance occur on many lands managed by CALM. Sites are scattered throughout the Region. Table 8 lists National Estate Places in the South Coast Region as designated by the Australian Heritage Commission. Issues and strategies for these areas are discussed below.

12.1 ABORIGINAL CULTURAL RESOURCES

Aboriginal people have occupied the south-west of Western Australia for at least 40 000 years. Numerous sites have been identified throughout the Region and although more of these occur on the Esperance coastal plain than any other part of this Region, this may reflect only the higher intensity of study in this area (WA Museum, pers. comm.). All Aboriginal sites and objects are protected under the Aboriginal Heritage Act.

Detailed records of Aboriginal sites are not held by CALM but by the WA Museum. Sites require protection from degradation resulting from unmanaged visitation, vandalism and management activities. CALM operations need to be carefully planned to avoid disturbance to Aboriginal sites.

As well as protection of sites, consideration must also be given to cultural continuity for Aboriginal people in the Region. Aboriginal culture is closely related to the land and activities such as camping, hunting (particularly for kangaroos), fishing and firewood collecting require access to natural lands in the Region. Nyungar people of the south-west have expressed a strong desire to be consulted on tenure and management issues in areas of the Region where they have an affiliation with the land.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Collate existing information on Aboriginal sites on CALM managed lands in the Region and ensure that sites are known by the Registrar of Aboriginal Sites at the WA Museum. Liaise with the Museum and other recognised Aboriginal representatives concerning maintenance of a confidential register in the Regional office and each District office, recognising that the list of sites will not be comprehensive.**
- (ii) Ensure that CALM's activities do not impact detrimentally upon known Aboriginal sites.**
- (iii) Train staff, in liaison with the Department of Aboriginal Sites, in recognition of sites and report any new sites to them so that registers can be updated.**

TABLE 8. NATIONAL ESTATE PLACES IN THE SOUTH COAST REGION

PLACE	STATUS
ALBANY DISTRICT	
West Cape Howe Area	Registered
Millbrook Reserve	Registered
Torndirrup National Park	Registered
Two Peoples Bay Wildlife Sanctuary	Registered
Islands near Albany (Michaelmas, Mistaken, Breaksea, Seal, Green, Chatham)	Registered
Stirling Range National Park	Registered
Mehinup Nature Reserve	Nominated
Quarrarn Nature Reserve	Nominated
William Bay National Park and Adjacent Reserves	Nominated
Fitzgerald River National Park	Registered
Porongurup National Park	Registered
Frank Hann National Park	Registered
Ravensthorpe Range	Registered
Oyster Harbour Fish Traps	Registered
Sealers'Oven	Registered
ESPERANCE DISTRICT	
Bremer Range Area	Registered
Eucla National Park Proposal	Registered
Recherche Archipelago	Registered
Cape Arid National Park	Registered
Cape Le Grand National Park	Registered
Truslove Area	Registered
Esperance Lakes (Lake Warden, Woody Lake, Mullet Lake)	Registered
Nuytsland Wildlife Sanctuary	Registered
Boyatup Art and Occupation Sites	Registered
Mt Ridley Art Site	Registered
Bandi Cave	Registered
Alexander River Mouth Quarry	Registered
Reserve Stone Arrangements	Registered
Djirtup Archaeological Sites Complex	Registered
Israelite Bay Telegraph Station	Registered

(Source: Australian Heritage Commission pers. comm. 1989)

- (iv) **Develop and implement management guidelines for Aboriginal sites on lands managed by CALM in liaison with the WA Museum, tertiary institutions and Aboriginal organisations.**
- (v) **Liaise with Aboriginal groups concerning CALM land use proposals and requests for access to CALM managed lands for cultural activities. Negotiate access in accordance with Departmental policies.**
- (vi) **Ensure that Aboriginal hunting, gathering, fishing, access and land use interests are fully addressed during preparation of area management plans.**
- (vii) **Where appropriate, incorporate material on Aboriginal cultural resources in interpretive displays and community education programs.**

12.2 HISTORIC SITES

There are numerous sites of historic interest and value on lands managed by CALM in the Region. These include old homesteads, stockyards, wells and examples of early fencing, mines, railway formations and bridges, townships, sawpits, the overland telegraph line, jetties, the rabbit proof fence and remnants of bay whaling operations.

Existing records of historic sites in the Region have been derived largely from historical research undertaken by CALM during the establishment of a heritage trail network (Sandiford 1988). Considerable work would be required to set up more complete records for the Region.

The locations of some sites are shown on Departmental maps. Management plans will refer to sites within the area of interest. The National Trust (WA) and Heritage Commission (Commonwealth) both maintain registers of significant sites. A list of National Estate locations appears in Table 8 at the beginning of this Section.

There are many threats to the preservation of historic sites, including damage caused by visitors. Guidelines for the conservation of historic places are provided in the "Australia ICOMOS (International Council on Monuments and Sites) Charter for the Conservation of Places of Cultural Significance", otherwise known as the "Burra Charter".

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) **Collate existing information on historic sites located on lands managed by CALM in the Region and maintain an up-to-date register of sites in the Regional office and in each District**

office. Liaise closely with the National Trust and the Heritage Commission in the preparation and maintenance of registers and in the evaluation of potential additions.

- (ii) In accordance with the "Burra Charter", develop management guidelines for historic sites on lands managed by CALM in the Region in liaison with the WA Museum, National Trust, Heritage Commission, tertiary institutions and historical societies.**
- (iii) Where appropriate, establish a program to conserve historic places and to develop facilities and visitor information.**
- (iv) Maintain the South Coast Heritage Trail Network.**
- (v) Maintain liaison with local historical societies regarding volunteer work and other activities.**

13.0 ENVIRONMENTAL MANAGEMENT

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

13.1 PLANT DISEASES

The major plant disease of concern to the Department is dieback disease. This is caused by the introduced soil-borne fungus *Phytophthora* species especially *cinnamomi*. These diseases are known to attack at least 900 plant species in many different families. The Proteaceae (for example, Grevillea, Banksia), Myrtaceae (for example, Eucalyptus, Bottlebrush, Myrtles), and Epacridaceae (the heaths), which together dominate many plant communities of the South Coast Region, are highly susceptible. Research indicates that the disease is spread by the movement of infected soil and is carried in water.

Parts of the Region have a warm, moist climate which favours the production of fungal spores, particularly after summer rains. Poorly drained soils which typify some of the Region also favour the production of spores and spread of the fungus. Clay and laterite act as impeding layers causing sub surface ponding necessary for the production of spores and the water tends to drain laterally spreading the fungus further. Plants growing on soils developed from limestone appear to be less susceptible to the disease.

Dieback disease cannot be eradicated once it is established at a specific site. Control measures, therefore, concentrate on:

- (a) Preventing the disease from establishing in new areas.
- (b) Minimising additional spread in areas where the disease already occurs.

The Department has developed policies regarding dieback disease protection in the South Coast Region. These are addressed in detail in the South Coast Region Dieback Protection Plan 1989-93 (CALM, 1989), and include:

- Definition of an essential system of roads and firebreaks which are to be retained in a well formed and well drained condition. Non-essential vehicle access to be closed.
- Construction of new roads and firebreaks to take place only where essential.
- Off-road vehicle use to be restricted to approved roads and tracks and approved beaches.
- All operations to be carefully evaluated for potential dieback disease impact.
- All operations to be undertaken with strict hygiene practices.

- Research to be undertaken on dieback disease spread, control and susceptibility of plants to attack.

Virtually all lands managed by CALM within the Albany District and within the western coast of the Esperance District (Starvation Boat Harbour to Israelite Bay) are thought to have the potential to become infected by dieback disease. However, some areas already have widespread infection (for example, Stirling Range National Park, Two Peoples Bay Nature Reserve), some are intermediate (Torndirrup National Park, Cape Le Grand National Park) and a few areas have minimal infection (Fitzgerald River National Park). Overall public response to the closure to vehicles of nonessential roads, which was instigated in 1986-87, has been very good. Several roads have been subsequently upgraded and re-opened for public use.

A number of canker fungi including *Botryosphaeria* and *Diplodina* have been isolated from dying plants in the Region. First identified at Cheyne Beach east of Albany, the disease caused by these fungi is now known to occur commonly in the Albany area and poses a particular threat to populations of *Banksia coccinea* although many other plants are also affected. As spores of the canker fungus disperse in the wind, it may prove a significant threat to susceptible species. Research into the disease is ongoing.

Other plant disorders are present on lands managed by CALM, including diseases caused by other species of *Phytophthora* and *Armillaria*. These also damage many plant species within the South Coast Region.

REGIONAL STRATEGIES

As listed in the South Coast Region Dieback Protection Plan (1989-93) and in addition to implementing other Departmental policies and guidelines the Region will:

- (i) Prevent the establishment of dieback disease in new areas and minimise additional spread in areas where the disease already occurs by controlling access and operations in susceptible areas.**
- (ii) Assess all operations and uses with an evaluation test for potential dieback disease impact.**
- (iii) Undertake all operations under hygienic conditions and monitor the effectiveness of such hygiene.**
- (iv) Identify priority areas within the Region for protection from dieback disease based on conservation values, risk of introduction and predicted impact.**
- (v) Assess dieback disease protection needs in the preparation of interim guidelines for necessary operations, proposals for compatible operations and in area management plans.**

- (vi) Improve understanding by the public and by CALM personnel of the dieback disease problem and protection measures on lands managed by CALM.**
- (vii) Undertake dieback disease mapping and assist with dieback research.**
- (viii) Monitor the spread of known infections and where possible develop and implement action steps to limit their spread.**
- (ix) Develop and adopt appropriate strategies for other plant disease species including Armillaria, canker and other Phytophthora species.**
- (x) Encourage other Government Departments and Local Authorities to adopt similar dieback disease control strategies.**

13.2 FIRE

Fire is a natural phenomenon in the South Coast Region because of summer drought and lightning storms. It was used deliberately by Aboriginal people before European settlement (Hallam, 1975), but since the advent of European settlement, fires seem to have become more common, especially in the moister southern forests. It is generally undesirable for uncontrolled wildfires to burn on or out of lands managed by CALM. The overall objectives of fire management within CALM are:

- To protect human life and 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.

In essence the Departmental policy on fire requires that:

- All possible steps should be taken to prevent wildfires.
- If wildfires do occur, attempts should be made to restrict their spread or confine them within predetermined areas.
- An effective organisation should be established to detect and suppress fires; liaison should be maintained with local Bush Fire Brigades.
- Where appropriate, fire suppression should be made easier and safer by the practice of cyclic prescribed burning along external boundaries or internal corridors, in "patches" throughout reserves or on adjacent lands.

- A continuing research program into fire ecology and fire control should be given high priority.

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 substantial resources available through the volunteer Bush Fire Brigades in the Region and the co-ordination and communication resources of the Bush Fires Board. Assistance from the Police and other agencies is also provided when life and property are threatened.

CALM should also assist with fire suppression on lands adjacent to CALM managed estate.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Establish and maintain an efficient fire detection system and improve the effective fire fighting forces and equipment within the resources available.**
- (ii) Reduce fuels by techniques such as prescribed burning, slashing and scrub rolling in carefully selected strategic buffer areas either within the land in question, or where possible, on adjacent lands.**
- (iii) Consistent with the requirement to protect life, property and nature conservation values, use prescribed burning to provide and maintain biological diversity.**
- (iv) Use fire to develop or favour habitat for specific flora and fauna species where appropriate.**
- (v) Maintain close liaison with local Bush Fire Brigades, neighbours of the CALM managed estate, Local Authorities and other agencies and through the mechanism of District Fire Plans, establish mutual aid arrangements.**
- (vi) Develop fire protection plans and fire emergency plans for lands managed by CALM.**
- (vii) Develop neighbour and public knowledge about community fire protection needs and Departmental fire management objectives and response procedures.**
- (viii) Establish and maintain an efficient radio communications network across the Region.**
- (ix) Assist with research into fire behaviour and fire ecology.**

- (x) **Monitor the effectiveness and impacts of fire management measures and make any necessary changes to procedures in the light of research and experience.**

13.3 WEEDS, FERAL ANIMALS AND PESTS

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 the lands it manages 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*) which is widespread within Porongurup National Park and also occurs in several other reserves of the Albany District. Other declared weeds in the Region include: penny royal (*Mentha pulegium* L.) and arurn lily (*Zantedeschia aethiopica*), also at Porongurup National Park and saffron thistle (*Carthamus lanatus* L.) at the Fitzgerald River National Park.

In addition to declared plants, "pest plants" may be prescribed by Local Authorities under the Agriculture and Related Resources Protection Act. The Department is required to control prescribed pest plants on lands it manages in the relevant Local Authority area. The following pest plants have been prescribed in the South Coast Region:

PEST PLANT	LOCAL AUTHORITY
Afghan Thistle (<i>Solanum hystrix</i> and <i>Solanwn hoplopetalwn</i>)	Cranbrook
Angel's Trumpet (<i>Dmra canida</i>)	Town of Albany, Cranbrook, Plantagenet, Denmark
Boxthorn (<i>Lyciumferocissimum</i>)	Esperance
Rapistrium weed (<i>Rapistrium Rugosum</i>)	Esperance
Umbrella grass (<i>Digitaria spp.</i>)	Esperance

Ward's weed (*Carrichthera annua*) although not prescribed, is a problem on the Nullarbor.

Weeds may have additional undesirable ecological effects such as gene-mixing with endemic varieties through cross-pollination with closely related introduced species.

Feral animals such as the cat (*Felis catus*), fox (*Vulpes vulpes*), goat (*Capra hircus*) and rabbit (*Oryctolagus cuniculus*) cause widespread environmental problems on CALM managed lands, including some islands. Impacts include predation on native fauna, destruction of native vegetation, introduction of disease and disturbance of native fauna due to smells such as from scats.

Other feral animals which occur, generally in the eastern sections of the Region include the horse (*Equus caballus*), the camel (*Camelus dromedarius*), and the domestic dog (*Canis familiaris*). Feral pigs (*Sus scrofa*) are found in the west and south-west of the Region. Occasionally the starling (*Sturnus vulgaris*) is located within Western Australia. Outbreaks have occurred in the Nullarbor area, at Cape Arid (1983-84), elsewhere around Esperance (1980, 1982, 1986), at Bremer Bay (1988), and at Manypeaks (1988). Control of starlings is undertaken by the Agriculture Protection Board, however CALM staff assist Agriculture Protection Board officers if sightings are made on lands managed by CALM.

Native fauna such as the red-capped parrot (*Purpureicephalus spurius*), grey kangaroo (*Macropus fuliginosus*) and emu (*Dromaius novaehollandiae*) can occasionally be pests to CALM neighbours. The dingo (*Canis familiaris*) and dingo hybrids can cause a threat to the pastoral industry and are declared pests. Control is carried out where essential to protect values on adjacent lands.

The larva of the native moth, the jarrah leaf miner (*Perthida glyphopa*) is the most damaging insect pest of jarrah in the west of the Region. However, some areas of jarrah woodland have recently been attacked by caterpillars of the gum leaf skeletoniser moth (*Uraba lugens*). Another insect, lerp (*Cardiospina* species) has had a major effect on yate trees in recent years. Currently there are no economically feasible methods of controlling these native insect pests which tend to multiply and then decrease in cycles.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Maintain an inventory of weeds, feral animals and pests on CALM managed lands in the Region.**
- (ii) In conjunction with the Agriculture Protection Board and adjacent landholders, develop programs to control declared weeds and pests as resources allow.**
- (iii) Maintain liaison with neighbours to optimise control of boundary weed infestations.**
- (iv) Carry out monitoring and control programs, as resources allow, on declared and non-declared weeds and pests.**

- (v) Assess the efficiency of control on target species and any effects on non-target species and make changes to procedures if required.**
- (vi) Provide information to the public on the impacts and control of weeds, feral animals and pests.**

13.4 REHABILITATION

Rehabilitation includes the processes necessary to return disturbed land to a predetermined landform and vegetation condition, land use or productivity.

Rehabilitation may be required after any site disturbance such as mining, gravel pit working, road works, clearing, disease, or pest attack. Rehabilitation may also be required after recreation activities or the effects of fire or fire suppression activities such as installation of fire breaks.

Since the early 1980s, a major effort has taken place within all coastal national parks and at Two Peoples Bay Nature Reserve to rehabilitate blowouts and other erosion often caused by poor location of facilities and footpaths near the coast. Major projects have occurred at William Bay National Park, Torndirrup National Park (numerous sites), Two Peoples Bay Nature Reserve, Fitzgerald River National Park, Stokes National Park, Cape Le Grand National Park (numerous sites) and Cape Arid National Park.

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

The plant species used for rehabilitation on parks and reserves should be a natural mix of local species wherever possible. Integration with the aesthetics and the use of surrounding lands is also necessary.

Many of the rehabilitation site works on lands managed by CALM are undertaken by the agency responsible for the site disturbance (for example, gravel pit rehabilitation by Main Roads Department and Shires).

Many areas of land managed by CALM were disturbed long ago and are yet to be rehabilitated (for example, old gravel pits). These areas should be progressively restored as resources become available for their rehabilitation.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Survey lands managed by CALM and specify the areas that require rehabilitation programs.**
- (ii) Prepare and implement rehabilitation prescriptions for all disturbed areas as resources permit.**
- (iii) Where rehabilitation is the responsibility of the user, establish a schedule of conditions between the user and CALM.**

14.0 RECREATION

CALM aims to cater for a wide range of recreational activities giving the most satisfying experiences for users, through the planning and managing of activities and facilities on lands managed by the Department.

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

Recreational use of CALM managed lands derives from use by local residents and by visitors from further afield, including tourists. The direct expenditure by tourists in Western Australia in 1989/90 was \$1.74 billion including \$47.9 million in the Great Southern Region (WA Tourism Commission, 1991). Lands managed by CALM are a significant factor in drawing tourists to the South Coast Region.

The number of recreational visits to national parks and nature reserves of the Region probably exceeds 1 million per year and is expanding annually. The most heavily visited areas as determined from traffic counter data, are Torndirrup National Park (estimated annual visits of 217 000 in 1989-90), the Stirling Range National Park (80 000 for monitored roads in 1989-90) and Cape Le Grand National Park (48 000 for the main entrance road in 1989-90).

Recreation opportunities occur throughout lands managed by CALM in the Region but major sites are within national parks and at Two Peoples Bay Nature Reserve. Where practicable, it is Departmental policy to charge appropriate fees for the provision of services or opportunities on CALM managed lands. The revenue collected in this way can be used to offset the costs of management and facilities.

The development of new recreation opportunities will be dependent upon the outcome of area management plans. The upgrading of existing sites should be addressed where use is resulting in site degradation or safety hazards.

Important aspects for management are:

- Camping
- Day use
- Motorised recreation
- Bicycle riding
- Horse riding
- Pets
- Water-based recreation
- Adventure activities
- Hunting
- Visitor safety.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Prepare a Regional Recreation Plan to provide a conceptual framework for recreational activities and opportunities throughout the Region.**

14.1 CAMPING

Camping is a traditional activity on many lands managed by CALM and in many of the areas proposed for future management by CALM.

Camping may be either as an adjunct to back-packing or vehicle based. Back-pack camping is permitted in almost all areas of national parks but is not generally allowed in nature reserves. Vehicle based camping is allowed at designated sites.

Occupied shacks on CALM managed lands are covered by the Government's "Coastal Squatter's Shacks" policy released in 1989.

Some issues of importance to managers with respect to camping are:

- Provision of suitable camping areas (both in terms of site stability and in meeting visitor needs)
- Minimising conflicts with day users
- Managing and maintaining campsites
- Lighting of campfires (collection of firewood and risk of bush fires need careful consideration).

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Identify and evaluate existing and potential campsites. Consider the upgrading or relocation of unsuitable sites and the development of new sites where warranted.**
- (ii) Cater for a range of camping requirements, such as small or large group camping and facilities for the disabled.**
- (iii) Ensure campsites are properly maintained and that environmental impacts are kept within predetermined limits.**
- (iv) Permit campfires in designated areas only, where the risk of wildfire can be minimised and firewood collection will not degrade conservation values.**

- (v) Maintain liaison with individuals and organisations who provide campsites on nearby or adjacent lands.**
- (vi) Provide information on camping opportunities.**

14.2 DAY USE

Most recreational pursuits on lands managed by CALM are carried out during the course of one day. These include picnicking, barbecuing, bushwalking, photography, painting, fishing and nature study.

Major issues with respect to day use recreation are:

- Location and design of facilities such as toilets, footpaths, barbecues and parking areas
- Provision of facilities for the disabled
- Maintenance of recreation areas and footpaths, including litter disposal
- Visitor safety
- Provision of recreation facilities for commercial tourist operations
- Visitor information and interpretation.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Assess requirements for developed recreation sites.**
- (ii) Evaluate existing sites in terms of location, design and suitability and restore, close or redevelop as appropriate.**
- (iii) Consider the provision of new recreation areas, including facilities and footpaths where appropriate, as resources for their development and maintenance become available and as provided for in area management plans.**
- (iv) Provide facilities suitable for use by disabled visitors at appropriate locations throughout the Region.**
- (v) Minimise conflicts between the general public and commercial tourist operations.**
- (vi) Maintain recreation sites in a safe, clean and tidy condition.**
- (vii) Minimise impacts of recreation activities on nature conservation and aesthetic values.**

- (viii) Provide information on opportunities for various types of day use recreation both on CALM managed lands and on other lands in the Region.**

14.3 MOTORISED RECREATION

CALM managed lands in the South Coast Region (particularly coastal areas and major national parks) are in great demand for motorised recreation.

Licensed vehicles are permitted on public roads on lands managed by CALM and normal road traffic rules apply. There are numerous "management tracks" on lands managed by CALM. These tracks are not maintained for public use. Some beaches are regarded as part of the road system.

Car and motorcycle rallying for sport is not permitted in national parks or nature reserves in the Region.

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 disturbing fauna. The second is conflict with other groups. Many recreational activities require peace and solitude in natural environments and are not compatible with intensive vehicular use of the same areas due to presence of access roads and tracks, noise, and in some instances, wheel tracks on beaches.

Visitor safety is also important.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Identify areas of land managed by CALM currently being used for motorised recreation and examine current and potential impacts on the environment and on other users.**
- (ii) Provide access for motorised recreation on roads and tracks developed and maintained to Departmental standards.**
- (iii) Manage vehicle access to ensure that recreational activities do not contribute to the spread of dieback disease.**

- (iv) Direct motorised recreation to the most appropriate areas, close unsuitable roads and tracks and prescribe conditions of use which will minimise environmental and social impacts.**
- (v) Subject to area management plans, develop potentially suitable areas in the Region to which displaced activities can be relocated.**
- (vi) Provide information on motorised recreation opportunities and responsible use of vehicles in natural environments.**

14.4 BICYCLE RIDING

Occasionally bicycles are used by visitors to CALM managed lands as an alternative form of transport to motor cars. Recently, some interest has arisen in the recreational use of "mountain bikes" on reserves vested in other agencies, particularly near to Albany and Esperance towns. Outside the Region and overseas, mountain bikes have been used on bushwalking paths away from roads. Such use has obvious ramifications for the comfort and safety of walkers, potential to spread dieback disease in infected soil and footpath "scuffing" leading to erosion.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Consider the designation of some paths or tracks for use by bicycles.**
- (ii) Otherwise restrict the use of bicycles, including mountain bikes, to those roads and tracks which are open to other types of public vehicles.**
- (iii) Provide information on opportunities for bicycle riding and on responsible use of bicycles in natural environments.**

14.5 HORSE RIDING

Horse riding has taken place in a number of areas along the south coast for many years. This has included some areas of land now managed by CALM, particularly prior to their gazettal as conservation reserves.

There is considerable debate within the community on the issue of access by horses to conservation reserves. Horses are generally only permitted on these lands in specially designated areas as they can cause a number of detrimental impacts on the environment and on other visitors.

Horses can cause erosion problems and have the capacity to spread dieback disease by picking up infected soil in their hooves. Droppings and feed can introduce weeds into natural environments and if not controlled, horses will trample and browse native vegetation. Conflicts between horse riders and other visitors can also be a problem, particularly in areas where people seek peace and solitude in natural environments.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Consider the designation of areas for horse riding (where it is environmentally acceptable and compatible with other uses) in the context of preparing area management plans.**
- (ii) Otherwise restrict use of horses to those roads and tracks which are both open to public vehicles and able to be used safely for horse riding.**
- (iii) Monitor horse riding in any approved areas.**
- (iv) Manage approved trails to minimise the environmental impacts of horse riding.**
- (v) Liaise with equestrian groups to seek co-operation in the planning and maintenance of horse trails.**
- (vi) Provide information on areas available for horse riding including alternatives to lands managed by CALM.**

14.6 PETS

Many visitors take their pets with them when they travel. The most common pets are dogs.

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

Pets under control are normally allowed on land which is managed by CALM for multiple use, but are not permitted on nature reserves. Gun dogs are permitted on game reserves during declared

hunting seasons. Dogs may be allowed in some sections of national parks and conservation parks. Seeing-eye dogs accompanying blind persons are allowed in national parks and conservation parks.

Tracker dogs are allowed for search operations on all of the lands managed by CALM.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Provide information explaining the Departmental policy on pets to the public and enforce it as necessary.**
- (ii) Identify and publicise areas where pets are permitted.**
- (iii) Minimise social and environmental impacts of pets in those areas where they are permitted.**

14.7 WATER-BASED RECREATION

Recreational fishing is permitted on some lands managed by CALM under conditions established by the Fisheries Act, unless restricted or prohibited under a management plan. Recreational fishing is not permitted in nature reserves, sanctuary zones in marine parks or national parks where it is not provided for in a management plan. The rules for recreational fishing are summarised in a series of pamphlets produced by the Fisheries Department in 1990.

Swimming, boating, diving and surfing are the other main water-based activities which occur in the Region. Access for water-based recreation on CALM managed lands in the Region will be addressed in area management plans as they are prepared.

Further background information on water-based recreation activities is available from several sources, including:

- A review of water-based activities on the south coast (Watson 1982)
- Reports on visitor surveys at Jerramungup (Van Steveninck, 1984) and Esperance (Craig and Oma, 1984)
- 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
 - inappropriate use.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Identify sites at which water-based recreation may occur and close unsuitable sites and access routes.**
- (ii) Determine which activities are appropriate for each site and manage access routes.**
- (iii) Develop and implement 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) Involve recreation groups, interested community members and Local Authorities in planning for water-based recreation activities and publicise information such as access routes.**
- (vi) Monitor the effects of water-based recreation on the environment in and around water bodies and modify plans as necessary.**

14.8 ADVENTURE ACTIVITIES

Due to the variety of terrain, including the main mountain peaks within easy reach of the State's south-west, the CALM South Coast Region is popular with the participants of several adventure activities including bushwalking, rock climbing and abseiling, orienteering and rogaining, hang gliding and paragliding, cave exploration and cave diving.

Furthermore, there appears to be growing interest shown by tour operators and other concessionaires in offering adventure activities within lands managed by CALM. This is covered in detail under the heading "Tourist Operations and Other Concessions".

Bushwalking

Bushwalking is particularly popular in the coastal parks and reserves around Albany, in the Porongurup and Stirling Ranges, in the Fitzgerald River National Park and at Cape Le Grand National Park. The more rugged terrain is mostly located within the Stirling Range and Fitzgerald River National Parks and walks in both areas have been included in bushwalking journals and books (Pawley, 1982; Meney and Brown, 1985). In both areas there is also a high concentration of species of flora and fauna declared rare or specially protected and, in the Stirling Range a widespread problem with dieback disease. Bushwalkers can cause erosion problems on footpaths and may also

carry dieback disease infected soil in their boots. Bushwalking clubs exist in Perth and Albany. There is no statewide or national organisation co-ordinating bushwalking.

Rock Climbing

Major rock climbing areas are located at West Cape Howe, Torndirrup, Porongurup, Stirling Range and Peak Charles National Parks. The climbing at West Cape Howe and the Stirling Range is renowned at the national level. Although Peak Charles has high climbing potential its remoteness tends to keep visitation very low. The State's main climbing club is located in Perth but a loose-knit group of climbers operates from the Albany / Porongurup area. Rock climbing is not coordinated at a national level.

Orienteering and Rogaining

Although not common in the South Coast Region at this time (1992), the large area of natural environment in the Region makes it potentially suitable for these navigational activities. Although the sports themselves do not appear to have high impacts in natural environments, the necessity for vehicle parking at starting points and provision of camping areas for competitors require careful management. WA's Orienteering and Rogaining groups are based in Perth.

Hang Gliding

One of the premier sites for hang gliding in Western Australia is located near Shelley Beach in West Cape Howe National Park. Torndirrup National Park is also popular as is Hamilla Hill in Stirling Range National Park. Sporadic use is made of other areas within the Region. The Hang Gliding Association of WA has a registration and accreditation system which forms the basis for existing access agreements to designated hang gliding zones within the CALM South Coast Region. The sport of paragliding is also managed by this Association.

Cave Exploration

The caves of the Nullarbor Plain are visited regularly by speleologists and scientists from throughout Australia. Many of the more significant caves occur on lands which are managed by the Department or proposed for future management. Several caves are considered to be of international significance. Caving standards and speleological study in Australia are co-ordinated through the Australian Speleological Federation (ASF) which in turn is affiliated with the International Union of Speleology. Two speleological societies in Western Australia, the Western Australian Speleological Group (WASG) and the Speleological Research Group (SRG), are affiliated with the ASF.

The ASF has established a number of "commissions" on various aspects such as conservation, safety and tourism. Over the past 20 or 30 years the ASF has been the major driving force on promulgating cave conservation and world trends in cave management throughout Australia, with numerous instances of direct advice to Government through voluntary submission and formal consultancies (see for example Davey, 1978).

Cave Diving

Diving within submerged cave systems for both recreation and scientific study is a relatively new phenomenon on the Nullarbor. The activity has previously been largely restricted to areas within

south-east Australia, such as the Piccaninnie Ponds near Mount Gambier. The Cave Diving Association of Australia (CDAA) was formed largely as a result of a multiple fatality in "the Shaft" at Piccaninnie. The CDAA has a formal registration and accreditation system which forms the basis for access agreements to cave diving areas in public lands managed by Government agencies (and others) within other states.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Recognise adventure activities to be legitimate forms of public recreation on lands and waters within areas managed by CALM subject to protection of conservation values, safety and the enjoyment of other visitors.**
- (ii) Establish and maintain liaison with representative bodies of adventure activities to encourage "feedback" and advice on management and controls and to share knowledge of safety and rescue procedures.**
- (iii) Encourage "low impact" bushwalking and camping.**
- (iv) Designate some areas within lands managed by CALM to provide for a range of bushwalking opportunities suitable for different users.**
- (v) Consider the special requirements of wilderness users (for example, scenic quality, feeling of remoteness, need for self-reliance) in the preparation of area management plans.**
- (vi) Retain existing approved hang gliding zones and only approve new sites after liaison with the Hang Gliding Association of WA.**
- (vii) Adopt a code of ethics (based on the ASF code) for entry to caves by all persons, including CALM personnel.**
- (viii) Adopt codes of ethics for all other adventure activities.**
- (ix) Adopt permit entry control to areas of interest to cave divers in parallel with the South Australian National Parks and Wildlife Service.**
- (x) Prepare a plan for the management of adventure activities within the CALM South Coast Region.**

14.9 DUCK HUNTING

Eight Nature Reserves in the South Coast Region have been gazetted as game reserves. These are:

NAME	RESERVE No.	SHIRE
White Lake	36550	Albany
Lake Balicup	18468	Cranbrook
Lake JerbaJ up	26160	Cranbrook / Gnowangerup
Lake Shaster	32339	Esperance / Ravensthorpe
Woody Lake	15231	Esperance
Mullet Lake	23815	Esperance
Lake Gore	32419	Esperance

Game reserves have been declared open or closed during particular duck shooting seasons with the length of game season and the duck species able to be taken in any season being determined by the Minister for Conservation and Land Management.

The last duck shooting season was declared in 1989. In 1990 a moratorium on duck shooting was put in place and no further seasons have been declared.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Manage duck shooting if seasons are declared, in accordance with Government policies.**
- (ii) Manage game reserves to ensure the protection of conservation values.**
- (iii) Enforce regulations on game reserves in the Region.**

14.10 VISITOR SAFETY

Lands managed by CALM within the South Coast Region have a very high level of visitor use. The Region has rugged terrain including mountains, gorges, forests, cave systems and the coastline. The area is popular for a variety of specialised adventure activities.

The Department encourages safe use of areas under its management. In addition the Department recognises that it has skills and resources which may be required from time to time by the Police for dealing with emergencies outside areas managed by CALM.

Serious accidents or deaths have occurred in national parks throughout the Region with the most regular accident record at Torndirrup National Park. This is due to the very high levels of public use at Torndirrup (possibly the highest in the state outside the metropolitan area) and the potentially hazardous coastline. A special effort has therefore been made in this area to warn visitors of the potential hazards and an emergency response plan has been prepared in liaison with the Albany Police.

To date there have been no fatalities directly associated with adventure activities. This probably reflects the relatively small number of participants in comparison with general visitor levels, the self-regulation and accreditation systems used in some activities and the high level of safety awareness of participants of these "high risk" activities. There have, however, been several accidents and major searches. In one incident in 1985 over 150 people were involved in the search for a missing bushwalker.

The co-ordination of search and rescue operations is a Police responsibility. However, when incidents occur on lands managed by CALM it is very often CALM staff who have to organise the initial response. Sometimes the police will request that field control is continued by CALM staff. In 1984 the CALM South Coast Regional Manager visited North America under the auspices of a Churchill Fellowship to investigate the management of national parks and wilderness areas with special reference to visitor safety. The report on this study tour (Watson, 1988) makes a number of recommendations on improving visitor safety management and the rescue equipment available.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Encourage visitor safety and safe working practices for CALM personnel within the Region.**
- (ii) In liaison with the Police Department, prepare plans for dealing with accidents and search and rescue operations.**
- (iii) Provide information for visitors which highlights potentially hazardous areas and activities.**
- (iv) Regularly inspect roads and recreation sites to ensure that potential hazards are identified and either removed or avoided by relocation of the facility.**
- (v) Provide basic rescue equipment and staff training so as to be able to assist the Police in emergency situations.**
- (vi) Ensure that permits (where used) are strictly adhered to. Otherwise encourage voluntary registration before participants embark upon adventure activities in areas away from roads or other facilities.**

15.0 PUBLIC PARTICIPATION AND LIAISON

There is a high level of community interest in and concern for the management of public lands and ecosystems in the State. CALM encourages this through community education, interpretation, community involvement and advisory services.

15.1 COMMUNITY EDUCATION AND INTERPRETATION

Most national parks and some nature reserves of the South Coast Region have a high public profile, either being actively promoted for tourism or by virtue of their visibility from surrounding areas (for example, mountain peaks and inshore islands). Further, the Region contains a high proportion of the State's declared rare flora and fauna.

Many visitors to the State enter via the Eyre Highway at Eucla and a large proportion of these continue west via the coastal route through Esperance, Ravensthorpe and Albany. Also, local residents throughout the Region use the reserves for recreational pursuits. As a result there are excellent opportunities to promote an awareness of conservation, land management and natural systems and processes by both the local community and visitors.

All CALM personnel in the Region have some involvement with community education and interpretation work, mainly through provision of information to visitors, informal contact and talks to community and school groups.

In 1987 a Heritage Trails Research Officer was appointed for fifteen months to research the historical development of the CALM managed estate within the Region and to establish a network of trails throughout the Region. This project has involved the establishment of interpretive trails at key sites across the Region plus the publication of a Regional guide to the heritage network (Sandiford, 1988).

A range of other publications on recreation facilities and activities and technical information is available at Departmental offices and ranger outstations throughout the Region.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Prepare interpretive and community education plans for the South Coast Region.**
- (ii) Seek to establish a full time Information Officer in the Region.**
- (iii) Increase and improve on-site interpretive facilities in the Region as resources permit.**

- (iv) **Develop improved interpretive material, especially at high use areas such as major national parks, Helms Arboretum (Esperance) and at Two Peoples Bay Nature Reserve.**
- (v) **Develop basic Regional and District libraries to cover information and advisory needs.**
- (vi) **Prepare and distribute information on conservation and land management issues through various media.**
- (vii) **Liaise closely with other agencies, organisations and individuals (such as tourism agencies, schools and museums), who have similar interests in the interpretation of lands managed by CALM.**

15.2 COMMUNITY INVOLVEMENT

The CALM Act (Sections 14, 33A and 57-59) makes statutory provision for public participation in the preparation of management plans and proposals for compatible operations. A range of less formal public involvement in other Departmental planning matters is also desirable. The Department wishes to co-operate with local communities and establish projects of mutual interest where appropriate.

Examples of community involvement include:

- Staff involvement on local tourist committees and with agricultural shows
- Advice about landscaping and tree planting and assistance to bodies such as "Greening Australia"
- Co-operation with schools, for example, on Arbor Day and through provision of work experience and
- Public workshops, seminars and talks to interested groups.

Various advisory committees, "Friends of the Park", and volunteer groups, for example:

- Working with residents in the area around Fitzgerald River National Park through the "Community-CALM Link" project
- Involvement with Land Conservation District Committees and catchment management advisory bodies
- Liaison with Bush Fire Brigades.

Public participation programs require considerable staff resources to plan, implement, review and follow-up. Volunteer programs such as the South Coast Volunteer Conservation Program require staff time for supervision and materials for the implementation of works programs.

A National Park Advisory Committee existed in Esperance from 1978-1984. The role of the Committee was to advise on the preparation of draft management plans for national parks of the

Esperance District. It comprised representatives from Local Government, Government Departments and other local interest and community groups. The Fitzgerald River National Park Advisory Committee was established in 1987 and the Stirling Range and Porongurup National Park Advisory Committee in 1991, to assist with the preparation of area management plans in the Region.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Continue existing involvement with local individuals and organisations with an interest in conservation and land management.**
- (ii) Re-establish the South Coast Volunteer Conservation Program.**
- (iii) In conjunction with the preparation of management plans, foster the establishment of advisory committees or other appropriate community involvement programs and continue to hold public workshops, seminars and other forums.**
- (iv) Establish Advisory Committees or other appropriate community involvement programs to provide ongoing local advice where appropriate.**
- (v) Seek regular 'feedback' from the community on Departmental policies and management practices through both formal and informal contacts.**

15.3 INFORMATION AND ADVISORY SERVICES

The public, other Government Departments, Local Authorities, farmers and business people are provided with a wide range of information and advice from the Department on matters of conservation, wildlife, land management and tree establishment. A Vegetation and Tree Planting Advisory Service (VATPAS) was established within the Department in 1990.

Information and advice is provided at local, District, Regional or Departmental level. Enquiries are referred to other Departments and Authorities when appropriate.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Continue to provide information on conservation, tree planting, wildlife management and land management matters on request.**

- (ii) When appropriate, continue to participate in workshops, seminars and displays.**
- (iii) Seek creation of appropriate staff positions to service the need for information and advisory services within the Region.**

16.0 PRODUCTION AND OTHER COMMERCIAL USE

Numerous activities associated with the production or use of natural resources occur on lands managed by CALM. Timber production, wildflower picking, seed gathering, honey production, gravel extraction, water production, shore based commercial fishing, commercial tourist operations and mineral resource development all occur at times on CALM managed lands.

