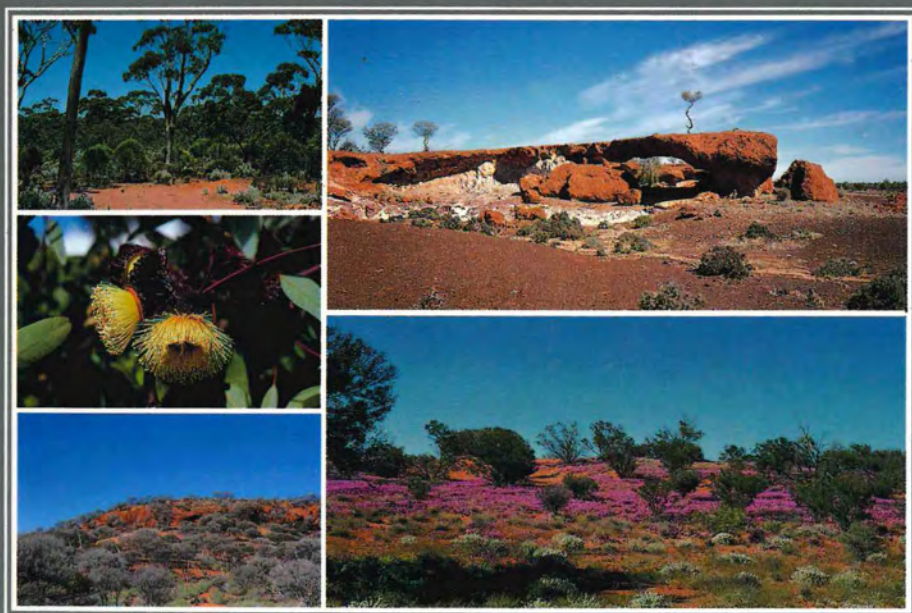


Goldfields Region



Department of Conservation and
Land Management, Western Australia

DECEMBER 1994

GOLDFIELDS REGION

REGIONAL MANAGEMENT PLAN

1994 - 2004

MANAGEMENT PLAN NO. 27

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- Various specialist branches within CALM
- CALM Science and Information Division
- The CALM Corporate Executive
- The National Parks and Nature Conservation Authority
- The Lands and Forest Commission.

Following liaison and discussions, advice was received from the six local government bodies in the region:

- Shire of Laverton
- Shire of Leonora
- Shire of Wiluna
- Shire of Menzies
- Shire of Coolgardie
- City of Kalgoorlie-Boulder.

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NOMENCLATURE

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

OBJECTIVES

The objectives of the Goldfields Region Regional Management Plan are:

- i. To document issues of conservation and land management in the Goldfields and indicate strategies for their management.
- ii. To assess the status and make recommendations for the improvement of the conservation reserve system in the Goldfields.
- iii. To provide information on the role and function of CALM in the Goldfields.
- iv. To provide a means for public and other participation in items i) and ii) above.

Regional objectives are identical to CALM's overall objectives, with the emphasis being on the Region carrying out Departmental operational functions.

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THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

1. ORIGIN, STRUCTURE, MISSION AND OBJECTIVES OF CALM

The Department of Conservation and Land Management was established in 1985 as a result of the amalgamation of the Forests Department, the National Parks Authority and the wildlife section of the Department of Fisheries and Wildlife. The Conservation and Land Management Act 1984 (CALM Act) was proclaimed on 22 March 1985. This 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 represents community interests associated with the lands vested in them.

The organisational structure of CALM is indicated in Figure 1. Critical to CALM's regional operational role is the existence of nine decentralized regions (Map 1).

The statement of mission adopted in CALM's Strategic Plan is:

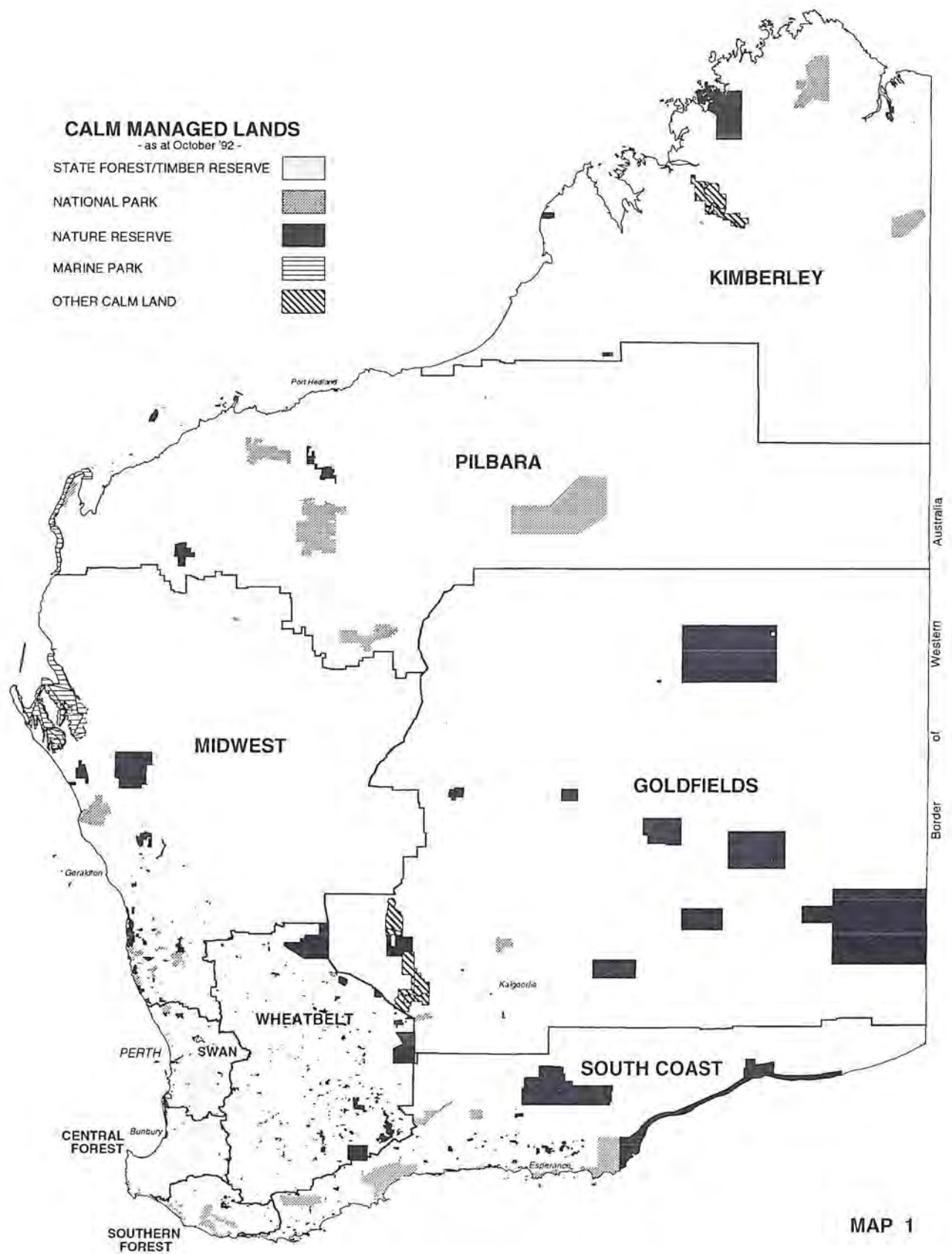
WE CONSERVE AND MANAGE WESTERN AUSTRALIA'S WILDLIFE AND THE LANDS, WATERS AND RESOURCES ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS.

Our mission has several elements, and these form the corporate objectives of CALM. They encompass the things we aim to achieve and the way in which we go about our work. Our corporate objectives are:

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

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

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



Department of Conservation and Land Management Organisational Structure

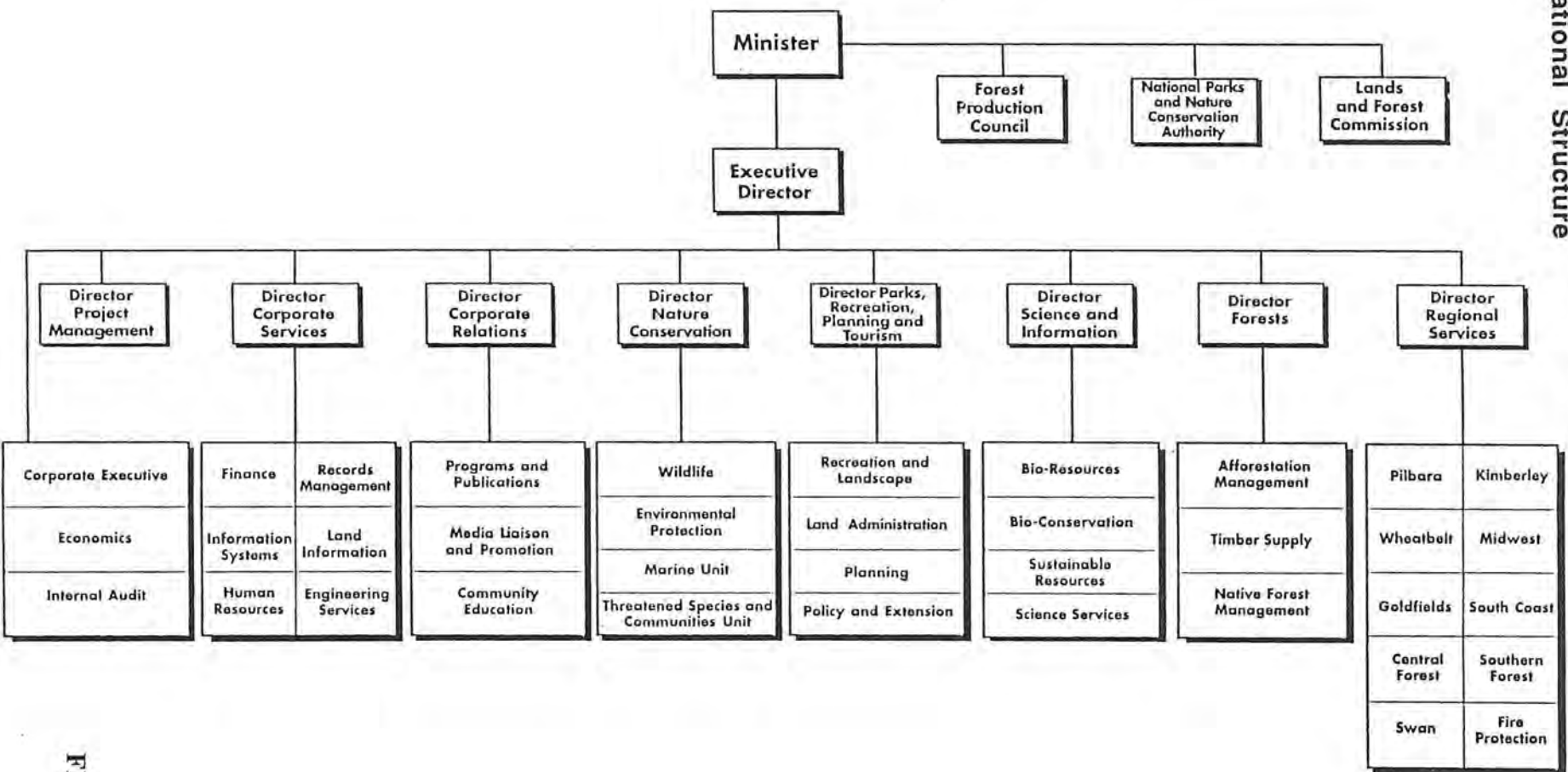


FIGURE 1.