In addition, the harvesting of wildlife species such as kangaroos and emus as well as wildflower picking on lands not managed by CALM, are managed by the Department under the Wildlife Conservation Act.

16.1 WATER

Public water supplies in the Region are based primarily on groundwater near the coast and on artificial catchments for inland towns. There are no major water supply dams in the Region.

Catchments are managed to optimise both the quantity and quality of water produced. In some instances land on gazetted water catchments and water reserves is jointly administered by CALM and the Water Authority of WA. The quantity of water collected varies according to seasonal rainfall, soil storage and natural use by forests and agricultural crops.

Water quality is assessed by colour, turbidity, salinity, chemical pollutants, bacteria and viruses. Increased salinity is regarded as a serious threat.

Surface water supplies are localised within the Region. Significant underground water supplies also exist, notably on the coastal fringe and these have been developed using borefields at Albany (in Torndirrup National Park) and Esperance.

Currently there is concern over the quality of water within the Frankland, Kent, Hay, King and Kalgan catchments with particular reference to salinity and possible eutrophication of inlets such as Wilson Inlet and Oyster Harbour.

There is much interest in various tree planting programs on cleared land within these catchments in an attempt to help reverse the process.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will, in conjunction with the Water Authority of WA:

- (i) Continue close liaison between Regional and District officers of CALM and the Water Authority of WA.**

- (ii) **Evaluate the potential impact of any water supply proposals on lands managed by CALM.**
- (iii) **Manage lands to keep deleterious impacts on water quality and quantity within Water Authority of WA standards.**
- (iv) **As required, develop management plans jointly with the Water Authority of WA where lands managed by CALM lie within important water catchment areas.**

16.2 NATIVE TIMBER

The timber industry is a significant contributor to the State's economy, employing more than 20 000 people directly and indirectly in WA and having an annual turnover in timber and timber products of \$330 million as at June 1985.

The timber industry in the Albany area began from 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 for karri and jarrah timber. The period of heavy exploitation earned the state valuable export income. It also led to township development in the Region and provided the roads and basic infrastructures that assisted the development of other industries. An industry based on sandalwood also flourished early this century, using Albany as a port for export. Cutting for mining timber occurred in the Ravensthorpe and Norseman areas.

Today the native timber industry in the Albany area is of only minor importance. There are 6 small sawmills operating on private property and collectively cutting only a few thousand cubic metres of sawlogs per annum. There is one larger sawmill based in Albany but this is supplied from Crown land in the CALM Southern Forest Region.

There is a strong demand for minor forest produce such as firewood, fence posts, mining timber and craftwood which is serviced from vacant Crown land and other Crown land in or adjacent to the Region.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) **Implement the strategies described in "Timber Production in Western Australia", CALM (1987b).**

- (ii) Provide minor forest produce (including firewood) for public use and commercial sale based on issue plans to be developed through the life of this Plan and ensure the availability of Crown land in the South Coast and adjoining Regions for this purpose.**
- (iii) Manage production forest for sustainable yield.**

16.3 PLANTATION TIMBER

Plantation forestry on previously cleared land commenced in the Region in 1987 through an expansion of the Department's Softwood Sharefarming Scheme to the Albany area. Since then, hardwood sharefarming has also been introduced.

The target for the softwood scheme is to establish 15 000 hectares of pines at the rate of 1 000 hectares per year within 100 kilometres of Albany. (This covers parts of the Southern Forest and Wheatbelt Regions as well). The aim is to establish a softwood industry in the Albany area. As at April 1991, the area of Softwood Sharefarming properties established within 100 kilometres of Albany was 1850 ha. This was all *Pinus radiata*.

A Hardwood Sharefarming Scheme based on Tasmanian bluegum (*Eucalyptus globulus*) plantations for pulpwood was introduced in the Albany area in 1988. In addition, "shelterbelt" planting based on a range of hardwood species, was initiated under the National Afforestation Program in 1988. Total hardwood plantings within 100 kilometres of Albany were 600 hectares as at April 1991.

Research is being conducted into the viability of plantation forestry in the Esperance area with a number of arboreta and trial plantings being used to gather data. In addition, the concept of timber production from shelterbelts is being examined for its economic viability. A Vegetation and Tree Planting Advisory Service was established within the Department in 1990.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Seek to obtain the necessary land, staff and funds to plant and manage the required area of plantation forest each year to achieve land management and timber production objectives.**
- (ii) Regularly review the planting rate, establishment, tending and other silvicultural techniques and implement appropriate changes.**
- (iii) Undertake research and silvicultural trials to determine suitable sites and appropriate management regimes.**

- (iv) **Maintain close liaison with landholders concerning sharefarming schemes.**
- (v) **Undertake public education programs on sharefarming and plantation forestry by holding information tours, developing demonstration trails and regular contact with the media.**

16.4 MINERAL RESOURCE DEVELOPMENT

The South Coast Region contains a number of mineral deposits, some of which are being mined and some of which are prospective. Major deposits are as follows:

Iron Ore: The Southdown Magnetite Project, 80 kilometres north-east of Albany, is the only significant iron ore occurrence in the South Coast Region. It is small in comparison to the Pilbara iron ore deposits and, unless it is found to be of value for speciality ore production, is unlikely to be mined in the foreseeable future. The potential for both direct and indirect impacts on conservation reserves would require evaluation.

Precious Metals: The Dundas Mineral Field (which includes Norseman), and the Phillips River Field (which includes Ravensthorpe), are the two principal gold sources in the South Coast Region. They have produced 143 tonnes and 4.3 tonnes, respectively, since mining began last century. Minor mineralisation is known from Calyerup (near Jerramungup) and West River. All areas of greenstones may contain gold. At Ravensthorpe, 2.6 tonnes of silver was extracted as a by-product of gold mining. The Albany-Fraser Orogen and Yilgarn Craton may both contain platinum and related metals.

Base and Minor Metals: Although a range of minerals which are sources of metals occur in the South Coast Region, there is at present little exploration and no mining. A total of 8 500 tonnes of copper has been produced at Ravensthorpe. Tungsten has been mined at Norseman and about 8 tonnes of ore concentrate produced. Several small, high grade pods of manganese ore have been identified in the Eyre Range, adjacent to lead, cobalt, arsenic and graphite mineralisation. The Yilgarn Craton and the Albany-Fraser Orogen are both potentially prospective for a very broad range of metals.

Heavy-Mineral Sands: These have been reported from several coastal locations in the South Coast Region, including Cheyne Bay and Hassell Beach. The only production so far was in 194950 when 160 tonnes was produced. Much of the coast now has high potential and considerable exploration is taking place. Inland of the modern shore, ancient (38-55 million year old) shorelines have been defined in both the Bremer and Eucla Basins; both are now being explored for heavymineral sands.

Energy Minerals: Lignite occurs in both Bremer and Eucla Basin sediments in seams of up to 24 metres thick between Scaddan, Norseman and Balladonia. A major deposit has been delineated east of Scaddan, but it is not usable at present because of the high salinity of groundwater in the lignite. Unsuccessful exploration for petroleum was carried out in the Region in the 1970s and two

stratigraphic wells were drilled. Nevertheless, oil and natural gas may be present in the offshore Bremer Basin and Eucla Basin, where thick sequences of sedimentary rocks occur.

Industrial Minerals are covered under Section 16.5 Gravel and Industrial Minerals.

Mineral resource development (including exploration) is regulated by the Mining Act. Government policy bans mining and exploration in national parks in the South Coast Region. Mineral exploration in A Class Reserves is subject to the agreement of the Minister for the Environment and a formal assessment by the EPA. Mining in A Class Reserves requires the consent of both Houses of Parliament. Exploration or production of petroleum is only allowed in national parks (or nature reserves) after declaration of the appropriate area under the Petroleum Act. Access for such activity is subject to Ministerial approval from the Minister for the Environment and the Minister for Mines and assessment by the EPA. Exploration and mining will be allowed in B and C Class Reserves subject to Ministerial approval from the Minister for the Environment and Minister for Mines, (Government of WA, 1990).

REGIONAL STRATEGIES

In addition to implementing Government policies and Departmental guidelines the Region will:

- (i) Monitor existing mining and exploration activities that impact directly or indirectly on CALM managed lands and take any necessary action to regulate them.**
- (ii) Evaluate the likely impacts of any proposed mineral resource development activities on lands managed or proposed for management by CALM and make recommendations within the context of Government policy.**

16.5 GRAVEL AND INDUSTRIAL MINERALS

Natural lands within the Region offer a range of materials for land management and community use. These include vermiculite, slate, dimension stone, building stone, clay, silica sand, talc, peat, graphite, beryl and gravel, all of which are defined as minerals under the Mining Act.

Vermiculite, used for a wide range of high technology applications, is mined from near Munglinup. Slate suitable for flagstone is quarried from rocks of the Albany-Fraser Orogen 10 kilometres east of Tenterden. Granite is quarried for dimension (or building) stone near Mt Barker and Albany. Building stones such as limestone (eolianite) and spongolite have been extracted in the South Coast Region. Substantial deposits of kaolin clay, suitable for brick making, are found in many places and clay bricks are made at Albany. Higher grade kaolin deposits are known at Tambellup.

Silica sand deposits are widespread throughout the Region. However, most are contaminated or are suitable only for construction sand. Deposits of high-grade silica sand suitable for foundry sand and

glass-making have been found in the Albany area and some is of export quality. Talc occurrences have been reported at Mt Barker, although no production is known. Several small deposits of peat occur near the coast. Graphite deposits are known in the South Coast Region and a deposit at Kendenup has been worked intermittently since 1875. Most of it is of little value, however recent work has located a higher quality graphite which may be mineable. Beryl, a source of the valuable high-technology metal beryllium, occurs in pegmatite veins around Ravensthorpe.

The major demand is for gravel for road construction and maintenance. Such materials may be required by CALM itself to maintain roads on lands managed by the Department, or by other agencies.

Leases for some of these materials may be provided on lands managed by CALM 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 and providing the roads being constructed or maintained service lands managed by CALM, as detailed in the Department's policy covering gravel and industrial minerals.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Develop working arrangements with agencies extracting gravel and industrial minerals from lands managed by CALM.**
- (ii) Assess all requests for access to gravel and industrial minerals on CALM managed lands within the context of Departmental policy.**
- (iii) Ensure that correct rehabilitation procedures are undertaken at extraction sites at the expense of the extracting agency.**

16.6 WILDFLOWERS

Wildflower production is an important industry in this State and was valued at over \$8.5 million in 1989. The picking industry has escalated in recent years in the South Coast Region. There is also potential for further escalation (for example in and areas).

All indigenous flora is protected and a licence is required before any wildflowers can be picked on Crown lands or taken from private property for sale. Commercial picking of wildflowers is not permitted on national parks or nature reserves within the South Coast Region. Picking is permitted for *bona fide* research programs and for Departmental nurseries.

Under the Wildlife Conservation Act, the Department administers control of the taking of flora on other public lands. Three forms of licence are issued by CALM:

- Commercial purposes licences, which allow the taking of protected flora from 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 declared rare flora. No picking is allowed within 50 metres of public roads. Commercial picking is allowed on State forest.

Commercial collection of flora is not restricted to flowering sprays, but also includes various other parts of plants such as leaves, nuts, fruits and seed which are used for a variety of purposes both in the floral trade, hobbyist fields and for propagation.

Commonly collected species in the South Coast Region are:

FLOWERING STEMS:

<i>Adenanthos cuneatus</i>	native temp
<i>Adenanthos obovatus</i>	basket flower
<i>Agonis parviceps</i>	winter-white tea tree
<i>Agonisjuniperina</i>	coarse tea-tree
<i>Anigozanthos rufus</i>	red kangaroo paw
<i>Banksia baxteri</i>	Baxter's or Bird's Nest banksia
<i>Banksia coccinea</i>	Albany or scarlet banksia
<i>Beaufortia sparsa</i>	swamp bottlebrush
<i>Dryandraformosa</i>	showy dryandra
<i>Evandra aristata</i>	kangaroo grass
<i>Johnsonia lupulina</i>	hooded lily
<i>Juncus holoschoenus</i>	fern rush
<i>Leptocarpus scariosus</i>	seeded rush
<i>Stirlingia latifolia</i>	blue boy or blue bush

NUTS AND LEAVES:

<i>Banksia grandis</i>	bull banksia
<i>Banksia occidentalis</i>	red swamp banksia
<i>Banksia gardneri</i>	---
<i>Daviesia cordata</i>	book leaf
<i>Eucalyptus calophylla</i>	marri
<i>Eucalyptus tetragona</i>	tallerack or white-leaved mallee
<i>Eucalyptus tetraptera</i>	four winged mallee
<i>Eucalyptus marginata</i>	jarrah
<i>Hakea cucullata</i>	cup-leaved hakea

As at April 1991, there were eight commercial wildflower merchants operating in the South Coast Region. There are up to 60 regular flower pickers in the Region plus a large number of itinerant pickers. The main picking period is through winter and spring. There are only minimal quantities of brown boronia available on private land but licence endorsements to pick this species are generally only applicable to the Walpole District of the Southern Forest Region. An unknown quantity of the produce picked in the South Coast Region on private property is sold to dealers in other areas.

The wildflower industry was the subject of an extensive review in 1988-89. A number of changes to the management of the industry were recommended in the report of the Review Committee.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Ensure that the wildflower resource is systematically identified and that sustainable levels of harvest are set and enforced.**
- (ii) Protect lands managed by CALM from the impacts of wildflower picking through liaison with other Departments and the public.**
- (iii) Develop liaison with local merchants and pickers to identify areas and levels of harvest.**
- (iv) Monitor harvest areas and make recommendations to managing Authorities on management according to impact on conservation values and potential for spread of dieback disease.**
- (v) Encourage the propagation of native flora for wildflower picking in plantations on cleared private land.**
- (vi) Develop and recommend implementation of management controls to prevent adverse effects.**
- (vii) Actively support the implementation of the 1989 recommendations of the Wildflower Industry Review Committee.**
- (viii) Monitor costs of administration and supervision of the industry and seek to recover costs from the industry.**

16.7 NURSERIES AND ARBORETA

There are no nurseries run by CALM within the Region. However, both the Albany and Esperance offices act as receipt posts for plants and seedlings ordered from Departmental nurseries at Narrogin and Manjimup.

Helms Arboretum was established within the Esperance Timber Reserve in 1965. Currently there are demonstration plots of approximately 150 species of trees and shrubs many of which have potential for windbreaks and amenity planting in the Esperance District.

Staff have also assisted with the design and development of arboreta on non-CALM managed lands at Ravensthorpe and at Grass Patch north of Esperance.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Maintain Helms Arboretum near Esperance.**
- (ii) Provide advice on the location, public accessibility, establishment and management of arboreta located on non-CALM managed lands.**

16.8 APICULTURE

The production of honey and beeswax is a significant industry in WA. Much of this production is from apiary sites on lands managed by CALM. The Department acts as the central registration authority for apiary sites on all Crown lands.

As at April 1991, apiarists held over 140 registered sites within this Region, some of which were on lands managed by CALM. The number of sites available is limited. There are numerous sites on private property with the bees using adjoining lands managed by CALM. 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 the Region will:

- (i) Continue liaison with beekeepers (including through the Beekeepers Consultative Committee) and the Department of Agriculture, to ensure the most efficient use of sites and minimal impact upon lands managed by CALM and on other land users.**

(ii) Encourage research into environmental effects of beekeeping.

(iii) Relocate sites to more appropriate areas where necessary.

(iv) Encourage the use of private land for beekeeping.

16.9 COMMERCIAL FISHING

Commercial fishing 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 fishers on lands and waters managed by CALM.

Commercial fishing is not permitted in waters currently managed by CALM in the Region. However, fishers do require access through lands managed by CALM to marine waters and for parking or transporting their vehicles, boats, fishing gear or produce. Several fishers camp on lands managed by CALM on occasions.

The fishers involved include abalone divers, rock lobster fishers, estuarine fishers and various inshore fishers in search of shark, mulies (pilchards), salmon and other commercial species. The Department issues permits for access through and camping on the lands it manages.

The establishment of areas as marine parks would allow for multiple uses such as conservation, recreation and production, although there are none in the South Coast Region at present (1992).

Wherever possible the Department has assisted commercial fishers by the provision of special campsites. However, there continues to be conflict between fishers and other park visitors at some sites, with the result that some special arrangements have been established including:

- No special provision for camping by commercial fishers at Lucky Bay in Cape Le Grand National Park.
- A half yearly closed season at Stokes Inlet (November - April), introduced by the Fisheries Department in 1982, which helps to protect fish stocks but also minimises use of the area by commercial fishers during the main tourist season.
- Guidelines regarding fishing operations at Two Peoples Bay Nature Reserve due to conflict with other reserve visitors and safety considerations at the very small launching area.

Details of the number and distribution of permits for commercial fishing from lands managed by CALM during 1990 are provided in Table 9.

Access for commercial fishing in coastal national parks and reserves of the South Coast Region will be addressed in area management plans as they are prepared.

TABLE 9. PERMITS FOR COMMERCIAL FISHING IN SOUTH COAST NATIONAL PARKS 1990 (CALENDAR YEAR)

LOCATION	ABALONE	ROCK LOBSTER	ESTUARINE	OTHER (HERRING, SALMON, SHARK ETC.)
Cape Arid	7	2	----	9
Cape Le Grand	7	2	----	9
Stokes	7	----	17	1
West Cape Howe	1	----	----	1
William Bay	3	----	----	4
Two Peoples Bay N.R.	2	----	5	15

Note: The total number of permits issued was 44. In most cases the same permit covered 2 or more parks, hence the higher absolute totals in the above table.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Develop working arrangements with the Fisheries Department and the commercial fishing industry.**
- (ii) Continue to require commercial fishers to hold a Departmental permit for access through CALM managed lands and/or the use of such areas as operational bases.**
- (iii) Specify conditions under which commercial fishing camps will be permitted on lands managed by the Department and minimise their impacts where they are permitted.**
- (iv) Liaise with the Fisheries Department to ensure the collation of known data on recreational and commercial fishing (such as spots fished, target species, fishing effort), on lands and waters managed by CALM in the Region with a view to minimising impacts and maintaining populations.**

16.10 TOURIST OPERATIONS AND OTHER CONCESSIONS

Four main types of tour operators and concessionaires operate within the Region:

- Tourist coach operators, frequently promoted as either general sightseeing tours or as wildflower tours.
- 4WD "safari" type operators who seek out areas which are inaccessible to conventional vehicles and generally involve their clients in "bush" camping.
- Adventure activity operators who lead people in activities such as bushwalking, rock climbing and cave exploration, usually but not always, in a "safari" type excursion.
- Retail concessions (such as ice cream van operators) who provide a service, usually in areas of high visitor use.

Commercial tourist activities require permission if they are to be conducted on CALM managed lands. CALM recognises three types of permission depending on the nature of the commercial activity. A "formal licence" is issued in cases where facilities (such as a souvenir outlet) are provided, where a sole franchise is granted or where the activity is based predominantly on lands or waters managed by the Department. A "written permit" is issued when the activity is a guided tour, instructional course or leisure activity. "Oral Permission" can be granted for "one-off" activities such as organised visits of short duration. Fees apply to commercial tourist activities conducted on CALM managed lands.

While it is recognised that tourist operators have a potentially significant contribution to make in terms of bringing more people in to appreciate the values of lands managed by CALM, these operations do pose management challenges. For example, tourist coaches require the design of roads and carparks to accommodate the manoeuvring of large vehicles. Also, toilet facilities have to cater for large numbers of people.

Safari type 4WD excursions generally like to offer the excitement of large open campfires at night and of challenging access. These activities diverge from the Department's wish to maintain dry "safe" access tracks to minimise dieback disease spread and the concept of low impact camping (preferably using bottled gas or solid fuel stoves for cooking). Commercial adventure activities present difficulties with regard to the environmental impact of groups camping on sites which have limited capability to withstand heavy use, safety aspects and the competence of group leaders and potential damage to sensitive areas such as caves on the Nullarbor Plain. To many users, retail concessions appear inappropriate in natural environments.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) **Require all commercial tourist operators wishing to make use of CALM managed lands and waters in the Region to obtain the appropriate level of permission and to pay the necessary fees for their activities.**
- (ii) **Protect lands managed by CALM from any undue environmental impact caused by concession activities and require operators to adopt safe procedures for the activities they provide.**
- (iii) **Ensure commercial operators maintain appropriate standards with respect to information and quality of service provided.**
- (iv) **Identify the sustainable level of tourist operator use of each area of national park and selected nature reserves where concessionaires wish to operate, monitor the impacts and regulate activities as required.**
- (v) **Establish and promote regular contact with tour operators so that they are kept abreast of regional and local management initiatives, developments and road conditions.**
- (vi) **Evaluate proposals for retail concessions according to Departmental policy and permit their establishment where appropriate.**

16.11 COMMERCIAL PRODUCTION ON LANDS NOT MANAGED BY THE DEPARTMENT

Under the Wildlife Conservation Act, CALM is responsible for the management of the commercial harvesting of native species on lands not managed by the Department. Kangaroo harvesting is managed according to the Department's Wildlife Management Program Number 3. Commercial Emu farming is regulated under Policy number 23.

Damage licences are also issued for designated species of native fauna on a non-commercial basis.

Wildflower picking and seed gathering are covered in Section 16.6.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) **Enforce regulations with respect to the commercial harvesting of native species.**
- (ii) **Monitor the impacts of commercial harvesting and make changes to management practices if necessary.**

17.0 OTHER LAND USES

Lands managed by CALM are subject to impact by various public utilities, radio communication sites, adjacent subdivisions, developments on enclave lands and by group training exercises.

17.1 PUBLIC UTILITIES

The main public utility organisations with responsibilities affecting lands managed by CALM are:

- Water Authority of WA
- State Energy Commission
- Local Government Authorities
- Westrail
- Telecom
- Main Roads Department
- Department of Land Administration.

Public utilities provide essential community needs but can have serious visual impacts and cause permanent loss of natural values.

Existing public utilities will be maintained and new developments will be proposed during the period of this Plan.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Liaise with officers in charge of key public utilities to ascertain whether any proposals are likely to affect lands managed by CALM.**
- (ii) Negotiate to obtain relocation of infrastructure or rescheduling of operations where this is necessary to minimise impact on lands managed by CALM.**
- (iii) Ensure that land disturbed by the installation and/or maintenance of public utilities is adequately rehabilitated at the expense of the responsible -Authority.**

17.2 RADIO COMMUNICATIONS FACILITIES

Many agencies including CALM, other Government Departments, Local Authorities, emergency organisations (for example, Bush Fire Brigades, search and rescue units, ambulance groups), and some private organisations, use two way radio communications within sections of the South Coast Region. In the case of the VHF frequencies, which are commonly used, the area of radio communication coverage is generally improved if the transmission point (radio mast) can be raised

as high as possible. As a result, radio masts tend to be erected on high points within the landscape, many of which occur within lands managed by the Department.

The presence of radio masts within lands managed by CALM raises several issues including:

- Landscape impact as the masts are generally visible from many points in the surrounding countryside.
- Access requirements for construction and subsequent maintenance.
- Potential for dieback disease to be introduced to high points in the landscape during initial construction or maintenance operations, putting maximum areas at risk of downslope infection.
- Direct impact (for example, rock drilling, vegetation removal), at the transmitter site.
- Safety of visitors and potential vandalism.
- Potential for radio interference caused by multiple use of the same radio mast by different organisations.

Requests may also be received for the placement of temporary radio communications facilities (such as for offshore seismic survey positioning) on CALM managed lands in the Region.

Although future developments in radio communication technology may result in greater use of satellite communications during the period of this Regional Plan, the requirements for land based radio communications are not expected to ease.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Review existing facilities on lands managed by CALM and where no serious environmental problems occur, allow them to remain.**
- (ii) Relocate any facilities found to be causing unacceptable environmental or other impacts.**
- (iii) Where possible, encourage the establishment of new and relocated radio facilities at alternative sites which are not located on lands managed by CALM.**
- (iv) Only allow sharing of CALM facilities where the reliability and effectiveness of CALM communications will not be impeded.**

- (v) Restrict the sharing of sites on lands managed by CALM to approved Government agencies, Local Government and essential emergency services.**
- (vi) Ensure that the costs of joint facilities are shared on an equitable basis by all users.**
- (vii) Introduce formal licensing arrangements for communication facilities on lands managed by CALM.**
- (viii) Accommodate requests for the placement of temporary radio masts only where they will not lead to unacceptable environmental or other impacts.**

17.3 SUBDIVISIONS

From time to time, proposals are made for the subdivision of private land which lies close to national parks or nature reserves. Such proposals are referred for comment to CALM by the Department of Planning and Urban Development. In many cases subdivision is likely to create increased impact upon the lands managed by CALM due to higher risks of fires occurring, greater public use by neighbours, roaming of pets and domestic stock, vegetation clearing, water quality changes and visual impacts.

In some instances there may be effects upon important natural features such as wetlands (for example, pollution or changes in water level), and there may be undesirable impacts upon wildlife or special habitats.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Assess all subdivision proposals likely to impact upon lands managed by CALM and advise the Department of Planning and Urban Development of any likely effects.**
- (ii) Seek to have subdivisions "self sufficient" with regard to fire protection by requiring that adequate fire control buffers be located within the subdivision and not on adjacent lands managed by CALM.**
- (iii) If subdivision is approved, establish contact and maintain liaison with all landowners to ensure that CALM policies and management practices are understood and respected.**
- (iv) Seek financial compensation from developers where subdivisions will incur additional management costs for the Department.**

17.4 ENCLAVE LANDS

Throughout the Region there are several enclaves which are effectively surrounded by lands managed by CALM. These can be either reserves or private land. Enclave reserves usually have a different gazetted purpose from that of the lands managed by CALM. Sometimes they are unvested but usually they are vested in another Government Department or in a Local Authority. This can present problems particularly in national parks because of the differing purposes and regulations or by-laws applying.

To the visiting public, the enclaves (whether reserves or private land) are usually perceived to be part of the surrounding lands managed by CALM and this leads to an expectation of similar standards of management.

Where enclave reserves occur, there are several options for future management. Assuming that the enclave is desirable, (that is, not degraded), in order of decreasing compatibility with CALM interests these options are:

- (a) Amalgamation of the enclave with the surrounding land managed by CALM and vesting in the NPNCA or the LFC.
- (b) Joint vesting of the enclave with the Executive Director of CALM and the other Authority or Department, generally with a change of purpose of the reserve to reflect the interests of both parties.
- (c) Alteration of the purpose of the enclave reserve to reflect CALM's interest but without formal vesting in the NPNCA, the LFC, or the Executive Director.
- (d) Maintenance of the status quo but with CALM's interests properly addressed in a management plan for the enclave reserve or by formal agreement or liaison with the controlling Department or Authority.

In the case of enclaved private lands, consideration can be given to their purchase on the open market if they become available.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) **Seek to obtain the necessary compatibility between enclave reserves and surrounding lands managed by CALM, in the case of national parks by negotiating changes in purpose and vesting.**

- (ii) Seek to maintain effective liaison with the agencies controlling enclave reserves.**
- (iii) Regularly review the management implications of enclave reserves.**
- (iv) Liaise with the owners of freehold enclaves to minimise management conflicts and purchase appropriate lands for inclusion in the surrounding reserve when they are available and as funds permit.**

17.5 ROAD RESERVES

The control of most roads and tracks within lands managed by CALM rests with CALM, however some roads fall within (or approximately within) surveyed road reserves and are controlled by either the Local Authority or the Main Roads Department. Such roads reserves are effectively linear enclave reserves.

Where such road reserves exist they are of varying widths and the arrangements between CALM and the responsible Authority with regard to construction work, maintenance and road verge management vary.

It is in CALM's interests to encourage the management of enclave road reserves so as to have consistency of road design, construction and management standards (such as maintenance, dieback disease hygiene, signposting), between roads on enclave reserves and roads wholly within land managed by CALM.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Oppose the creation of new road reserves within lands managed by CALM except where these are preferable to existing road reserve alignments.**
- (ii) Address the tenure and management of enclave road reserves on lands managed by CALM through direct negotiation with the controlling Authority and through the medium of area management plans.**
- (iii) Liaise with Authorities in whom enclave roads are vested to seek management of road verges compatible with the adjacent lands managed by CALM and to ensure that roads and road verges are maintained in a safe condition while taking into account environmental and aesthetic values.**

17.6 GROUP TRAINING EXERCISES

Several areas in the South Coast Region have a history of use for training purposes by various organisations including some sections of the armed forces. The natural areas of the Region make it a sought after location for group training.

CALM recognises the potential of natural areas for these purposes, but also has to take into account important factors, such as the rapid spread of dieback disease in many areas and the increasing use of areas for recreational purposes.

REGIONAL STRATEGIES

In addition to implementing Departmental policies and guidelines the Region will:

- (i) Direct group training towards areas designated for multiple use, such as State forest.**
- (ii) Ensure that activities do not impose long term environmental threats, (such as dieback disease spread), to the Region.**
- (iii) Permit group training to occur in national parks and other conservation areas of the Region, only in special circumstances, where there is no other acceptable alternative for these specific activities and where impact on other visitors and the environment is minimal.**
- (iv) Continue to approve specialist training activities (such as rock climbing and rescue) subject to:**
 - a) Selection of areas where any environmental impacts and impacts on other park visitors are at acceptable levels;**
 - b) Sharing of knowledge with regard to rescue techniques with Departmental staff;**
 - c) Full acceptance of risk by the coordinating organisation.**

PART E. RESEARCH

Research activities within the South Coast Region are undertaken by CALM staff, by volunteers working with CALM, by members of academic and research institutions and by other Government Departments. Current efforts are directed towards social research (including historical and archaeological research), nature conservation research (including research into particular species or groups of species), silvicultural (tree growing) research and fire research. Priorities for future research are indicated in each subject area.

18.0 SOCIAL RESEARCH

18.1 ARCHAEOLOGICAL AND ETHNOGRAPHIC RESEARCH

The Department does not undertake any archaeological or ethnographic research within the South Coast Region. However research on Aboriginal occupation has been undertaken by others at Fitzgerald River National Park and at Cape Le Grand and Cape Arid National Parks (Smith, 1982). Linguistic research of relevance to the Region has been undertaken by Von Brandenstein (1988) from oral sources mainly in the Esperance and Norseman areas.

Archaeological and ethnographic research by the WA Museum and by individuals should be encouraged. This is a specialist area in which Departmental staff are unlikely to have the necessary skills.

18.2 HISTORICAL RESEARCH

Research covering the period of European settlement is widespread through a network of amateur historians and local historical societies. A comprehensive review of past events affecting lands managed by CALM in the Region was undertaken as background research for the CALM South Coast Heritage Trails Network (Sandiford, 1988).

Historical research will generally fall to persons and organisations outside the Department, however, opportunistic studies such as the heritage trails study should continue when funding and staff allow.

18.3 VISITOR SURVEYS

The Department has established a series of "benchmark" areas across the State in order to monitor public visits to areas managed by CALM and also to detect changes in visitor patterns. Within the South Coast Region five areas have been included in this "VISTAT" research program:

Torndirrup National Park
Two Peoples Bay Nature Reserve
Stirling Range National Park
Cape Le Grand National Park
Cape Arid National Park

In addition, monitoring of selected sites within the Region has occurred as follows:

Ellens Peak log book, Stirling Range National Park - continuous from 1971.

Bald Head log book, Torndirrup National Park - continuous from 1981.

Coastal Trail log book, Cape Le Grand National Park - continuous from 1983.

Mt Ragged log book, Cape Arid National Park - continuous from 1981.

Blowholes, Torndirrup National Park - annual 1980-1990.

Madfish Bay, William Bay National Park - intermittent from 1985.

Traffic counters have been used intermittently in several parks and reserves since 1981.

In 1987-88 extensive visitor surveys were undertaken by CALM in the Fitzgerald River National Park to provide background information for use in preparation of the Management Plan (Cavana and Moore, 1988).

The Region has a major commitment to the CALM "VISTAT" program which monitors visitors to selected areas managed by CALM. In addition, studies of remote area use will continue through retention of log books. Specific visitor surveys will continue to be a major input to the preparation of area management plans. Surveys of commercial operators may also be required. The use of path counters to monitor numbers of walkers on footpaths in the Region will continue.

To date, no detailed attitudinal surveys or landscape perception studies have been undertaken within the Region. Whilst such research is currently outside the scope of the existing staff resources and skills, it is hoped that opportunities will occur for such work during the period of this Regional Plan.

19.0 NATURE CONSERVATION RESEARCH

There are many recent and current nature conservation research studies within the Region.

19.1 BIOGEOGRAPHICAL RESEARCH

Major Departmental work has occurred recently in the Nullarbor area including the establishment of an ecological survey base and research into the biogeography of Nullarbor flora. Research and monitoring in this area is ongoing. Similar work has begun in the Cape Arid area at the western margins of the Nullarbor. Some work is ongoing within the Recherche Archipelago. A biological survey of Stokes National Park has also commenced. This is being undertaken privately but the survey design is such that the results will provide valid input to the Department's ecological data base. The same approach was used for a similar study of the Fitzgerald River National Park undertaken by consultants (K. Newbey and A. Chapman) to the Fitzgerald River National Park Association.

Other more specific Departmental programs include flora studies of the Stirling Range and environs (G. Keighery) and of Middle Island in the Recherche Archipelago and Two Peoples Bay Nature Reserve (A. Hopkins). Private fauna oriented studies have been undertaken by A.Chapman in the Ravensthorpe Range and the Kybulup area (north-east of the Fitzgerald River National Park), and by V.Smith at Torndirrup National Park. The latter study has located a new population of the rare dibbler (*Parantechinus apicalis*) which has subsequently been located in Fitzgerald River National Park as well.

The Royal Australasian Ornithological Union maintains the Eyre Bird Observatory located within Nuytsland Nature Reserve. Resident staff and visitors conduct ongoing studies into birds and vegetation types. The Albany branch of the WA Wildflower Society is very active and has established a fully operational herbarium of several thousand specimens which is accommodated within the Regional office. The society undertakes general recording and study of flora within the Albany District but also carries out special tasks from time to time on request from the Department.

All Regional staff record whale sightings and each year a Wildlife Officer in Albany undertakes an aerial reconnaissance for whales along the southern and western coasts of the State in conjunction with the WA Museum and Australian National Parks and Wildlife Service. Speleologists have undertaken some cave research, generally of a sporadic nature but nevertheless, in most instances, the only information recorded to date (see for example Dunkley and Wigley, Eds, 1978).

Biogeographical studies are required in other lands managed by CALM in the Region to provide the best available information as a base for management plans.

19.2 ENTOMOLOGICAL RESEARCH

The Department commenced a study on the lerp building insect, *Cardiaspina brunnea* in 1988. This insect severely affects the health of flat-topped yate. This study is examining the biology, ecology and behaviour of this insect in relation to the ultimate aim of biological control. The study is being conducted in the Stirling Range and Fitzgerald River National Parks and includes sites of remnant flat-topped yate stands in the agricultural areas of Jerramungup and Tambellup.

19.3 FAUNA CONSERVATION RESEARCH

The Department has two major ongoing fauna conservation studies specific to the Region. These are the Noisy Scrub-bird translocation project and studies of the Ground Parrot. Many of the biogeography programs and other projects described in this part of the Plan involve the recording of fauna.

The value of fauna studies such as the work by V. Smith at Torndirrup National Park, where dibblers have been discovered, cannot be underestimated (Smith, 1990). Many of the fauna species of the Region are highly sensitive to certain fire regimes through changes in habitat. The knowledge that dibblers occur in at least one locality within the Torndirrup National Park has immediately required that the area involved be protected from fire if possible.

19.4 FLORA CONSERVATION RESEARCH

Orchid studies of the Stirling Range National Park, Fitzgerald River National Park and Cape Le Grand National Park are completed or in progress. There are several studies which are not specific to the Region but which have involved a major effort there including preparation of the WA Banksia Atlas, preparation of the WA Rare Eucalypts Atlas and studies of the eucalypts of WA salt lakes.

The flora conservation program has set a 20 year goal to have management programs in place for all declared endangered flora. If this is to be realised there will need to be a major effort in studies of rare or endangered flora within the Region, including the establishment of permanent monitoring sites.

19.5 WETLAND AND WATER BIRD RESEARCH

Departmental research includes studies of the state of the wetlands of the south-west and studies of the fringing vegetation of wetlands. In addition the Department co-ordinates the annual duck count on wetlands which is undertaken mainly by volunteers. Several CALM staff of the South Coast Region have contributed to the duck count in a voluntary capacity. The Water Authority of WA, Waterways Commission and EPA are also conducting wetland research in the Region.

The EPA is undertaking a series of descriptive studies of the inlets and estuaries of the south coast (Hodgkin and Clark, 1987, 1988a, 1988b, 1989, 1990a, 1990b). Departmental staff are assisting in this work by collecting water samples and recording river flow and major events such as the natural breaking and forming of inlet sand bars.

19.6 MARINE RESEARCH

An annual census of marine mammals has been conducted along the south coast. In addition, the marine environment and fauna off the coast of Esperance are being monitored to assess the impacts of the oil and fertiliser spilled into the ocean when the bulk carrier Sanko Harvest ran aground in February 1991. Further marine research will be needed in order to assess the requirements for marine conservation reserves along the south coast.

19.7 FIRE RESEARCH

A number of fire research programs which have relevance to the management of fire in the South Coast Region have been conducted. Several of these have been undertaken by CALM staff. P. Jones of the then Forests Department conducted fire behaviour and fuel studies in the Stirling Range National Park in 1973-74. A. Hopkins has studied the effects of fire at Two Peoples Bay and the Recherche Archipelago and with C. Robinson examined the fire induced structural change in a woodland community near Lake King (Hopkins and Robinson, 1981).

In addition, a number of other research projects have been undertaken. In 1980 an experiment was established by the Bush Fires Board to monitor the effects of chaining and burning in heath and woodland communities along the vermin proof fence between Ravensthorpe and Lake King.

A. Chapman and K. Newbey have undertaken monitoring work on fire ecology in the core area of the Fitzgerald River National Park following a 1985 wildfire and, as consultants to the Department, they undertook similar studies in the Marningerup Block of the Fitzgerald River National Park in 1985-86. The recolonisation of burnt heaths by insects was studied in 1985-86 at Torndirrup National Park (P. Dyer and J. Lyon). Departmental staff are now monitoring the effects of the 1990 wildfires in the Fitzgerald River National Park.

Further work is now being undertaken on the heathlands of the South Coast Region. Fire research plots have been established in the Stirling Range National Park for the purpose of studying both fire behaviour and fire effects on plants and animals. Fire behaviour models will assist with planning for both wildfire control and in habitat management. Fire ecology research will ensure the appropriate fire regimes are implemented for the conservation of park wildlife.

Little is known of the impact of fire on particular species, the long term effects of fire intensity and frequency upon vegetation types, or the rate of spread and other characteristics of fire for use in

prescribed burning operations. Continuing research into these fields will provide invaluable information for the refinement of management strategies.

19.8 PLANT DISEASE RESEARCH

Since 1986, a major ongoing effort has been made towards monitoring and attempting to understand more fully the distribution and control of *Phytophthora* species in the national parks and nature reserves of the Region. The effect of other plant pathogens is also under scrutiny.

A study on the impact of dieback disease on flora in the Stirling Range National Park was initiated in August 1988. Joint research with the CSIRO is examining the potential for control of dieback disease using phosphorous acid treatment.

20.0 SILVICULTURAL RESEARCH

Sharefarming plantings of *Pinus radiata* and *Eucalyptus globulus* have been made in the South Coast Region. Some research work has been carried out on the nutrient requirements of *Pinus radiata* at establishment.

A range of herbicides is being evaluated to determine the most effective method of controlling competition from weeds during the initial phase of plantation establishment. Work is also being carried out on the determination of growth rates and growth patterns of *Pinus radiata*. The evaluation of site suitability for *Pinus radiata* is receiving examination to ensure that all sites planted to pine are capable of producing a crop.

Where rainfall is greater than 600 mm, trees have the potential to provide a viable new farm crop and to generate secondary benefits such as treatment of salinity and eutrophication. With the assistance of two major Commonwealth grants, research is now underway to investigate the integration of tree crops into farming systems. The objective of this work is to create viable agricultural systems which maintain water and environmental quality. Large, long term studies have commenced in the upper Denmark Catchment and on the King River and Kalgan River Catchments. The silvicultural development of short rotation eucalypts (especially *E. globulus*) has also been commenced and numerous plots will be established in the South Coast Region.

Agroforestry trials are being conducted at the Esperance Timber Reserve in conjunction with the Department of Agriculture.

Fertiliser requirements for *Pinus radiata* on various south coast soil types requires ongoing research. The likely growth patterns of pine trees within the Region is unknown and hence further research will be required into silviculture treatments such as pruning, subsequent fertiliser levels and effects of understorey grazing in later years of the rotations.

In the event that commercial tree growing extends to other species or to the other areas of the Region, parallel silvicultural studies will be required.

21.0 MANAGEMENT RESEARCH

There is currently a lack of research which is oriented specifically to immediate management needs. For example, research is urgently required to identify the best methods of constructing and maintaining footpaths. As highlighted earlier in this Plan, footpath erosion and maintenance is a major issue within the Region. Studies are needed to identify the most cost effective way of stabilising footpaths and making them durable.

There are many other examples of the need for research within the Region affecting day-to-day management and operational strategies.

PART F. IMPLEMENTATION

Implementation of the Regional Plan involves subsequent planning in a programmed manner, personnel, recognition of legal responsibilities and ongoing liaison. Each of these aspects is addressed in turn.

22.0 SUBSEQUENT PLANNING

This Regional Management Plan will form the basis for seven major types of more detailed plans:

- Interim guidelines for necessary operations
- Proposals for compatible operations
- Area management plans
- Issue plans
- Wildlife management programs
- Operational plans
- Input to planning by other agencies.

In the case of area management plans, it is possible to identify current (1992) priorities, however these may require reassessment over the life of this Plan as discussed shortly.

In the case of the other six categories of planning it is more difficult to predict a future structured program. Some requirements for issue plans have been specified throughout this Regional Plan but it is likely that many new issues and operational requirements will arise over the next ten years.

22.1 INTERIM GUIDELINES FOR NECESSARY OPERATIONS

Sections 33 and 33A of the CALM Act provide that "necessary operations" can be carried out when there is no management plan. For nature reserves, marine nature reserves, national parks, conservation parks and marine parks, these are defined as those actions necessary for the preservation or protection of persons, property, land, flora or fauna and for the preparation of a management plan.

In the absence of area management plans, staff of the South Coast Region have prepared, or are preparing interim guidelines for most national parks and some nature reserves.

Interim guidelines comprise a short section giving basic background information on the area and a series of goals, objectives and strategies for dealing with fire management, environmental management (dieback disease, pest and weed control, rehabilitation) and maintenance of recreational facilities including roads, footpaths and campsites.

Interim guidelines are conservative, especially with regard to recreational facilities, so as not to preempt options presented later in the area management plan. Interim guidelines are prepared in consultation with all relevant branches of the Department and they are endorsed by the relevant

Divisional Director of the Department. In addition they are reviewed annually. Liaison also occurs outside the Department with regard to the sections on fire management. These sections should be gazetted under Section 34 of the Bush Fires Act as fire management plans meeting Bush Fires Board and Local Authority requirements.

Once an area management plan is prepared and gazetted, the need for interim guidelines for necessary operations will, by definition, cease. However, the need will still remain in most cases for detailed operational prescriptions which are subject to annual review and these will be addressed through "operational plans" which are described in Section 22.6.

22.2 PROPOSALS FOR COMPATIBLE OPERATIONS

Amendments to the CALM Act (1991) provide that "compatible operations" can be carried out in national parks, conservation parks and marine parks where there is no management plan. Compatible operations are defined as operations approved by the Minister as being, in his opinion, compatible with the purposes for which the park is managed under the CALM Act.

As with management plans, these proposals must be publicly notified and written submissions on the proposal can be made. The final proposal is then submitted to the NPNCA and the Minister for the Environment for approval.

Proposals for compatible operations in the South Coast Region may be submitted during the life of this Plan.

22.3 AREA MANAGEMENT PLANS

The CALM Act (Section 33) requires the Department to manage land covered by the Act in accordance with management plans covering a specific area or set of areas such as one or more national parks, nature reserves, State forests or other reserves. These are the most detailed management plans prepared by CALM and they address the management issues specific to an area which cannot be adequately covered by a regional management plan.

Program for the preparation of area management plans

A desirable program for preparation of area management plans is presented in Table 10. This program represents the Region's view of current (1992) planning priorities and is based on the following premises:

- All current and proposed national parks, conservation parks and marine parks will require area management plans because they involve the interaction of conservation purposes and recreational use in an appropriate balance which must be clearly defined.

- Many nature reserves, marine nature reserves and areas of State forest will not require a specific area management plan in the short term and can be adequately managed under the guidance of this Regional Plan, interim guidelines for necessary operations and general Departmental policies for the time being.
- It will be acceptable to treat some groups of nearby similar reserves together for the purposes of area management plans.
- The program is based on current (1992) priorities and it will require regular review. Furthermore, the planning priorities of the Department as a whole and the resources available for planning will have a major bearing on the ability to prepare area management plans.

Despite the above constraints the program provides a framework for structured planning of areas managed by CALM in the South Coast Region. The program does not include all future additions to areas currently managed by the Department. As new areas come under CALM management, the priorities may need to be modified.

TABLE 10. PRIORITY FOR PREPARATION OF AREA MANAGEMENT PLANS

ALBANY DISTRICT

1. Fitzgerald River National Park (completed 1991)
2. West Cape Howe National Park (in preparation 1992)
3. Two Peoples Bay Nature Reserve (in preparation 1992)
4. Stirling Range and Porongurup National Parks (in preparation 1992)
5. Waychinicup and Gull Rock National Parks
6. William Bay National Park and Quarram Nature Reserve
7. Torndirrup National Park
8. Other Reserves

ESPERANCE DISTRICT

1. Esperance Lakes Nature Reserves (including "RAMSAR" Wetlands)
2. Stokes National Park and other Reserves of Esperance District East Coast
3. Cape Arid National Park and Nuytsland Nature Reserve
4. Peak Charles National Park
5. Cape Le Grand National Park
6. Recherche Archipelago Islands and Rocky Islets
7. Eucla National Park
8. Other Reserves
9. Helms Arboretum

Regional classification of national parks as a guide for area management planning. National parks provide the major interface between CALM and the community in the South Coast Region. Annual visits are estimated to be in excess of one million persons and parks form major "attractions" as perceived by the tourist industry. All but one of the Department's ten outstations within the Region are in national parks and staffed by national park rangers.

National parks are relatively large areas of predominantly natural systems with a high scenic and conservation value but which are generally free from exploitation of natural resources within them and where visitors are allowed to enter for inspirational, educative, cultural and recreational purposes.

In its broadest sense, national park management is about simultaneously catering for the recreational requirements of the present generation whilst protecting the natural attributes of the area and leaving options open for future generations.

Furthermore, national parks show great diversity in their scenery, climate, vegetation, history of use and other factors. Hence some, such as Torndirrup National Park near Albany and Cape Le Grand National Park at Esperance, are oriented towards high visitor use relative to their size. Others such as Cape Arid National Park, Fitzgerald River National Park and Stirling Range National Park are more clearly oriented towards the "wilderness" end of the spectrum in which natural values are more likely to prevail.

The Recreation Opportunity Spectrum

The concept of a Recreation Opportunity Spectrum (ROS) involves a recognition that different people seek different forms and levels of recreation and that provision of a range of opportunities and types of recreation will ensure that most users are catered for. In the context of recreation in natural areas, in particular national parks, this may be simply interpreted as meaning that zoning should try to cater for different degrees of accessibility and development of facilities. Within the spectrum of park users there are many who visit parks to get away from the organisation and gadgetry of modern day society and for these people the ability to visit wilderness with no signs of other human activity is an essential experience. Conversely, elderly and handicapped people also have legitimate requirements for modern facilities and the opportunity to easily visit at least some major attractions within national parks.

The ROS concept cannot, however, stand alone and when applied, the inevitable impacts upon the natural environment of any human use must be taken into account. A concept called "Limits of Acceptable Change" (LAC) has been introduced to cater for the on going assessment of site durability and public impact. Further detail on ROS and LAC is provided by Stankey et al. (1985), Clark and Stankey (1979) and on wilderness management by Hendee et al. (1978) and Watson (1988). The ROS concept clearly has potential for application within each individual national park, although in small national parks wilderness opportunity will be absent. However, the national parks of the South Coast Region are distributed somewhat like a "string of beads" along the coastline and immediate hinterland, with only Peak Charles being located any major distance inland. Use by tourists tends to be on a regional rather than local basis. For example interstate travellers and many Perth based visitors travel along the coast visiting a selection of national parks along the way.

Similarly, local use tends to be on a district basis, especially around Esperance (three parks within about one hour's drive - Cape Arid, Cape Le Grand, Stokes - and one Park two hours away - Peak Charles) and around Albany (five parks within one hour's drive - William Bay, West Cape Howe, Torndirrup, Porongurup, Stirling Range). Therefore, there exists an opportunity to place the management emphasis of these parks within a spectrum of opportunity which relates to the major population and tourist centres of the Region. This is illustrated in Table 11.

TABLE 11. A CONCEPTUAL OPPORTUNITY SPECTRUM FOR MAJOR SOUTH COAST REGION NATIONAL PARKS

PARK "TYPE"	ALBANY DISTRICT	ESPERANCE DISTRICT
Parks with Major Wilderness Potential	Fitzgerald River National Park	Cape Arid National Park
	Stirling Range National Park	Peak Charles National Park
Low Key" or Intermediate Parks	Waychinicup National Park	Stokes National Park
	West Cape Howe National Park	
	William Bay National Park	
	Porongurup National Park	
	Gull Rock National Park	
Parks with Existing or Potential Major Site / Facility Developments	Torndirrup National Park	Cape Le Grand National Park

(This Table refers to the "overall" or "major" perception of each park - there will of course be a range of use zones within most parks).

Within the Esperance group, Cape Le Grand National Park is seen as the major "development" park with good access from the town, well designed facilities and the ability to withstand heavy use including regular tourist activity. Cape Arid National Park and Peak Charles National Park are seen as providing for wilderness opportunity and Stokes National Park is seen as providing for low key camping and nature study. Whereas park interpretation will occur in all areas there is special scope at Cape Arid National Park due to its varying land forms and landscapes, its diversity of flora and fauna and its archaeological and historical significance.

In the Albany District, Torndirrup National Park is seen as providing for the main tourist use, William Bay National Park clearly has great potential for interpretation and nature study, Porongurup National Park has potential for a network of developed footpaths and the Stirling Range National Park has some potential for wilderness type activity and adventure activities in addition to its major landscape and conservation values. West Cape Howe and Waychinicup National Parks are seen to provide primarily for low key recreational use.

While these proposals may be modified with time and during the preparation of area management plans for each park, they provide for the basic emphasis of current management within interim guidelines for necessary operations and they foreshadow the likely emphasis of recreational use to be addressed within area management plans.

22.4 ISSUE PLANS

Several issue plans have been mentioned within the previous parts of this Regional Plan including plans for the management of recreation throughout the Region and more specifically for adventure activities and interpretation and community education. One issue plan, the South Coast Region Dieback Plan, is now in its second term. It was originally drawn up to address dieback disease management in the period 1986-1988 (CALM, 1986) and recently renewed for a further five years (CALM, 1989).

As with area management plans, it may be possible to timetable priorities for preparation of issue plans. However, in the case of issue plans, major involvement is required by other branches of the Department and timing will therefore also be dependent upon branch priorities at the wider State level.

22.5 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 particular species.

During the period of this Regional Plan it is likely that several wildlife management programs will be prepared and the Noisy Scrub-bird Management Program will require revision by 1996.

22.6 OPERATIONAL PLANS

Operational plans detail operations 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 topics will be addressed by operational plans:

- Emergency operations including search and rescue and whale strandings
- Fire control
- Noxious weed and feral animal control
- Prescribed burning
- Pine silviculture
- Pine planting
- Recreation site management
- Road construction and maintenance
- Path management

22.7 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 the Department and for some jobs carried out by contractors.

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

- Dieback hygiene manual (1986)
- Seven Way Test Guidelines (1983)
- Rare flora register
- Recreation operations manual
- Sign manual
- Chemicals manual
- Foresters Manual (to be progressively incorporated into a CALM Operations Manual)
- Pine management guide

- Code of Softwood Logging Practice (1985)
- Code of Hardwood Logging Practice (1987)
- Manual of Hardwood Logging Specifications (1987).

22.8 INPUT TO 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 CALM's Acts, regulations and responsibilities. This Department also intends that other Departments should conform with its Acts and regulations.

CALM's plans are discussed with organisations and individuals likely to be affected by them and input is sought into other organisation's plans that are likely to affect CALM.

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

- Commonwealth Government:
Telecom: microwave link proposals, telephone cable developments
Contingency plans for marine oil spills (jointly with State Government).
- State Government:
Department of Agriculture: catchment management functions.
Department of Planning and Urban Development: Regional or area plans, coastal management plans.
- Environmental Protection Authority:
Coastal management plans, (as prepared by the former Department of Conservation and Environment prior to mid 1986), conservation reserve proposals for Systems.
- Great Southern Development Authority:
Miscellaneous development plans.
- Main Roads Department:
Proposals such as major roadworks.
- State Energy Commission:
Proposals for new electricity or gas lines.
- Tourism Commission:
Regional and local tourist development plans.

- Water Authority of WA:
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 ERMPs for major new developments.
- Tourist industry:
Accommodation and concession proposals.

23.0 PERSONNEL

Although increase in personnel numbers is justified in many areas within the Region, in the current economic situation rapid increases are unlikely to occur. In the short term there are some obvious deficiencies in staffing skills and expertise and in administrative support staff including:

- Regionally based co-ordination of research
- Regionally based interpretation / community education
- Permanent field presence in the Nullarbor area
- District manager in Ravensthorpe
- Improved nature reserve management capability throughout the Region.

This Regional Plan has also identified several additional areas for management by CALM within the Region. Numerous strategies have been proposed, many of which require extensive research, monitoring and liaison programs. As the Plan is implemented it will need to be matched by provision of the necessary resources including personnel.

23.1 TRAINING

In accordance with the Departmental training policy, 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.

23.2 VOLUNTEERS

The Department receives valuable assistance from volunteers throughout the state, including in the South Coast Region. Subject to staff capability, attempts will be made to re-establish the South Coast Volunteer Conservation Program and to foster interaction with groups such as "Friends of Parks", the Fitzgerald River and West Cape Howe National Park Associations, the Albany branch of the WA Wildflower Society, local Aboriginal groups and other interested organisations and individuals. Programs like "Community- CALM Link", established in the vicinity of Fitzgerald River National Park in 1990, will also be considered. Efforts will be made where possible to support private research work of potential value to the Department provided this is undertaken in a professionally competent manner.

24.0 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 WITHIN THE REGION ARE:

Bush Fires Act, 1954 as amended
Land Tax Assessment Act, 1976 as amended
Mining Act, 1978 as amended

OTHER ACTS WHICH AFFECT THE DEPARTMENT'S LAND MANAGEMENT RESPONSIBILITIES IN THE REGION 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 (Off-road Areas) Act, 1978 as amended
Country Areas Water Supply Act, 1947 as amended
Environmental Protection Act, 1986 as amended
Financial Administration and Audit Act, 1987 as amended
Fisheries Act, 1905 as amended
Great Southern Development Authority Act, 1987
Historic Shipwreck Act, 1976 as amended
Land Act, 1933 as amended
Local Government Act, 1960 as amended
Main Roads Act, 1930 as amended
Maritime Archaeology Act, 1973
Public Works Act, 1902 as amended
Rights in Water and Irrigation Act, 1914 as amended
Soil and Land Conservation Act, 1945 as amended
State Energy Commission Act, 1979 as amended
State Planning Commission Act, 1985 as amended
Town Planning and Development Act, 1928 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.

25.0 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
- Customs
- Department of Defence
- Telecom Australia

ASSOCIATED STATUTORY AUTHORITIES STATE GOVERNMENT, INCLUDE THE FOLLOWING:

- Agriculture Protection Board
- Albany Port Authority
- Bush Fires Board
- Department of Agriculture
- Department of State Development
- Department of Land Administration
- Department of Planning and Urban Development
- Department of Marine and Harbours
- Department of Mines
- Department of Sport and Recreation
- Education Department
- Environmental Protection Authority
- Fisheries Department
- Great Southern Development Authority
- Main Roads Department
- Police Department
- State Emergency Service
- State Energy Commission
- State Government Insurance Office
- Valuer General's Office
- Waterways Commission
- Water Authority of WA
- WA Museum
- WA Tourism Commission
- Westrail

LOCAL GOVERNMENT

All Shires and Towns which contain lands managed by CALM.

PRIVATE SECTOR

Industry groups, such as tourism, wildflowers, agriculture, land conservation districts, fishing, timber production, beekeeping, mining

User groups, such as clubs, organisations and individuals who regularly visit CALM managedlands

The media and last but not least,

The general community.

25.1 ADVISORY COMMITTEES

There is provision for the establishment of committees to advise on the preparation of area management plans and general management of lands managed by CALM. Currently (1992) two such committees exist in the Region, one for the Fitzgerald River National Park and the other for the Stirling Range and Porongurup National Parks. The Stirling Range and Porongurup Committee has the specific task of advising the Department on development of an Area Management Plan. The Fitzgerald River Committee advises on management issues in that Park.

Committees such as this are invaluable in helping to establish a two way flow of information between CALM and the general community. Establishment of similar committees will be considered during the period of this Plan for the Esperance District and possibly the balance of the Albany District. However, the timing for establishment of such committees will need to be in tandem initially with the preparation of area management plans.

REFERENCES

REFERENCES

- Beard, J.S. (1979). Phytogeographic Regions. In J. Gentili (ed), "Western Landscapes", University of WA Press for the Education Committee of the 150th Anniversary Celebrations, 1979.
- Berndt, R.M. (1979). Aborigines of the South-West. In: Berndt, R.M. and Berndt, C.H. (Eds), "Aborigines of the West. Their past and their present". University of WA press for the Education Committee of the 150th Anniversary Celebrations, 1979.
- 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.
- Cavana, M. and Moore, S. (1988). "Fitzgerald River National Park. Visitor Survey. November 1987 - April 1988". Department of Conservation and Land Management, Perth.
- Chalmers, C.E. (1983). "Draft Coastal Management Plan: Munglinup Inlet Area", Department of Conservation and Environment, Perth.
- Chape, S. and Sanson, G. (1983). "Esperance District Coastal Management Plan", Department of Conservation and Environment, Report 11, March 1983.
- Clark, N. and Stankey, G.H. (1979). "The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research", U S Department of Agriculture, Forest Service, General Technical Report.
- Conservation Through Reserves Committee, (1974). "Conservation Reserves for Western Australia", Department of Conservation and Environment, Perth.
- Craig, G., Burkin, B. and Van Steveninck, A. (1984). "Ravensthorpe District Draft Coastal Management Plan", Department of Conservation and Environment, Bulletin 152, February 1984.
- Craig, G.F., and Oma, V. (1984). "Esperance Eastern Coast Planning and Management Report", Department of Conservation and Environment, Bulletin 173 June 1984
- Davey, A. (Ed), (1978). "Resource management of the Nullarbor Region, Western Australia - a report to the Environmental Protection Authority, 1978", Australian Speleological Federation.
- 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 and Denmark Shire Council, (1987). "Draft Coastal Management Plan: Shire of Denmark", Department of Conservation and Environment, Bulletin 199, January 1987.
- Department of Conservation and Land Management, (1986). "South Coast Region Dieback Protection Plan 1986-88".
- Department of Conservation and Land Management, (1987a). "Strategies for conservation and recreation on CALM lands in Western Australia - the conservation, environmental protection and recreation strategies of WA's Department of Conservation and Land Management".
- Department of Conservation and Land Management, (1987b). "Timber production in Western Australia. A strategy to take WA's south-west forests into the 21 st century".
- Department of Conservation and Land Management, (1989). "South Coast Region Dieback Protection Plan 1989 - 93".
- Dunkley, J.R. and Wigley, T.M.L. (Eds), (1978). "Caves of the Nullarbor - a review of speleological investigations in the Nullarbor Plain, Southern Australia", Speleological Research Council Ltd, 1978.
- Environmental Protection Authority, (1975). "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, Perth.
- Environmental Protection Authority, (1976). "Conservation reserves for Western Australia as recommended by the Environmental Protection Authority 1976 - Systems 1, 2, 3, 5", Department of Conservation and Environment, Perth.
- Esperance Shire Council, (1984). "Israelite Bay Management Plan", Esperance Shire Council, December 1984.
- Fisheries Department, (1990). "Anglers and Divers fishing guide", pamphlet.
- Fisheries Department, (1990). "Marron Fishing in WA", pamphlet.
- Fisheries Department, (1990). "Net fishing and Closed Waters in WA", pamphlet.
- Fisheries Department, (1990). Fishing for Rock Lobsters in WA", pamphlet.
- Gentili, J. (Ed), (1979). "Western Landscapes", University of Western Australia Press, Perth.
- Government of Western Australia, (1988). "Mining and the environment. Balancing the scales", Western Australian Government Policy Report.

- Government of Western Australia (1989). "Government Policy for administration of coastal squatter shacks", Western Australian Government Policy.
- Government of Western Australia (1990). "Resolution of conflict. A clear policy for national parks", Western Australian Government Policy Report.
- Hallam, S.J. (1975). "Fire and hearth: a study of Aboriginal usage and European usurpation in south-western Australia", Australian Institute of Aboriginal Studies, Canberra.
- Hendee, J.C., Stankey, G.H. and Lucas, R.C. (1978). "Wilderness Management", US Forest Service Miscellaneous Publication No 1365, October 1978.
- Hodge, B. (1987). "Inventories of the Estuaries and Coastal Lagoons of South-Western Australia" in Hodgkin, E.P. and Clark, R. "An inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Wellstead Estuary, the Estuary of the Bremer River", Environmental Protection Authority, WA Estuarine Studies Series 1.
- Hodgkin, E.P., and Clark, R. (1987). "An Inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Wellstead Estuary, the Estuary of the Bremer River", Environmental Protection Authority, WA Estuarine Studies Series 1.
- Hodgkin, E.P., and Clark, R. (1988a). "An Inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Wilson, Irwin and Parry Inlets, the Estuaries of the Denmark Shire", Environmental Protection Authority, WA Estuarine Studies Series 3.
- Hodgkin, E.P., and Clark, R. (1988b). "An Inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Beaufort Inlet and Gordon Inlet, Estuaries of the Jerramungup Shire", Environmental Protection Authority, WA Estuarine Studies Series 4.
- Hodgkin, E.P. and Clark, R (1989). "An Inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Estuaries of the Shire of Esperance", Environmental Protection Authority, WA Estuarine Studies Series 5.
- Hodgkin, E.P. and Clark, R (1990a). "An inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Estuaries of the Shire of Ravensthorpe", Environmental Protection Authority, WA Estuarine Studies Series 7.
- Hodgkin, E.P. and Clark, R (1990b). "An Inventory of Information on the Estuaries and Coastal Lagoons of South-Western Australia. Estuaries of the Shire of Albany", Environmental Protection Authority, WA Estuarine Studies Series 8.

- Howard, M.C. (1979). "Aboriginal society in south-western Australia". In Berndt, R.M. and Berndt, C.H. (Eds), "Aborigines of the West. Their past and their present", University of WA Press for the Education Committee of the 150th Anniversary Celebrations, 1979.
- Jarvis, N.J. (Ed), (1979). "Western Australia - an atlas of human endeavour 1829-1979", Departments of Education and Lands and Surveys, Perth.
- McKenzie, N.L. and Robinson, A.C. (Eds) (1987). "A biological survey of the Nullarbor Region of South and Western Australia in 1984", SA Department of Environment and Planning, WA Department of Conservation and Land Management and Australian National Parks and Wildlife Service.
- McNamara, K.J. and Prince, R.I.T. (1986). "Kangaroo management in Western Australia", Department of Conservation and Land Management. Wildlife management program No. 3.
- Meney, K. and Brown, P. (1985). "Forest on foot: 40 walks in the forest of the South-West of Western Australia", Campaign to Save Native Forests, Perth, 1985.
- 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.
- Newbey, K.R. (1987). "Draft Management Plan Pallinup / Beaufort Inlet Area", Bulletin 178, Environmental Protection Authority, 1987.
- Nind, S. (1832). "Description of the natives of King George's Sound (Swan River Colony) and adjoining country", Royal Geographical Society Journal 1, 21-51. In "Nyungar, the people. Aboriginal customs in the south-west of Australia", Ed N.Green, Creative Research, Perth, 1979.
- O'Brien., B.J. (Ed, 1979). "Environment and Science", University of WA Press, Perth.
- Pawley, S. (1982). "A Stirling effort : rugged and spectacular bushwalking on West Australia's prickly Stirling Range", Australian Wild Magazine, 2 (4), 38-41.
- Sandiford, E.(Libby) M. (1988). "Rugged Mountains, Jewelled Sea - explore the living history of the South Coast from Eucla to Albany", Department of Conservation and Land Management, Perth.
- Smith, M. (1982). "Late Pleistocene Zamia exploitation in southern Western Australia", Archaeol Oceania 17, 117-121, 1982.
- Smith,V. (1990). "The terrestrial vertebrate fauna of the Torndirrup National Park", Western Australian Naturalist, 18 (3), 82-92.

- Stankey, G.H., Cole, D.N., Lucas, R.C., Petersen, M.E. and Frissell, S.S. (1985). "The Limits of Acceptable Change (LAC) System for Wilderness Planning", US Department of Agriculture, Forest Service, General Technical Report.
- Tindale, N.B. (1974). "Aboriginal Tribes of Australia", Los Angeles, University of California Press.
- Van Steveninck, A., Burkin, B. (1984). "Starvation Boat Harbour Coastal Management Plan", Department of Conservation and Environment, Bulletin 15 1, February 1984.
- Van Steveninck, A. (1984). "Jerramungup Coastal District Recreation Survey", Department of Conservation and Environment, Bulletin 162, January 1984.
- Von Brandenstein, C.G. (1988). "Nyungar anew. Phonology, text samples and etymological and historical 1500 word vocabulary of an artificially re-created aboriginal language in the southwest of Australia", Department of Linguistics, Australian National University.
- Waltham, A.(Tony) C. (1974). "Caves", Macmillan 1974.
- Watson, J. (1978). "Caves in Western Australia", Department of Conservation and Environment, Bulletin No 51, September 1978.
- Watson, J.R. (1982). "Water-based recreation in national parks on the South Coast of Western Australia", Recreation Australia 2, 24-29.
- Watson, J.R. (1984). "Blowholes visitor survey - Torndirrup National Park, Western Australia", Australian Ranger Bulletin, 2 (4), 122-3.
- Watson, J.R. (1985). "Volunteer programs - an aid to park management and a valuable communication link with the community", Australian Ranger Bulletin, 3 (3), 12-13, 1985.
- Watson, J.R. (1988). "The management of national parks and wilderness in the Western USA with special reference to visitor safety", Department of Conservation and Land Management, Occasional Paper 2/88.
- Watson, J.R. (1991). "The Identification of River Foreshore Corridors for Nature Conservation in the South Coast Region of Western Australia", in "Nature Conservation 2 : The Role of Corridors", ed. by D.A. Saunders and R.J.Hobbs, Surrey Beatty and Sons, pp 63-38.
- Western Australian Museum, (1988). "The Biological Survey of the Eastern Goldfields of Western Australia. Part 4. Lake Johnson-Hyden Study Area", Records of the WA Museum Supp. No 30.
- Western Australian Tourism Commission, (1991). "Western Australian Regional Tourism Research Monitor, Executive summary, July 1989 - June 1990".

GLOSSARY

Glossary

Active recreation:	Recreation which has a significant effect on one or more of the following: native flora, fauna, the environment, or other people.
Agroforestry:	Combining agriculture, grazing or cropping with forestry on the same land.
Archaean:	Pre-Cambrian (older than about 570 million years).
Catchment:	The surface area from which water runs off to a river or any other collecting reservoir (for example, swamps and groundwater).
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.
Clay pans:	Areas of clay deposition formed from small shallow lakes.
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.
Craton:	A major structural unit of the earth's crust consisting of a large stable mass of rock.
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.
Declared plants:	"Weeds" which by law have to be destroyed or controlled by landowners or land managers.

Declared Rare or Otherwise in Need of Special Protection:	A species may be declared "rare" if less than a few thousand adults exist in the wild or "Otherwise in Need of Special Protection" if it is not presently in danger of extinction but is at risk over a longer period.
Development:	Modification of the biosphere and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life.
Doline:	A sink hole down which surface waters proceed underground in karst country.
Duplex soil:	A double layered soil type, generally freely drained sand over clay or some other soil horizon that is essentially impervious to water.
Ecosystem:	A specific environment, for example, a lake including all its biological, chemical and physical components.
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.
Ethnographic Research:	Study of Aboriginal traditional knowledge.
Eutrophication:	Water pollution caused by excessive plant nutrients (mainly phosphorus and nitrogen) causing excessive plant growth such as algae and phytoplankton.
Exotic:	A plant introduced from another locality. Not indigenous.
Fault:	A fracture in a rock along which there has been an observable amount of movement.
Fauna:	Animal life.
Feral Animal:	An introduced or domestic animal now living in the wild.
Flora:	Plant life.
Fold:	A movement of the earth's surface. A flexure of rocks, that is, a change in the amount of dip of a bed of rock.

Forb:	A herbaceous perennial.
Forest:	An ecosystem characterised by a more or less dense and extensive tree cover.
Freehold land:	Land owned by a private person or organisation.
Geomorphology:	The description and interpretation of landforms.
Gneiss:	Banded rock formed during high-grade regional metamorphism. Generally coarse-grained rock.
Granite:	A coarse-grained igneous rock.
Greenstone:	A field term for any slightly altered basic rock.
Hardwood:	The timber of broadleaved trees and the trees themselves, belonging to the botanical group Angiosperms, for example, Eucalypts.
Hydrology:	The study of water movements, quality, distribution and utilisation, above, on and below the ground.
Igneous rocks:	One of three main groups of rocks. The primary source of material on the earth's surface. Formed from molten rock.
Interpretation:	The process of communicating the significance (bringing out the meaning) of an area by describing and explaining its characteristics.
Joint:	A fracture in a rock between the sides of which there is no observable relative movement.
Karst:	Pattern of denudation in limestone and dolomitic rocks caused by groundwaters and underground streams.
Laterite:	Residual deposits of hydrated iron oxides and aluminium oxides (bauxite in particular).
Landform:	All the physical, recognisable, 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.
Marine:	Of ocean or sea. (Note: Terrestrial and freshwater flora and fauna can also be included in "Marine Reserves").

Metamorphic rock:	One of the three main groups of rocks. End product of metamorphism.
Metamorphism:	The processes by which changes are brought about in rocks within the earth's crust by the agencies of heat, pressure and chemically active fluids.
Multiple use management:	The use of an area for several different purposes.
Orogen:	An area formed by the process of mountain building which leads to intense deformation of existing rocks.
Passive recreation:	Recreation which has an insignificant effect on native flora, fauna, the environment and other people.
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.
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 570 million years ago to the time of consolidation of the earth's crust about 4 500 million years ago.
Priority use:	The use which will prevail in any situation of conflict between various uses.
Proterozoic rocks:	Rocks from the Precambrian time period.
Quartzite:	Metamorphosed sedimentary rock.
Rehabilitation:	Process necessary to return disturbed land to a predetermined surface, land use or productivity.
Salinity:	The measure of total soluble (dissolved) salt (mineral constituents), in water. Water containing more than 500 parts per million (mg/l) is not considered desirable for domestic use.
Salt lake:	Body of inland salty water.

Scarp:	An inland cliff or steep slope, often formed as a direct result of a geological fault.
Sedimentary rocks:	One of the three main groups of rocks. Formed from pre-existing rocks by the action of erosion (for example, sandstone), chemical precipitation (for example, rock salt) or the activity of organisms (for example, limestone).
Shale:	A sedimentary rock which easily splits along the planes of deposition.
Sharefarming-	The commercial growing (farming) of trees by a landowner in association with the Department.
Silviculture:	The art and science of establishment and tending of forest.
Skeletal soil:	Very thin cover of soil over rock.
Softwood:	The timber of trees and the trees themselves, belonging to the botanical group Gymnosperms, for example, pines.
Specially Protected Fauna:	See Declared Rare or Otherwise in Need of Special Protection.
Species richness:	A measure of the diversity of species. A "species rich" area has many different species present.
Speleologist:	One who studies caves.
Strategic Plan:	A document expressing an organisation's direction and commitments, for example, in terms of its mission, charter, objectives and strategies.
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.
Terrestrial:	On land, land dwelling.
Tertiary:	Period of geological time, from about 1 million to 65 million years ago.
Unconsolidated sands:	Loose sands which have not been cemented together.
Underground water:	Water which occupies the pores and crevices of rock and soil.

- Vermin: Destructive animals or pests, usually introduced.
- Volcanic rock: Fine grained or glassy igneous rock.
- Weeds: Plants (often self-sown exotics) growing where they are not wanted.
- Wetland: Any lowland area covered by shallow and sometimes temporary or intermittent waters (for example, 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.	<i>Acacia</i>
APB	Agriculture Protection Board
ASF	Australian Speleological Federation
B.	<i>Banksia</i>
CALM	(Department of) Conservation and Land Management
CITES	Convention on International Trade in Endangered Species
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTRC	Conservation Through Reserves Committee
E.	<i>Eucalyptus</i>
EPA	Environmental Protection Authority
ERMP	Environmental Review and Management Program
<i>et al.</i>	and others
ha	hectare
JAMBA	Japan Australia Migratory Birds Agreement
km	kilometre
L.	Lake
LAC	Limits of Acceptable Change
LFC	Lands and Forest Commission (a controlling body established under Section 20 of the CALM Act, 1984)
M.	<i>Melaleuca</i>
MPA	Management Priority Area
P.	<i>Pinus</i>
m	metre
m ²	square metres
m ³	cubic metres
mg/l	milligrams per litre
n.d.	No date
NPNC	National Parks and Nature Conservation Authority (a controlling body established under Section 21 of the CALM Act, 1984)
RAOU	Royal Australasian Ornithological Union
ROS	Recreation Opportunity Spectrum
SAS	Special Air Services
SEC	State Energy Commission
t	Tonnes
TDS	Total dissolved solids
VCL	vacant Crown land
VHF	very high frequency
VISTAT	Visitor information statistics program (a system to record the number and use patterns of visitors to selected areas managed by CALM)
WAWA	Water Authority of WA

APPENDICES

APPENDIX 1

PROPOSED CHANGES IN TENURE, VESTING AND PURPOSE IN THE SOUTH COAST REGION

Please Note:

1. The great majority of recommendations made in the Draft Plan were not "new" but rather they were either:
 - outstanding from previous reports, for example, the EPA Red Books, EPA South Coast Reserves Working Group Recommendations, various coastal management plans pertaining to the Shires of Denmark, Jerramungup, Ravensthorpe and Esperance and reports on the Nullarbor from 1978 (EPA / ASF) and 1987 Ooint WA / SA) biological survey assisted by the Australian National Parks and Wildlife Service
 - simply formalising the vesting of existing but unvested reserves and national parks by recommending formal vesting in the NPNCA
 - already agreed to by the various interested parties, for example, Local Authorities and relevant Government Departments, but not yet actually implemented due to administrative delays such as the need for survey of boundaries.
2. Implementation of certain "EPA Red Book" proposals affecting the South Coast Region is occurring independently of the regional planning process as outlined in the Government's "Resolution of Conflict" document released in 1990.
3. The action to be taken by CALM on each proposal outlined in this Appendix has been determined in the light of public submissions received on the Draft Plan, as indicated in the "Summary of Public Submissions" document.

SHIRE OF DENMARK

D1 Draft Proposal: A 98 ha block, Forest Act Reserve 175/25, which contains karri regrowth and which would be more appropriately managed as a nature reserve.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

D2 Draft Proposal: Vacant Crown land and unvested reserve 10048 including Owingup Swamp and the lower reaches of the Kent River to be added to Quarrarn Nature Reserve 33842. EPA Red Book recommendation 2.12 (2) refers.

Action: This proposal has been implemented through normal administrative processes but is a separate nature reserve, not an addition to Reserve 33842.

D 3 Draft Proposal: Stanley Island (vacant Crown land) located off Point Hillier to be added to Quarrarn Nature Reserve. EPA Red Book recommendation 2.13 refers.

Action: CALM will pursue implementation of this proposal now.

D 4 Draft Proposal: Approximately 6 ha in the south-east corner of William Bay National Park (Reserve A24482) to be transferred to Reserve A24913 Parklands and Recreation vested in the Shire of Denmark. This would enable the Shire to provide access and to manage the Lights Beach area as a total unit (currently Lights Beach and access thereto fall partly within A24913 and partly within A24482).

Action: CALM will not pursue implementation of this proposal at this time but will consider seeking further public comment at a later date.

SHIRE OF ALBANY

A1 Draft Proposal: A 20 ha block, Forest Act Reserve 217/25, which contains karri regrowth and which would be more appropriately managed as a nature reserve.

Action: CALM will pursue implementation of this proposal now.

A2 Draft Proposal: An unvested Timber Reserve A7557 which is to be included within West Cape Howe National Park.

Action: This reserve has been incorporated in the West Cape Howe National Park as proposed.