Knowledge: To seek and provide an up-to-date and sound scientific and information basis for the Department's conservation and land management activities.

Community Support: To promote community awareness and appreciation of the values of the wildlife, lands, waters and resources entrusted to the Department, and to develop community understanding and support for the Department's conservation and land management activities.

Human Resources: To recruit, develop, reward and retain knowledgeable and talented staff, and to provide a stimulating, safe, productive and supportive work environment where staff can pursue individual goals consistent with those of the Department.

Corporate Efficiency: To optimise the efficiency, effectiveness and responsiveness of the Department in the achievement of conservation and other management objectives.

In formulating policies and management plans for conservation and recreation management, CALM is guided by the principles set down in a number of key documents. These are:

- The State Conservation Strategy, which sets out conservation objectives and strategies for W.A.
- The CALM Act and the Wildlife Conservation Act, which provide the legal framework for management of parks, reserves, forests and wildlife in W.A.
- The Departmental Strategic Plan, which guides the Department in establishing overall objectives and allocating priorities to works programs.
- "Strategies for Conservation and Recreation on CALM lands in Western Australia."
- "The Management Strategies for the South-West Forests of Western Australia", which elaborates on the principles in the State Conservation Strategy and applies them to forest management for timber production in W.A.

DEFINITIONS

The definitions of conservation, development and environment adopted by CALM are those set down in the State Conservation Strategy for Western Australia (Dept. of Conservation and Environment, 1987) and the Western Australian Environmental Protection Act 1986 (EPA Act).

Conservation

The management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is positive, embracing preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment. Living resource conservation is specifically concerned with plants, animals and microorganisms, and with those non-living elements of the environment on which they depend. Living resources have two important properties that distinguishes them from non-living resources: they are renewable if conserved; and they are destructible if not.

Development

The 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. For development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short term advantages and disadvantages of alternate actions.

Environment

Living things, their physical, biological and social surroundings, and interactions between all of these.

For the purposes of this definition of environment, the social surroundings of man are his aesthetic, cultural, economic and social surroundings to the extent that those surroundings directly affect or are affected by his physical or biological surroundings.

2. MANAGEMENT

CALM has two major management tasks:

- Management of lands vested in the controlling bodies; and
- Conservation of wildlife throughout W.A. irrespective of land tenure, vesting and ownership.

2.1 MANAGEMENT OF LANDS VESTED IN THE CONTROLLING BODIES

The Conservation and Land Management Act 1984, as amended, provides the legislation, statutes and regulations for CALM's management of the following categories of land:

Nature Reserve
Marine Nature Reserve
National Park
Conservation Park
Marine Park
State Forest
Timber Reserve
Miscellaneous (5g) Reserve

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

2.1.1 Nature Reserve/Marine Nature Reserve

Vesting: National Parks and Nature Conservation Authority

Tenure: A, B or C Class

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 nature conservation values are paramount and permitted recreational activities must be compatible with the conservation, scientific and educational aspects of the area.

2.1.2 National Park

Vesting: National Parks and Nature Conservation Authority

Tenure: Usually A Class, some national parks are C Class.

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

Comment: Commercial exploitation of wildlife is not permitted. Only those recreational pursuits which do not adversely affect ecosystems and their landscapes are permitted. The classification of national park applies to areas which have national or international significance for scenic, cultural or biological values.

2.1.3 Conservation Park

Vesting: National Parks and Nature Conservation Authority

Tenure: A, B or C 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 may not necessarily have major national or international significance, may be relatively small in size or their landscape or biota has been affected by past land use. Conservation parks in forest areas will not be zoned to include areas where commercial timber production may occur.

2.1.4 Marine Park

Vesting: National Parks and Nature Conservation Authority

Tenure: A Class

Purpose: Marine conservation and recreation, with areas zoned for commercial fishing on an ecologically sustainable 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.

2.1.5 State Forest

Vesting: Lands and Forest Commission

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

Purpose: Multiple use.

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

2.1.6 Timber Reserve

Vesting: Lands and Forest Commission

Tenure: Can be changed at discretion of Minister only, i.e. agreement of Parliament not required.

Purpose: Timber production.

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

2.1.7 Miscellaneous Reserve

Vesting: Lands and Forest Commission or National Parks and Nature Conservation Authority (areas managed under Section 5g of the CALM Act) or Executive Director.

Tenure: A, B or C Class.

Purpose: These reserves have a wide variety of purposes, but normally are related to recreation, wildlife conservation and historical features. As with timber reserves,

this classification is often transitional, and on further evaluation the classification can be changed to a more appropriate one.

CRITERIA FOR ALLOCATION OF LAND TO CALM CATEGORIES

The following criteria apply to categories of CALM land:

Nature Reserve/Marine Nature Reserve

Areas to be managed for nature conservation and scientific study.

Have important nature conservation value, either as part of a conservation reserve system, as a remnant of native vegetation or because of the occurrence of particular species.

National Park

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

Have important conservation, cultural and scenic values.

Nationally or internationally significant, 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 generally smaller areas or where nature conservation values have been affected by past land use.

Marine Park

Marine areas managed for nature conservation, scientific study, public enjoyment and commercial fishing on an ecologically sustainable basis.

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

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 and subject to specific time, area, or use constraints.

Miscellaneous Reserve

Lands which do not satisfy 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.

Compatibility between land uses and reserve categories are indicated in Table 1.

Table 1. COMPATIBILITY BETWEEN LAND USES AND RESERVE CATEGORIES RELEVANT TO THE GOLDFIELDS REGION

LAND USE	RESERVE CATEGORY			
	Nature Reserve	National Park	Conservation Park	State Forest
Nature Conservation	/	/	/	O
Recreation	O	O	O	O
Catchment Management	/	/	/	/
Timber Production	X	X	X	/
Public Utility	X	O	O	O
Mineral Resource Development (see Section 14.5)	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

Footnote: Procedures for mining access on CALM managed lands are now as in section 24 of the Mining Act 1978-87.

2.2 CONSERVATION ON LANDS NOT VESTED IN THE CONTROLLING BODIES

CALM is responsible for the conservation and protection of indigenous flora and fauna on all land and waters within State boundaries under the Wildlife Conservation Act 1950.

Included as wildlife are both flora and fauna defined separately under S.6 as:

"fauna" means -

- any animal indigenous to any State or Territory of the Commonwealth or the territorial waters of the Commonwealth;
- any animal that periodically migrates to and lives in any State or Territory of the Commonwealth or the territorial waters of the Commonwealth; and
- any animal declared as fauna pursuant to subsection (2) of this section, and includes in relation to any such animal
- any class of individual member thereof;
- the eggs, larvae or semen;
- the carcass, skin, plumage or fur thereof, but does not include any prescribed animal or prescribed class of animal.

Although invertebrates and some fish are included as fauna under the Act, all invertebrates except Jewel beetles (family Buprestidae), ants of the genus *Nothomyrmecia*, some spiders, shrimps and one snail have been declared not protected by Ministerial notice.

"flora" means any plant (including any wildflower, palm, shrub, tree, fern, creeper or vine) which is -

- (a) native to the State; or
- (b) declared to be flora pursuant to subsection (4) of this section, and includes any part of flora and all seeds and spores thereof.

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

Under section 45 of the Bush Fires Act, CALM may take responsibility for the suppression of bush fires threatening State forest. Under an agreement with the Department of Land Administration, the Agriculture Protection Board has responsibility for the control of vermin and declared plants on vacant Crown land and unvested reserves. The Sandalwood Act 1929 (as amended) provides for the harvesting of sandalwood on Crown lands, private property and certain types of reserves.

CALM has the responsibility for administering the Wildlife Conservation Regulations 1970 which provide for the protection, management and control of nature reserves. Under section 130 of the CALM Act those provisions also apply to those reserves created under the Land Act for the conservation of flora and/or fauna, but which are not vested in the National Parks and Nature Conservation Authority.

3. THE PLANNING PROCESS

The CALM Act commits CALM to the preparation of management plans for all lands under its control. Relevant sections are s.53-61, which specify that:

a management plan shall contain a statement of the policies or guidelines proposed to be followed and a summary of the operations proposed to be undertaken in respect of that land during a period not exceeding 10 years. Public notification of a plan shall be given and written submissions may be made by any person within a period not less than two months.

Due to the remote nature of some Goldfields communities the draft management plan was open for public submissions for four months instead of the statutory two. Consultation

conducted prior to the production of the draft plan included briefing sessions with all the Shires in the Goldfields Region. Additionally, 18 organisations including Aboriginal groups, Land Conservation District Committees, Government Departments and the Amalgamated Prospectors and Lease Holders Association were asked for expressions of interest. Only two of them replied. A leaflet advising the general public that a plan was being prepared was circulated through Shire offices.

CALM has a hierarchy of types of plans to cater for the need for broad policy statements over the whole State, more detailed plans for regions, and still more detailed plans for specific areas. The hierarchy of plans is:

- CALM Strategic Plan
- Regional management plan
- Area management plan

The CALM strategic plan contains broad policy objectives for all major aspects of land and water vested in the NPNCA or the LFC in Western Australia and for the conservation of indigenous plants and animals.

A regional management plan will be prepared for each CALM administrative region. The plan will cover all categories of land and water vested or proposed to be vested in the NPNCA or the LFC.

An area management plan will apply to a specific area such as national park, conservation park, marine park, nature reserve, marine nature reserve, State forest, or other reserve. These are the most detailed management plans of all. Area management plans will be prepared only where there are requirements above and beyond those that can be considered by a Regional management plan.

In addition, CALM prepares issue plans, wildlife management programs, operational plans, manuals and prescriptions. These are used to implement regional and area management plans and many of them are available for public reference.

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. Firstly, it provides the public with information about, and the opportunity to comment on and seek changes to, land use decisions.

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

NECESSARY OPERATIONS

In the absence of an area management plan certain necessary operations may be undertaken on nature reserves and marine nature reserves in accordance with section 33(3)(b)(i). Such operations are defined as "those that are necessary for the preservation or protection of persons, property, land, flora or fauna, or for the preparation of a management plan".

By this definition necessary operations are restricted in scope and it is important that they do not pre-empt the options for a future management plan. Necessary operations are usually proposed as part of the interim guidelines prepared by district and specialist staff, to guide the management of an area until a management plan is prepared. Sometimes necessary operations are proposed to deal with a particular problem or a management crisis, such as feral animal control or protection from wildfire. Necessary operations are referred to the Executive Director for approval.

COMPATIBLE OPERATIONS

Section 33(3)(b)(ii) provides that compatible operations may be undertaken in the case of national parks, conservation parks and marine parks where there is for the time being no management plan. Compatible operations are defined as necessary operations, as described above for nature reserves, and operations approved by the Minister for the Environment as being compatible with the purposes for which the park is managed.

Compatible operations must be publicly notified as for management plans, and an opportunity shall be given for written submissions as if the proposal were a proposed management plan. The proposal may then be submitted to the Minister for approval.