A 3 Draft Proposal: Migo, Richards and Seagull Islands, currently vacant Crown land, to become nature reserves. EPA Red Book recommendation 2.13 refers.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

A 6 Draft Proposal: Reserve 801, Parkland and Recreation, currently vested in the Shire of Albany, to be cancelled and added to Marbellup Nature Reserve 24891 which lies adjacent. Reserve 801 is uncleared and has no known public use. It contains declared rare flora.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

A 7 Draft Proposal: Reserve 20948, Water Supply, currently vested in the Minister for Water Resources, to be established as a nature reserve vested in the NPNCA but with Water retained in the purpose.

Action: This proposal has been implemented through the normal administrative processes. CALM will however, make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

A 8 Draft Proposal: Reserve 24000, Timber Firewood, unvested, to become State forest. This would enable the Department to more formally manage the area as source of domestic firewood on a sustainable basis.

Action: CALM will pursue implementation of this proposal now.

A10 Draft Proposal: Reserve 28503, Gravel Quarry, currently vested in the Shire of Albany, to be cancelled and added to Torndirrup National Park. The gravel source is exhausted and addition

to the National Park was agreed to several years ago but action to effect the change was overlooked.

Action: CALM will pursue implementation of this proposal now.

A11 Draft Proposal: Reserve 23923, an unvested flora reserve, to become a nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

A14 / 15

Draft Proposal: Reserve 33308, Recreation, Town of Albany and Class "A" Reserve 27107, National Park, unvested, to be amalgamated to form a national park vested in the NPNCA. The area contains several species of rare flora, rare fauna and provides a scenic backdrop to Albany and King George Sound. Existing recreational use would continue to be catered for and possibly expanded through the mechanism of a management plan.

Action: CALM will

- pursue implementation of proposal A 15 now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan
- hold further discussions with affected parties on proposal A 14 before implementation is pursued.

A16 Draft Proposal: Class "A" Reserve 28690, Conservation of Flora, unvested, to be added to Mount Mason Nature Reserve 28689 which is already vested with the NPNCA.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

A17 Draft Proposal: Reserve 22058, Conservation of Flora and Fauna, vested in the NPNCA to be cancelled and vested in the Town of Albany to form part of Council's Lake Seppings management proposals.

Action: CALM will pursue implementation of this proposal now.

A17a

Draft Proposal: Class "A" Reserve 24991, Water and National Park, unvested, to become managed as part of Two Peoples Bay Nature Reserve. Subject to the requirements of the Water Authority of WA, Water may be retained in the purpose of the reserve. The reserve contains rare flora and has potential habitat for the Noisy Scrub-bird.

Action: CALM will pursue implementation of this proposal now.

A18 Draft Proposal: Reserve A24705 Moodiarup Road, has a current purpose National Park (Flora). The purpose should be changed to Conservation of Flora and Fauna.

Action: CALM will pursue implementation of this proposal now.

A19 Draft Proposal: Class "A" Reserve 23850, Recreation, Camping and Water, unvested, is in excellent condition and protects the wetlands of Lake Corimup. The area would provide a valuable nature reserve.

Action: CALM will pursue implementation of this proposal now.

A20, A21, A22, A23, A23a, A23b, A23c, A23d

Draft Proposal: Action is already nearing completion to establish Waychinicup National Park comprising Mount Manypeaks Nature Reserve 36028; the Arpenteur Nature Reserve 36719; Cheyne Road Nature Reserve 27157; Reserves 25865, 27502, 31888, 29883 and vacant Crown land. The Department has been managing the area in liaison with the Shire of Albany and the Water Authority of WA since 1986. The amalgamation derived from a Cabinet endorsed EPA South Coast Reserves Working Group recommendation following Recommendation 2.14 of the EPA Red Book.

Action: Proposals A20, A21 and A23d have been implemented through the normal administrative processes. CALM will pursue implementation of proposals A22, A23a, A23b and A23c now.

CALM remains committed to proposal A23 and will make further contact with affected parties before implementation is pursued. Discussions have already commenced with the Water Authority of WA.

A24 Draft Proposal: Hassell National Park, Reserve A26650, is a long narrow road reserve which does not meet the criteria for a national park. The area would be more appropriate as a miscellaneous reserve allowing for the existing multiple use to occur whilst still protecting roadside vegetation as the primary management objective.

Action: CALM will make further contact with affected parties to discuss changing the proposal from miscellaneous reserve to conservation park.

A25 Draft Proposal: Cheyne Island near Cape Riche, Reserve 14944, is currently unvested with a purpose Parklands and Recreation. The island should become a nature reserve in line with EPA Red Book recommendation 2.14.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

A26, A27, A28, J8

Draft Proposal: Reserve 31240, Government Requirements, unvested, extends from south-west of Cape Riche in the Albany Shire to the Pallinup River in the Jerramungup Shire (A26 / J8). This reserve, together with Class "A" Reserve 14943, Parklands and Recreation, unvested and a narrow strip of vacant Crown land at Cheyne Bay, should be amalgamated into a conservation park. The area has high conservation value including species of declared rare flora. As conservation park, existing legitimate recreational use may continue.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued. This will include discussions with Aboriginal groups who have independently expressed an interest in camping in this area.

A29 Draft Proposal: Reserve 1998, Camping and Conservation of Flora and Fauna, Shire of Albany. The reserve should become a nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

A30 Draft Proposal: Reserve 5205, Gledhow Nature Reserve, is a small swamp area on the outskirts of Albany and is currently not vested. It should be vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

A31 Draft Proposal: Reserve 30791 is an unvested nature reserve adjacent to Mt Boyle Road near the Kalgan River. It should be vested in the NPNCA.

Action: This proposal has been implemented through the normal administrative processes, however, CALM will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

SHIRE OF PLANTAGENET

P2 Draft Proposal: Reserve 25965, Conservation of Flora, unvested, to become a nature reserve vested in the NPNCA. The reserve, though small, is in excellent condition and contains rare flora.

Action: This proposal has been implemented through the normal administrative processes.

P3- Draft Proposal: Reserve 15775, Yellanup Road is currently an unvested reserve for Drainage and Conservation of Flora. The reserve should become a nature reserve vested in the NPNCA.

Action: CALM- will not pursue implementation of this proposal at this time but will consider seeking further public comment at a later date.

P4 Draft Proposal: Class "A" Reserve 10003, Conservation of Flora and Fauna, unvested, to be vested in the NPNCA.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

P5 Draft Proposal: Reserve 17644 comprises a small disused gravel pit adjacent to Porongurup National Park. It should be cancelled and added to the National Park.

Action: CALM will pursue implementation of this proposal now.

P6, P7, P8

Draft Proposal: Reserves 800, Public Utility, unvested, 27605, Public Enjoyment, unvested and 27607, Recreation Golf Course, Shire of Plantagenet, at Kamballup lie adjacent to each other and collectively comprise approximately 120 ha of diverse topographic relief. The area has high floristic value with several species of flora at the limits of their natural range and one unnamed *Eucalyptus* species. Ideally the area should be established as a nature reserve, however, use by the local community and recent quarrying activities (soapstone) may necessitate a multiple use designation under Section 5g of the CALM Act.

Action: CALM will hold further discussions with affected parties on the possibility of pursuing reservation of parts of these areas under Section 5g of the CALM Act where nature reserve vesting may conflict with existing uses and the remainder as nature reserve. Protection of the declared rare flora species present (only known population) will be ensured.

P9 Draft Proposal: Reserve 1090, Water and Stopping Place, vested in the Minister for Water Resources, is an enclave reserve within the Stirling Range National Park. It has been effectively managed as part of the National Park for many years and the purpose should be amended to National Park and Water, with vesting in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

SHIRE OF GNOWANGERUP

G1 Draft Proposal: Reserve 15756, Conservation of Flora, unvested, at Toompup, to be vested as a nature reserve in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

SHIRE OF JERRAMUNGUP

- J1 Draft Proposal:** Reserve 22343, Water, unvested, lies adjacent to an existing nature reserve (26792) which is vested in the NPNCA. It would be desirable to amalgamate the two reserves, however as the reserves lie in two different Shires (Jerramungup and Gnowangerup) and because of the preference of the Water Authority of WA to retain Water in the purpose, it is proposed that Reserve 22343 be retained as a separate reserve with a purpose Conservation of Flora and Fauna and Water, vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now.

J2, J3a

Draft Proposal: Reserve 33257, Parklands and Recreation, unvested and a corridor of vacant Crown land along Corackerup Creek provide a link between the Pallinup Estuary (proposed conservation park) and the Corackerup and Peniup Nature Reserves. Both areas should become nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

- J3 Draft Proposal:** Reserve 29500, Government Requirements, unvested, is a large (6 000 ha) reserve with very high conservation value including the presence of rare fauna. The reserve is to become a nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of this proposal as soon as the issue of gavel extraction is resolved and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

J4, J5, J5a, J6, J7, J8

Draft Proposal: It is proposed to establish a conservation park around the Pallinup Estuary (Beaufort Inlet) by amalgamating the following areas:

Reserve 14986, Parklands and Recreation, unvested;
Reserve 14987, Recreation and Camping, Shire of Jerramungup;
Reserve 14988, Recreation and Camping, Shire of Jerramungup;
Reserve 22353, Recreation and Camping, Shire of Jerramungup;
(Part) Reserve 27102, Common and Recreation, unvested;
Reserve 33257, Parklands and Recreation, unvested.

The Millers Point area, Reserve 21647, Recreation and Camping, should remain vested in the Shire of Jerramungup. Reserve 33257 extends west into the Albany Shire as recommendation A26. The area in question has been variously proposed as national park and nature reserve and has been addressed by the EPA South Coast Reserves Working Groups for Jerramungup

and formerly for Gnowangerup. The high conservation value of the area is addressed by Newbey (1987) and a study of the Beaufort Inlet has been documented by Hodgkin and Clark (1988b).

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

J8a Draft Proposal: Reserve 28283, Government Requirements, unvested, is a 101 ha reserve located on Gairdner South Road and contains remnant vegetation primarily of open yate and open mallee woodlands and samphires along drainage lines. The reserve should become a nature reserve vested in the NPNCA.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

J9, J10, J11, J12, J13

Draft Proposal: It is proposed to establish a nature reserve corridor link between the Lake Magenta Nature Reserve and Fitzgerald River National Park by amalgamating the following areas:

Reserve 26172, Water, unvested;

Reserve 36207, Recreation and Parkland, unvested;

Reserve 1028, Resting Place, unvested;

Vacant Crown land / Road 8792;

Reserve 35398, Recreation, unvested.

The proposed corridor along the Fitzgerald River valley is in excellent condition throughout. It should be vested in the NPNCA as a nature reserve.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

J14 / R28, J15, J18, J21, J22, J23 / J24, J33, J34, J35, J36

Draft Proposal: It is proposed that the Fitzgerald River National Park be extended to more logical cadastral and physical boundaries by adding the following areas:

(Part) Reserve 32666, Government Requirements, unvested;

Reserve 1029, Resting Place, unvested;

Vacant Crown land (park headquarters);

Reserve 5051, Water, unvested, vacant Crown land (south of Calyerup);

(Part) Reserve 33258, Parklands and Recreation, unvested;

Reserve 2507, Water, unvested;

Reserve 3251, Resting Place for Travellers and Stock, unvested;

Reserve 2524, Water, Minister for Water Resources;

Reserve 23060, Public Utility, unvested.

Most of the land in this proposal was recommended for addition to the National Park in EPA Red Book recommendation 3.2 (Figure 3.8). Reserves 2507 and 2524 may need to remain as separate reserves with a purpose of National Park and Water.

Action: Proposals J23 and J24 are to become nature reserves under Government policy. CALM remains committed to the addition of these areas to the Fitzgerald River National Park. CALM will conduct a review of the boundaries of these proposals and then make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

CALM will pursue implementation of proposals J15, J18 and J36 now.

CALM will pursue implementation of the part of proposal J14 which lies to the north of Gordon Inlet Road and make available for vesting in the Shire of Jerramungup those parts of the Fitzgerald River National Park which lie south-east of that road.

CALM will not pursue implementation of proposals R28, J33, J34 or J35.

CALM remains committed to proposals J21 and J22 and will make further contact with affected parties before implementation is pursued.

J25 Draft Proposal: An isolated portion of the Fitzgerald River National Park located at Dillon Bay is not appropriate as national park and would be better left as vacant Crown land or made available for alternative reservation.

Action: CALM will pursue re-vesting of this reserve in the Shire of Jerramungup now and make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

J19, J20

Draft Proposal: Reserve 10132, Water Supply / Rabbit Proof Fence, unvested and surrounding vacant Crown land in the Calyerup area. In the EPA Red Book it was recommended that the area of vacant Crown land should be added to the Fitzgerald River National Park (Recommendation 3.2, Figure 3.8). Whilst this outcome is favoured by CALM and the NPNCA in whom the area would be vested, it is recognised that there are mining and mineral prospecting activities in the area. The area was therefore proposed in the draft as a miscellaneous reserve vested in the NPNCA and allowing for multiple use.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

J17, J26, J27, J28, J29, J30, J31, J32, R20, R21, R22

Draft Proposal: The following enclave reserves located within the Fitzgerald River National Park should become part of the Park:

Reserve 20393, Water, unvested;

Reserve 1406, Water, unvested;

Reserve 10133, Water Supply Rabbit Proof Fence, unvested;

Reserve 12121, Water Rabbit Department, unvested;

Reserve 12122, Water Rabbit Department, unvested;

Reserve 12123, Water Rabbit Department, unvested;

Reserve 10135, Water Supply Rabbit Proof Fence, unvested;

Reserve 5055, Water, unvested;

Reserve 12124, Water Rabbit Department, unvested;

Reserve 512, Public Purposes, unvested;

Reserve 10865, Water Act, unvested.

Action: CALM will pursue implementation of these proposals now but will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

J37, J38

Draft Proposal: Reserve 22355, Recreation and Camping, Shire of Jerramungup, is an enclave reserve within the Fitzgerald River National Park which runs as a narrow foreshore strip along both sides of the Bremer River. It is proposed that the section along the northeast bank of the river be cancelled and added to the National Park. The section of the National Park to the south-west of the river is difficult to manage especially if the Wellstead Estuary sand bar at Bremer Bay is open, when rangers have to take a long detour via Devils Creek Road to reach the area. It is proposed that this isolated section of the National Park to the south-west of the river be added to the remaining portion of Reserve 22355 along the south-west bank of the river and be managed by the Shire of Jerramungup.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

SHIRE OF RAVENSTHORPE

R1a Draft Proposal: Reserve 31424, Flora and Fauna, unvested should be established as a nature reserve vested in the NPNCA. The reserve contains a broad range of local vegetation associations and contains the Western whipbird, a rare and endangered bird.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

R2 Draft Proposal: Reserve 39566, Preservation of Timber, currently vested in the NPNCA has already been recommended for divesting from the NPNCA as it is not appropriate as either national park or nature reserve.

Action: CALM will pursue an appropriate divesting of this reserve now.

R3 / R4

Draft Proposal: Reserve 7853, Common, unvested and Reserve 23438, Recreation, unvested, near Hopetoun are to be established as a nature reserve vested in the NPNCA in accordance with a Cabinet endorsed recommendation of the EPA South Coast Reserves Working Group.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

R5a Draft Proposal: Reserve 8457, Water, unvested, lies adjacent to Jerdacuttup Lakes Nature Reserve and should be cancelled and added to that reserve.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

R6 Draft Proposal: Reserve 11577, Water Supply, Minister for Water Resources, near Kundip, contains declared rare flora and is adjacent to Kundip Nature Reserve. It should have a change of purpose to Conservation of Flora and Fauna and Water and be vested in the NPNCA.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

R6a Draft Proposal: Three sections of vacant Crown land / road reserve along the Ravensthorpe-Hopetoun Road are recommended as miscellaneous reserves vested in the

NPNCA. The roadside reserves cross a variety of different landforms and soil types and contain a rich and diverse flora.

Action: CALM will conduct a review of the components of this proposal recommending changes if necessary and then make further contact with affected parties before implementation is pursued.

R 8 Draft Proposal: Reserve 27177, Conservation of Flora, unvested, should become a nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

R9, R9a, R9b, R9c, R9d, R9e

Draft Proposal: A large area of vacant Crown land in the Hatter Hill area should be established as a nature reserve vested in the NPNCA. The area represents substrates associated with outcrop hills of granite and ironstone. The plant communities associated with these outcrops include declared rare flora and many endemic species which are not represented on reserves elsewhere. The following reserves should also be included:

Reserve 19866 Timber for use of Agriculture Department, unvested;

Reserve 9926 Water Supply Rabbit Department, unvested;

(Part) Reserve 13527 Water Supply Mines, unvested;

Reserve 13526 Water Supply Mines, unvested;

Reserve 21168 Water, Minister for Water Resources.

The latter area may need to remain as a separate reserve for Conservation of Flora and Fauna and Water, vested in the NPNCA.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

R10 Draft Proposal: Reserve 27023, Frank Hann National Park, vested in the NPNCA, would be more appropriate as a nature reserve due to its low recreational use. The area contains several species of declared rare flora.

Action: National park status is to be maintained for this area.

R11 / R12

Draft Proposal: Under a Cabinet endorsed EPA South Coast Reserves Working Group Recommendation, Reserve 9393, Paddock Rabbit Department, unvested and Reserve 7580, Rabbit Department, unvested, are to be established as nature reserves. It is proposed that the

lands involved lying to the west of the Rabbit Proof Fence be added to Reserve A40156, Jerdacuttup Lakes Nature Reserve and lands to the east of the fence be added to the west block of Reserve 32339, Lake Shaster Nature Reserve.

Action: This area is to become nature reserve under Government policy. CALM remains committed to seeking "A" Class status for these reserves and will make a further contact with affected parties about the views expressed in their submissions to the Draft Plan.

R13 Draft Proposal: The portion of Reserve 34410, Parklands and Recreation, unvested, lying between Aerodrome Road and Bell Road, should become a nature reserve vested in the NPNCA as it contains a diverse and undisturbed flora.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

R14 Draft Proposal: A block of vacant Crown land lying between Aerodrome Road and the northern boundary of Reserve 30795 should be established as a nature reserve vested in the NPNCA due to its diverse and undisturbed flora.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

R15, R16

Draft Proposal: Reserve 30795, Timber, unvested, known as Cocanarup Timber Reserve, is located both to the north-west and to the south-east of the Jerramungup-Ravensthorpe Road. The northern portion has been managed for timber cutting by the former Forests Department and subsequently by CALM. It is proposed that an area of vacant Crown land adjacent to the southern boundary of the northern portion and the section of Reserve 30795 lying between the Highway and Cocanarup Road, should be added to the area currently available for cutting and be established as State forest.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

R17, R23, R24, R25, R26, R27

Draft Proposal: A large area roughly bounded by the Cocanarup Road, the Hopetoun-Ravensthorpe Road and the northern boundary of the Fitzgerald River National Park comprises the following:

(Part) Reserve 30795, Timber, unvested, (section to the south of Cocanarup Road) vacant Crown land;

Reserve 205 10, Stock and Water Tank, unvested;
Reserve 20509, Water, Travellers and Stock, unvested;
Reserve 26662, Conservation of Flora and Resting Place, unvested;
Reserve 9559, Water Act, unvested.

In the EPA Red Book it was recommended that a substantial proportion of this area be added to the Fitzgerald River National Park (Recommendation 3.2, Figure 3.9). Whilst such an outcome is favoured by CALM and by the NPNCA in whom the area would be vested, it is recognised that there are mining and mineral prospecting activities in the area. The area was therefore proposed in the draft as a miscellaneous reserve vested in the NPNCA and allowing for multiple use. The area contains several species of declared rare flora and fauna.

Action: These areas are to become nature reserves according to Government policy. CALM will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

R29, R30

Draft Proposal: Reserve 32047, Parklands, unvested and Reserve 18460, Water and Camping, unvested should be established as a nature reserve vested in the NPNCA. The area is on granite bedrock and has no active mineral interest. It forms the northern part of the Ravensthorpe Range Reserve proposed under EPA Red Book Recommendation 3.8 (Figure 3.19).

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

R31, R32, R33, R34, R35, R36, R37, R38

Draft Proposal: The following areas form the balance of the EPA Red Book Recommendation 3.8 (Figure 3.19) for the Ravensthorpe Range:

Reserve 17880, Water, Minister for Water Resources;
Vacant Crown land north of the Ravensthorpe-Esperance Road;
Reserve 17384, Water, unvested;
(Part) Reserve 16119, Common, unvested;
Reserve 10021, Quarry Ironstone Flux, unvested;
Reserve 12201, Recreation Ground, unvested;
Vacant Crown land to the south of the Ravensthorpe-Esperance Road;
Reserve 31979, Parklands and Recreation, unvested.

In the EPA Red Book it was recommended that this area become a nature reserve (Recommendation 3.19). This remains the favoured outcome by CALM and by the NPNCA in whom the area would be vested. Due to the active mining and mineral prospecting activities, the area was proposed in the draft as a miscellaneous reserve vested in the NPNCA and allowing for multiple use. The Ravensthorpe Range contains several species of declared rare flora and fauna.

Action: These areas are to become nature reserves according to Government policy. CALM will conduct a review of the boundaries of these proposals recommending changes if necessary and then make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

R39 Draft Proposal: It is proposed that Cheadanup Nature Reserve, A31754, be extended by the addition of vacant Crown land to the north. The proposed addition contains the largest known population of a declared rare eucalypt.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

SHIRE OF ESPERANCE

E1 Draft Proposal: Approximately 100 ha of Lake Shaster Nature Reserve 32339 should be excised for addition to Reserve 32337, Recreation, Shire of Esperance. This is in accordance with a Cabinet endorsed EPA South Coast Reserves Working Group recommendation and will enable the Shire to improve its facilities at Munglinup Beach.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E1a Draft Proposal: Lake Shaster Nature Reserve comprises a western block extending from Munglinup Inlet to Starvation Boat Harbour and an eastern block between Munglinup Inlet and Stokes National Park which it adjoins. It is proposed that the eastern portion, less the area excised as per recommendation E I above, be added to Stokes National Park.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

E2 Draft Proposal: Reserve 25376, Timber and Water, unvested, is in good condition and would be valuable as a nature reserve vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E3 Draft Proposal: Reserve 35659, Conservation of Flora, unvested, should be vested as a nature reserve in the NPNCA.

Action: CALM will pursue implementation of this proposal now (less the area excised as a gravel reserve) and make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E4 Draft Proposal: Reserve 31745, Conservation of Flora and Fauna, unvested, should be vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E5, E6, E7, E8

Draft Proposal: There is an opportunity to provide a corridor link between uncleared land on the margins of the southern Goldfields and the coastal reserves of the Esperance Shire by reserving land along the Young River as a linear nature reserve incorporating:

Reserve A31762, Park, unvested;

Reserve A31751, Park, unvested;

Reserve A31750, Park, unvested;

Reserve A31749, Park, unvested.

Reserve 31751 may need to be reserved for multiple use under Section 5g of the CALM Act due to a current mining lease at the centre of the reserve.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

E9, E10, E11

Draft Proposal: There is opportunity to provide a similar corridor along the Lort River by establishment of a reserve incorporating:

Reserve A31739, Parklands, unvested;

Reserve 26913, Park, unvested;

Reserve A31761, Park and Protection of River and Foreshore, unvested.

A nature reserve vested in the NPNCA is proposed.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E 12, E 13, E 14

Draft Proposal: An area of Crown land comprising: Reserve 27888, Conservation of Flora, unvested; Reserve 26885, Conservation of Flora, unvested; (Part) Reserve 30672, Preservation of Natural Vegetation and Ocean Foreshore, unvested. These areas are currently proposed to form a nature reserve under a Cabinet endorsed EPA South Coast Reserve Working Group recommendation. However, this recommendation predates the establishment of CALM and it is now proposed that the area which extends from Stokes National Park in the west to the east shore of Lake Quallilup in the east, be simply added to Stokes National Park.

Action: These areas are to become nature reserves under Government policy. CALM remains committed to the addition of these reserves to Stokes National Park and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E15 Draft Proposal: Another Cabinet endorsed EPA South Coast Reserves Working Group Recommendation seeks to add a portion of Reserve 24486, Flora, unvested, to Lake Mortijinup Nature Reserve A35557, which is already vested in the NPNCA.

Action: This area is to become nature reserve under Government policy. CALM remains committed to seeking "A" Class status for this reserve and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E16 Draft Proposal: Reserve 19628, Conservation of Flora and Fauna, vested in the NPNCA, located at Dalyup, is badly degraded due to rabbits and weed invasion. It is not appropriate to remain as a nature reserve and should become vacant Crown land or be vested for an alternative purpose.

Action: CALM will pursue an appropriate re-vesting of this reserve now.

E18 Draft Proposal: A small (2 ha) disused gravel reserve is located on Reserve 14543, Gravel, unvested. The area is already effectively managed as part of Reserve 23527, Forestry Purposes, vested in the LFC. It is recommended that the reserve become part of the proposed Helms State forest (E 19a).

Action: CALM will pursue implementation of this proposal now.

E19 Draft Proposal: A small (10 ha) reserve, Reserve 34788, Explosives, unvested, is enclaved within Reserve 23527. It is recommended that the reserve become part of the proposed Helms State forest (E19a).

Action: CALM will pursue implementation of this proposal now.

E19a

Draft Proposal: Reserve 23527, Forestry Purposes, vested in the LFC, which includes Helms Arboretum should become State forest.

Action: CALM will pursue implementation of this proposal now.

E20, E21

Draft Proposal: Two reserves in the Pink Lake area should be established as nature reserves vested in the NPNCA:

Reserve 24511, Conservation of Flora, unvested;

Reserve 4182, Water and Conservation of Flora and Fauna, Minister for Water Resources.

Together these reserves provide a short, but potentially important, corridor link between coastal reserves west of Esperance and the western end of the Esperance lakes system of nature reserves.

Action: CALM will pursue implementation of these proposals now (less an area to be excised for future industrial use).

E25a, E25

Draft Proposal: The isolated eastern block of Reserve 28170, Use and Requirements of Government, unvested, lies adjacent to Cape Le Grand National Park and would provide a valuable addition. Part of the western block of Reserve 28170 adjacent to Mullet Lake Nature Reserve and including Bannitup Lake, should be added to Mullet Lake Nature Reserve which is already vested in the NPNCA. This recommendation derives from EPA Red Book Recommendation 3.4 (4) and from the EPA South Coast Reserves Working Group.

Action: CALM will pursue implementation of proposal E25a now and make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

Proposal E25 is to become nature reserve under Government policy. CALM remains committed to seeking "A" Class status for this reserve and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E28a, E28

Draft Proposal: Vacant Crown land and Reserve 27087, Conservation of Flora and Fauna, unvested, between Mungliginup Creek and Cape Arid National Park should be added to Reserve 27086 which is already vested in the NPNCA as a nature reserve.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued.

E31 Draft Proposal: Reserve 36002 at Israelite Bay, Preservation of Historic Buildings and Graves, is jointly vested in the National Trust of Australia (WA) and the Executive Director of CALM. As the area adjacent to the reserve is proposed to become national park (see E32), it is recommended that Reserve 36002 have a change of purpose to National Park and Preservation of Historic Buildings and Graves, with joint vesting arrangements continuing.

Action: CALM will not pursue implementation of this proposal at this time.

E32 / DS14

Draft Proposal: It is recommended that Nuytsland Nature Reserve A27632, vested in the NPNCA have a change of purpose from Primitive Area for the Study of Flora and Fauna, Geological and Anthropological Features, to National Park. This would recognise the scenic and recreational attributes of the area whilst still allowing for conservation as a primary purpose.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

E33, E33a, DS4

Draft Proposal: It is proposed to extend Peak Charles National Park north to the Lake King-Norseman Road and east and south to the limit of agricultural land. The southern extension will provide a link to the proposed Lort River corridor reserve. Reserve 2786 Resting Place, unvested ("The Cups") should be included.

Action: CALM will

- pursue implementation of that part of proposal DS4 which lies directly north of Peak Charles National Park and also proposal E33a now
- make further contact with affected parties on the remainder of proposal DS4 and also proposal E33 before their implementation is pursued.

E34 Draft Proposal: Reserve 21362, Tank, Minister for Water Resources, contains declared rare flora. The purpose should be changed to Conservation of Flora and Fauna and Water, with vesting in the NPNCA.

Action: CALM will not pursue implementation of this proposal as Reserve 21362 has now been vested in the Shire of Esperance for the purpose of Water Tank.

SHIRE OF DUNDAS

DS1, DS2, DS3

Draft Proposal: New nature reserves vested in the NPNCA are proposed in the Mt Day area to the north-west of Johnston Lakes, Knapp Rock area to the north of Johnston Lakes and in the Bremer Range. All three areas are currently vacant Crown land. The areas have been selected to represent the diversity of communities found in outcrop areas of the southern Goldfields.

Action: CALM remains committed to these proposals and will make further contact with affected parties before implementation is pursued. The potential for links between these proposals and the adjacent Wheatbelt and Goldfields Regions will be considered in the Management Plans for those Regions.

DS5 Draft Proposal: Reserve 8029, Water and Conservation of Flora and Fauna, Minister for Water Resources, ("Twenty Five Mile Rocks Nature Reserve"), would be more appropriately vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS5a

Draft Proposal: The existing Brockway Timber Reserve should become State forest. In addition, excellent stands of *Eucalyptus brockwayi* occur in the Mt Thirsty area 25 kilometres north-west of Norseman and in a second area approximately 15 kilometres west-north-west of Norseman. Both areas are vacant Crown land. The latter area is proposed as an additional block to Brockway State forest.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS6 / DS7

Draft Proposal: Reserve 17154, Water, Minister for Water Resources and Reserve 6043, Water, unvested, are recommended to become a nature reserve vested in the NPNCA. The area is located a few kilometres to the north-east of Norseman and includes Bekker Hill and Jimberlana Hill. It also contains proposed rare flora.

Action: CALM will not pursue implementation of these proposals at this time but will consider seeking further public comment at a later date. Measures will be taken to ensure the protection of the declared rare flora in the area of these proposals.

DS8 Draft Proposal: A new nature reserve is proposed in vacant Crown land to the south-east of Madoonia Downs pastoral station. Monitoring quadrats were established in the area around 1980 to measure long term changes in the status of species in the region.

Action: CALM remains committed to this proposal and will make further contact with affected parties before implementation is pursued.

DS9 Draft Proposal: Two large areas of vacant Crown land, one between Balladonia and Caiguna, the other south of Madura, were recommended for addition to the Nuytsland Nature Reserve in a recent biological survey of the Nullarbor (McKenzie and Robinson, 1987). These areas should now become national park in line with recommendation E32 / DS 14.

Action: CALM will pursue implementation of this proposal now and make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS10

Draft Proposal: Two large areas of vacant Crown land, one to the north of Madura and one to the north of Eucla along the WA / SA border, were recommended as nature reserves in the biological survey of the Nullarbor (McKenzie and Robinson, 1987). Both proposals extend into the CALM Goldfields Region and are also addressed in the Goldfields Regional Plan.

The Nullarbor karst landform is the largest of its kind in the world and has many unique features including caves and unique cave dwelling invertebrate fauna. In spite of this, most of the Nullarbor, particularly the southern half, is not represented in any Western Australian conservation reserve. A recent ecological computer analysis, (McKenzie et al. 1989), using data from the 1984 biological survey (McKenzie and Robinson, 1987), indicated that Nullarbor plants and animals could be assigned to 14 distinct groups. Of these, only 6 are represented in the existing reserve system; an additional 6 groups will be represented if the proposed reserves are established. The remaining two groups are present only on pastoral leases, but their fauna and flora are present elsewhere in the Goldfields.

The proposed reserves would exclude existing road and rail reserves and Loongana townsite reserve. Existing accesses within the proposed reserves (such as Madura to Loongana) will remain open but any further access would be subject to environmental impact assessment and CALM's concurrence.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS11

Draft Proposal: Several caves of the WA Nullarbor are recommended for reservation as they fall outside existing or other proposed reserves. These include Homestead Cave which the Australian Speleological Federation believes has the potential to be the longest in the world. The areas around the caves are proposed as miscellaneous reserves vested in the NPNCA.

Action: CALM will pursue implementation of this proposal now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS12 / DS13

Draft Proposal: A new national park was proposed in 1978 in the Abrakurrie-Eucla area. The proposal was endorsed by the more recent biological survey of the Nullarbor. The land in question is vacant Crown land and Reserve 19713, Water, unvested. This reserve should remain as a separate reserve with a purpose National Park and Water so as to protect any future water supply requirements. Vesting should be in the NPNCA.

Action: CALM will pursue implementation of these proposals now and will make further contact with affected parties about the views expressed in their submissions to the Draft Plan.

DS14

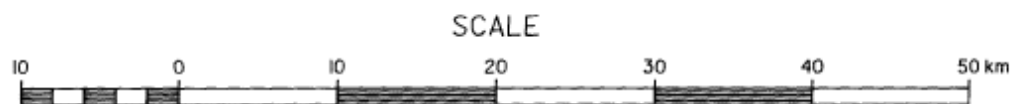
See Proposal E32.

FIGURES

CALM MANAGED PUBLIC LANDS

- as at 31 December 1990 -

ALBANY DISTRICT (WEST)



NATIONAL PARK



NATURE RESERVE



MISCELLANEOUS CALM
ACT RESERVE



STATE FOREST/
TIMBER RESERVE

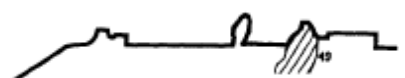


REGIONAL BOUNDARY



SHIRE BOUNDARY

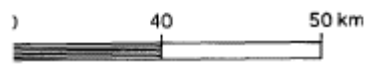
ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