THE GOLDFIELDS REGION - RESOURCES AND ADMINISTRATION

4. PHYSICAL AND BIOLOGICAL RESOURCES

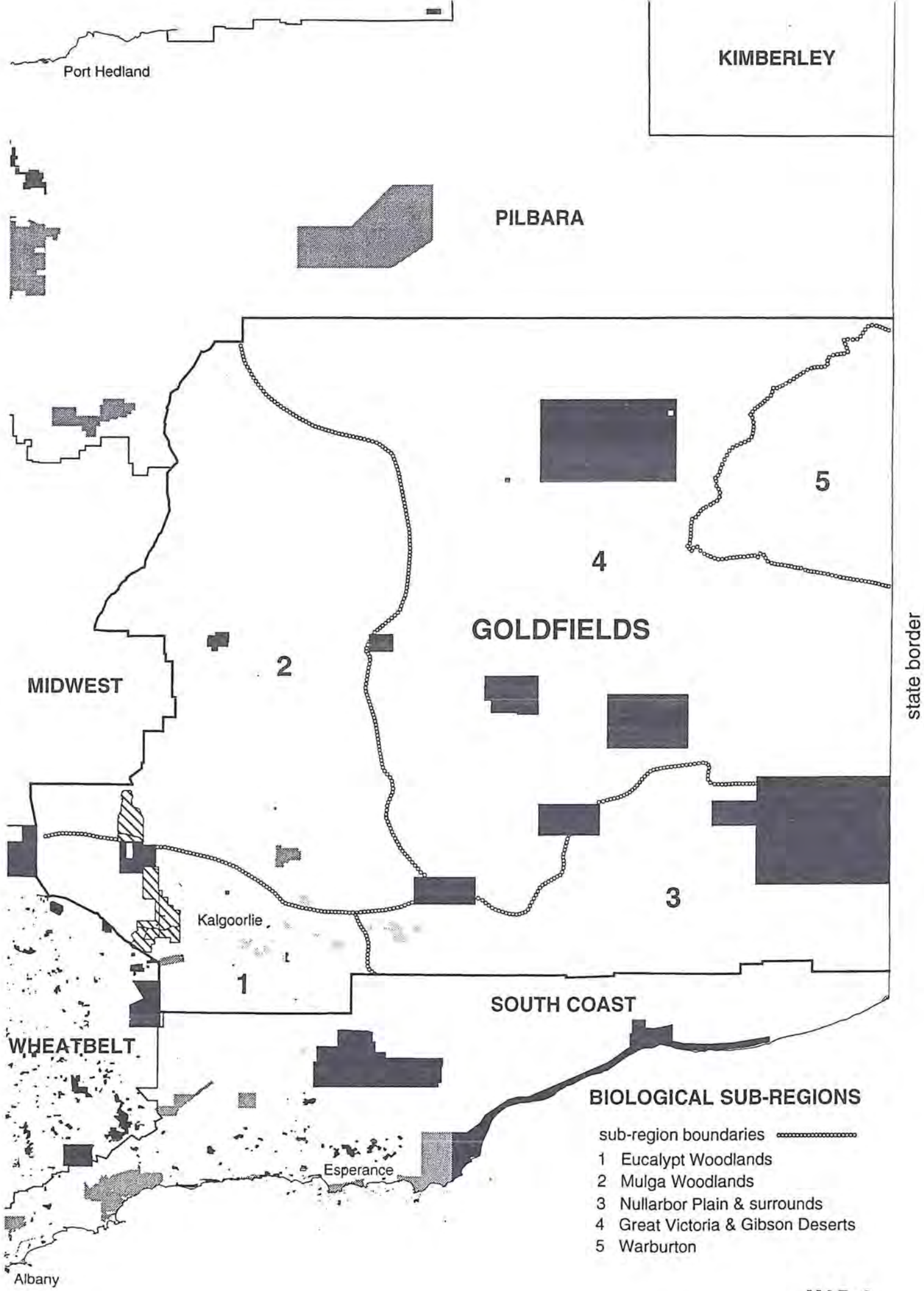
The extent of the Goldfields Region of CALM is indicated in Map 1. The total area is 77.4 million hectares. Geographically the region extends from the eastern edge of the cereal producing area, the Wheatbelt, through the eucalypt woodlands of the south west interzone to the central desert areas, and including large portions of the Nullarbor Plain and mulga woodlands. There is a climatic gradient from a winter rainfall regime of approximately 300 mm per annum in the south west to an unseasonal regime of approximately 150 mm in the northern Nullarbor area. The contribution to rainfall of cyclonic influences, particularly rain-bearing depressions increases to the north of the region. A recent report on implications of the Greenhouse effect for Western Australia suggests that rainfall intensities may increase significantly and return periods (the average time between events) may decrease (Allan *et al.*, 1992). These scenarios are relevant to land-use planning in the Goldfields Region.

Geographically the western half of the region comprises Pre-cambrian granites, gneisses and greenstones or erosional remnants, e.g. breakaways and sandplains of these components. Minor topographic relief is offered by low hills and ranges of banded ironstone and greenstone in the Yilgarn.

The Nullarbor is the largest karst area in the world. It comprises Tertiary limestones and other marine sediments. Deserts of W.A. have been described and delineated by Beard (1969). In the Goldfields Region deserts include red sandplains and dunes from the weathering of lateritic duricrust and low hills and ranges of either Proterozoic laterites or sandstones. Major ancient drainage lines and lakebeds of Tertiary age are interspersed with other landforms throughout the Goldfields.

Soils reflect geology with red-brown earthy loams in the south west, shallow calcareous loams on the Nullarbor, red siliceous sands in the desert and brown sandy clay loams over much of the Mulga woodlands. A useful summary of the physical environment of the Goldfields and a bibliography is in Department of Planning and Urban Development (1989).

Flora and fauna are determined by climatic and geological gradients within the region as well as more recent land use practices. For the purposes of this brief overview six biological sub-regions are recognized. Five of these are indicated in Map 2, the sixth being too fragmented to map at this scale.



KIMBERLEY

PILBARA

5

4

GOLDFIELDS

2

MIDWEST

3

Kalgoorlie

1

SOUTH COAST

WHEATBELT

Esperance

Albany

state border

BIOLOGICAL SUB-REGIONS

sub-region boundaries

- 1 Eucalypt Woodlands
- 2 Mulga Woodlands
- 3 Nullarbor Plain & surrounds
- 4 Great Victoria & Gibson Deserts
- 5 Warburton

4.1 EUCALYPT WOODLANDS

These occupy an area known biologically as the south-west interzone or the Coolgardie Botanical District between the south-west land division and the deserts of the interior. The woodlands have some elements of the flora of both these regions as well as some of their own. They are located in the south-west of the region.

The vegetation is predominantly eucalypt woodland (Beard 1981) becoming open and with a saltbush-bluebush understorey on the more calcareous soils. Patches of shrub steppe adjoin the Great Victoria Desert and scrub-heath and *Allocasuarina* thickets occur on sandplains. *Casuarina cristata* woodlands occur on some soil types.

The eucalypts of the Goldfields attract considerable attention because nowhere else in the world do so many tall trees grow in such an arid environment. This fact is of considerable interest to foresters from China, Africa, Israel and Mediterranean countries where Goldfields eucalypts are used for arid zone re-afforestation and rehabilitation. It comes as a surprise to many people that the trees they are most familiar with as street or ornamental trees, only occur naturally in relatively localized and restricted areas. Of 47 eucalypt species in Goldfields woodlands 24 are present as trees, the remainder occurring as mallees.

These woodlands are not continuously distributed. Other landforms of biological and conservation importance are granite outcrops, small patches of sandplain, and saltlakes and drainage lines. These are specialized habitats for flora and fauna which harbour different species than the woodlands. Sandplains in particular have more small mammals than other habitats in the Goldfields.

Granite outcrops are often host to rare or poorly known plants such as Goldfields Bottlebrush (*Melaleuca coccinea*), and the eucalypts Bookleaf Mallee (*Eucalyptus kruseana*), Round-leaved Mallee (*E. lata*) and Webster's Mallee (*E. websteriana*).

The stony hills of the Goldfields also contribute some interesting flora such as the Yilgarn Dryandra (*Dryandra arborea*) which is the largest and most eastern occurring Dryandra. Many other geographically restricted and rare plants also occur on the stony hills around Mt Jackson, Mt Manning and the Koolyanobbing Range.

4.2 MULGA WOODLANDS

As a generalisation, the areas to the north and east of Kalgoorlie-Boulder essentially form the Mulga region of Western Australia (Beard 1976), though there are small patches of Mulga in other parts of the Goldfields, in the deserts, and around the Nullarbor. Mulga is a typically Australian word with different connotations to different people; biologically it refers to the small wattle tree or shrub *Acacia aneura*. This species grows on red-brown sandy loams throughout much of the southern interior of Western Australia. Both leaf shape and size vary according to the environment. Over much of the plains it forms a low woodland, but on shallow soils and hills it forms a shrubland. Recent studies indicate that Mulga is very

sensitive to fire (Fox 1986). Randell (1992) in a major taxonomic revision of 'mulga' recognises numerous species. Implications for management are that Mulga woodlands should not be considered uniform or consistent throughout.

Sandalwood (*Santalum spicatum*) is a small tree which is widespread in this region. It forms the basis of a small, valuable, thriving industry based on the export of the wood for incense manufacture in south east Asia.

4.3 NULLARBOR PLAIN

Vegetation of the Nullarbor (which means 'no-trees') consists of shrubs dominated by either Pearl Bluebush (*Maireana sedifolia*) or Saltbush (*Atriplex* species). Claypans support a grassland of *Stipa* spp. and *Danthonia caespitosa*. Slight depressions in the plain with deeper soil and more moisture are known as dongas. These have taller plants including Weeping Pittosporum (*Pittosporum phylliraeoides*), Kurara (*Acacia tetragonophylla*) and *Grevillea nematophylla*.

Ephemeral species occur in great abundance following rain. Sturt Pea (*Clialanthus formosus*) and White Everlastings (*Helipterum floribundum*) add a dash of colour.

On the north and west peripheries of the open plain, the vegetation consists of low woodlands of Myall (*Acacia papyrocarpa*), Mulga (*Acacia aneura*) and Beelar (*Casuarina cristata*). The predominant low shrubs are Pearl Bluebush (*Maireana sedifolia*) and Saltbush (*Atriplex vesicaria*). Low grasslands (*Danthonia caespitosa* and *Stipa* spp.) occur on drainage floors, claypans and dongas.

To the south of the open plain, low limestone ridges carry low woodlands. The local distribution of salt in some intervening claypans is responsible for the presence of Samphire (*Halosarcia* spp.) while Pearl Bluebush (*Maireana sedifolia*) and Saltbush (*Atriplex vesicaria*) occur on the lower slopes of the ridges and less saline claypans.

A narrow coastal plain (the Roe Plain) links through to South Australia. Its vegetation consists of a mosaic of mallee dominated by *Eucalyptus gracilis*, *E. socialis* and *Melaleuca* spp., including *M. pauperiflora*, and lightly wooded shrub steppe dominated by Myall (*Acacia papyrocarpa*) (Beard 1975). The distribution of many south western species ends on this plain. The shrub steppe on the mud flats near the coast is dominated by Samphire (*Halosarcia* spp.), and Heath occurs on cliff tops and slopes. Vegetation surrounding the Plain provides an important corridor for fauna, particularly birds, between south-west Western Australia and South Australia.

4.4 GREAT VICTORIA AND GIBSON DESERTS

To the north of the Nullarbor Plain the vegetation grades into the sand dunes and spinifex of the Great Victoria Desert.

Vegetation is typified by very open woodland of Marble Gum (*Eucalyptus gongylocarpa*) over Spinifex (*Triodia basedowi*). This combination occurs on open plains and sand ridges in the desert.