LANDS

30 -

1



NATURE RESERVE

STATE FOREST/
TIMBER RESERVE

SHIRE BOUNDARY

IT BEEN SHOWN ON THIS MAP

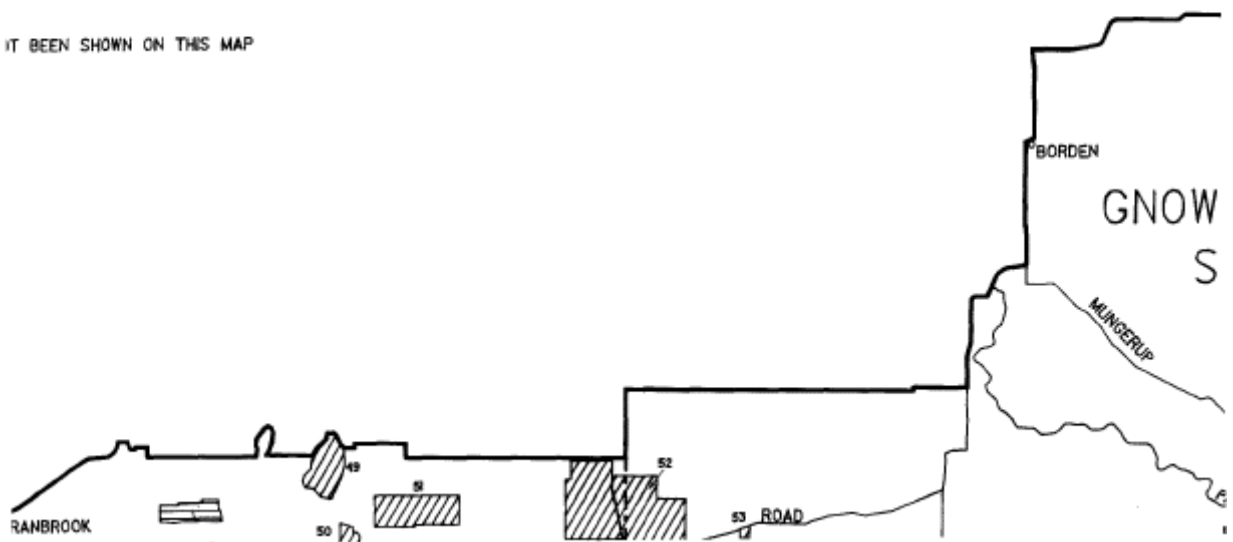
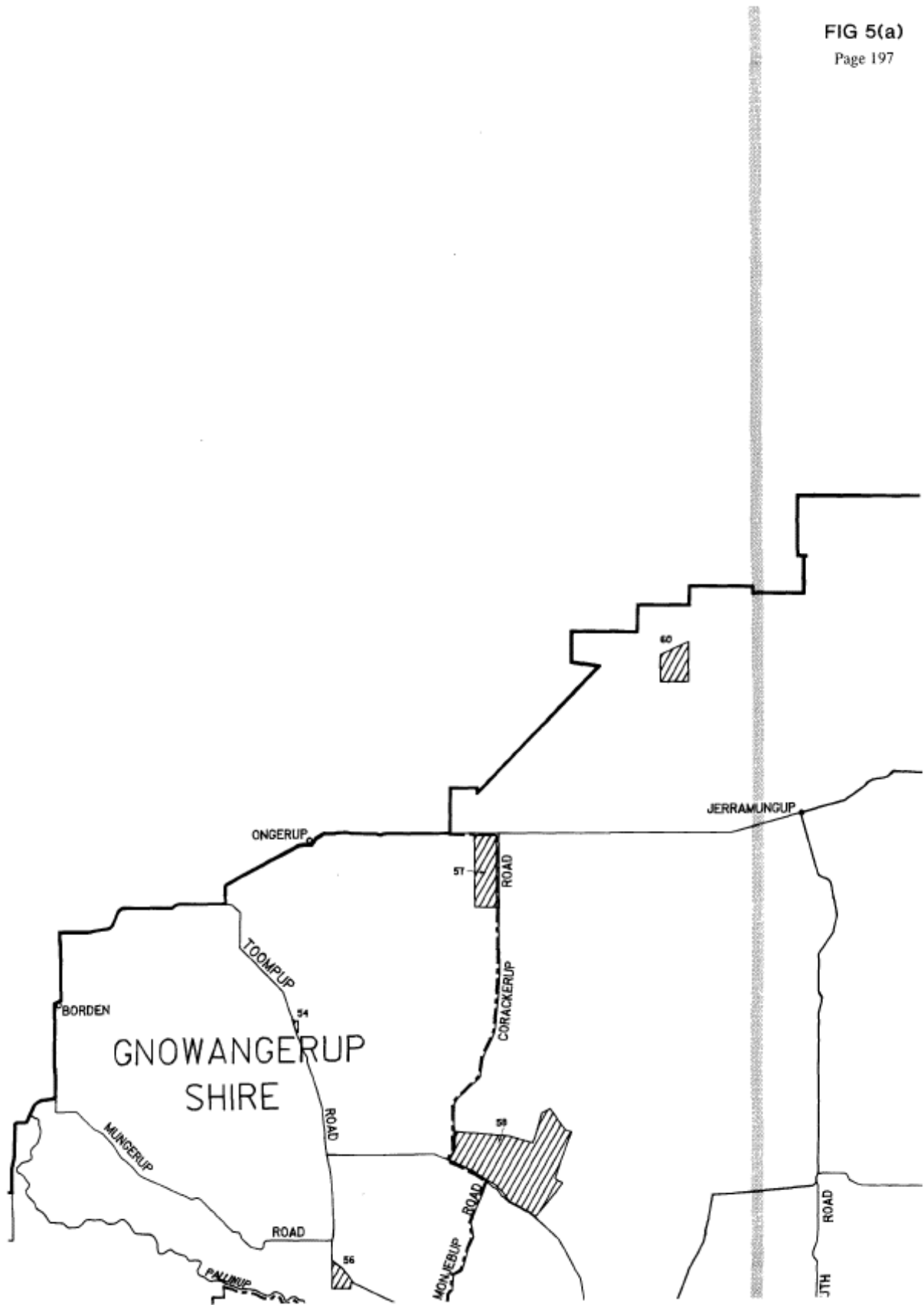
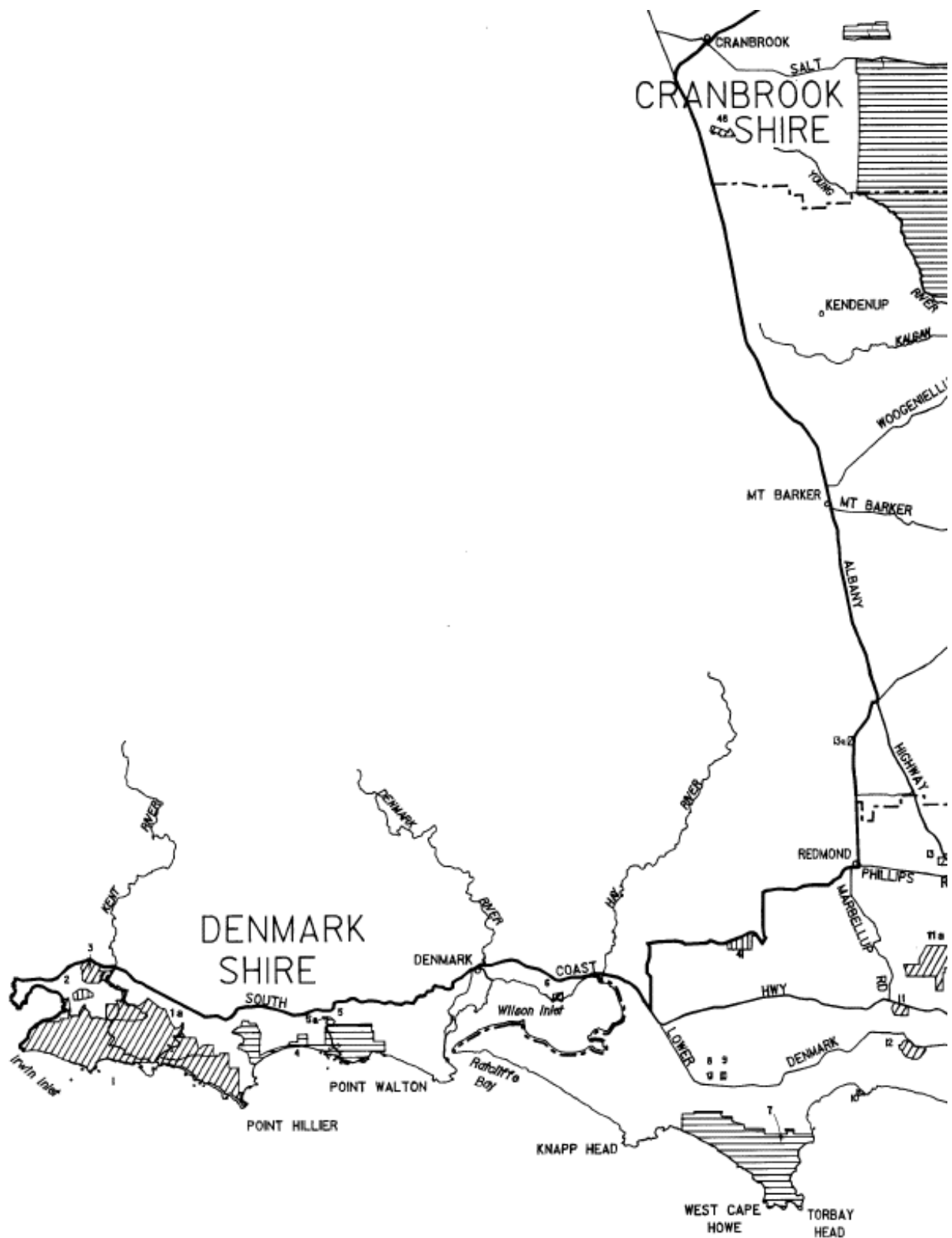
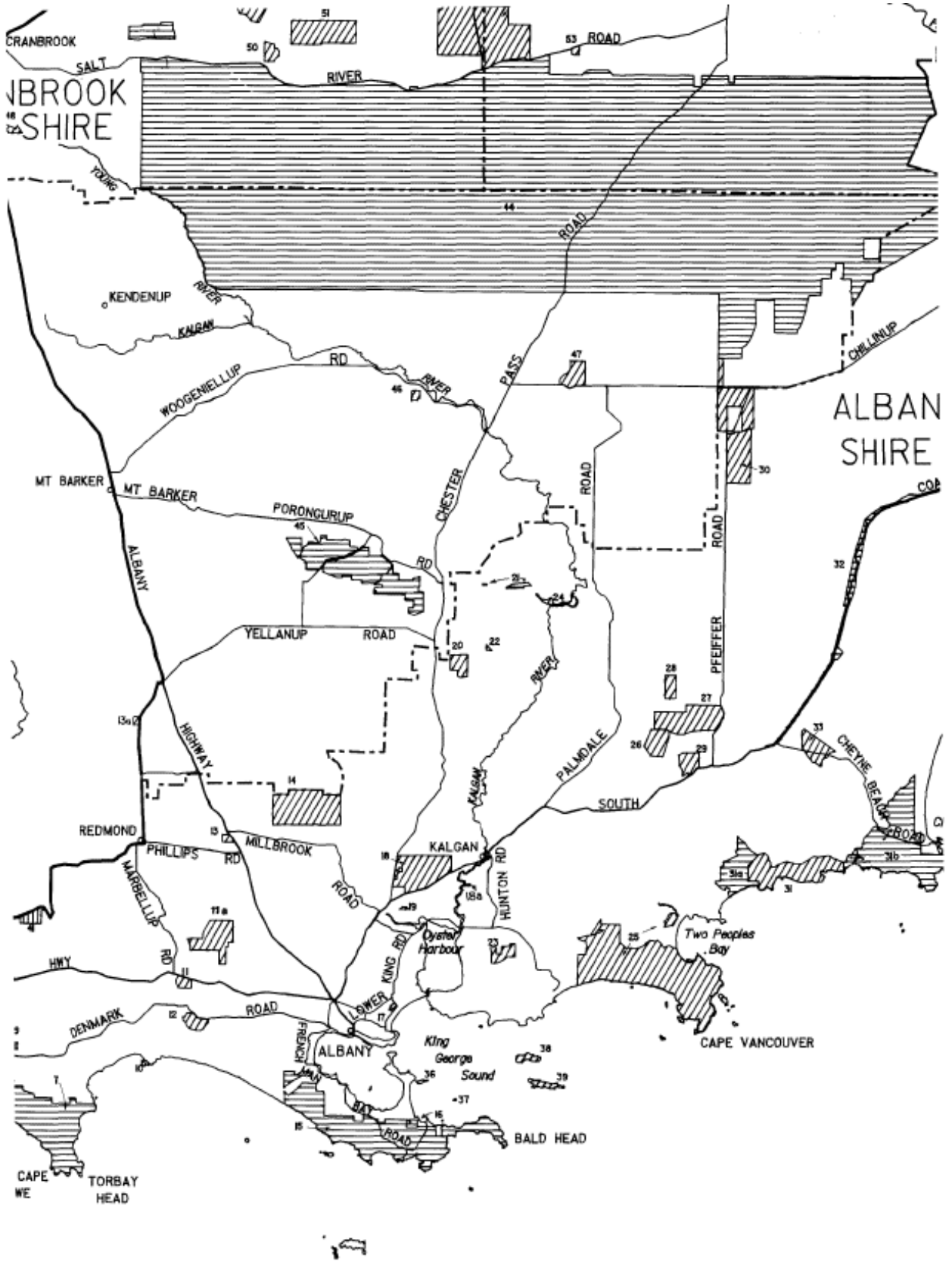


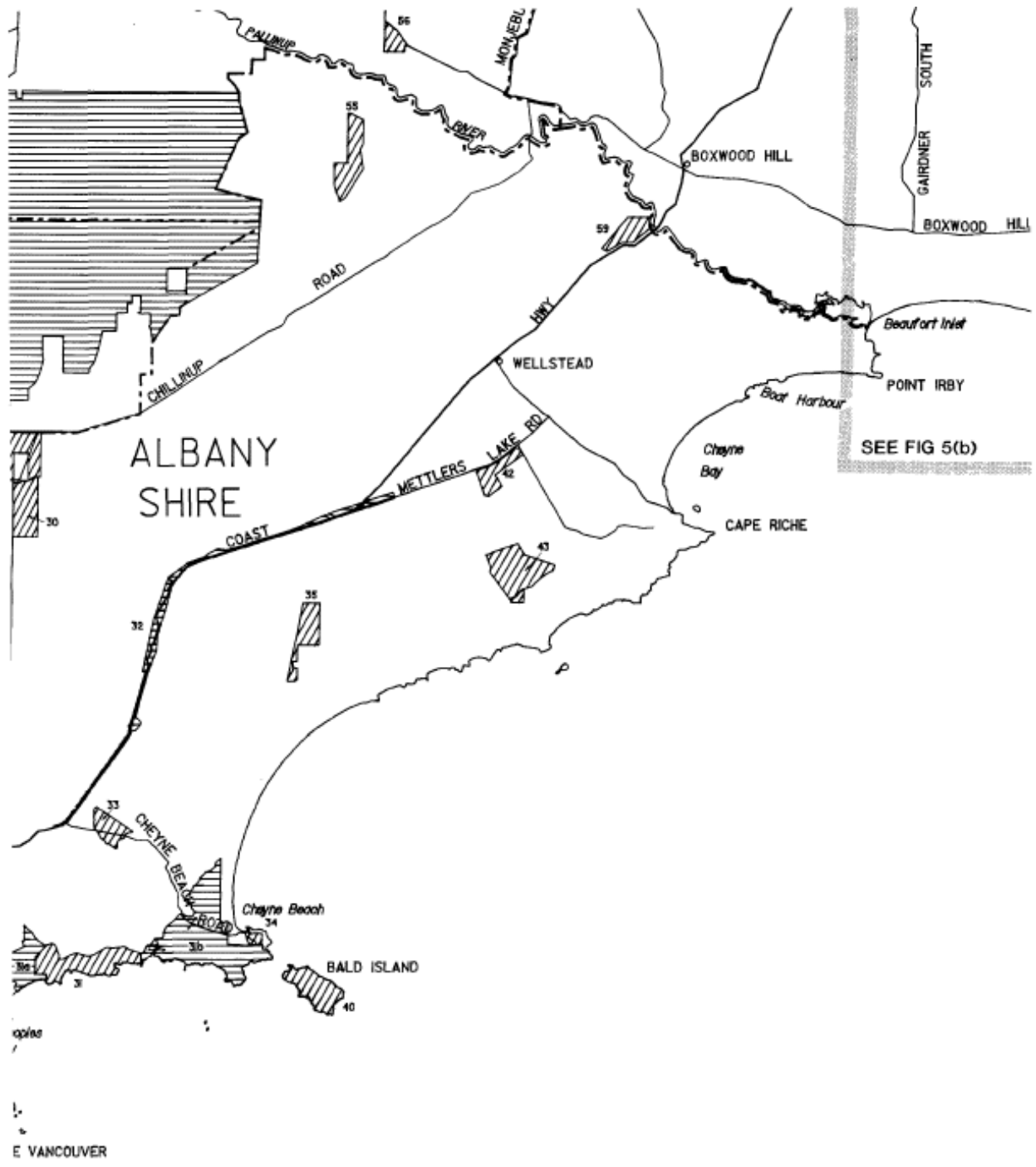
FIG 5(a)
Page 197





S







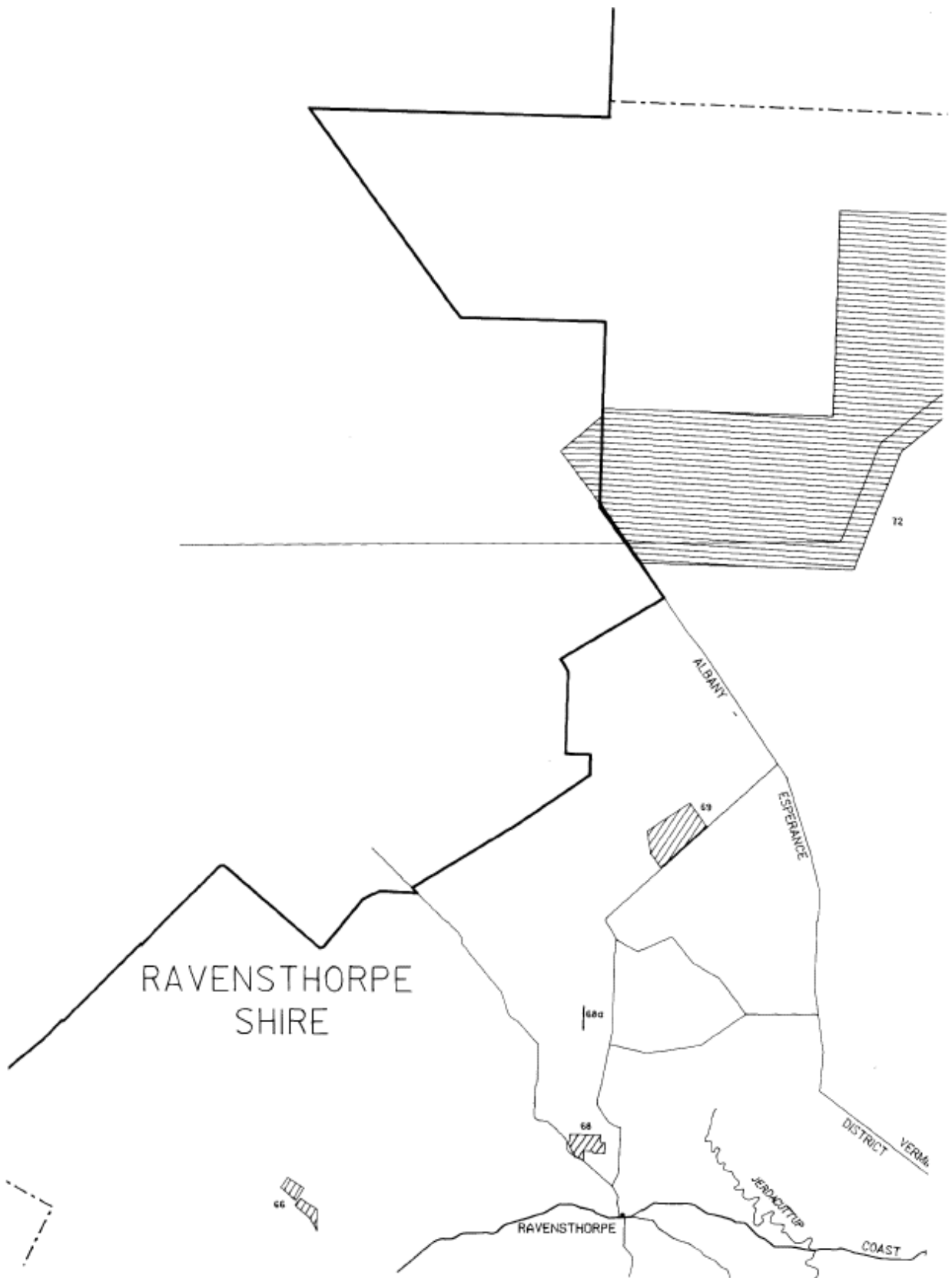
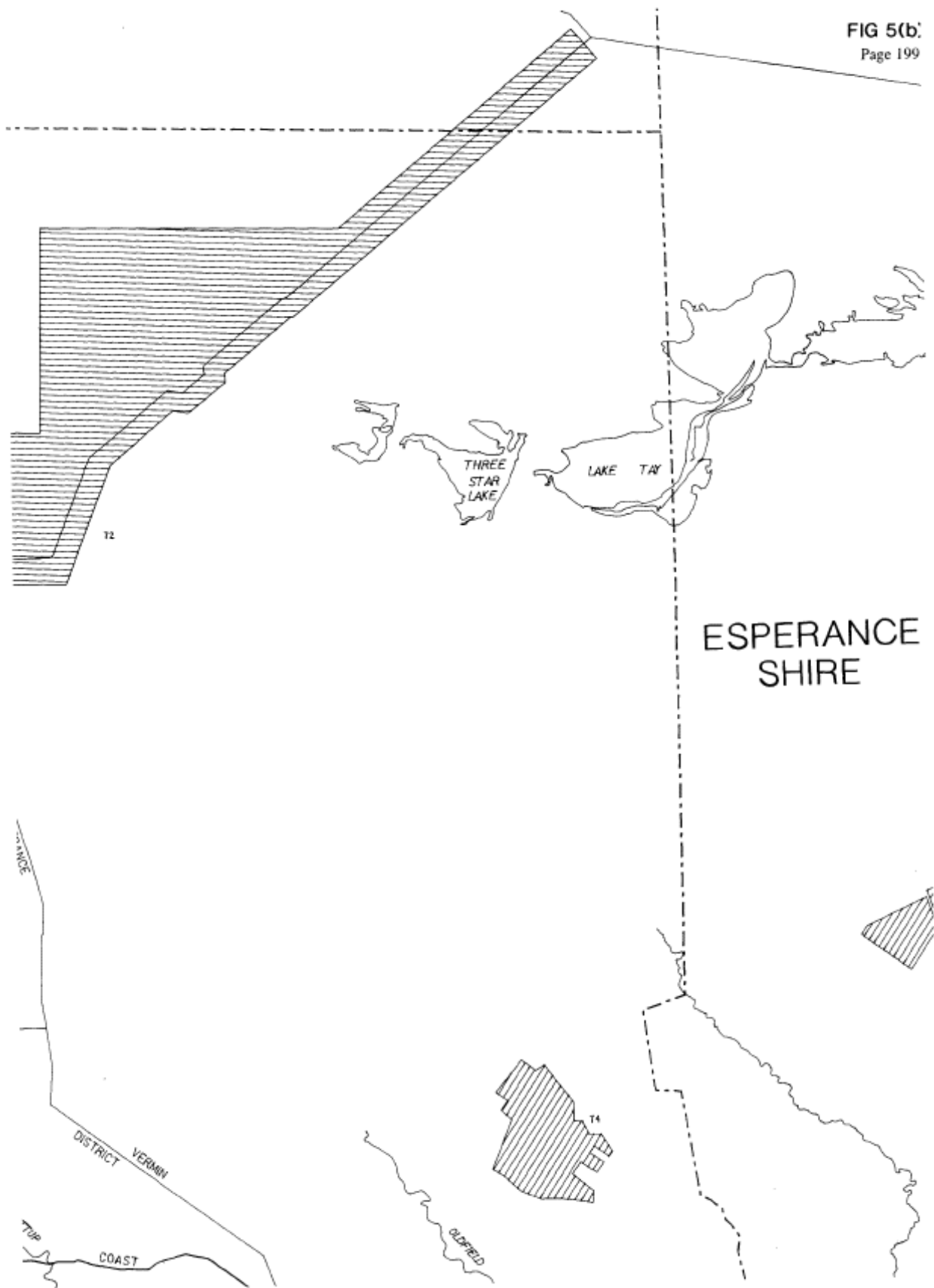
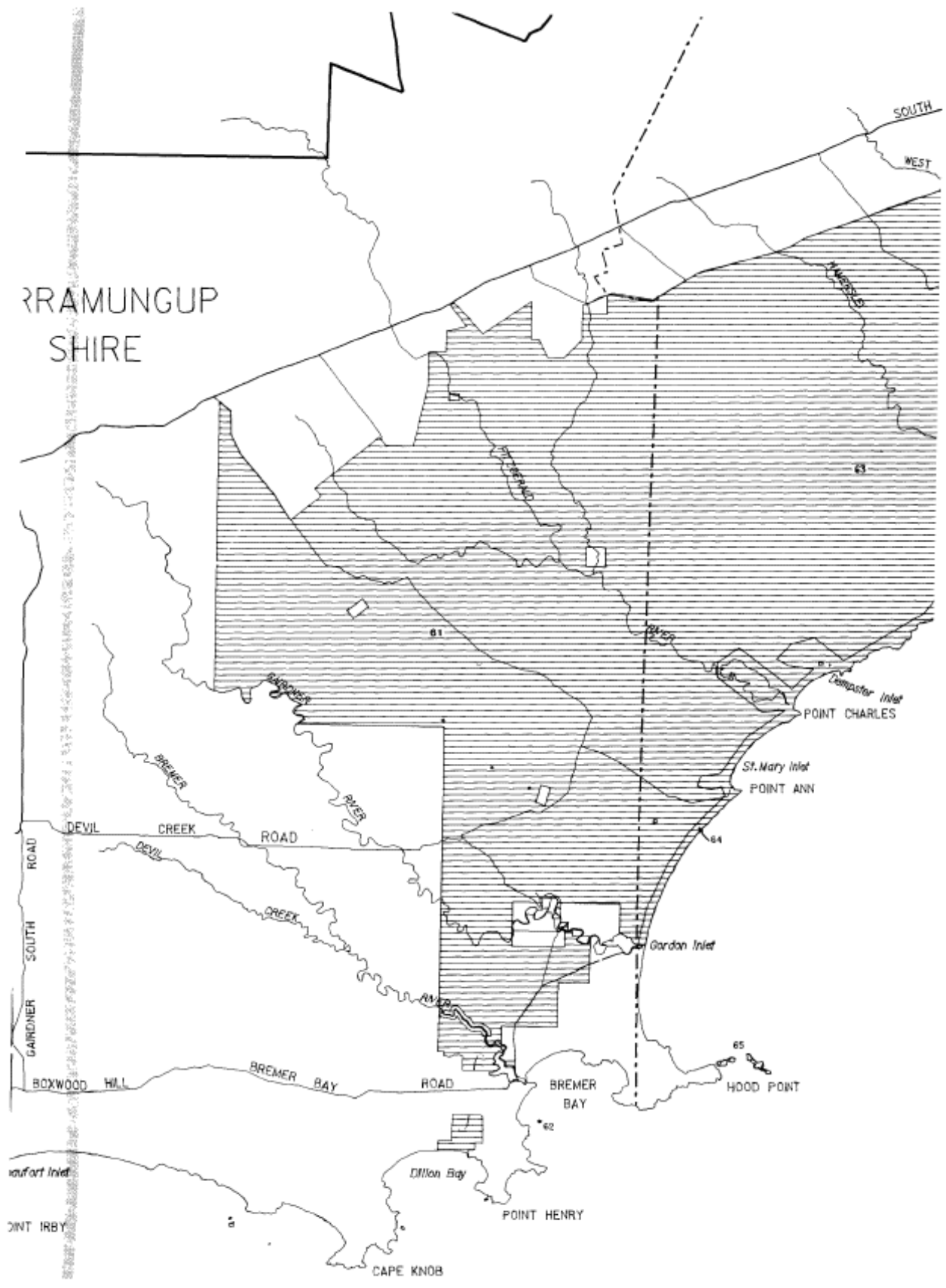
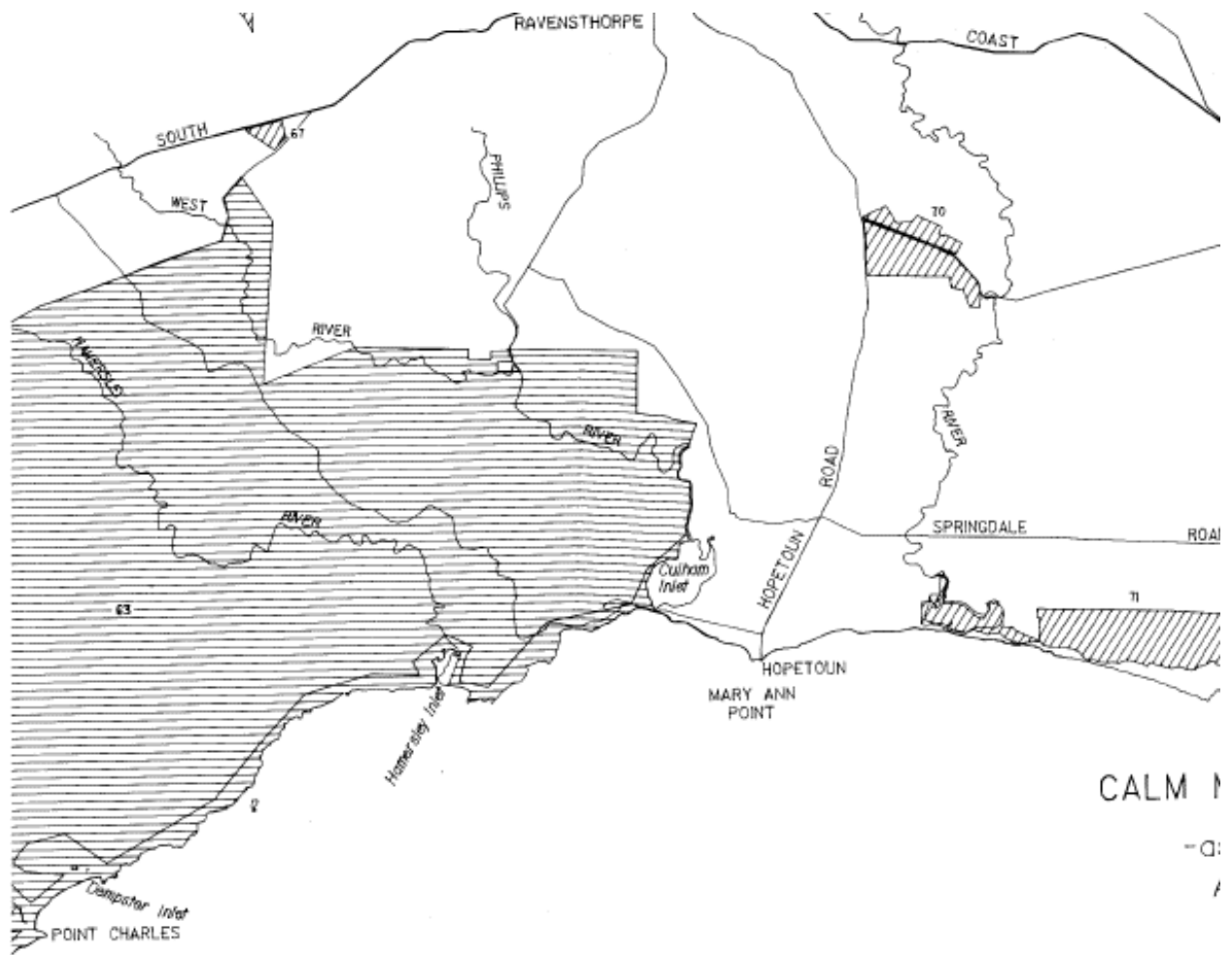


FIG 5(b)
Page 199










CALM M

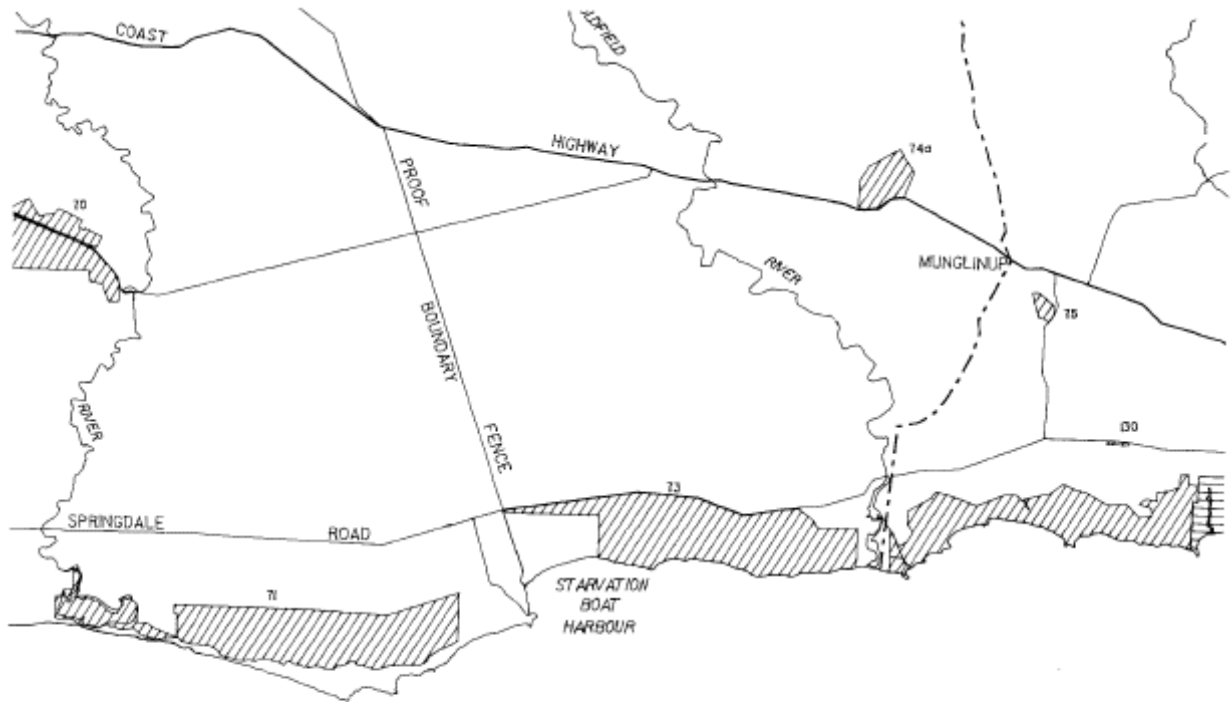
-G:
/

ry Inlet
T ANN

-  NATIONAL
-  MISCELLANEOUS ACT RESERVE
-  REGIONAL

ISLANDS NOT PART OF CA

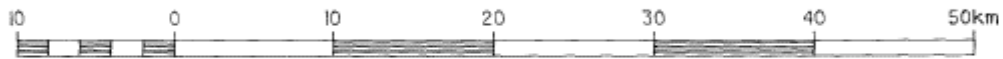
POINT



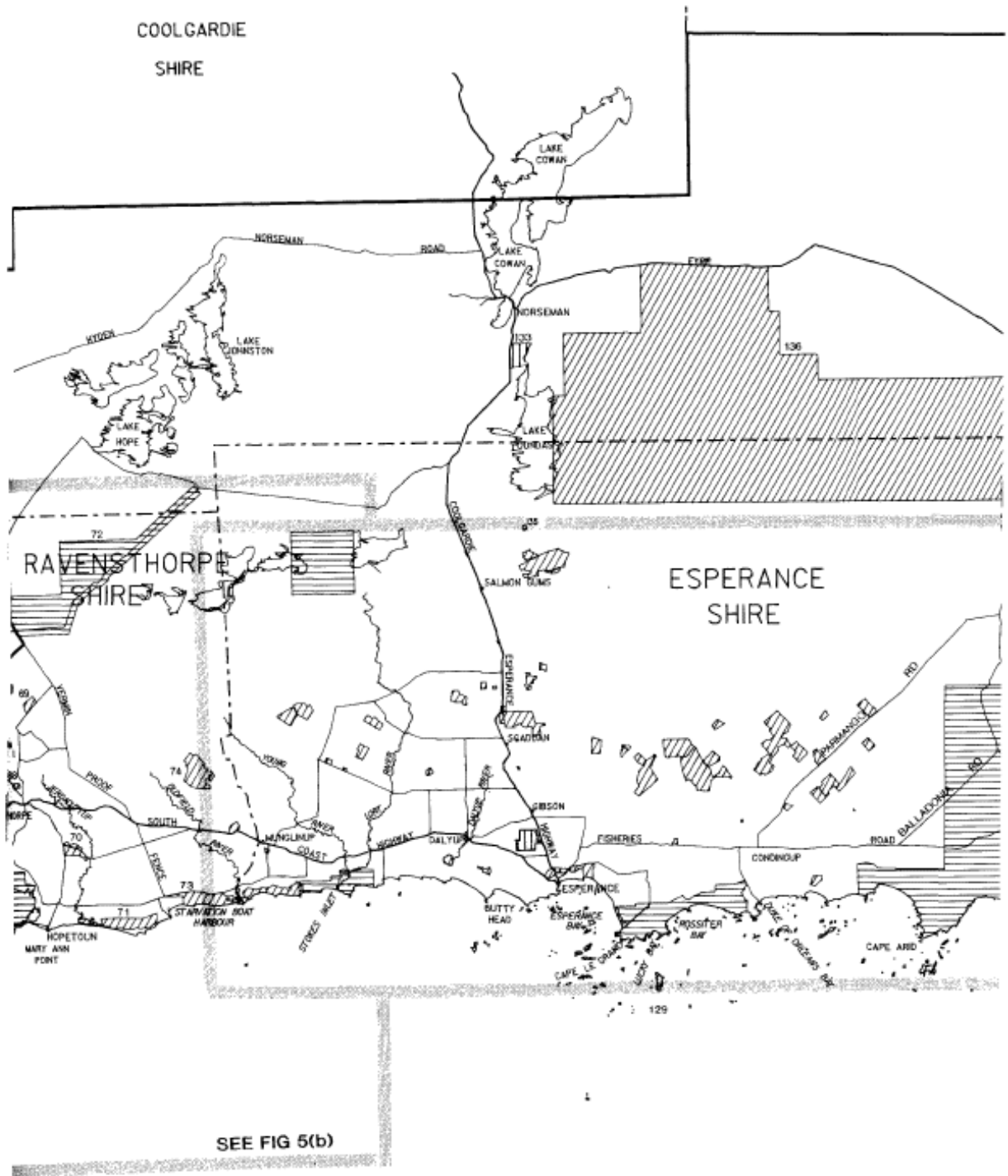
CALM MANAGED PUBLIC LANDS

-as at 31 DECEMBER 1990-
ALBANY DISTRICT (EAST)

SCALE



ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



KALGOORLIE - BOULDER SHIRE

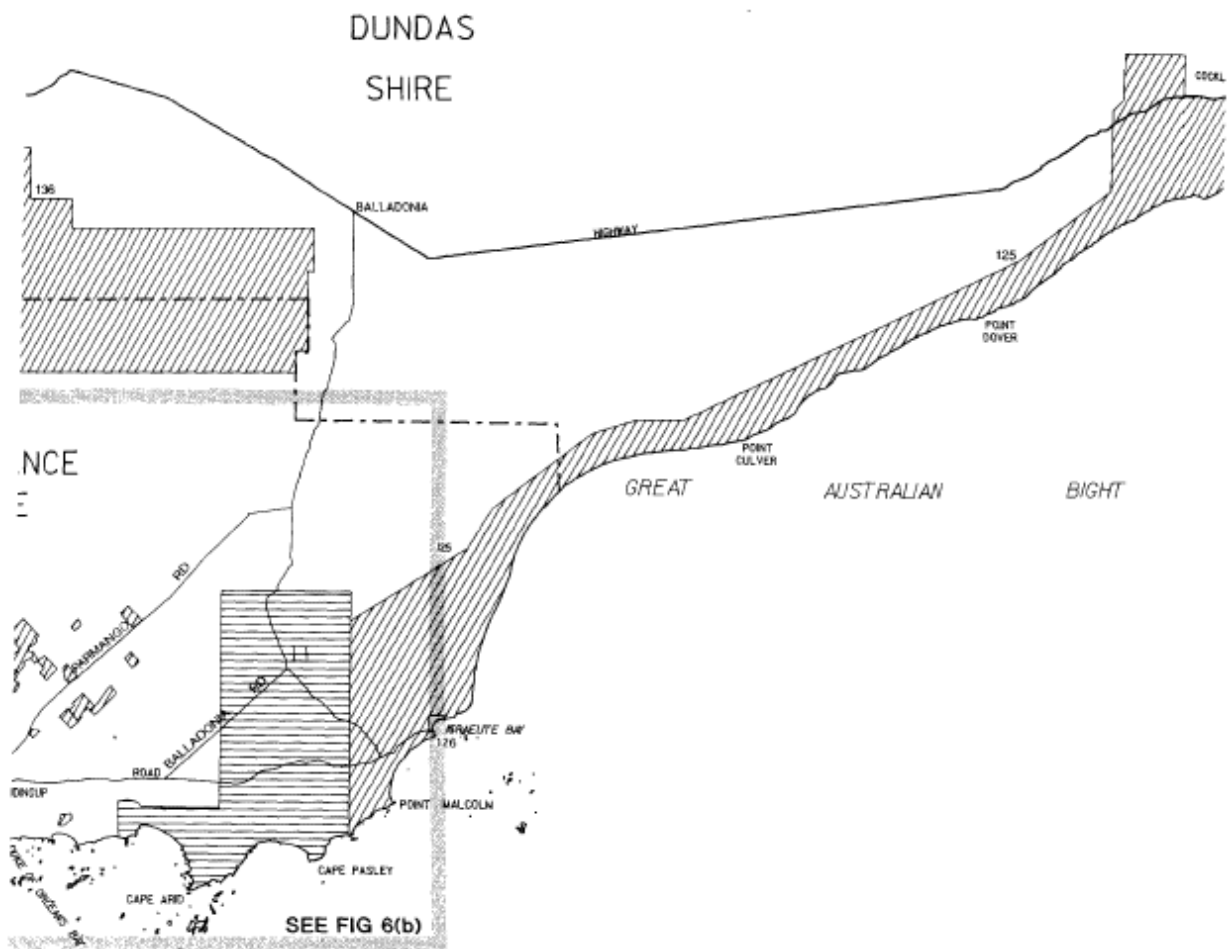
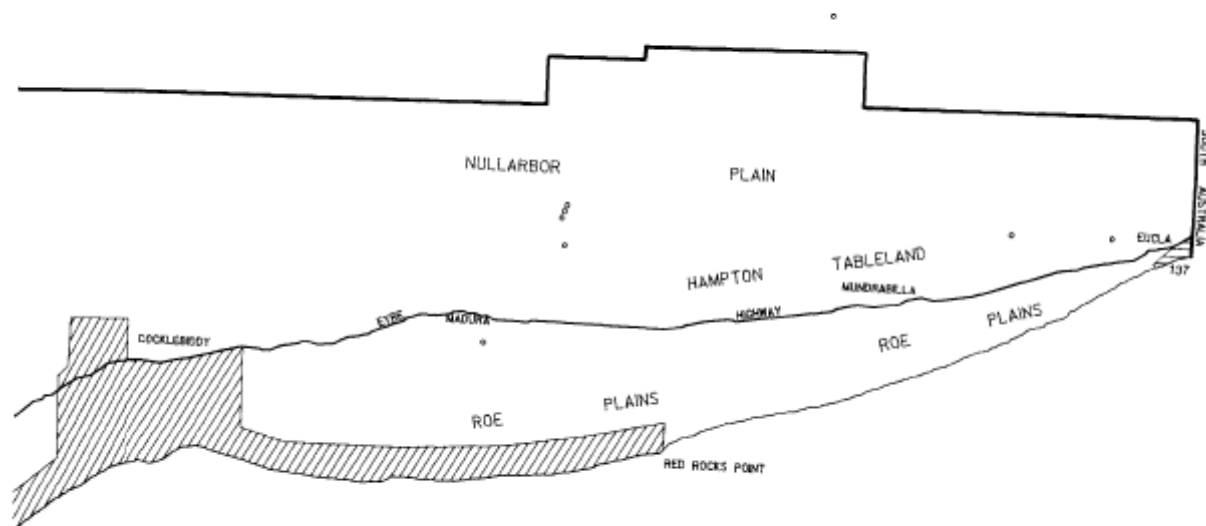