Other vegetation types are Mallee (*Eucalyptus youngiana*, *E. concinna*, *E. leptopoda* and *E. rigidula*), *E. kingsmillii*, *E. oleosa*, and Mulga, the latter occurring principally on breakaway ridges and inter-dune swales.

Saltlakes including Forrest Lakes, Carlisle Lakes and Jubilee Lakes are surrounded by a low woodland of Beelar (*Casuarina cristata*). Understorey near Lakes Throssell and Rason includes *Ptilotus obovatus*, *Atriplex hymenotheca*, *Maireana carnosae*, *Frankenia* sp. and *Zygophyllum* sp. Samphires (*Halosarcia* species) and Saltbush surround and cover the lake beds.

The desert Grass Tree *Xanthorrhoea thorntonii* occurs in the south-west of the desert.

Plains of deep red sands which occur north and east of the Interzone between the arid zone and the South-west Botanical Province (Beard 1981) support richly varied assemblages of trees, shrubs and hummock grasses. The hummock grasses are collectively known as spinifex and feature the genera *Triodia* and *Plectrachne*.

Geomorphically, the spinifex plains occur on sand sheets found on elevated plains. Many of these plains overlie remnant sections of the Plateau of Tertiary laterite, while other sand plains overlie granite slopes and plains or salt lake fringes. All evidently originate from Pleistocene aeolian periods and many exhibit desert dunefield development, which becomes more marked to the north and east. The distinctive red siliceous sands are very low in plant nutrients.

Unlike the mulga woodlands, with which they occur regionally (and intergrade locally), the spinifex plains are inherently adapted to fire. Fire patterns dominate the appearance of these landscapes at all scales, from the ground to satellite images of the region. The structure and composition of spinifex associations is very variable as a result of fire-related plant succession and many local variations in soils and species distributions.

4.5 LAKE FRONTAGE-CHENOPOD SHRUBLAND

Low-lying areas receiving run-off from breakaways, ranges and wash plains enjoy better moisture and nutrient status than elsewhere. Halophytic shrubs dominate the vast majority of such areas, which exhibit characteristic zonation of the plant communities according to local effects of topography, drainage and soil type. Within the confines of the salt lake beds, soils are replaced by saline muds or other sediments such as kopi, which is an unrefined form of gypsum.

4.6 Warburton Region

The Warburton Region is characterised by ranges of both massive quartzite and basalt. The distinct substrate and topographic relief offered by these ranges as well as the resulting water catchment and drainage offer a range of habitats and opportunities not available elsewhere in the desert. Distinctive vegetation includes impressive groves of Desert Oak (*Allocasuarina decaisneana*) which are best developed on sandplains between the ranges. There is an endemic fauna including Dusky Grasswren (*Amytornis purnelli*) and a gekko (*Gehyra montium*) as well as some threatened mammals, e.g. Black-footed Rock Wallabies (*Petrogale lateralis*) which are declining locally. At least five species of threatened flora are present. The Warburton Region as a whole is of considerable importance to Aborigines and there have been major re-settlement or outstation programs. The region is increasingly becoming a tourist attraction due to improved access, its singular scenic quality and increasing interest in Aboriginal culture. The entire sub-region is contained within numerous reserves 'for use and benefit of Aboriginal inhabitants' vested in the Aboriginal Lands Trust.

State of Biological Knowledge of the Goldfields Region

The level of biological knowledge is different in each sub-region. In 1975 following well above average rainfall years in 1973/74 a series of desert biological surveys commenced which ran until 1980 and examined some 10 remote desert localities; see Burbidge *et al.*, (1976), McKenzie and Burbidge (1979), and Burbidge and McKenzie (1983). Prior to these surveys Queen Victoria Spring Nature Reserve and Great Victoria Desert Nature Reserve were the only two desert reserves in WA. The System 11 biological surveys, undertaken between 1978 and 1982, examined some 160 sites for fauna and approximately 1 500 flora sites were described, and each site was sampled three times; see McKenzie (1983) and Biological Surveys Committee (1984). This was a landmark in biological survey theory and practice, and it involved some 3 700 person days. It also revealed three species of mammal and two species of reptile new to science.

In 1983 and 1984 further surveys of the Nullarbor Plain were conducted by the then Department of Fisheries and Wildlife and South Australian National Parks and Wildlife Service. These were funded by the Australian National Parks and Wildlife Service (see McKenzie and Robinson 1987). This survey examined 82 separate sites, each twice, in an area of 32 million ha between Balladonia and Colona and the coast and the Great Victoria Desert. This survey was notable as new techniques of analysis of biological data and physical gradients were developed as a result.

Vegetation has been mapped at 1:1 000 000 over the Region by Beard (1974, 1975, 1976) and the accompanying memoirs provide much information relevant to land management.

Further biological data on the Goldfields Region have been obtained from mining company environmental assessments, the Agriculture Protection Board, the Rangeland Management Branch of the Department of Agriculture, the Mulga Research Centre within Curtin University, other Universities and from within CALM. These are dealt with further in Section 18.0 Research.

5. HISTORY OF LAND USE IN THE GOLDFIELDS

Conservation as a land use is a relatively new concept and past land use practices influence both the biota of the Goldfields and the practice of conservation and land management.

Archaeological studies in the Goldfields indicate that Aboriginal people have been in this region for at least 20 000 of the 40 000 or more years they have occupied Australia.

Aboriginal practices including hunting and burning had already modified the flora and fauna of Australia by the time of European settlement (see Merrilees 1968). The cessation of traditional Aboriginal burning in the spinifex deserts as recently as the 1960's may have been a factor in the local extinction of mammal species (see Burbidge and McKenzie 1989). Addressing this situation is now a major research project for CALM.

In parts of the Great Victoria and Gibson Deserts Aboriginal people still maintain strong cultural links with their lands. There is also an emerging trend for urban Aboriginal people to re-identify with their culture and lands.

The discoveries of gold in the 1880's in the Yilgarn, 1892 in Coolgardie and Wiluna, 1893 in Kalgoorlie and 1896 in Laverton prompted the European settlement of the Goldfields.

These discoveries led to establishment of towns, railways and telegraph communications and stimulated pastoral settlement. The gold mining industry declined temporarily after 1908, yet remained buoyant throughout the depression of 1930-33, with rising gold prices. From the mid 1960's to the early 1980's the gold industry declined again but this was offset in this region to some extent by the 'Nickel Boom' of 1966-70. Gold output reached a record 1 623 000 fine ounces in 1987 (Department of Planning and Urban Development 1989). Thus, then as now, the mining industry has driven the social and economic life of the region. From a land-use point of view it is necessary to distinguish between mining and exploration, although they both are 'mining' under the Mining Act.

As opposed to production mining, exploration is a land evaluation process in which relatively low impacts are spread over relatively large areas. As a general rule the impacts of exploration are more readily managed than those of production mining.

Pastoral development followed prospectors into the Goldfields. In the Laverton/Leonora district Nambi pastoral station was established in 1899 and Banjiwarn in 1903. Laverton Downs was taken up in 1918, Erlistoun and Bandy in 1921. Further north Yelma was established in 1901, Eraheedy 1903, Windidda 1916, Carnegie 1921, and Glenayle 1938 (dates from Beard 1974). Thus, unlike the Murchison where pastoral use began in the 1870's and most land was taken up by 1910, the Goldfields has a relatively short history of pastoral use. Except for Noondoonia 1880, Balladonia and Nanambinia in 1883, the industry on the Nullarbor is even more recent; most development did not occur until the 1960's. The numbers of sheep in pastoral areas of W.A. peaked at 5.5 million in 1934, declining to 3.0 million in 1941 and have maintained that approximate figure until the 1970's (Beard 1976).

In the last decade sheep numbers have declined further, but there has been a small increase in cattle numbers. Although degradation due to overgrazing is a present factor in environmental management on the Goldfields, changed attitudes, low wool prices and more conservative stocking rates are reducing impacts of grazing. However this will change if wool prices were to rise dramatically. It must also be acknowledged that the pastoral industry does provide a management presence in situations where otherwise there would be no capability to control fires, weeds, and feral animals particularly goats, maintain access and report illegal activities.

At present there are 79 pastoral leases in CALM's Goldfields Region occupying 18.8 million ha or 24.3% of the region (Table 2). The opportunity for expansion of the pastoral industry in the Goldfields is extremely limited as all land east of 122° and south of 26° has been withdrawn from further releasing (Government Gazette of W.A. 13 April 1973). The recently convened working group for the release of Crown land for pastoral purposes is in complete agreement that there should be no further release of vacant Crown land for entirely new pastoral leases.

Timber reserves on the Goldfields have an interesting history in that all were once part of a total of 243 000 ha of State forest established around Goldfields mining centres and towns to protect eucalypt and mulga woodland. These were all relinquished in the 1960s because the then Forests Department was unable to take responsibility for fire control on them.

A unique feature of land-use on the Goldfields has been the extensive utilization of native eucalypt and mulga timber for both mining timber and fuel. Between 1890 and 1960 an estimated 30 million tonnes of timber were removed from 4 million hectares of eucalypt and mulga woodland (Williamson 1983).

Table 2. MAJOR LAND TENURE CATEGORIES IN CALM GOLDFIELDS REGION

	Million Hectares	Percent
Pastoral lease	18.8	24.3
Conservation Reserve	6.9	8.9
Aboriginal Reserve	8.0	10.3
Vacant Crown land	41.3	54.6
Other (townsite, other reserve etc)	<u>1.5</u>	<u>1.9</u>
	77.4	100.0

6. LOCAL GOVERNMENT AND POPULATION

The Goldfields Region of CALM includes the Shires of Wiluna, Leonora, Laverton, Menzies, Coolgardie, and Ngaanyatjaraku, the City of Kalgoorlie-Boulder and part of the Shire of Yilgarn. In the 1991 census the residential population of the Region was 38 708 with 66% residing within the City of Kalgoorlie-Boulder. Characteristic of the Goldfields population is the relatively high proportion of Aborigines, males and people in the working age group of 15-59 years. The Goldfields Region represents 30% of the area of Western Australia, but holds only 2.4% of the State's population.

7. REGIONAL ORGANISATION

7.1 PERSONNEL

The existing staffing structure is indicated below.



* Kalgoorlie-Boulder Urban Landcare Group

As opportunity and economic circumstances offer every effort will be made to secure the extra staff needed to implement this Regional Management Plan. One and five year staffing priorities are as outlined in the Regional Strategic Plan which is updated annually. Staff will be needed in the areas of planning, aboriginal liaison, reserves management and the associated necessary support.

7.2 INFRASTRUCTURE

The present Regional infrastructure includes a regional office in Hannan Street, Kalgoorlie, and a workshop, depot and laboratory at 89 Ward Street, Kalgoorlie.

The Region has no district organization but there are un-manned outstations at Wanjarri Nature Reserve, Jaurdi and Mt Elvire Pastoral Leases which can be used as bases for regional operations.

7.3 MANAGEMENT CAPABILITY ZONES

Map 3 indicates Goldfields Region management capability zones. In Zone A (within a 50 km radius of Kalgoorlie-Boulder) CALM's ability to respond to any situation, e.g. fire, salt water

spill, illegal activities, is excellent in that the response can be within 1-2 hours. In Zone B, within a 50 to 150 km radius of Kalgoorlie-Boulder, the response time is increased to 4-6 hours. In Zone C operational capability for 'response management', e.g. fire or illegal activity, is severely constrained by remoteness, lack of access, and very sparse population. Management operations here can only be achieved with prior planning and preparation, or by utilizing local government or private resources, and response time for any contingency is increased to 1-3 days. In some situations CALM resources from Merredin or Esperance district offices would be available in shorter time than from Kalgoorlie-Boulder. Management capability with respect to fire is addressed in Section 14.1.

7.4 REGIONAL OFFICE SERVICES

In addition to regional administration, management and operations, the following services are available at the Goldfields Regional Office:

- a) Licensing
 - Forest Produce and Sandalwood Licences issued locally
 - Damage Licences issued by the Wildlife Officer
 - Kangaroo tags issued locally
 - Avicultural Licences receipted locally and processed in Perth
 - Flora licences for commercial purposes, scientific or other prescribed purposes, commercial producers and nurseryman's licence receipted locally and processed in Perth
 - Receival point for timber harvesting contract returns
- b) Publications
 - Sale of selected CALM publications and posters
- c) Information Services
 - Information and pamphlets are available on CALM activities, national parks and reserves throughout W.A., local tree planting, native flora and fauna.
- d) Tree Orders for Narrogin Nursery
 - Tree (seedling) orders are taken throughout the year and trees are delivered in June of each year.

PUBLIC LANDS MANAGED AND PROPOSED FOR MANAGEMENT BY CALM

8. MANAGEMENT OF CONSERVATION RESERVES

Policy Statement No. 31, Management of Reserves for the Conservation of Nature, establishes CALM's objectives, policies and strategies for management of conservation reserves. It includes the following objective:

To select and manage conservation reserves, and take other steps necessary, to ensure the long-term maintenance of species and genetic diversity and the persistence of those habitats, indigenous species and ecological processes that comprise Western Australian ecosystems.

GENERAL POLICIES

The Department will:

1. Establish and manage a Statewide reserve system that:
 - (a) is broadly representative of the State's natural habitats and contains viable populations of all species of animals and plants representative of the indigenous Western Australian flora and fauna;
 - (b) forms a network of natural lands and waters which are sufficiently large and appropriately located and spaced to provide refuge for migratory and nomadic species as well as habitat for sedentary species;
 - (c) protects areas of special nature conservation value.
2. Manage these reserves to maintain the existing suite of native species, where appropriate to re-establish species which have been lost from the area, and in special cases, provide appropriate habitat for particular species or communities.
3. Determine and maintain those ecological processes that are essential for the persistence of natural communities and ecosystems, promote opportunities for enhancing current biotic diversity where appropriate and eliminate or reduce those processes such as loss of habitat and predation that result in a reduction of biotic diversity.
4. Maintain the most favourable possible habitat and ecological conditions for species of indigenous plants and animals in danger of extinction.

5. Protect conservation reserves against natural or man-induced changes detrimental to the maintenance of conservation values in the long-term, whether such changes arise from events or activities inside or outside the reserves.
6. Rehabilitate conservation reserves which have suffered detrimental changes in the past, as laid down in Policy Statement No. 10, Rehabilitation of Disturbed Land.
7. Undertake ecological research to develop a knowledge base and management techniques and guidelines appropriate to reserve management objectives.
8. Monitor change in reserve environments and selected species populations and translate and incorporate results into management objectives, as laid down in Policy 28.
9. Encourage the use of nature reserves and national parks for non-destructive and management-oriented research, and appreciation of nature.
10. Encourage the adoption by the public of a 'conservation ethic', which recognises the rights of future generations and the responsibilities of the present one to manage natural resources such that the opportunities, the environmental quality and natural values we enjoy remain for future generations as well.

MULTIPLE USE PLANNING

Demands

The community requires that six principal values are provided from the lands entrusted to CALM in the Goldfields Region. These are:

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

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

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

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 timber harvesting where permitted or other products)
- mineral resource development (where this is required under Government policy)
- public utilities.

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. State forests can provide simultaneously for ecologically sustainable yields of timber, recreation, and most forms of wildlife habitat (see Table 1, p.9).

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 (ie. at certain periods or at very regulated levels) are referred to as **conditional uses**. Uses which will conflict with the priority use are referred to as **incompatible uses**. These can not be permitted in the same area at the same time.

9. EXISTING PUBLIC LANDS MANAGED BY CALM

Existing public lands managed by CALM in the Goldfields Region are listed in Appendix 1 with their area, Shire and vesting body. A summary description of the different reserve categories follows.

9.1 NATIONAL PARKS

Both Boorabbin and Goongarrie National Parks are at present completely undeveloped without facilities or Ranger staff because at present there is no demand for them. Boorabbin National Park flora and fauna are well known; it has high conservation values including three species of semi-arid-zone Banksia (*B. audax*, *B. elderiana* and *B. lullfitzii*) and nine species

of agamid reptiles, which is the greatest species richness for agamids in the Eastern Goldfields. On its present boundaries Boorabbin does not fit the usual image of a National Park; it is proposed as a component in a larger national park proposal (Section 11.8). Goongarrie National Park's flora and fauna are very poorly known. However, it does have considerable potential to be developed as a 'typical' national park (Section 10.4).

9.2 STATE FORESTS AND TIMBER RESERVES

Timber reserves on the Goldfields have an interesting history in that all were once part of a total of 243 000 ha of State forest established around Goldfields mining centres and towns to protect eucalypt and mulga woodland. These were all relinquished in the 1960s because the then Forests Department was unable to take responsibility for fire control on them.

The four existing timber reserves were resurrected in 1975. Karamindie State Forest was gazetted on 8 May 1925, and is one of the State's earliest State forests. Together, these reserves conserve some of the best examples of cut and uncut, arid-zone eucalypt woodland in the Goldfields. Approximately 30 species of eucalypt, 14 growing as trees, are present on the reserves, and with few exceptions e.g. *Eucalyptus salmonophloia*, Salmon Gum, these species are restricted to the Goldfields.

9.3 SANDALWOOD RESERVES

Goldfields sandalwood reserves are a conservation resource of considerable importance. They are amongst the State's earliest reserves, some being gazetted as early as 1923; their importance attaches to sandalwood growth rate, germination and phenology data dating back to the 1920s. There are few opportunities for research in WA which have a comparable time dimension. These data have recently been collated and summarized (see Loneragan 1990). All sandalwood reserves are either fenced on the boundary or have fenced exclusion plots to control grazing and determine its effect on regeneration. Under the Sandalwood Act (Regulations) no living Sandalwood harvesting is permitted on these reserves.

All sandalwood reserves are vested in the Lands and Forest Commission.

9.4 NATURE RESERVES

The nature reserves of the Goldfields include an adequate system of reserves in the Great Victoria Desert and one large reserve in the Gibson Desert. It is noteworthy that the selection of these reserves in the 1970s was the first time in WA that reserves had been selected on the basis of biological knowledge and scientific reserve selection criteria, particularly size and landform diversity. Elsewhere in the Goldfields nature reserves are either very small or do not represent the landform and vegetation diversity of the region (see Map 2). Wanjarri Nature Reserve is notable as the only reserve in the northern Goldfields, as well as having the richest vertebrate fauna for an arid zone nature reserve in WA. Smaller nature reserves close

to Kalgoorlie and Coolgardie are often associated with granite outcrops; some are extensively used for recreation as they have been modified by dam construction for Goldfields woodland use. An important exception is Victoria Rock Nature Reserve which is largely a pristine granite outcrop.

9.5 PASTORAL LEASES

CALM managed lands in the Goldfields include two former pastoral leases, Jaurdi and Mt Elvire. These were purchased under the Sandalwood Conservation and Regeneration Project (SCARP) in 1989 and 1990 respectively. They are very important for sandalwood and arid-zone woodlands conservation and are not now managed for pastoral purposes. It is intended to change these areas to State forest (see sections 10.8 and 10.9).

The fauna of Mt Elvire is reasonably well known as it was studied in 1980-81 as part of the System 11 biological studies.

There are some data on flora and fauna (particularly birds) for Jaurdi pastoral lease but there have been no detailed surveys to date.

9.6 ARBORETA

The Goldfields Region includes two arboreta:

Kalgoorlie Arboretum, Reserve No. 23840, 26.5 hectares and
Coolgardie Arboretum, Reserve No. 31983, 24 hectares.

Both arboreta have extensive plantings of Goldfields trees, particularly eucalypts. Kalgoorlie Arboretum is a high profile area for CALM and is used extensively for recreation. It has recreational developments including picnic tables, walk trails and information. The arboreta have considerable potential for environmental education. They will be managed by CALM in conjunction with the community and local government, in accordance with CALM policy.

9.7 NATIONAL ESTATE

In recognition of their outstanding conservation values, the following areas in the Goldfields Region which are managed by CALM are listed on the Register of the National Estate:

Boorabbin National Park
Goongarrie National Park
Queen Victoria Spring Nature Reserve
Mt Manning Range Nature Reserve
Wanjarri Nature Reserve
Mangkili Claypan Nature Reserve
Gibson Desert Nature Reserve.



The following areas proposed for CALM management are also on the register of the National Estate:

Carnarvon Range Proposed Conservation Park

Lake Disappointment Proposed Reserve

Windich Spring Proposed Conservation Park.

Funding for certain aspects of management of listed areas, e.g. biological or heritage value surveys, may be available upon application to the Australian Heritage Commission for the National Estate Grants Program.

10. PROPOSED CHANGES OF TENURE, PURPOSE, VESTING OR BOUNDARIES OF EXISTING PUBLIC LANDS MANAGED BY CALM

The requirement to change tenure, purpose, vesting or boundaries of reserves arises for several reasons which may be interrelated. For example, traditional uses, particularly heavy recreational use, may in some cases be incompatible with nature reserve purpose and management. Thus a change in purpose and/or vesting may be appropriate. The management of recreation in natural environments requires a 'manageable boundary' which accommodates the extent of the feature, e.g. a granite rock. The boundary must protect the attraction and its conservation values, and at the same time allow the impact of recreation, e.g. soil compaction and access, not to be too severe over a small area. Thus a boundary change may be appropriate.

In the case of unvested reserves, the managing authority has a case for tenure and vesting to be in the appropriate authority to justify continuing allocation of resources. In the case of conversion of pastoral leases, timber reserves and sandalwood reserves to State forests, a means to facilitate granting of mining tenements has been proposed. The Ministers for the Environment and Minerals and Energy have agreed, in principle, to amend the Mining Act to allow mining in State forests outside the south-west by the Minister for the Environment's recommendation rather than his concurrence. The Minister for Minerals and Energy has recommended Cabinet approval and industry consultation before the Mining Act amendments proceed.

10.1 SANDALWOOD RESERVES TO BECOME STATE FORESTS

Recommendation 1

That the following reserves vested in the Lands and Forests Commission for the purpose of 'timber-sandalwood' and timber become State forests vested in the Lands and Forest Commission under Section 8 of the CALM Act:

Emu Rock (No. 19645) City of Kalgoorlie-Boulder
Wallaby Rock (No. 19764) City of Kalgoorlie-Boulder
Coonana (No. 19640) City of Kalgoorlie-Boulder
Yallari (No. 19212) Shire of Coolgardie
Scahill (No. 19621) Shire of Coolgardie
Calooli (No. 19211) Shire of Coolgardie, is recommended for incorporation into the proposed Kangaroo Hills State Forest (see section 10.2)
Lakeside (No. 19214) City of Kalgoorlie-Boulder.
Bullock Holes (No.19825) City of Kalgoorlie-Boulder.