FIG 6(a)
Page 201



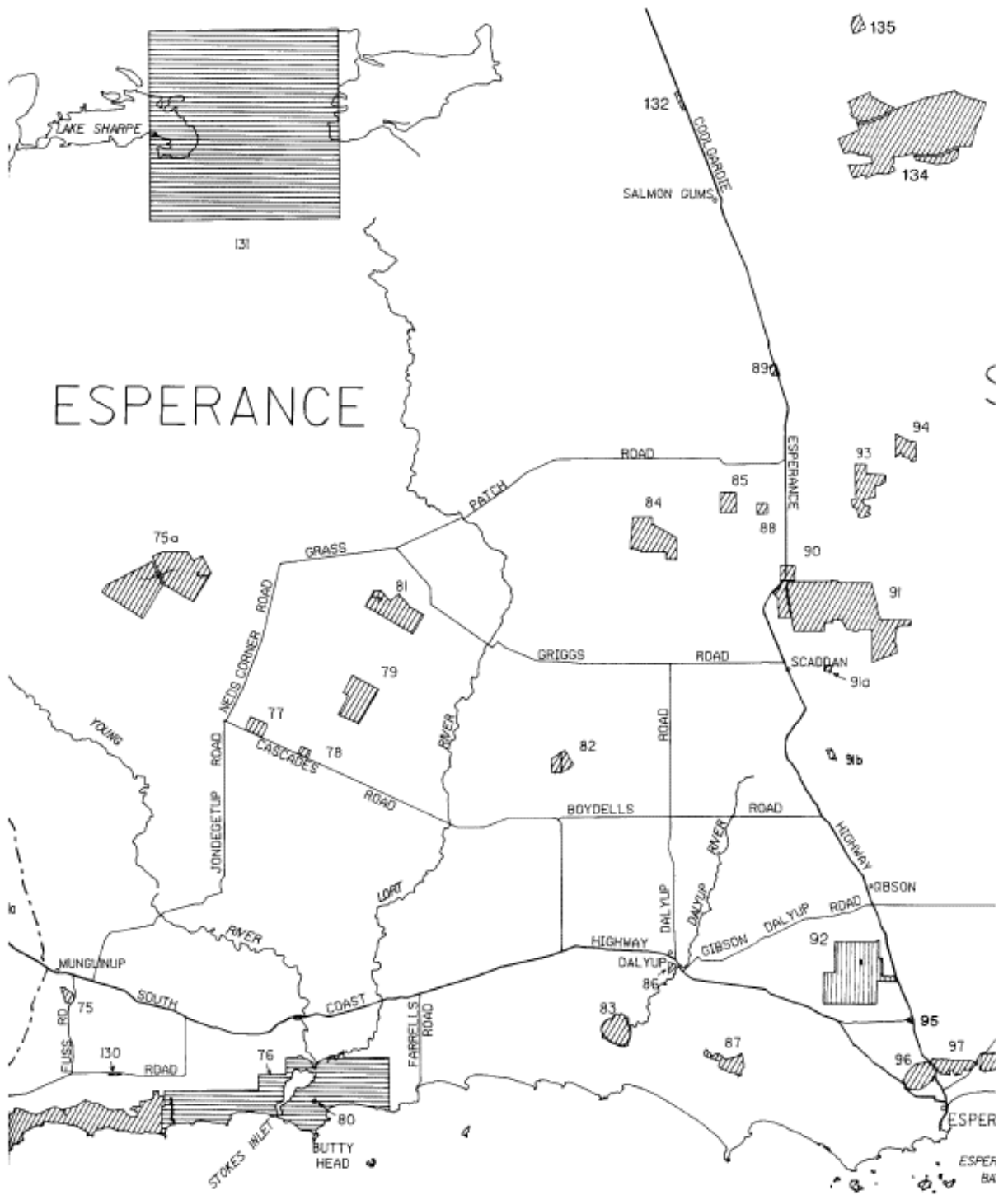
BIGHT

C.A.L.M MANAGED PUBLIC LANDS

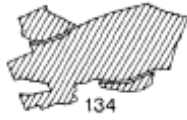
-as at 31 December 1990-
ESPERANCE DISTRICT

SCALE





135







C.A.L.M MANAGED PUBLIC LANDS

-as at 31 December 1990-

ESPERANCE DISTRICT (ENLARGEMENT)



-  NATIONAL PARK
-  NATURE RESERVE
-  MISCELLANEOUS CALM ACT RESERVE
-  STATE FOREST / TIMBER RESERVE

SHIRE

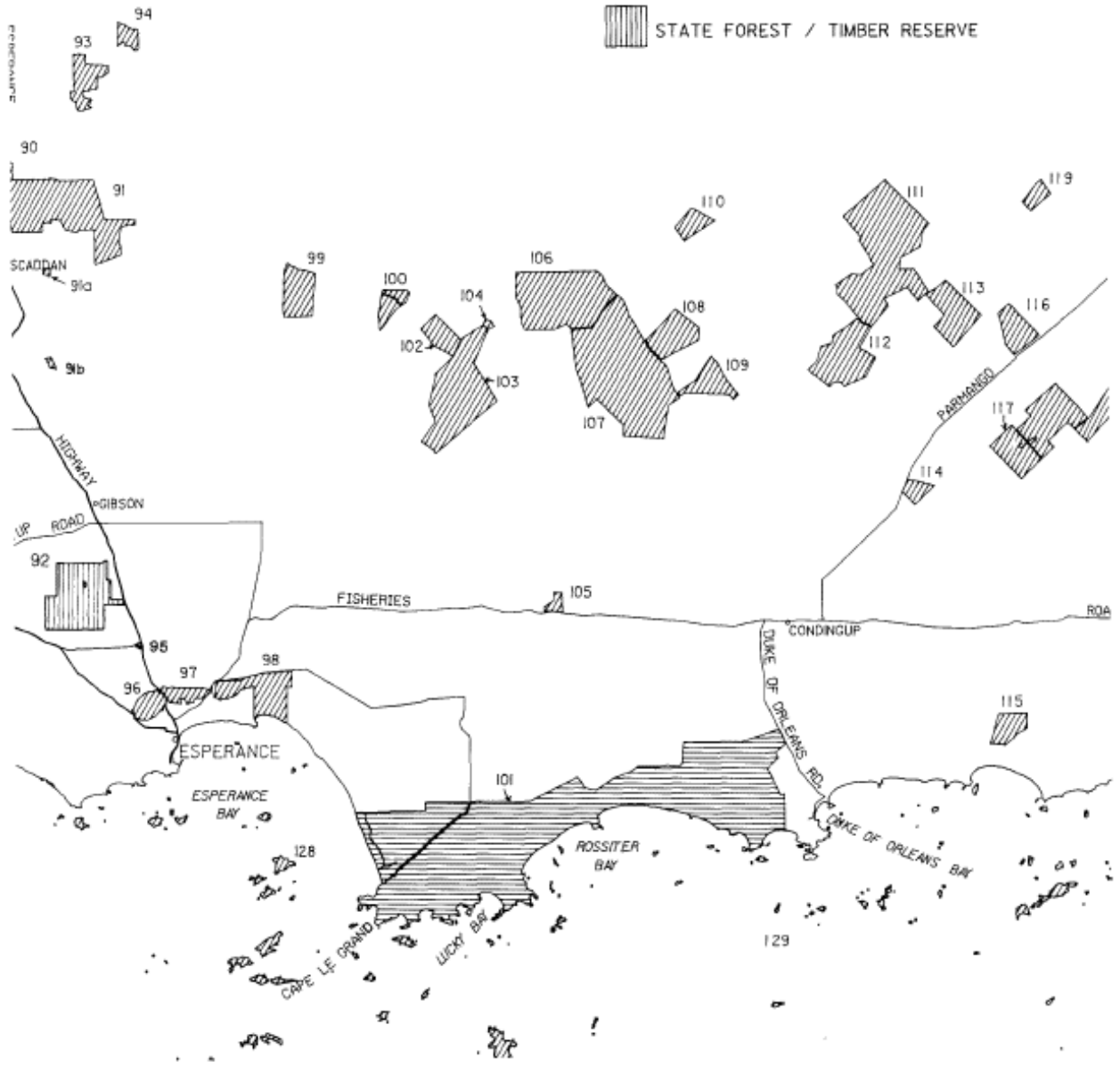


FIG 6(b)
Page 203

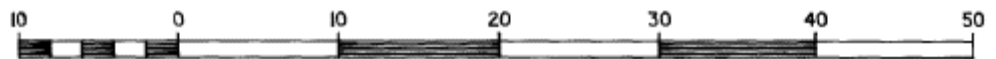


PROPOSED CHANGES TO TENURE

-as at 31 DECEMBER 1990-

ALBANY DISTRICT (WEST)

SCALE



NATIONAL PARK



NATURE RESERVE



MISCELLANEOUS CALM
ACT RESERVE



STATE FOREST/
TIMBER RESERVE



CONSERVATION PARK

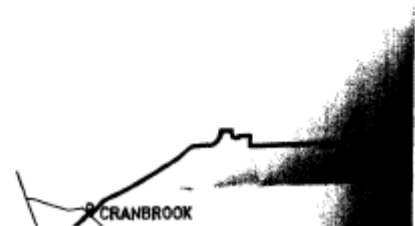
----- SHIRE BOUNDARY

———— REGIONAL BOUNDARY

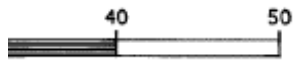


OTHER RESERVE (Removed from CALM management)

ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



NURE



ATURE RESERVE

ATE FOREST/
MBER RESERVE

IRE BOUNDARY

GIONAL BOUNDARY

CALM management)

BEEN SHOWN ON THIS MAP

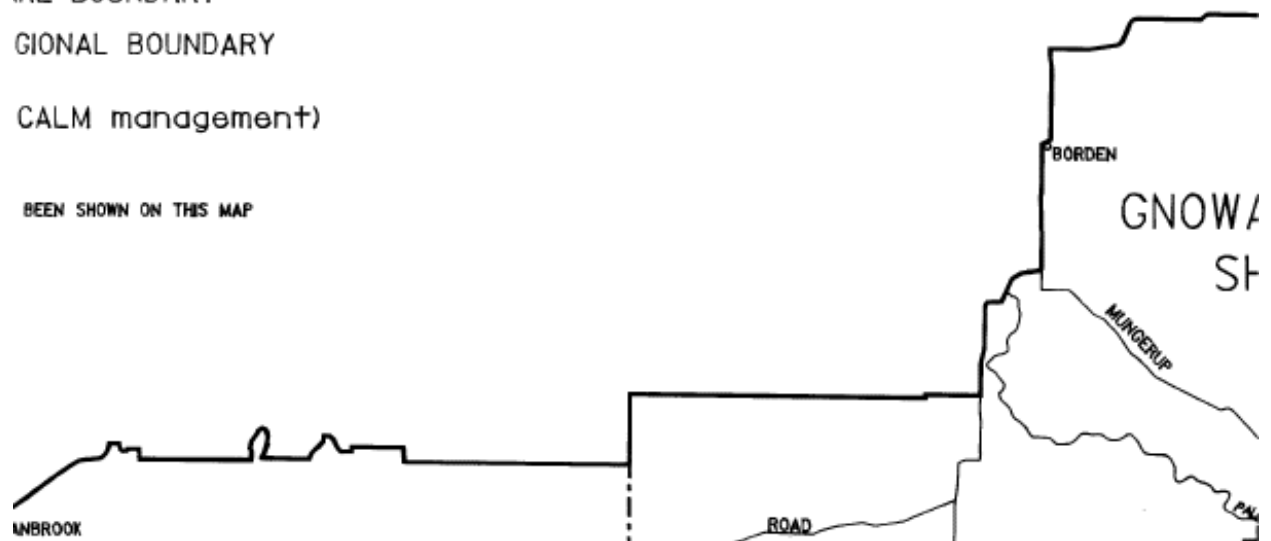
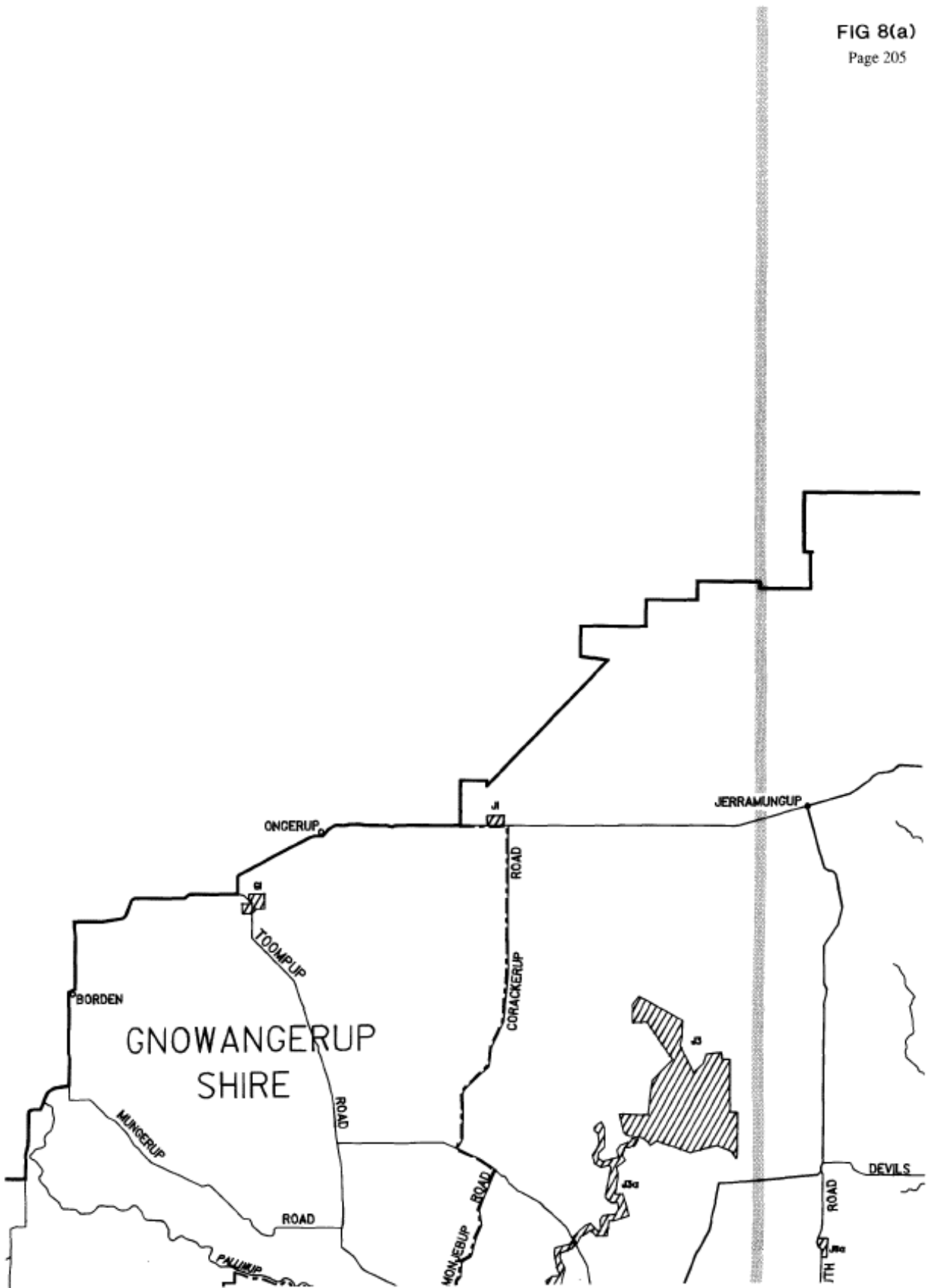
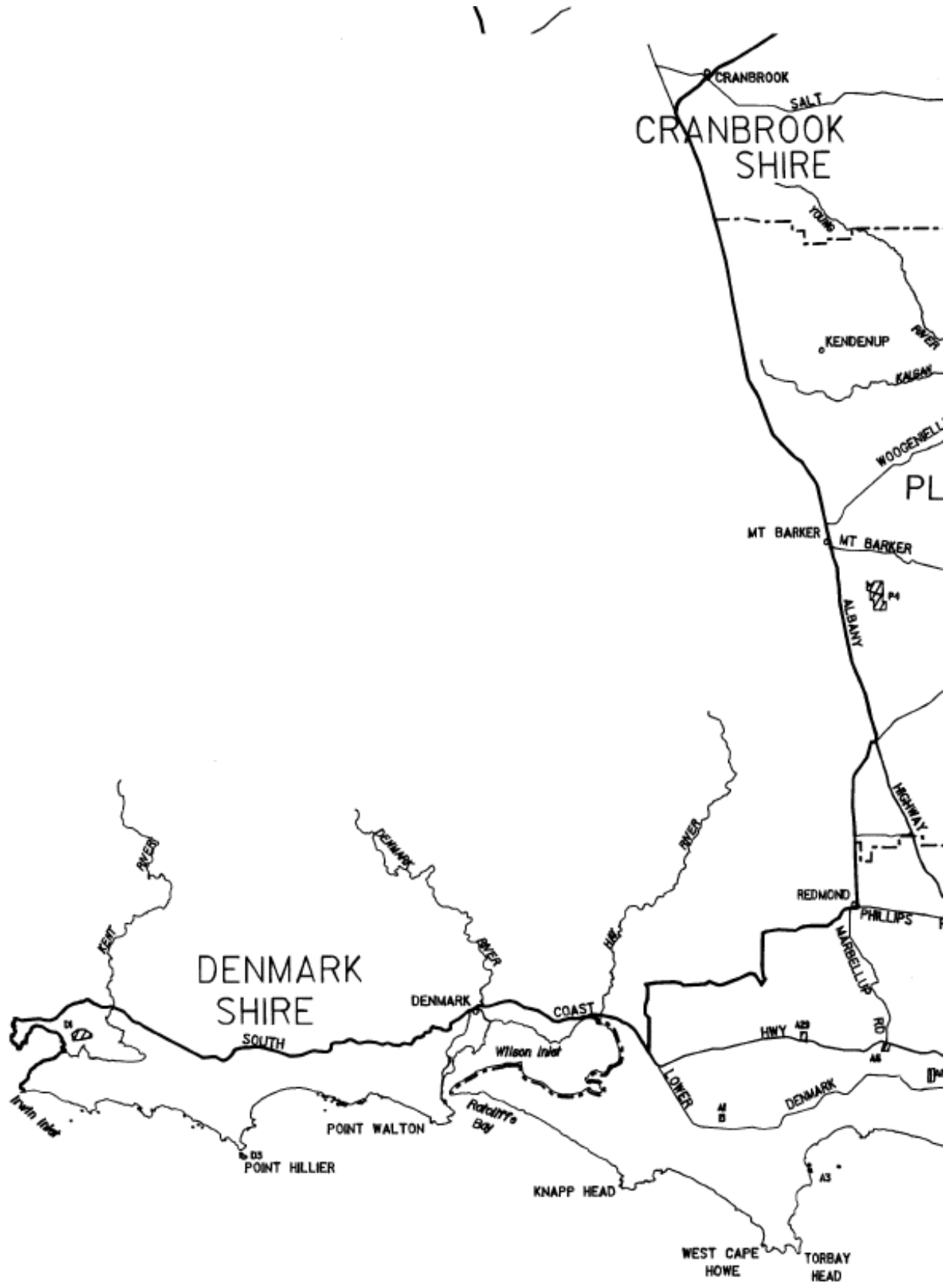
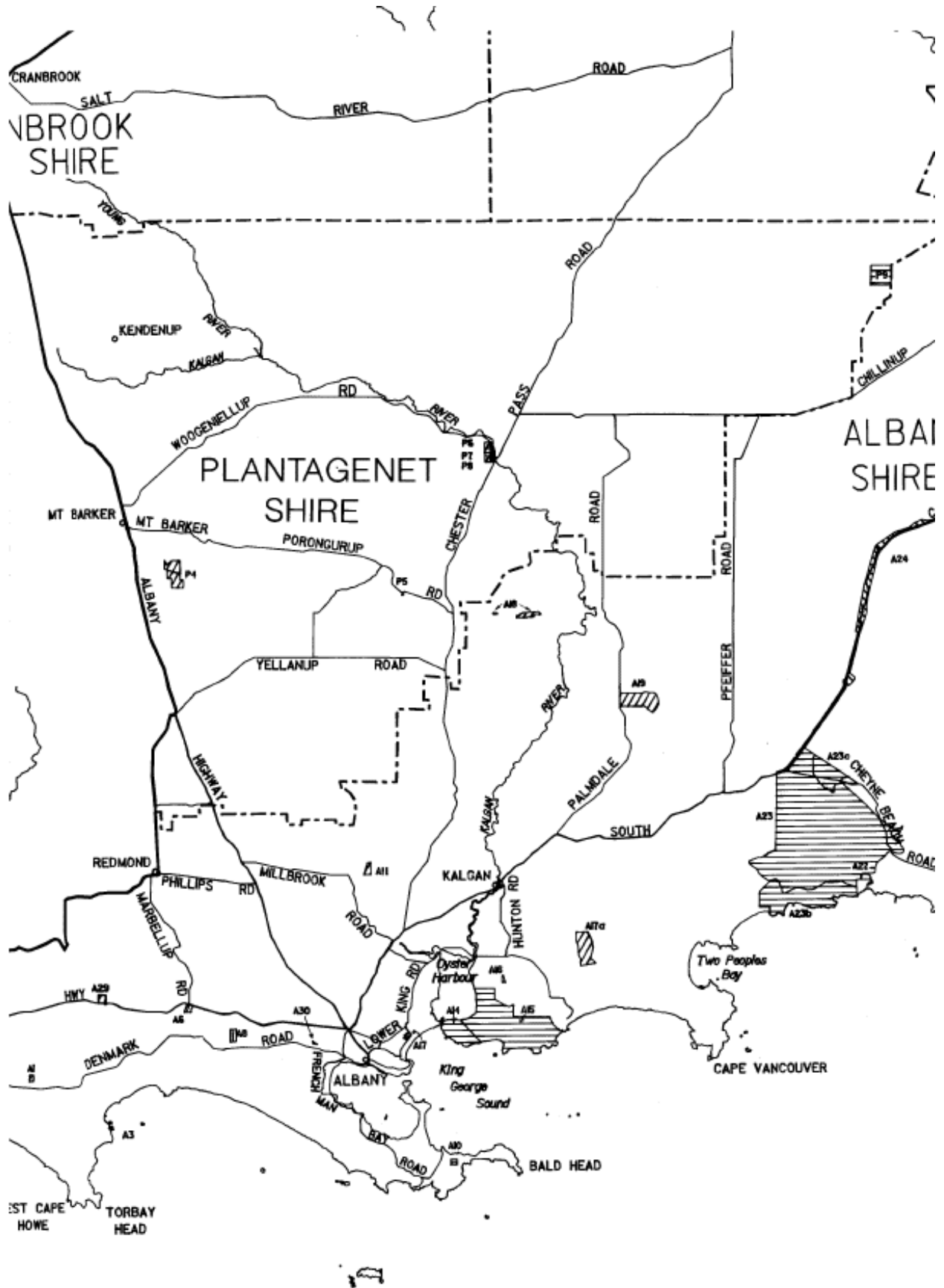
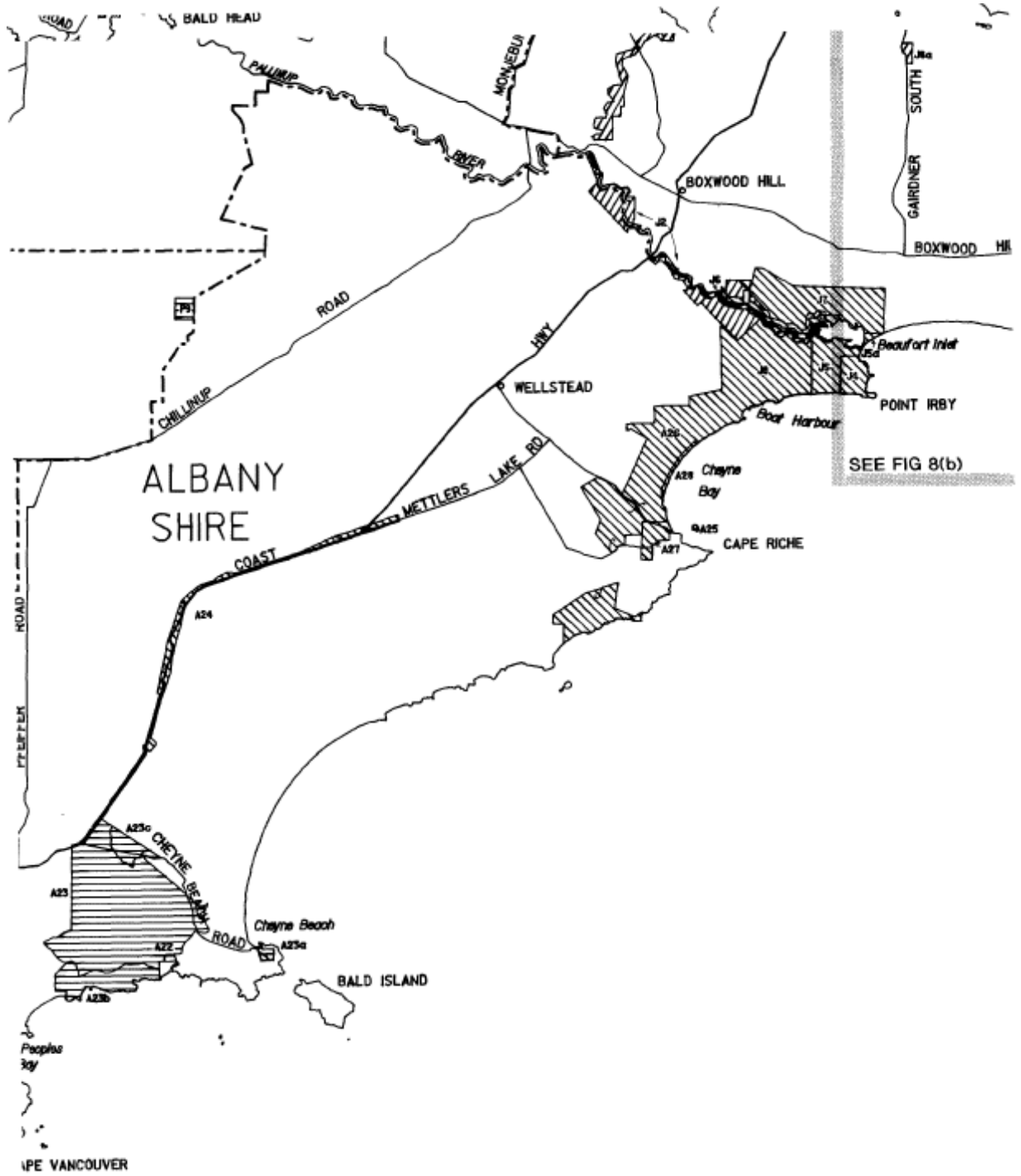


FIG 8(a)
Page 205

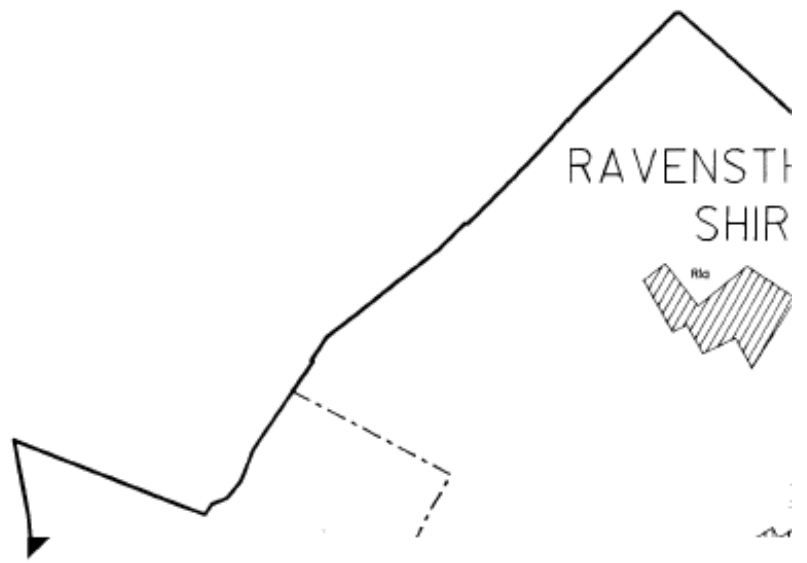








(a)



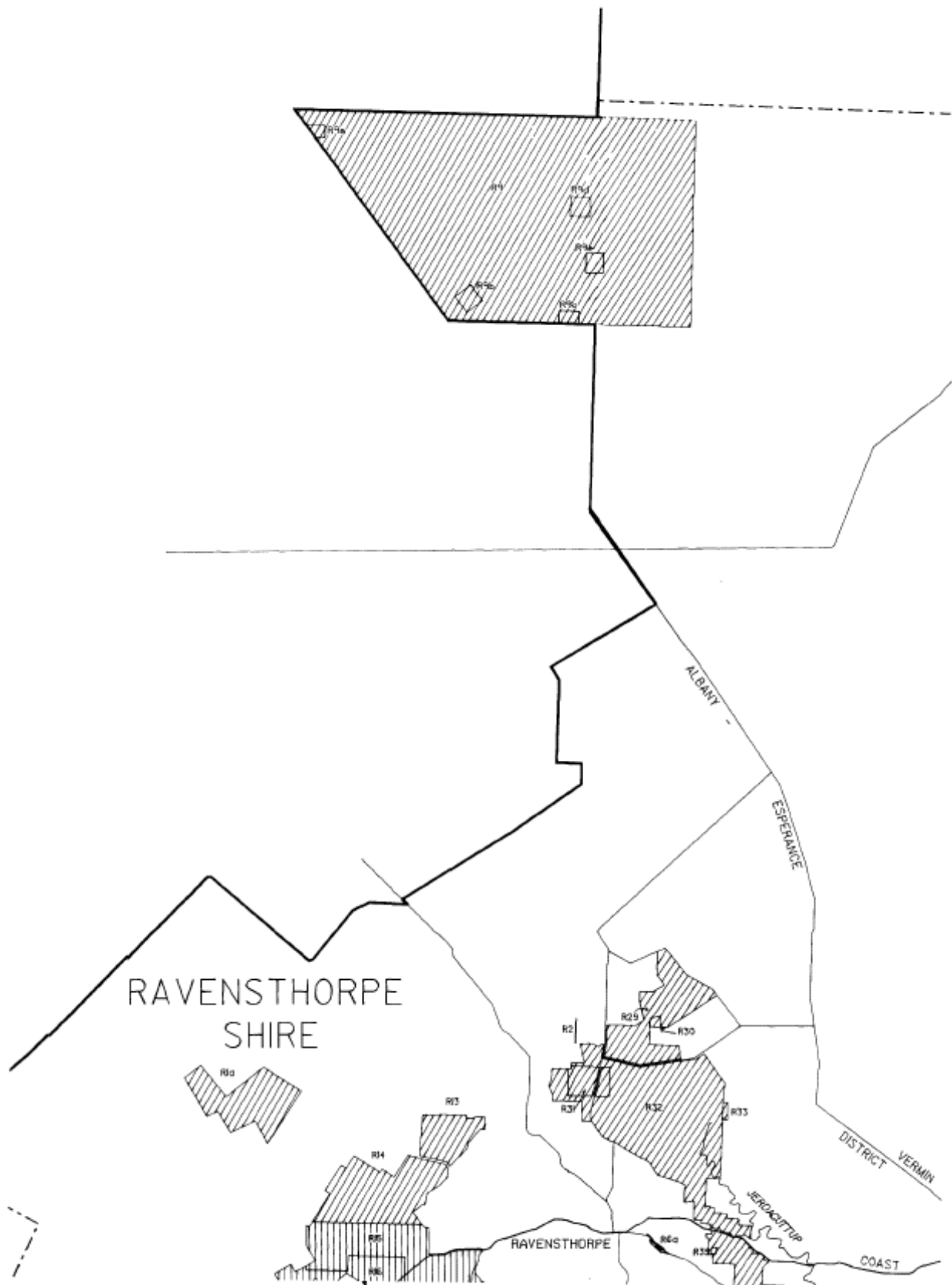
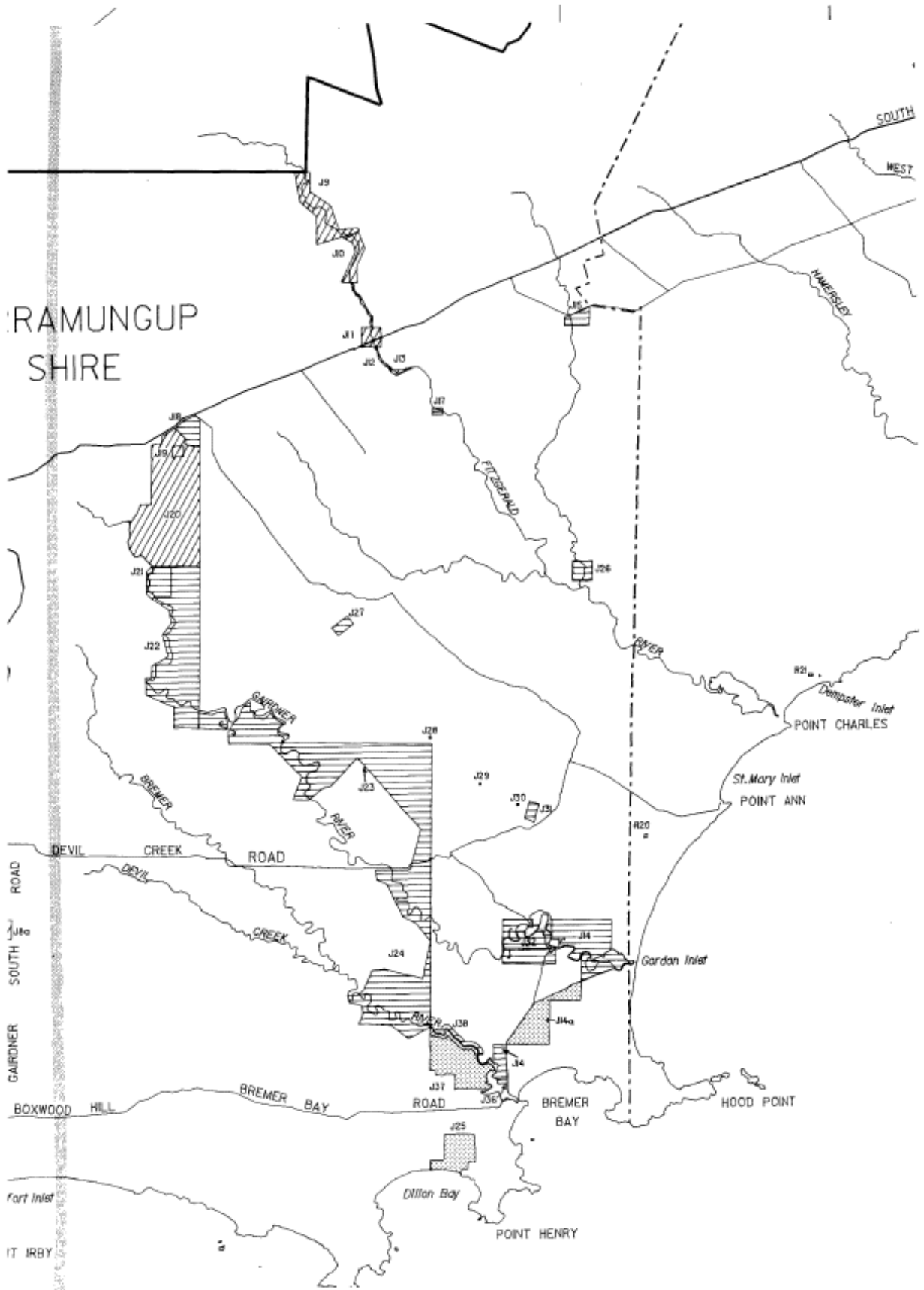
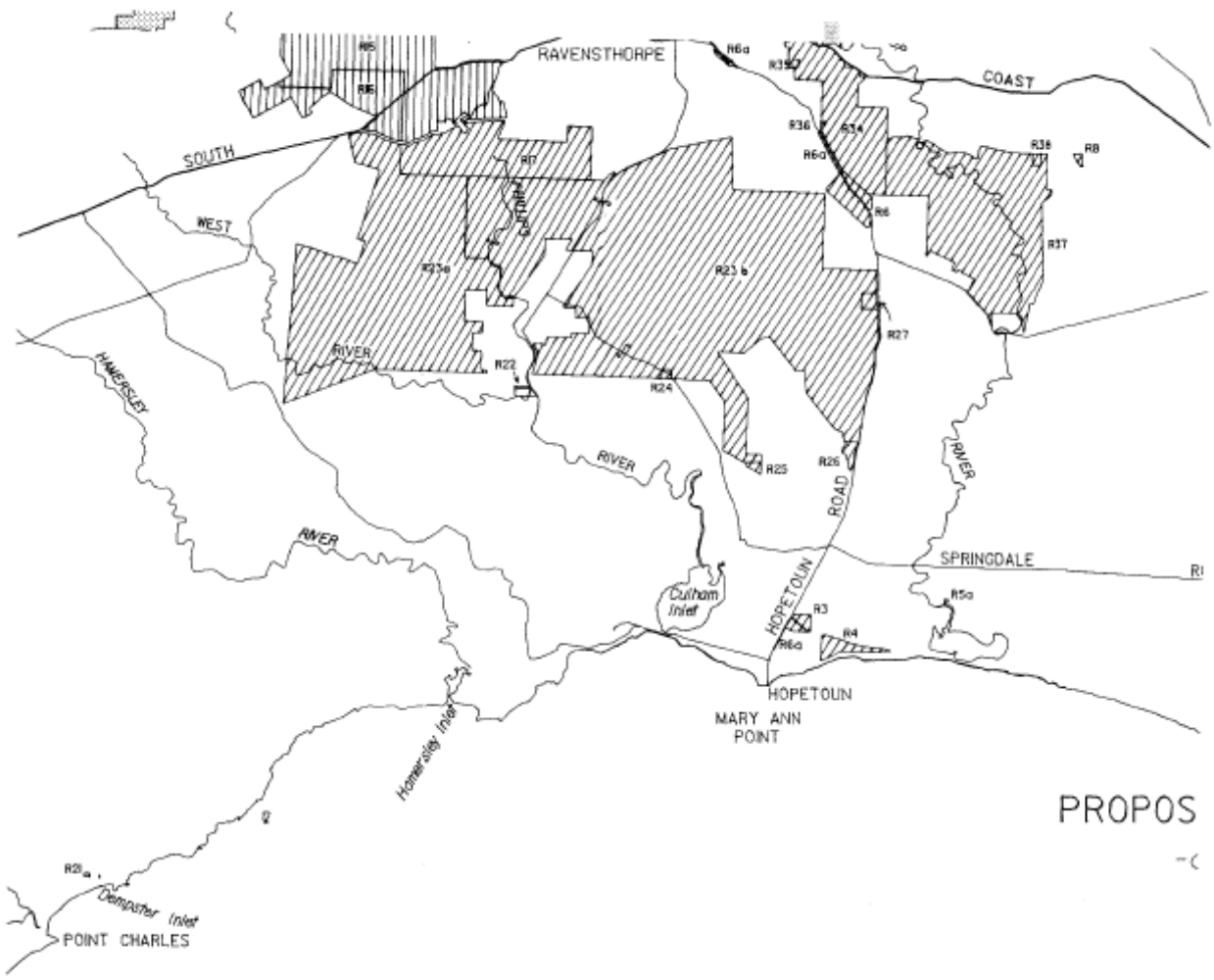


FIG 8(b)
Page 207











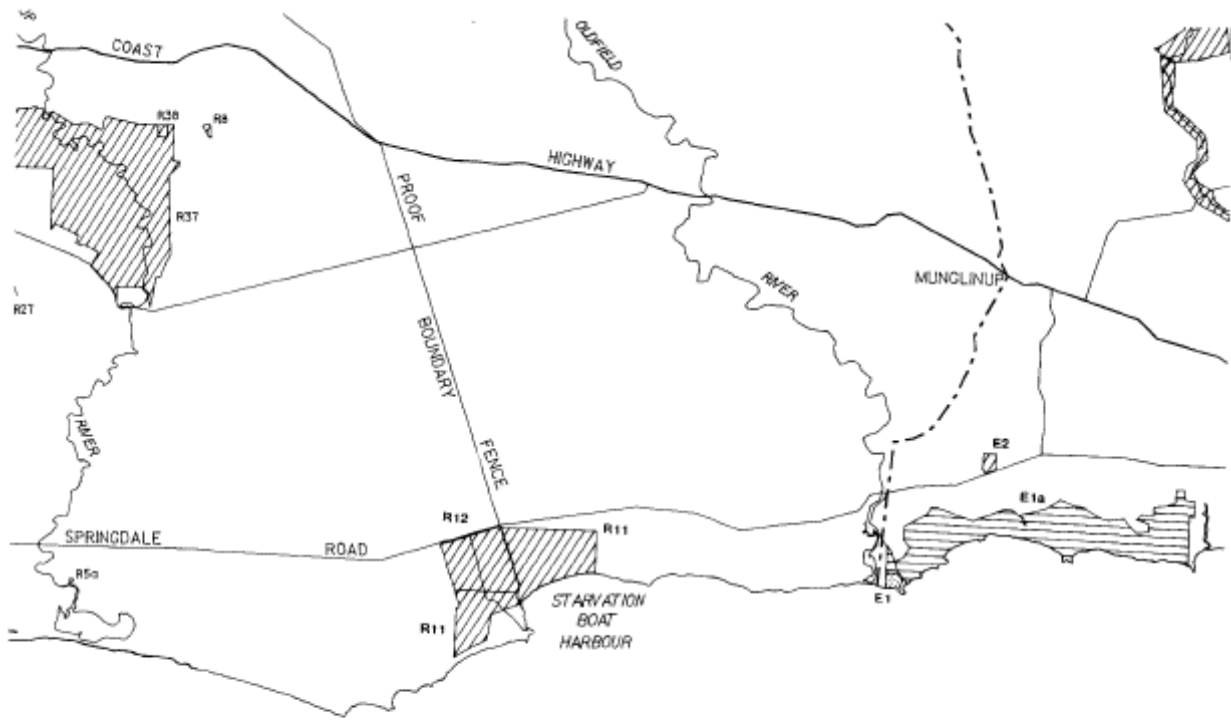
Mary Inlet
MARTIN ANN



-  NATIONAL
-  MISCELL.
ACT RES
-  CONSERV
-  OTHER F

ISLANDS NOT PART

POINT



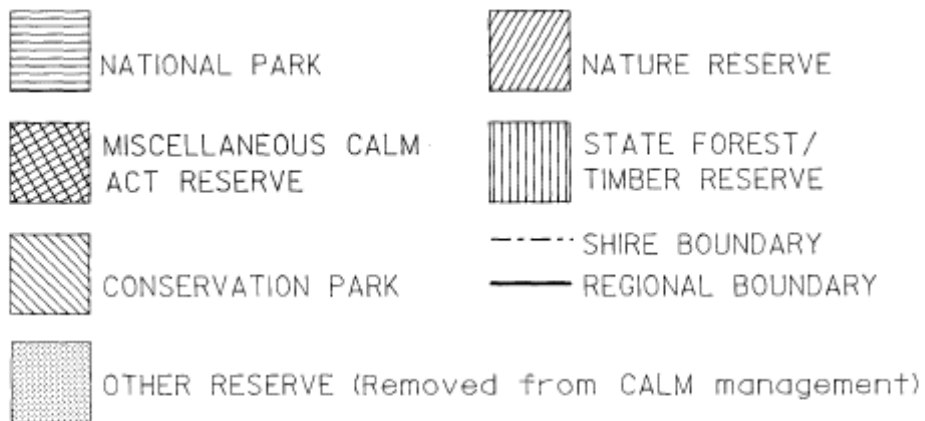
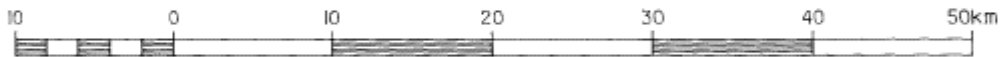
PROPOSED CHANGES TO TENURE

-as at 31 DECEMBER 1990-

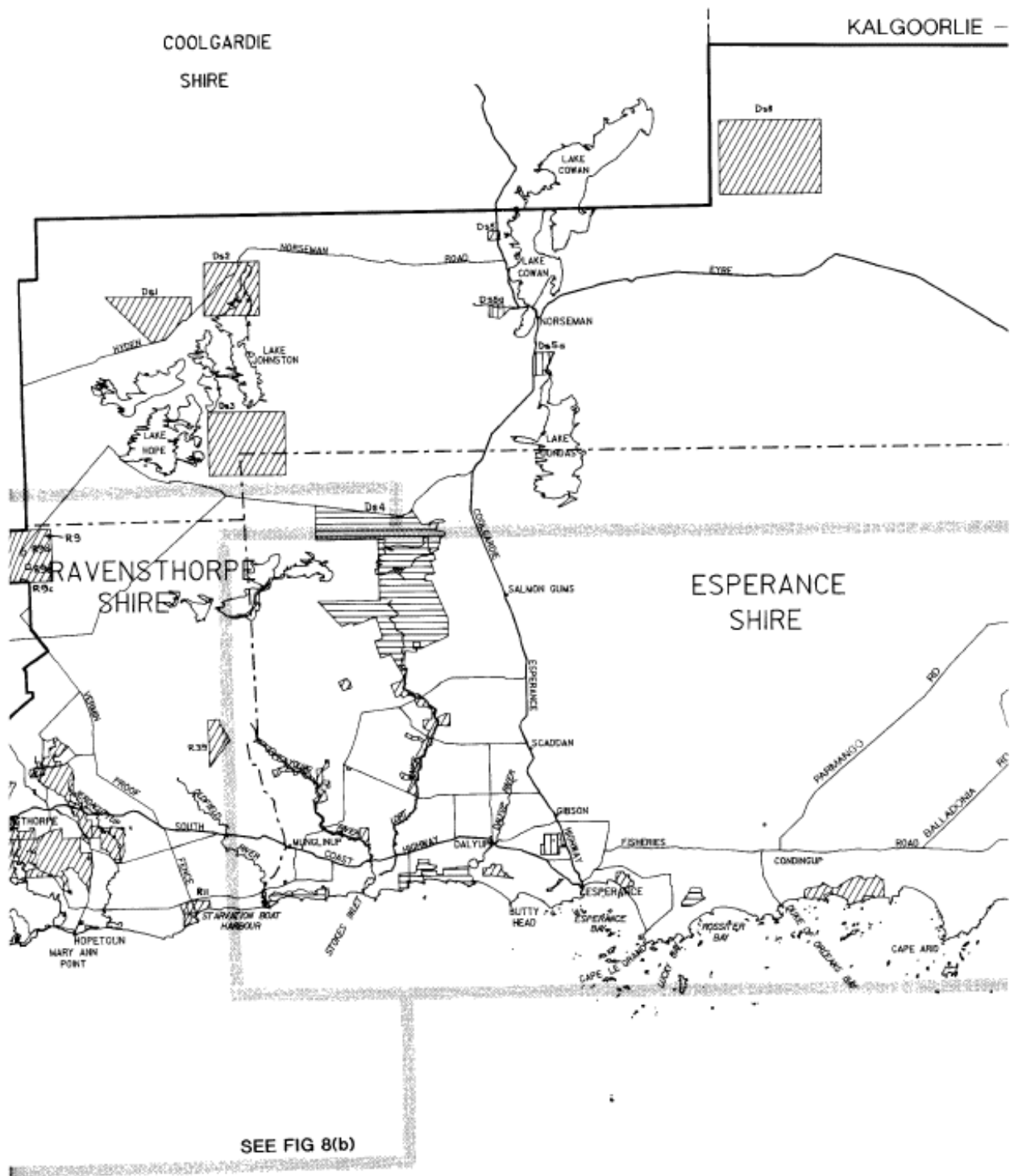
ALBANY DISTRICT (EAST)



SCALE



ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



KALGOORLIE — BOULDER SHIRE

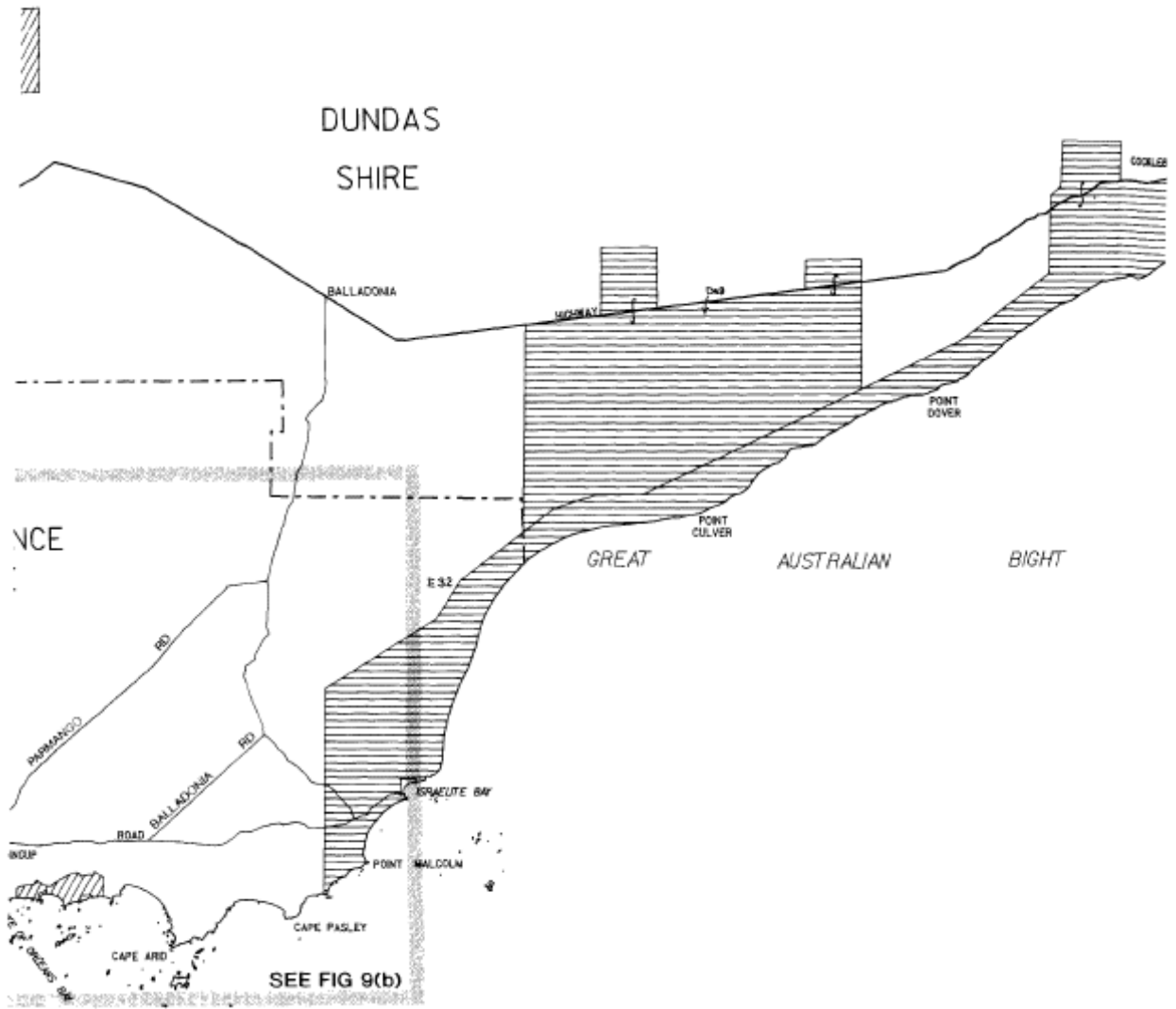
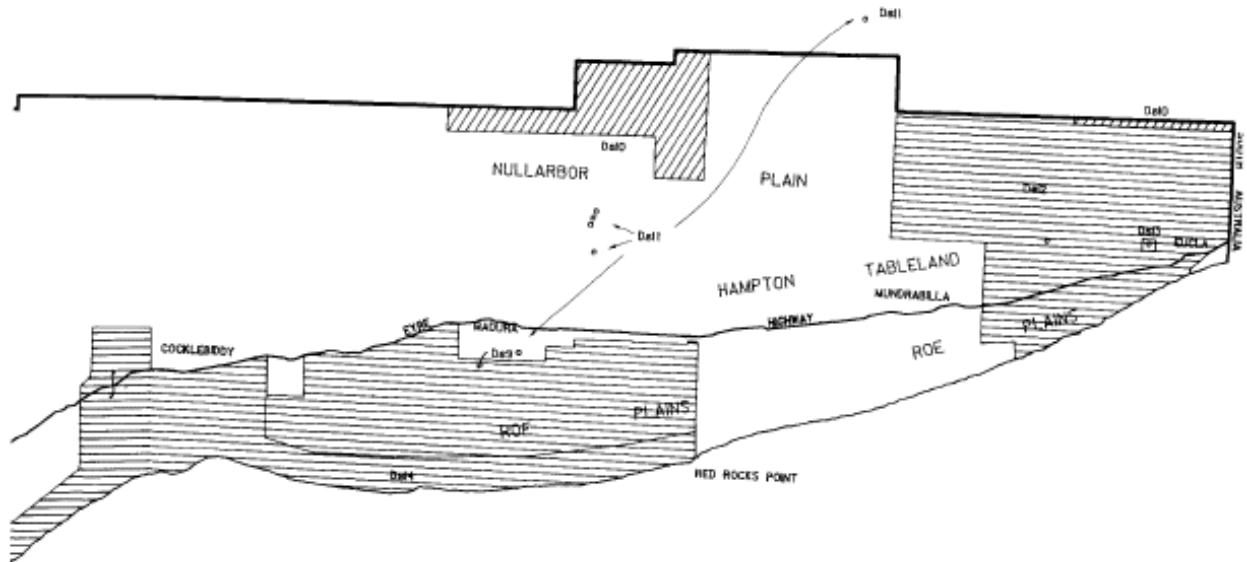


FIG 9(a)
Page 209



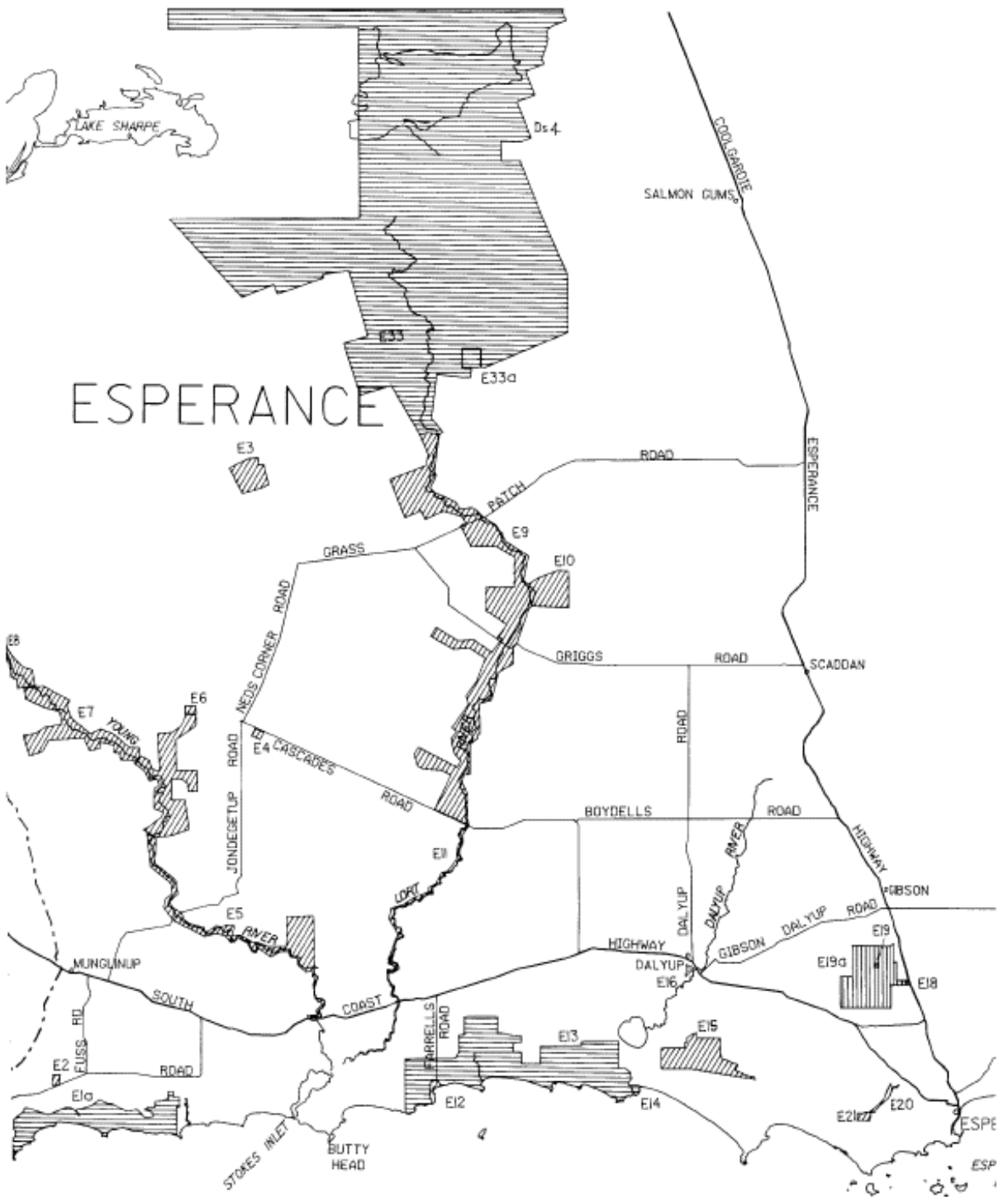
BIGHT

PROPOSED CHANGES TO TENURE
-as at 31 December 1990-
ESPERANCE DISTRICT

SCALE



- NATIONAL PARK
- NATURE RESERVE
- MISCELLANEOUS CALM ACT RESERVE
- STATE FOREST / TIMBER RESERVE
- OTHER RESERVE (Removed from CALM Management)
- REGION BOUNDARY
- SHIRE BOUNDARY








PROPOSED CHANGES TO TENURE

-as at 31 December 1990-

ESPERANCE DISTRICT (ENLARGEMENT)

SCALE



-  NATIONAL PARK
-  NATURE RESERVE
-  MISCELLANEOUS CALM ACT RESERVE
-  STATE FOREST / TIMBER RESERVE
-  OTHER RESERVE (Removed from CALM Mana)

SHIRE

ESPERANCE

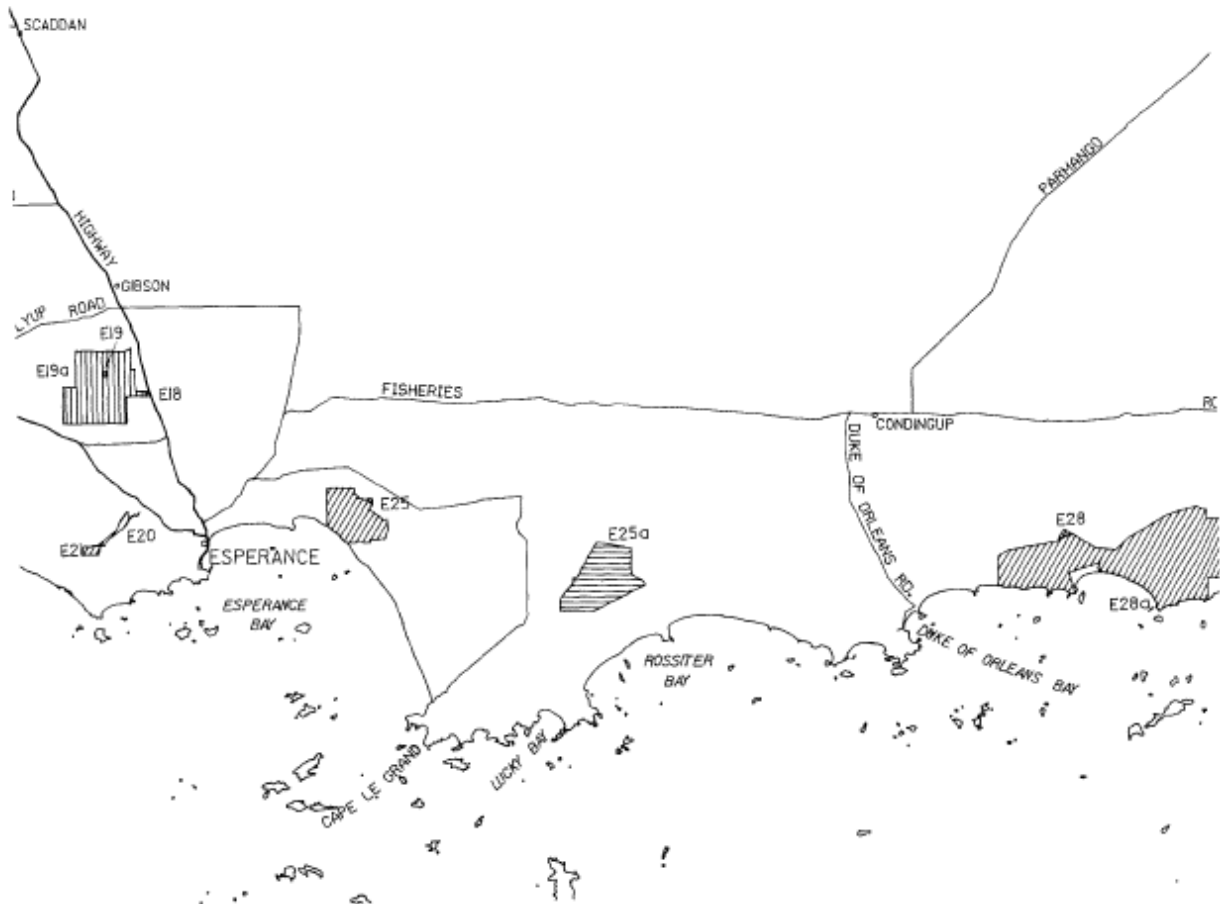
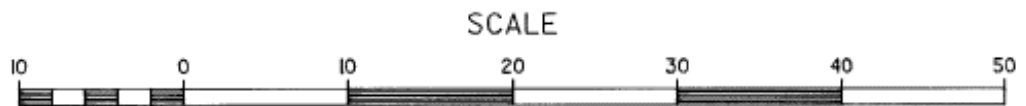



FIG 9(b)
Page 211

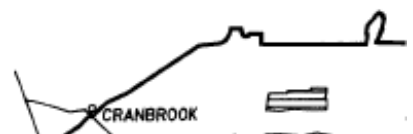


C.A.L.M MANAGED PUBLIC LANDS
 - as Proposed by the R.M.P -
 ALBANY DISTRICT (WEST)

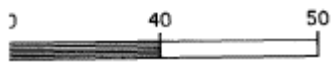


- | | | | |
|---|-----------------------------------|---|---------------------------------|
|  | NATIONAL PARK |  | NATURE RESERVE |
|  | MISCELLANEOUS CALM
ACT RESERVE |  | STATE FOREST/
TIMBER RESERVE |
|  | CONSERVATION PARK |  | SHIRE BOUNDARY |
| | |  | REGIONAL BOUNDARY |

ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



LANDS
R.M.P -



- | NATURE RESERVE
- | STATE FOREST/
| TIMBER RESERVE
- SHIRE BOUNDARY
- REGIONAL BOUNDARY
- NOT BEEN SHOWN ON THIS MAP

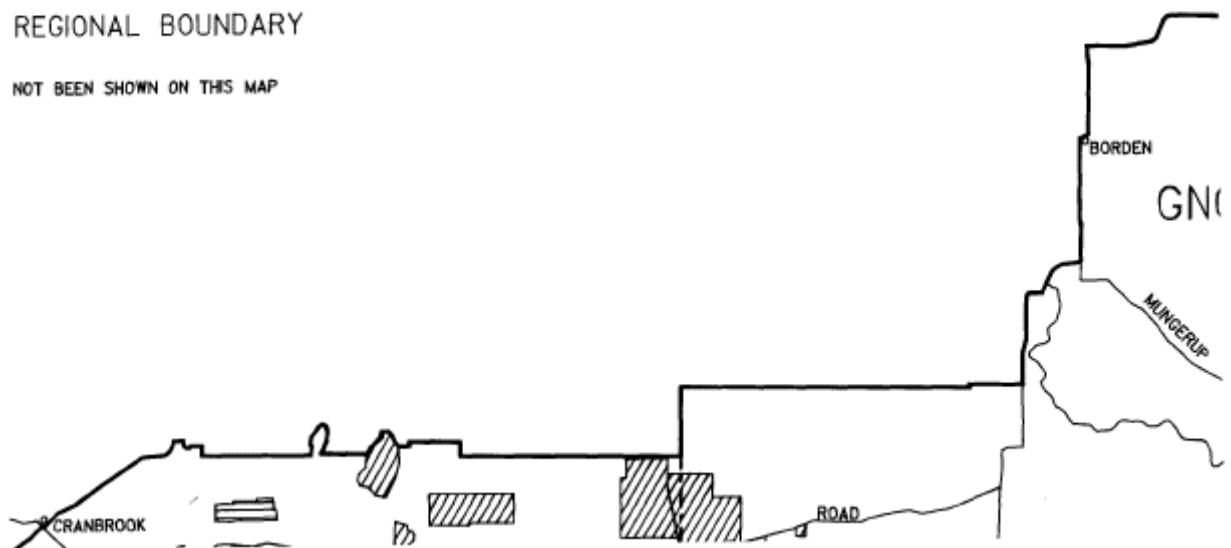
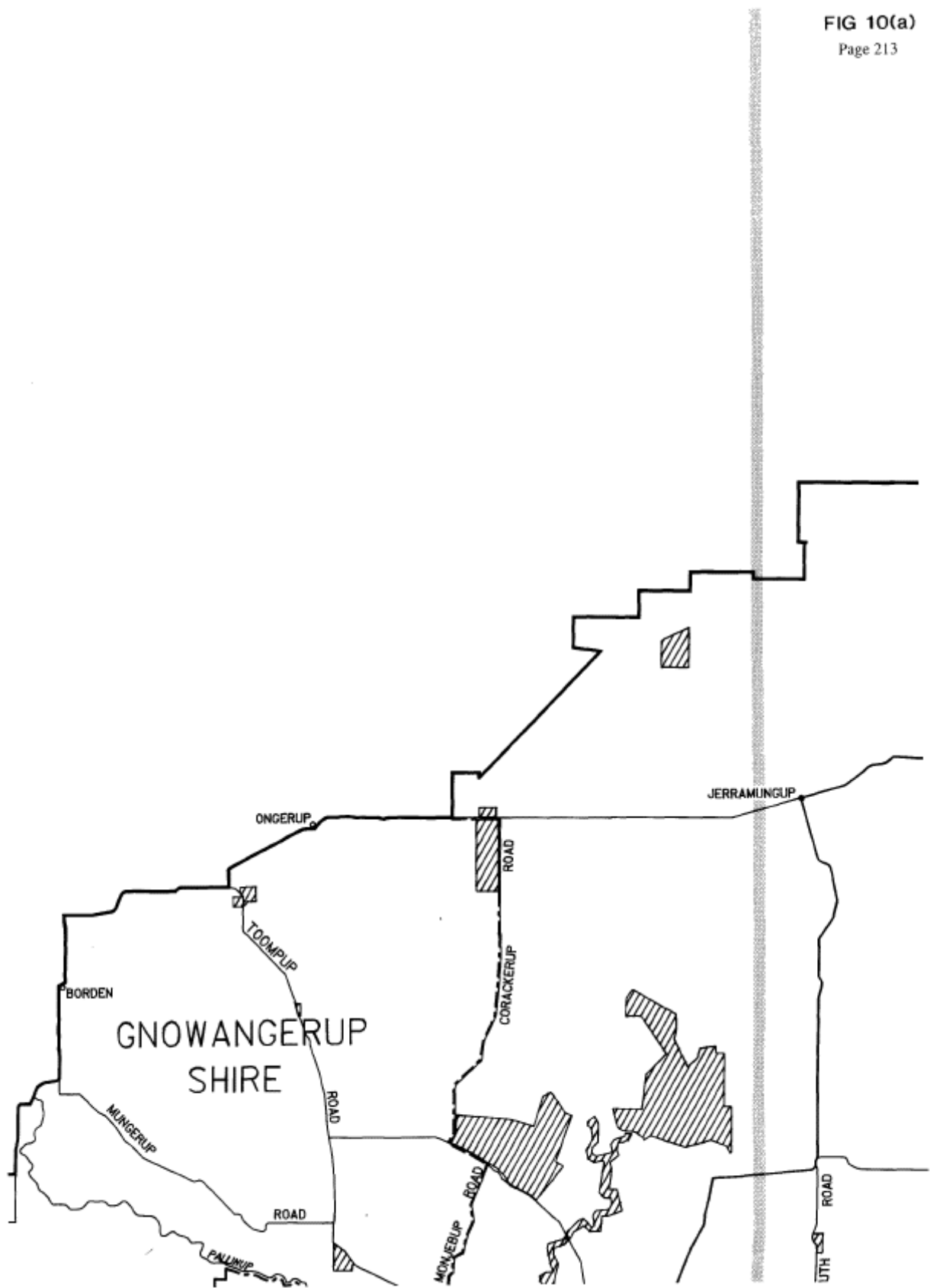
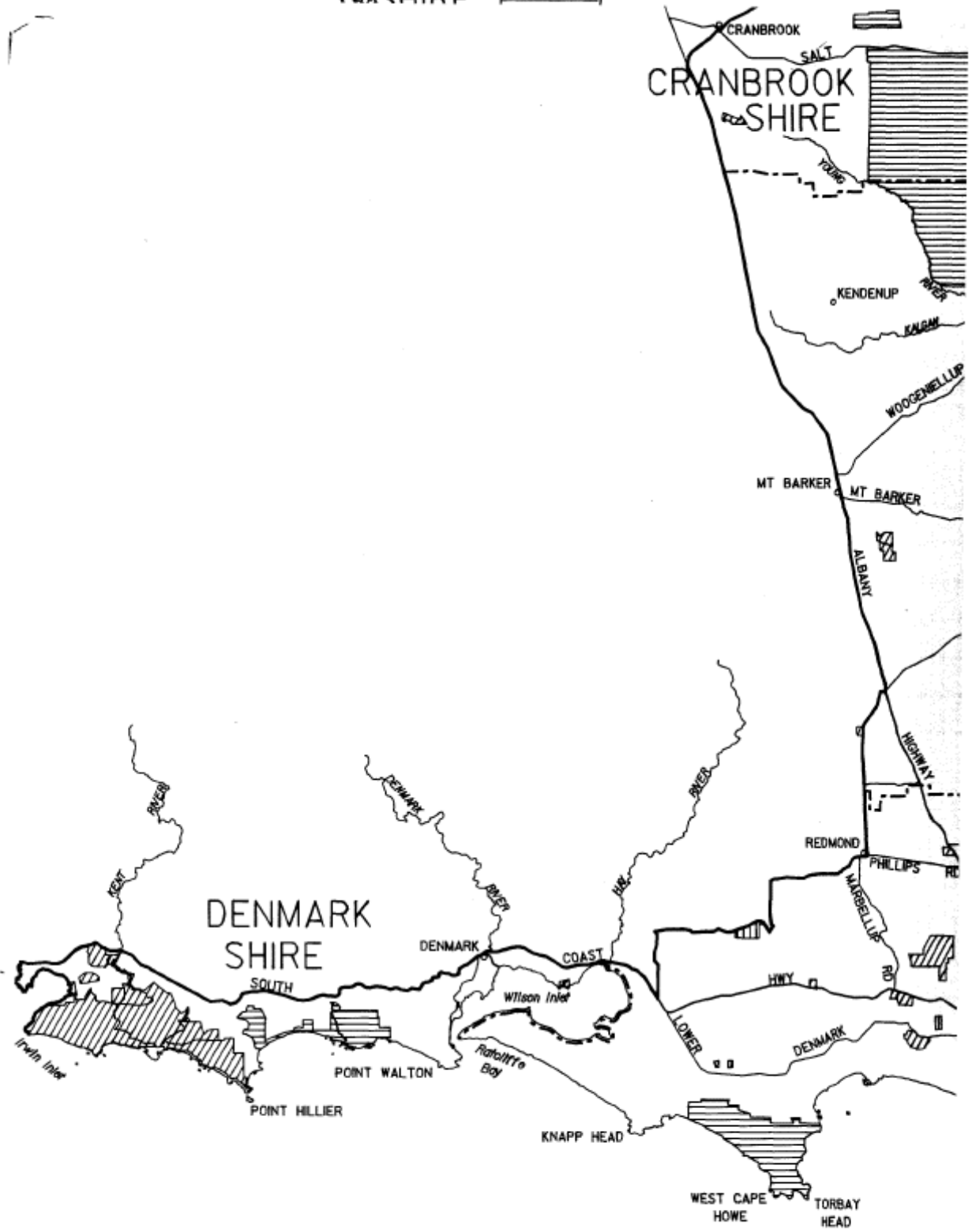
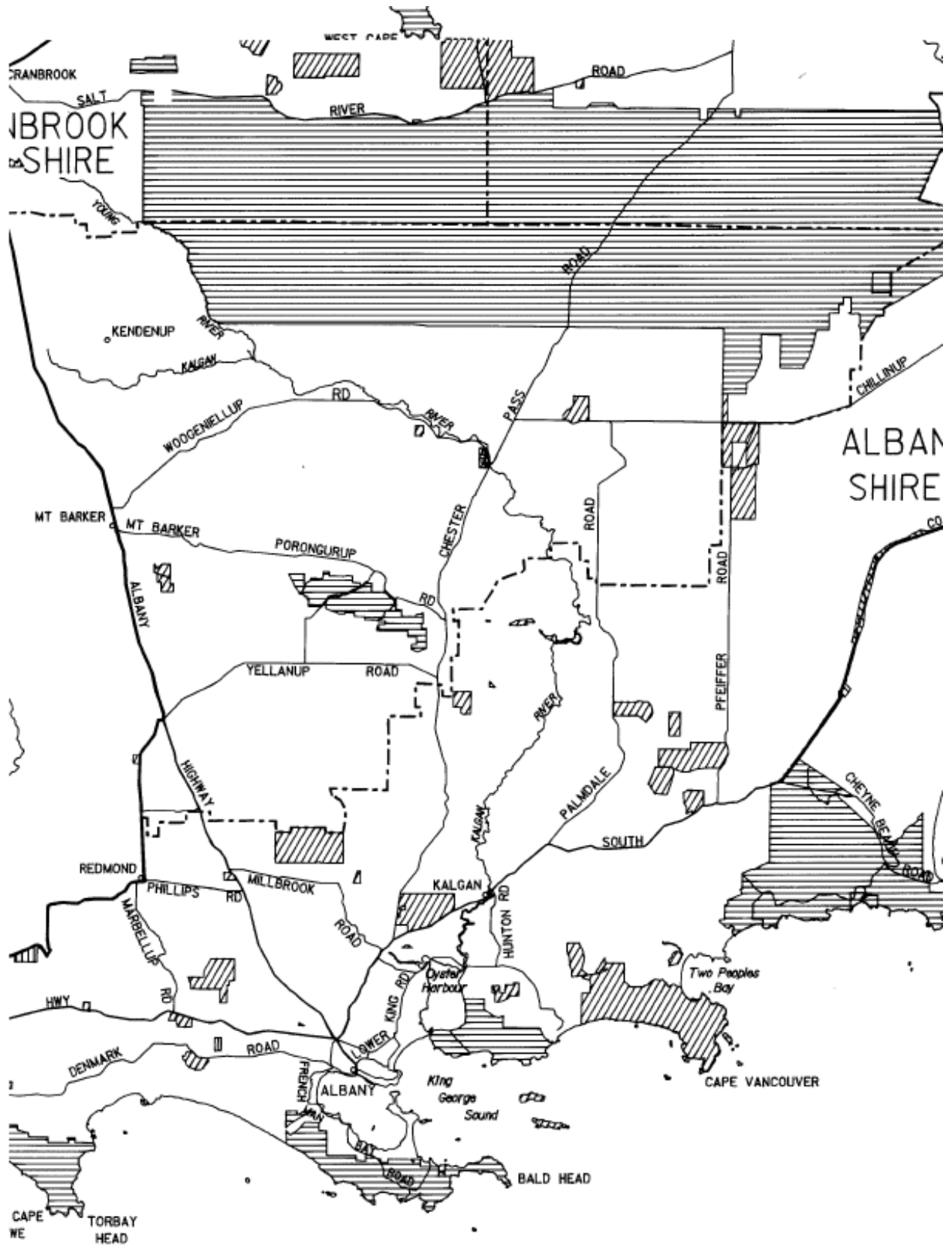