See Appendix 1 for further details of these reserves.

Recommendation 2

That the Lakeside Sandalwood Reserve boundary be amended to exclude the Kaltails mining operation. The new western boundary to be from a point on the Trans-Australian Railway at 121° 34.70'E, 30° 47.68'S, thence 3.2 km south to 121° 34.70'E, 30° 49.43'S, thence 0.8 km at 288° to 121° 34.23'E, 30° 49.29'S, thence 1.8 km at 205° to 121° 33.74'E, 30° 50.19'S on the southern boundary. The area proposed for excision is 1 370 ha out of a total area of 3 787 ha. Appropriate compensation under the State Agreement Act will be required.

Justification and Implications

These reserves, which were gazetted between 1923-1928, are amongst the State's oldest conservation reserves. They have considerable importance to sandalwood research as they have research plots which are fenced and ungrazed and growth rate data going back to these years. In pastoral areas these plots and reserves have considerable value in evaluating the effects of grazing.

Conversion to State forest affords them greater protection because boundary changes require the approval of both Houses of Parliament while allowing some other uses under section 9 of the CALM Act. For implications see Section 2.1.5. Changing the boundary to exclude the Kaltails mining operation will exclude the localised but severe degradation caused by a rising saline water table. The affected area has minimal conservation value and the proposed excision includes a buffer zone to prevent incursion into the remaining reserve.

Response to submissions

CALM remains firmly committed to this proposal. The only impediment to implementation is the outcome of the Minister for Minerals and Energy's requirement for Cabinet approval and industry consultation before amending the Mining Act to facilitate granting of mineral tenements on State forests outside the south-west (see page 29). CALM will implement excision of the Kaltails mining project area.

10.2 EXISTING TIMBER RESERVES TO BECOME STATE FOREST

Recommendation 1

That the following existing Timber Reserves become State forests vested in the Lands and Forest Commission:

Majestic (No. 195/25) City of Kalgoorlie-Boulder

Randell (No. 194/25) City of Kalgoorlie-Boulder

Kambalda (No. 199/25) Shire of Coolgardie

Kangaroo Hills (No. 198/25) Shire of Coolgardie.

In order to minimize adverse impacts on vegetation and biodiversity of grazing, which exists concurrently on these reserves, monitoring on grazing lease numbers 3114/1192 (Mt Monger Station) on Majestic and 3114/617 (Cowarna Downs) and 332/1803 and 3114/1192 (Mt Monger) on Randell, will be required to ensure that the stocking is maintained at no greater than a sustainable level.

An encumbrance on Randell Timber reserve is the presence of four unvested Land Act reserves:

Reserve No.	Area	Class	Purpose	Vesting
9695	5149.62 ha	C	Common	Not vested
12923	515.97 ha	C	Water	Not vested
9885	4.04 ha	C	Recreation	Not vested
11662	2.02 ha	C	Water	Not vested

Reserves 12923, 9885 and 11662 were specifically excluded from Randell Timber Reserve when it was gazetted (Government Gazette, 31 December 1975). Reserve 9695 was not excluded by the gazettal notice. To rationalise management of Randell Timber Reserve all four reserves should be cancelled.

As they are concurrent, grazing leases on Kambalda (No. 3114/1076) and Kangaroo Hills Timber Reserves (No. 3114/468) can only be terminated with an appropriate agreement with, and compensation to the pastoralists, and an arrangement to fence stock out of the relinquished leases.

Justification and Implications

These reserves, Majestic and Kambalda in particular, include some of the best examples of un-cut, arid zone eucalypt woodlands (see Section 4.1). Loss of plant biodiversity, particularly of perennial shrubs due to grazing is incompatible with this status. An appropriate management aim is to negotiate to remove grazing or manage it at a sustainable level. Conversion to State forest affords greater protection while allowing some other uses under Section 9 of the CALM Act. For implications see Section 2.1.5.

Recommendation 2

That the Kangaroo Hills Timber Reserve boundary be amended to exclude part of the Burbanks mining centre. The proposed amended boundary to be from a point on the existing eastern boundary at 121° 08.73'E, 31° 01.16'S thence 0.8 km west to 121° 08.20'E, 31° 01.16'S thence 2.1 km at 221° to 121° 07.33'E, 31° 02.04'S thence 1.0 km east to 121° 08.17'E, 31° 02.04'S and from here to the starting point. The area proposed for excision is 160 ha of a total of 6 657 ha.

Justifications and Implications

The area proposed for excision is largely devoid of natural vegetation due to past mining activities and is currently occupied by expanding operations. For an area with minimal conservation values the cost of management to CALM is disproportionate to any benefit.

Response to submissions

CALM remains committed to providing statutory protection to the types of un-cut woodland represented on these reserves. With little likelihood of grazing being removed from both Randell and Majestic, CALM will re-assess whether examples of this type of woodland are available for reservation elsewhere. Mining issues relevant to the conversion of Sandalwood Reserve to State forest indicated above also apply here. The proposal to excise part of Kangaroo Hills Timber Reserve is in response to submissions received.

10.3 NATURE RESERVES TO BECOME CONSERVATION PARKS

Recommendation 1

That the following existing nature reserves vested in the Hon. Minister for Water Supply become 'A' Class Conservation Parks vested in the NPNCA:

Burra Rock Nature Reserve (No. 7038) Shire of Coolgardie

Cave Hill Nature Reserve (No. 17804) Shire of Coolgardie.

An increase in size from 202 ha to 1 600 ha is recommended for Cave Hill to accommodate recreation and conservation over the entire Cave Hill granite outcrop system. The extension is defined from 31° 38.44'S to 31° 40.61'S and from 121° 13.00'E to 121° 15.60'E. At present the southern portion of the rock is outside the reserve (Map 5).

Justification and Implications

Both these reserves are used extensively for recreation and CALM manages and promotes this use by installation of facilities such as barbecues, toilets, and picnic tables. Cave Hill in particular has high conservation values; both reserves would be difficult to manage as 'A' Class nature reserves. For implications see Section 2.1.3.

Response to submissions

CALM will proceed with implementation as no identified user group is adversely affected and the recommendations were generally supported.

Recommendation 2

That Rowles Lagoon Nature Reserve which was recently regazetted as conservation park (Govt. Gazette, 8 April 1994, p.1480) be managed and developed as a recreation area.

Justification and Implications

In the period between release of the draft, receipt of public comments and approval of the final Regional Management Plan, the issue of enabling water skiing and recreation arose following filling of the lake. The Minister for the Environment decided to approve water skiing, making a change in purpose from nature reserve to conservation park necessary under the CALM Act.

Recommendation 3

That the conservation status of the Rowles Lagoon system of lakes be enhanced by entering into a Section 16A agreement for management of a portion of land south of Rowles Lagoon Conservation Park including 'the creek', and that options for the incorporation of Canegrass Lagoon into Clear and Muddy Lakes nature reserve be investigated.

10.4 EXTENSION OF GOONGARRIE NATIONAL PARK

Recommendation 1

That Goongarrie National Park in the Menzies Shire be extended eastward to include part of Menangina South pastoral lease no. 398/567, incorporating Cockatoo Rocks and Water Reserve no. 8640 (Map 4), as offered by the lease holder. The extension is to cover an area of 12 150 ha and to be 'C' Class conservation park.

Justifications and Implications

This portion of Menangina Station has been offered for incorporation into Goongarrie National Park by the pastoralist. The land has some different vegetation characteristics, e.g. *Xanthorrhoea thorntonii* as well as *Eucalyptus jutsonii* and *Lepidobolus deserti* which are both 'threatened' species. Biological work in 1992 has clarified CALM's case for this extension which includes a landform with vegetation characteristics not known to be represented in the existing national park. Pre-existing tenements and mineral prospectivity preclude national park status for the proposed extension.

Recommendation 2

When the extension of Goongarrie National Park is implemented, cancel Water Reserve No. 8640 and incorporate the land in the conservation park component.

Justifications and Implications

To rationalise management, all other enclave water reserves in Goongarrie National Park have been cancelled or are in the process of being cancelled.

Recommendation 3

CALM Goldfields Region develop Goongarrie National Park according to an area management plan.

Justifications and Implications

With increasing public interest in conservation of the arid zone there is a case for establishing recreational, educational and environmental interpretation facilities in a national park context in the Goldfields Region. This area lends itself admirably to the interpretation of several environmental themes, including:

- i) The mulga/eucalypt line. This is an exceptionally good theme involving the interaction of climate and soil to influence vegetation and land use. Goongarrie National Park is practically on the mulga/eucalypt line with both vegetation types present.
- ii) Arid zone ecology. This theme can be developed by reference to the observation that 75% of Australia receives less than 250 mm rainfall per annum. Issues include fragile soils, effects of grazing and fire, and the difficulty of mulga regeneration.

The System 11 Biological Survey, e.g. Dell *et al.* (1988) and mulga research work by the Mulga Research Centre on Menangina pastoral lease and Goongarrie National Park provide a wealth of local resource data to call upon.

Response to submissions

CALM will proceed with implementation of the proposed extension as a 'C' Class conservation park due to submissions from DOME and mining companies, and develop the existing national park as recommended within the life of the plan.

10.5 MT MANNING RANGE NATURE RESERVE

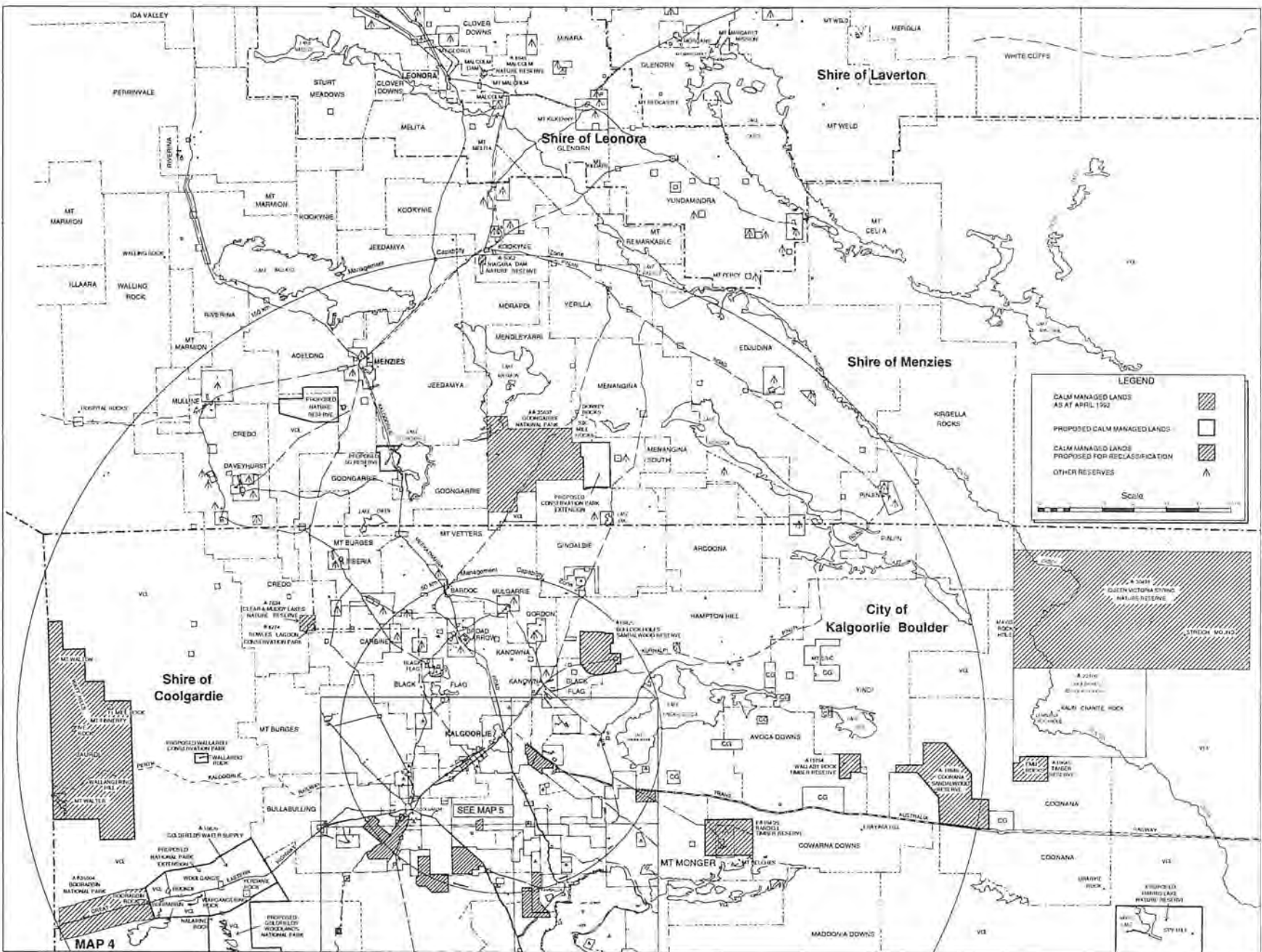
Recommendation 1

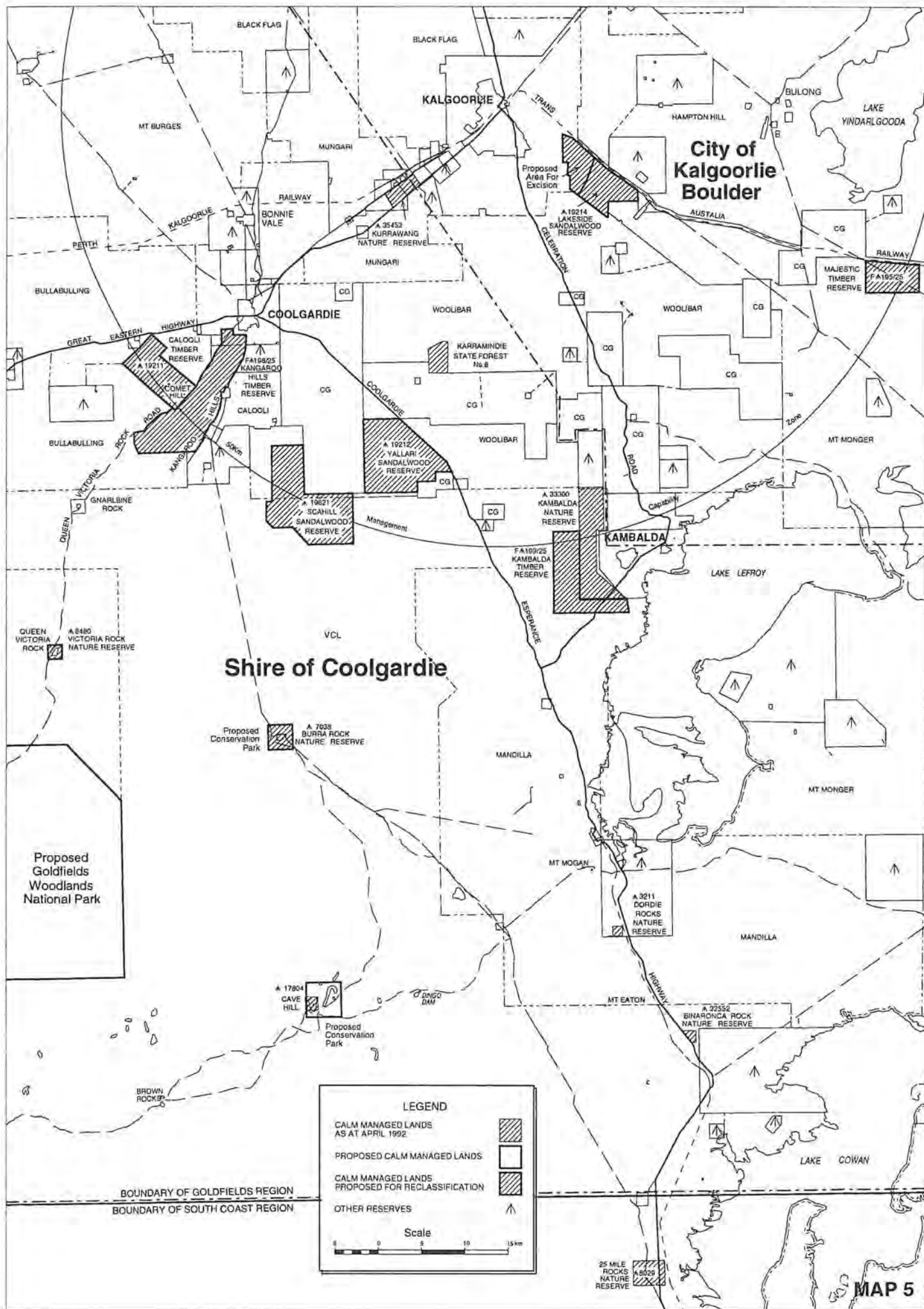
That Mt Manning Range Nature Reserve in the Shire of Yilgarn retain its C Class status, vesting and purpose due to pre-existing mining tenements and that the enclave formerly occupied by Temporary Reserve 1971, including the range itself, be incorporated into the reserve (Map 3).

Justification and Implications

A Class status is not recommended because the proposed additions (see below) will have C Class status according to Government policy and it is desirable to have consistent management across the entire reserve. The land formerly occupied by temporary reserve 1971 has reverted to vacant Crown land though it is now occupied by an exploration licence. It is appropriate that the vacant Crown land which incorporates the range itself become part of the reserve and mining is managed according to Government policy (see Section 14.5).

MAP 4. This map is also reproduced to larger scale at the back of the book.





Recommendation 2

That Mt Manning Range Nature Reserve be extended southward by adding 91 650 ha of vacant Crown land to include the Helena and Aurora Range. The proposed southern extension is defined by that area from approximately latitude 30° 11.75'S to 30° 30.00'S and longitude 119° 30.06'E to 119° 47.80'E. The southern extension should have 'C' Class status.

Justifications and Implications

With the proposed southern extension, the opportunity also exists to conserve the reptile and small mammal fauna of the Bungalbin Hill area. This virtually undisturbed habitat contains a rich fauna including five dasyurid marsupial species, and 51 species of reptiles including 13 species of geckoes, the highest number recorded for any surveyed site in the Eastern Goldfields District (Henry-Hall 1990).

Keighery (1980) and Dell *et al.* (1985) have advocated a southern extension to conserve both the restricted banded ironstone flora, and the rich and diverse fauna. Conservation Through Reserves Committee (CTRC) recommendation 11.4 also involves an extension of Mt Manning Range Nature Reserve.

Key Features:

Restricted vegetation types and flora of the banded ironstone ranges.

Declared Threatened Flora confined to the Helena and Aurora Range.

Five Priority species from CALM's Reserve Flora List.

The sandplain vegetation representing an important inland extent of south-western sandplain heaths.

Ungrazed eucalypt woodlands surrounding the ranges.

The diverse reptile and small mammal fauna of the Bungalbin Hill area containing extremely rich dasyurid marsupial and gecko assemblages.

Recommendation 3

That Mt Manning Range Nature Reserve be further extended west by 132 400 ha as recommended by Henry-Hall (1990) and CTRC recommendation 11.4.

The proposed western extension is defined as that area bounded on the west by 119° 14'E to include Marda Dam, Windarling Peak, Pigeon Rock, and Deception Hill; north by 29° 50'S to include Chatarie Well, the entire Die Hardy Range and Yokradine Hills system, Olby Rock and vacant Crown land; east by the western boundary of the Mt Manning Range Nature Reserve; and south by 30° 17'S to include Mt Jackson, Boondine Hill, Muddarning Hill and Yenyanning Hills (Map 3).

The proposed western extension includes excisions of 37 450 ha from Mt Jackson (3114/639) and 50 500 ha from Diemals (3114/1110) pastoral leases.

The proposed extension should incorporate an additional block of vacant Crown land (3 200 ha) adjacent to the north-west corner of the Mt Manning Range Nature Reserve, and the Water

Reserves Marda Dam (17009), Pigeon Rock (9644), Chatarie Well (13468) and Olby Rock (13467). The western extension is a CTRC recommendation, therefore would have C class status under Government policy.

Justification and Implications

Several important flora populations potentially threatened with extinction by degradation of their specific habitat would be protected with the proposed western extension (Henry-Hall 1990). These include Declared Threatened Flora entirely confined to the banded ironstone hills in the vicinity of Mt Jackson, and restricted flora on the Die Hardy Ranges and Yokradine Hills. Nearby Pigeon Rock is the largest of a series of granite outcrops that support distinctive vegetation complexes including poorly known eucalypts and diverse orchids.

The restricted distributions of two rare eucalypts would also be incorporated by the proposed western extension. The *Eucalyptus formanii* vegetation type occurs only to the north and the south of the Die Hardy Range, and east towards the Mt Manning Range and Mt Elvire. Undulating plains in the greenstones of the Mt Jackson area support interesting Eucalyptus woodland mosaics, including *E. corrugata*. The Declared Threatened Flora *Tetradlea harperi* and *Prostanthera magnifica* occur in the Mt Jackson area. *Tetradlea harperi*, entirely confined to banded ironstone hills around Mt Jackson, grows only within this restricted habitat over a small geographical range. The Priority One species *Leptospermum* sp. (J. Thompson s.n.) and *Lepidium merrallii* are rarely collected and poorly known and occur in the area.

Response to submissions

CALM remains committed to these proposals and DOME has supported them as a 'C' Class nature reserve. Implementation of Recommendation 3 will be deferred, however CALM will proceed with Recommendations 1 and 2.

10.6 NIAGARA AND MALCOLM DAMS

The recommendations involving reserve No. 5062 - Niagara Dam, Shire of Menzies vested in the NPNCA and reserve No. 8946 - Malcolm Dam, Shire of Leonora vested in the Minister for Water Supply, both relatively small reserves, include several options. CALM's preferred position is to relinquish part of Niagara Dam and all of Malcolm Dam reserves to their respective local authorities for gazettal for the purpose of recreation.

Recommendation 1

That Niagara Dam Reserve No. 5062, Shire of Menzies vested in the NPNCA, be divided in half, the southern half including the dam itself and the recreation area be vested in the Shire for recreation, and the northern half which includes the largest known population of *Eremophila mirabilis*, a threatened species, be regazetted 'C' Class nature reserve vested in the NPNCA.

Recommendation 2

That Malcolm Dam Reserve No 8946, Shire of Leonora be relinquished by CALM and vested in the Shire for recreation.

Justification and Implications

It is considered inappropriate for CALM to manage these two reserves for three reasons:

- a) Neither are natural areas; both include man-made dams.
- b) Both are heavily used for recreation and sometimes activities, e.g. shooting, which are incompatible with nature reserve status.
- c) Both are too distant from Kalgoorlie to be effectively managed by CALM as recreation sites.