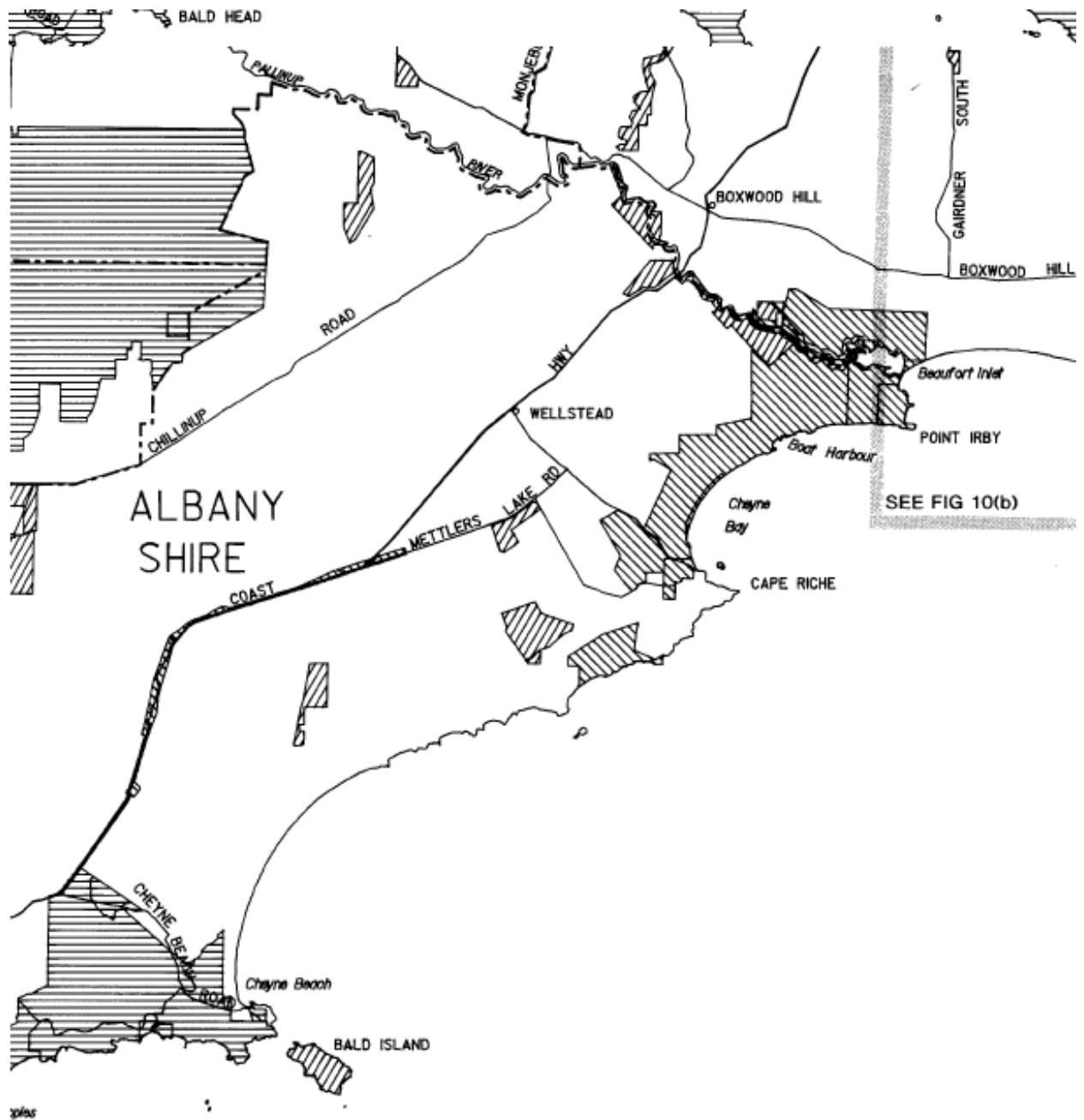
FIG 10(a)
Page 213



CRANBROOK
SHIRE



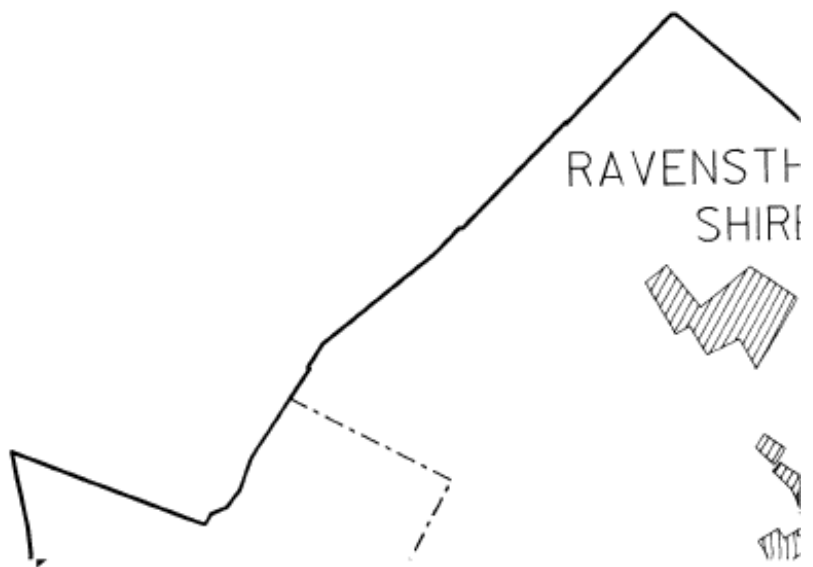




VANCOUVER



1) 



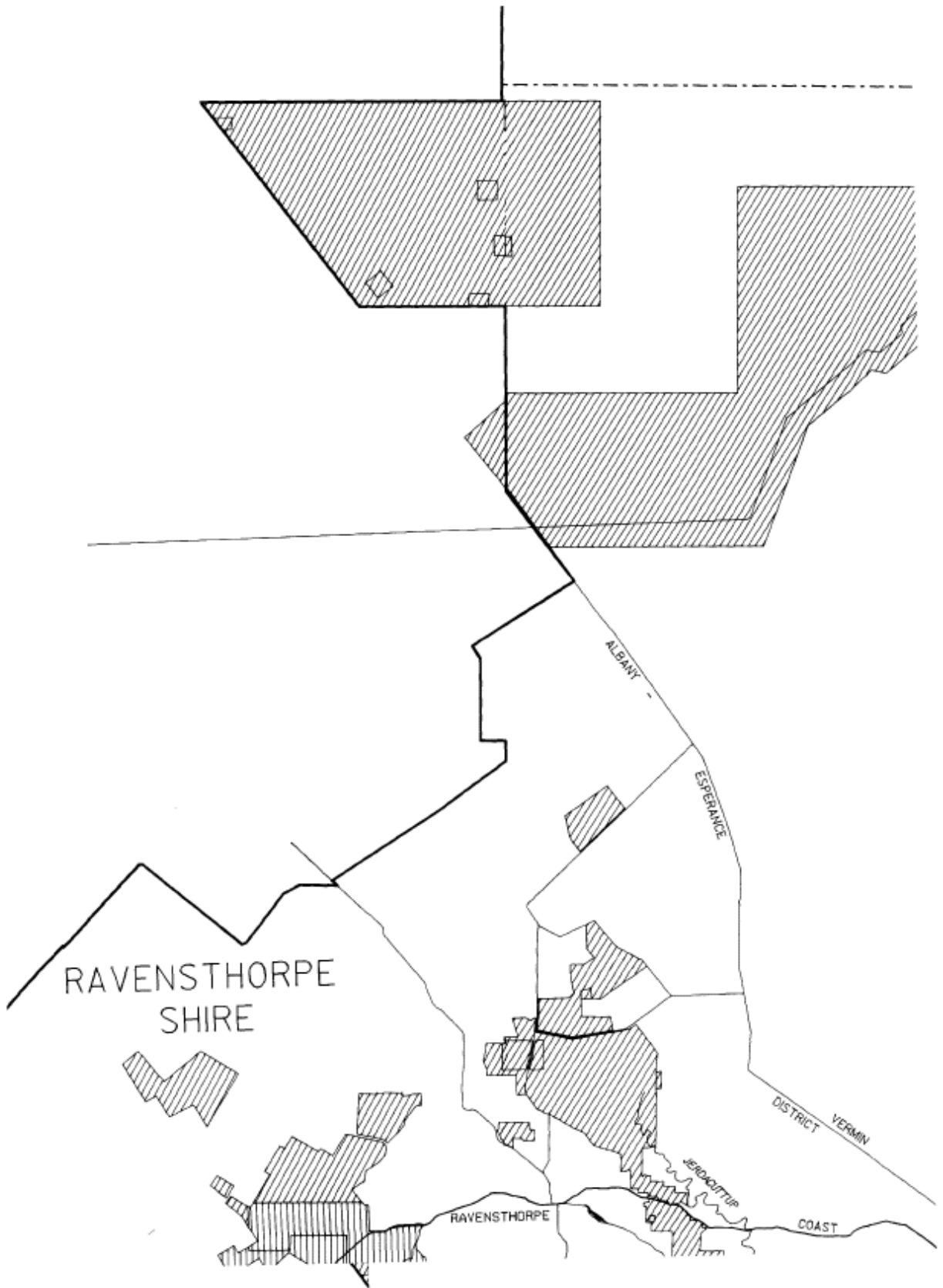
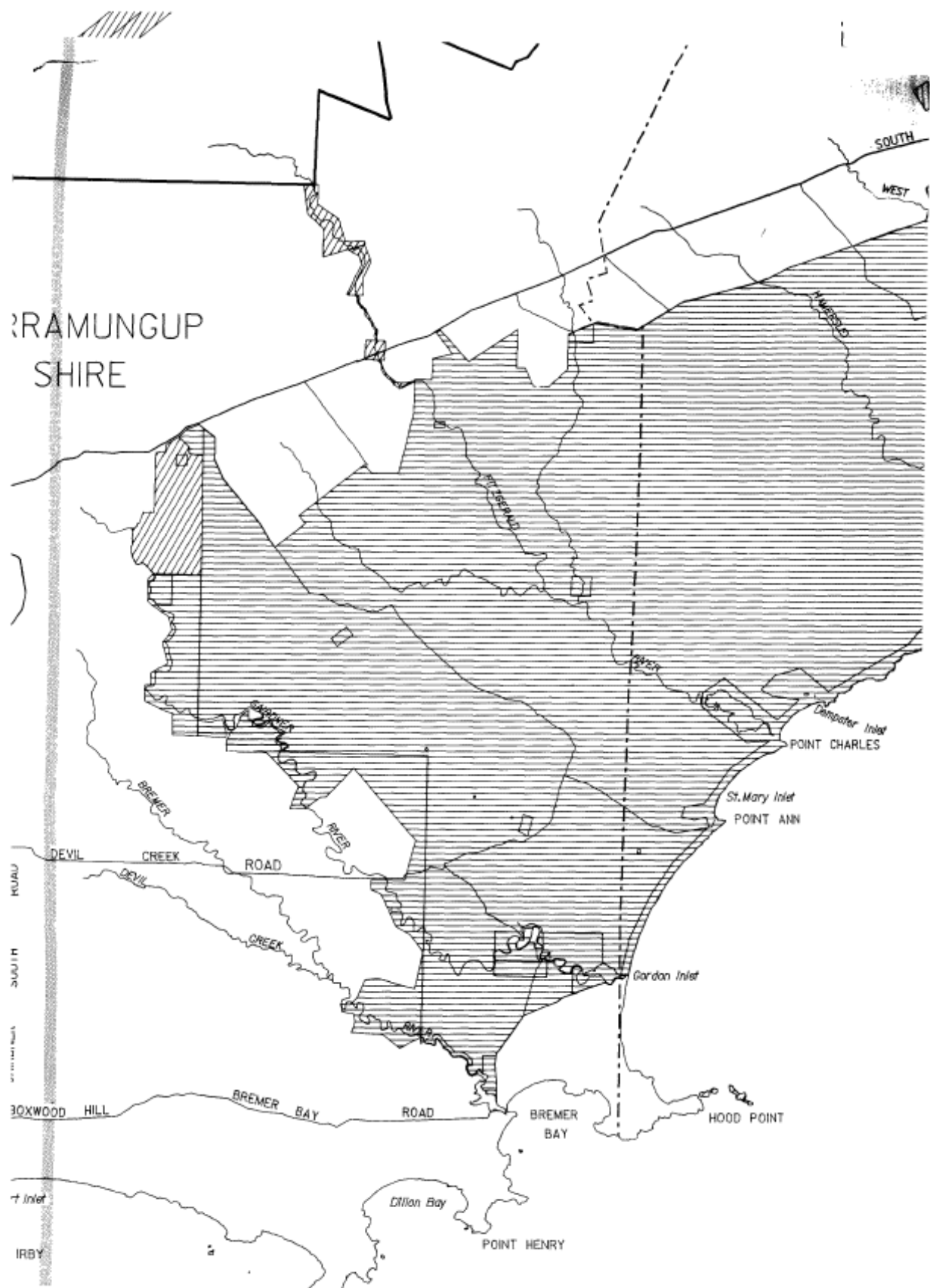
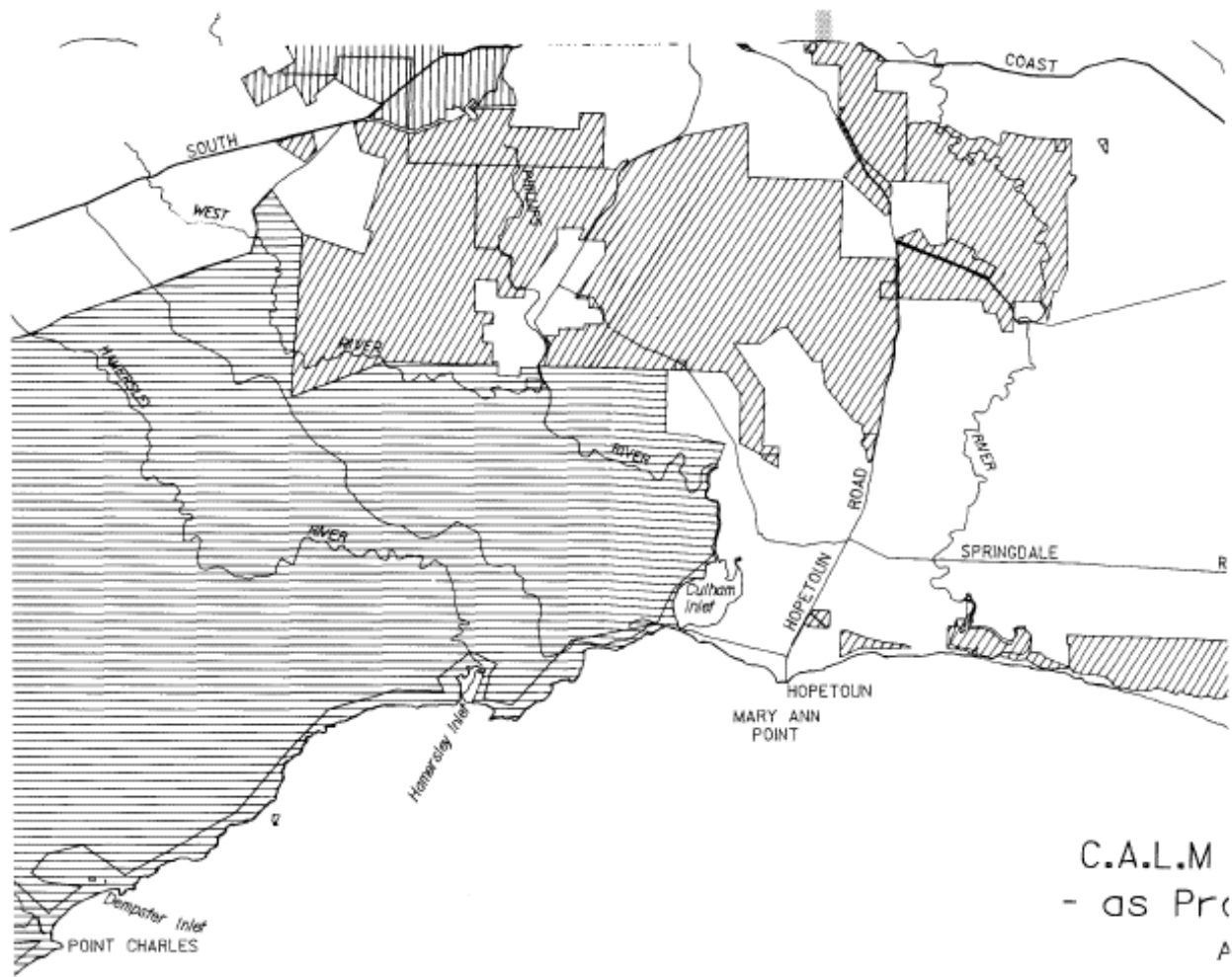


FIG 10(D)
Page 215

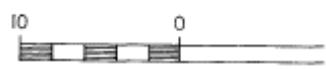








C.A.L.M.
- as Pr
A

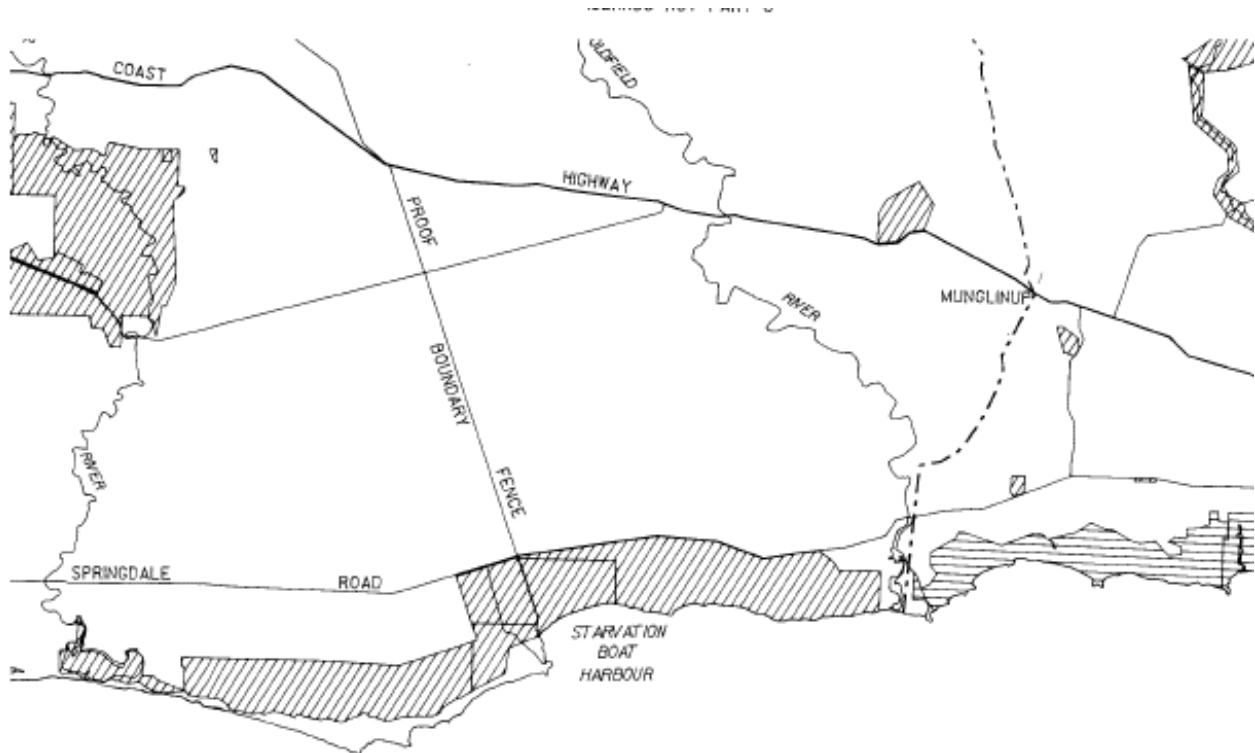
ary Inlet
INT ANN



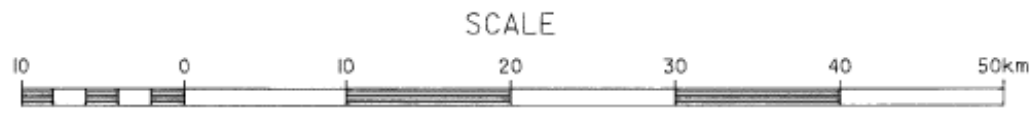
-  NATIONAL
-  MISCELLA
ACT RESI
-  CONSERV,

POINT

ISLANDS NOT PART 0

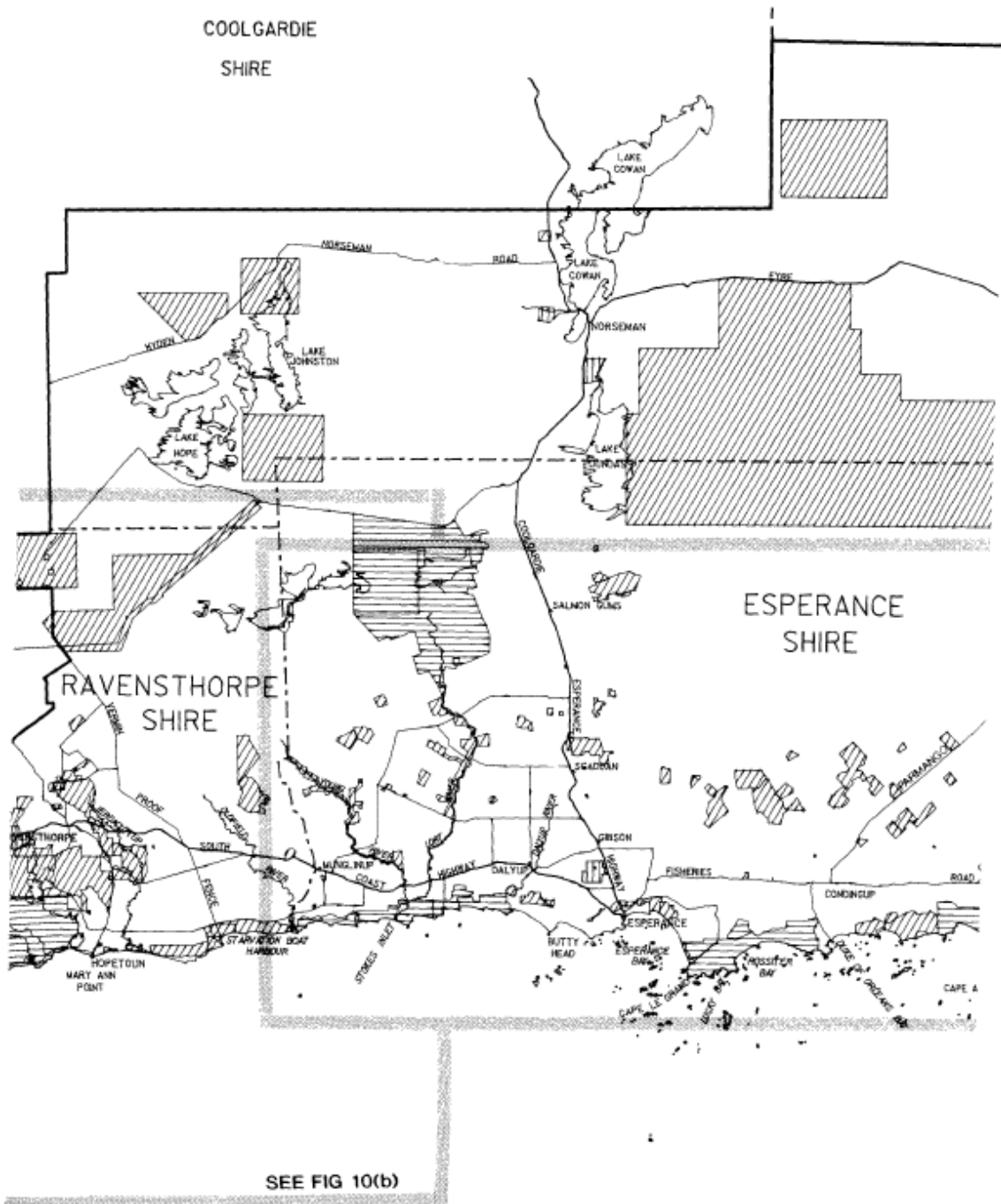


C.A.L.M. MANAGED PUBLIC LANDS
 - as Proposed by the R.M.P. -
 ALBANY DISTRICT (EAST)



- | | | | |
|---|-----------------------------------|---|---------------------------------|
|  | NATIONAL PARK |  | NATURE RESERVE |
|  | MISCELLANEOUS CALM
ACT RESERVE |  | STATE FOREST/
TIMBER RESERVE |
|  | CONSERVATION PARK | - - - - | SHIRE BOUNDARY |
| | | ———— | REGIONAL BOUNDARY |

ISLANDS NOT PART OF CALM MANAGED PUBLIC LANDS HAVE NOT BEEN SHOWN ON THIS MAP



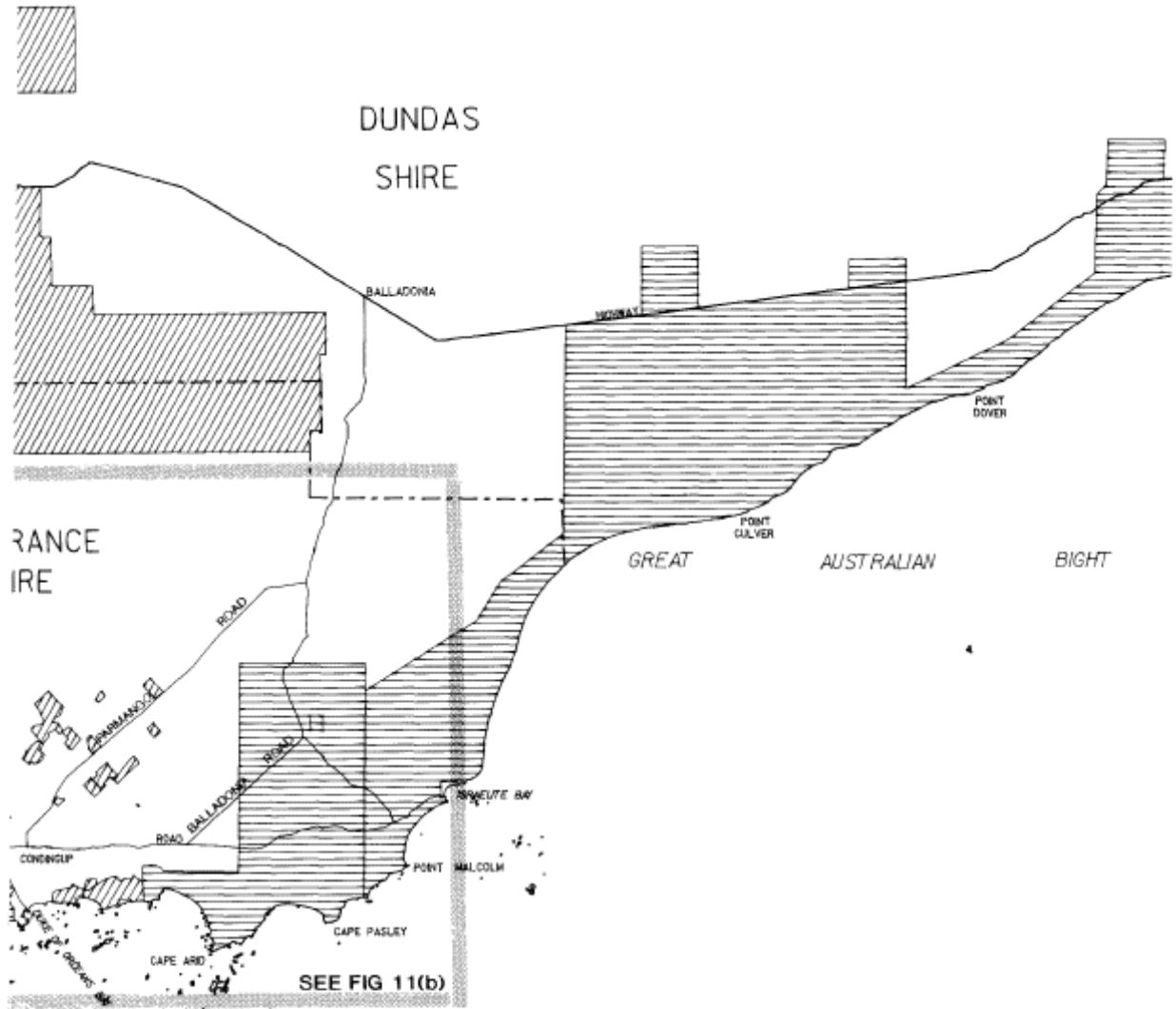
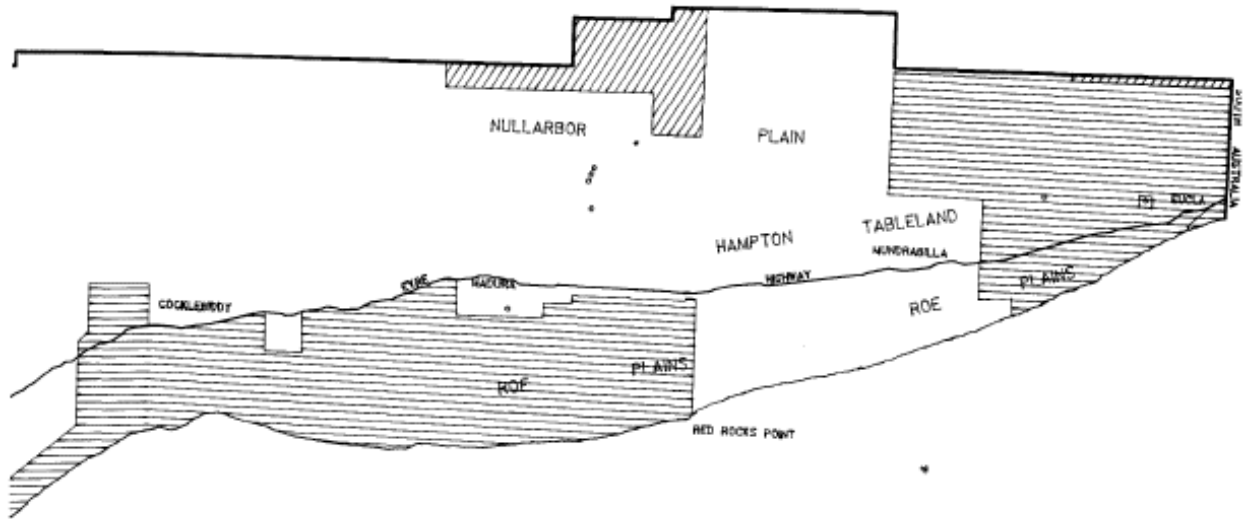
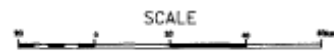


FIG 11(a)
Page 217

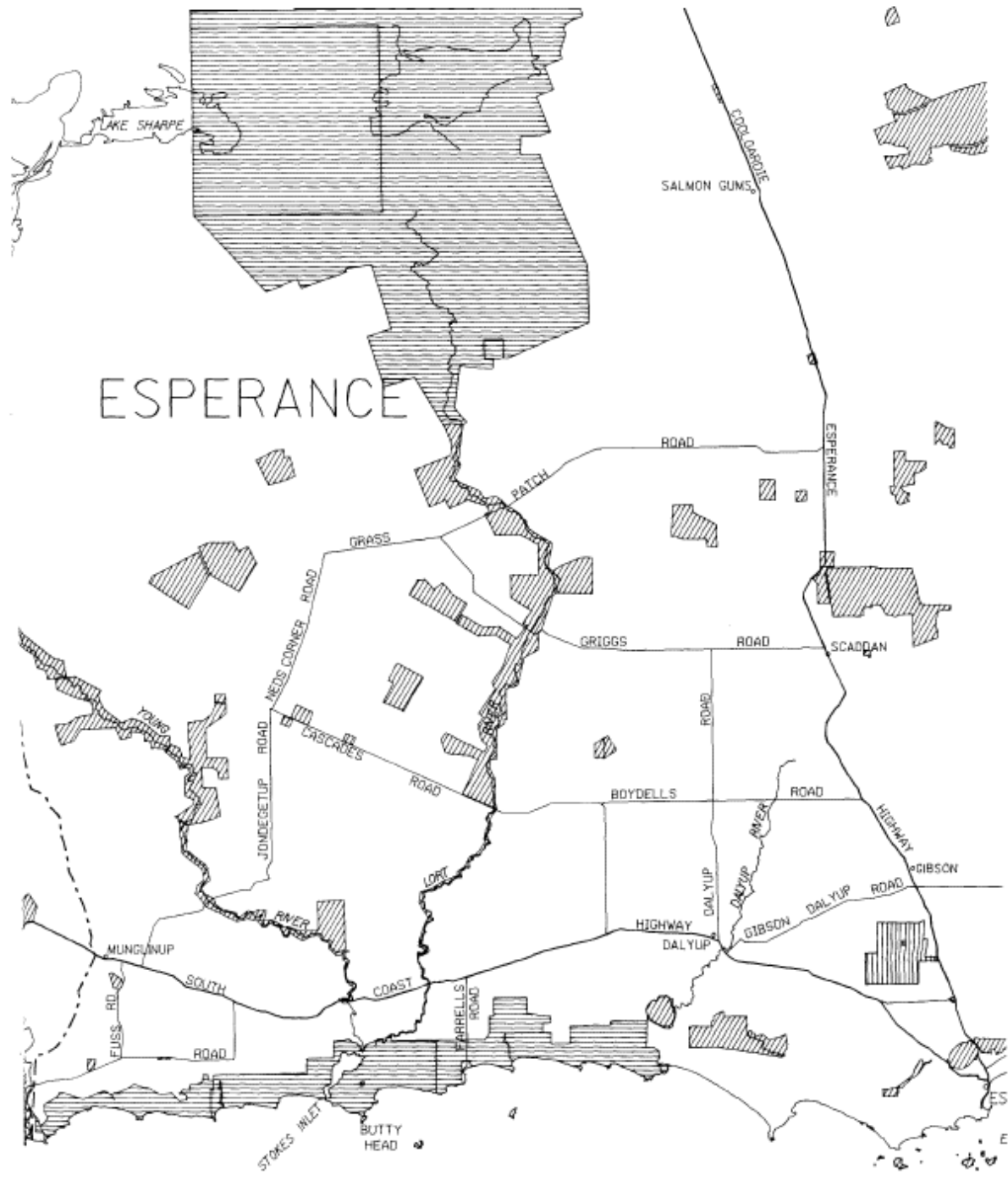


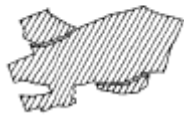
BIGHT

C.A.L.M MANAGED PUBLIC LANDS
- as Proposed by the R.M.P -
ESPERANCE DISTRICT







-  NATIONAL PARK
-  NATURE RESERVE
-  MISCELLANEOUS CALM ACT RESERVE
-  STATE FOREST / TIMBER RESERVE
-  REGION BOUNDARY
-  SHIRE BOUNDARY





CALM MANAGED PUBLIC LANDS
- as Proposed by the R.M.P -
ESPERANCE DISTRICT (ENLARGEMENT)



-  NATIONAL PARK
-  NATURE RESERVE
-  MISCELLANEOUS CALM ACT RESERVE
-  STATE FOREST / TIMBER RESERVE

SHIRE

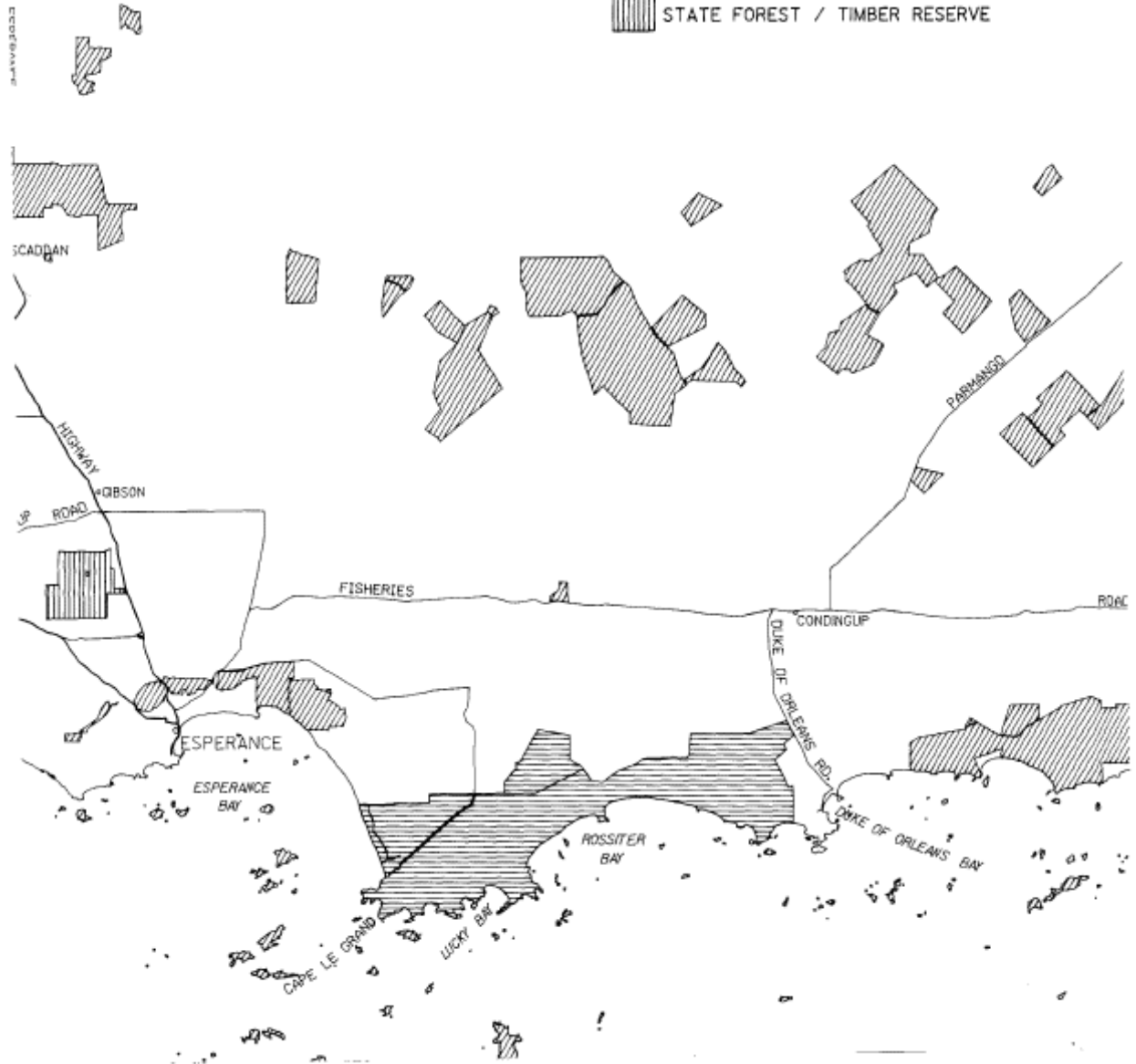


FIG 11(b)
Page 219

NDS
M.P -



SERVE
ERVE