Response to submissions

Although both Leonora and Menzies Shires indicated a preference for on-going CALM management, CALM remains committed to these proposals and recommends that the entire Malcolm Dam and southern half of Niagara Dam nature reserve revert to vacant Crown land or recreation reserve. CALM will continue to manage the northern half of Niagara Dam reserve as a 'C' Class nature reserve.

10.7 CARDUNIA ROCKS NATURE RESERVE

The Draft Plan recommended an increase in area for this reserve from 38 ha to 832 ha to better conserve *Eucalyptus kruseana*, a threatened species.

Response to submissions

CALM will withdraw the proposal to extend Cardunia Rocks Nature Reserve due to the minimal risk posed by grazing to *Eucalyptus kruseana* and opposition from DOME. Instead this site will go on record in Section 12 - Sites with high conservation values not intended for reservation. Management and monitoring of grazing levels will be required as another threatened species, *Melaleuca coccinea* is also present.

10.8 JAURDI PASTORAL LEASE

Recommendation 1

That Jaurdi pastoral lease No. 3114/1072 (321 000 ha) in the Shires of Yilgarn, Menzies and Coolgardie should become State forest vested in the Lands and Forest Commission and the water reserves Nos 3112, 3114, 3115, 3116 and 3117 should be cancelled and incorporated within the State forest. The proposed State forest is to exclude an easement for railway purposes 100 metres wide on both sides of the railway.

Justifications and Implications

The lease was purchased by CALM in 1989 using Sandalwood Conservation and Regeneration Project funding and is not now used for grazing. The lease has high conservation values for arid-zone woodland vegetation because it was never extensively

stocked. State forest is an appropriate form of tenure to achieve the multiple objectives of sandalwood, arid-zone woodland and flora and fauna conservation without unduly restricting other land uses, particularly mining. See Section 2.1.5 for implications. The former facilities including homestead, quarters and shearing shed have potential for development as a Field Studies Centre.

Recommendation 2

That the northern portion of Jaurdi pastoral lease including the Hunt Range in the Shire of Yilgarn be excised from the lease and incorporated into Reserve No. 36208 Mt Manning Range Nature Reserve (see Map 3). The proposed excision is defined from latitude 30° 06.70'S to 30° 17.00'S and from longitude 119° 47.18'E to 120° 00'E, an area of 37 240 ha. 'C' Class status is recommended for the proposed addition.

Justifications and Implications

The greenstone landform which comprises the Hunt Range is not represented in any nature reserve in the Goldfields (see also recommendation 11.6). Other conservation values include the presence of *Dryandra arborea*, a rare and geographically restricted plant (see Keighery, 1980). *Eremophila caerulea merrallii* a Declared Threatened Species has recently been discovered in the Range. Hunt Range, Pittosporum Rock and Kurrajong Rock are vegetation monitoring sites for System 11 biological surveys (see Dell *et al.* 1985). Mining would be subject to Government Policy procedures. See Section 14.5.

Response to submissions

CALM remains firmly committed to this proposal. The only impediment to implementation is the outcome of the Minister for Minerals and Energy's requirement for Cabinet approval and industry consultation before amending the Mining Act to facilitate granting of mineral tenements on State forests outside the south-west (see page 29).

10.9 MT ELVIRE PASTORAL LEASE

Recommendation

That Mt Elvire pastoral lease No. 3114/679 (155 000 ha) in the Shire of Menzies become State forest vested in the Lands and Forest Commission and water reserve No. 13478 be cancelled and incorporated within the State forest.

Justification and Implications

The lease was purchased by CALM in 1990 using Sandalwood Conservation and Regeneration Project funding and is not now used for grazing. The lease has outstanding conservation values for sandalwood, flora, fauna and landscape including the only extensive tract of chenopod lake frontage vegetation in the conservation estate on the Goldfields, an outlier population of Western Myall trees, *Acacia papyrocarpa*, and a geographically restricted eucalypt *Eucalyptus formanii*. The fauna is reasonably well known and includes 16 species of native mammal, 34 species of reptiles, 4 species of frogs and 106 species of birds which is exceptionally high for an arid zone area. State forest is an appropriate form of tenure to

achieve the multiple objectives of conservation of sandalwood, and flora and fauna without unduly restricting other land uses, particularly mining.

Response to submissions

CALM remains firmly committed to this proposal. The only impediment to implementation is the outcome of the Minister for Minerals and Energy's requirement for Cabinet approval and industry consultation before amending the Mining Act to facilitate granting of mineral tenements on State forests outside the south-west (see page 29).

10.10 MISCELLANEOUS RECOMMENDATIONS CALM'S REVIEW OF B AND C CLASS NATURE RESERVES

In 1988 CALM reviewed all 'B' and 'C' Class nature reserves with a view to either cancelling or upgrading them to 'A' Class. Of the Goldfields Regions recommendations for upgrading only Victoria Rock Nature Reserve has been implemented (Government Gazette, 4 August 1989).

Recommendation 1

That the following outstanding 'C' Class nature reserves be upgraded to 'A' Class nature reserves vested in the NPNCA:

Dordie Rock No. 3211 in the Shire of Coolgardie
Kurrawang No. 35453 in the Shire of Coolgardie
Clear and Muddy Lakes No. 7634 in the Shire of Coolgardie
Kambalda West No. 33300 in the Shire of Coolgardie
Binaronca Rock No. 32552 in the Shire of Coolgardie

Justification and Implications

These relatively small reserves each have high conservation values based on the presence of wetlands, unmodified eucalypt woodland, rich vertebrate fauna or geomorphology. Mining would be subject to Government policy.

Response to submissions

With the exception of Dordie Rock Nature Reserve, due to pre-existing tenements and prospectivity, CALM will defer implementation of these proposals pending further mineral exploration or an assessment that continuing exploration or mining is detrimental to their demonstrated conservation values.

Recommendation 2

That options for the incorporation of Canegrass Lagoon into Clear and Muddy Lakes nature reserve be investigated.

Justification and Implications

Since the Draft Regional Management Plan was written and public submissions received, the filling of the lake following the wettest year on record, and the Minister for the Environment's

decision to enable water skiing and recreation on Rowles Lagoon Conservation Park (see Section 10.3), presented the opportunity to re-evaluate the conservation of Rowles Lagoon system of wetlands.

10.11 GREAT VICTORIA DESERT NATURE RESERVE

Recommendation 1

That the Great Victoria Desert Nature Reserve have a change of purpose from 'A' Class nature reserve to 'A' Class conservation park vested in the NPNCA.

Recommendation 2

That CALM will refer a proposal to the Hon. Minister for Aboriginal Affairs to excise a portion of the Great Victoria Desert Nature Reserve west of 127° 21'E.

Justification and Implications

This recommended change of tenure will accommodate the multiple objectives for management of this area much better than 'nature reserve'. This area is of great importance for conservation of biological and landscape values and maintenance of Aboriginal culture and traditional usage.

The Great Victoria Desert area is home to members of the Paupiyala Tjurutja Aboriginal Corporation. These people have very strong ties with members of Oak Valley community in South Australia, just across the border. There is a permanent settlement called Tjuntjunjarra within the Great Victoria Desert reserve and a road links the two communities and provides access to the adjacent unnamed conservation park in South Australia. The proposed change of tenure will provide consistent status for the two contiguous reserves.

It is proposed to form an Aboriginal/CALM Park Council to facilitate Aboriginal involvement in the management of the reserve, similar to the arrangements proposed for the Purnululu National Park in the Kimberley Region.

Response to submissions

The Paupiyala Tjurutja Aboriginal Corporation have indicated that as well as seeking secure access arrangements into the reserve to enable their continued enjoyment of cultural values and other traditional usage, their members also seek an excision from the reserve for their community use. Examination of landform/vegetation types in the reserve indicate the proposed area of excision west of 127° 21'E would not unduly detract from the species richness or biological representativeness of the reserve. CALM will therefore not object if this excision is pursued.

Mining access should not be affected by the proposed change of tenure, especially as the status is to be retained as Class 'A'.

10.12 GIBSON DESERT NATURE RESERVE

Recommendation 1

That the Gibson Desert Nature Reserve have a change of purpose from 'A' Class nature reserve to 'A' Class conservation park vested in the NPNCA.

Recommendation 2

That CALM will refer a proposal to the Hon. Minister for Aboriginal Affairs for consideration by Government for an extension, as shown in Map 3, of enclave reserve No. 29452 for use and benefit of Aborigines. The proposed extension is defined as having the following co-ordinates: 126° 20.00'E, 24° 33.00'S; 126° 20.00'E, 24° 39.00'S; 126° 09.00'E, 24° 39.00'S; 126° 09.00'E, 24° 33.00'S.

Justification and Implications

As in the case of the Great Victoria Desert, a change of tenure for this reserve will better accommodate the multiple objectives for management of the area. The reserve is of great importance for conservation of biological resources and maintenance of Aboriginal culture and traditional usage. The Aboriginal people have indicated a strong desire to be involved in the protection and management of both cultural and conservation values of the reserve. Class 'A' conservation park would provide a better opportunity and legal basis for management of Aboriginal cultural interests.

Reserve No. 29452, for use and benefit of Aborigines, is contained within the Gibson Desert Nature Reserve and this enclave includes a place called Karilywara which is of great importance to the Ngaanyatjarra people. Outstation facilities including a camp, bore and airstrip were constructed at Karilywara, but by mistake these facilities were located outside the Aboriginal reserve and inside the nature reserve. Further funding of the outstation development requires that the community gain tenure of this land. The Ngaanyatjarra people indicated in an extensive submission that they wish to be involved in management of a large area, not just in the vicinity of the outstation. Discussions between Aboriginal community representatives and CALM officers confirm that there will be continued co-operation in the management of these areas of mutual interest.

Response to submissions

CALM understands the difficulty facing these people in gaining the necessary funding to resource their remote outstations. The presence of Karilywara community members in this areas has potential for increased security and better, more cooperative management of this remote reserve. For this reason CALM will not object to the proposal for expansion of the Aboriginal reserve (through excision from the proposed conservation park), and will seek a formal management agreement to ensure the conservation values of the area continue to be maintained.

11. PROPOSED ADDITIONS TO PUBLIC LANDS MANAGED BY CALM

The rationale for further nature conservation reserves being declared in CALM's Goldfields Region is that certain of the biological sub-regions identified in Section 2.1, particularly Goldfields eucalypt woodlands and mulga woodlands, are very poorly represented in the existing reserve system. This deficiency is apparent in Map 1 which indicates the distribution of conservation reserves in WA, that is, the western half of the Goldfields is demonstrably deficient in reserves. As vacant Crown land is non-existent in this general area, the only option for CALM to rectify this deficiency is to purchase pastoral leases on the open market and change their tenure to a category appropriate to flora, fauna and landscape conservation. The State Conservation Strategy which has been endorsed by the Government supports the principle of protection and management of representative areas with those of highest conservation value being protected by A Class nature reserve or national park status.

To be effective any conservation reserve must have the following characteristics:

- i) be large enough to support sufficient individuals of a species to maintain a sufficient gene pool to survive natural disturbances, e.g. fire and human agents of attrition
- ii) have a high area to perimeter ratio to reduce "edge" effects
- iii) be large enough to contain examples of all or most of the sub-regional landforms and vegetation types.

The proposed new reserves which follow are recommended by reference to these characteristics, made on the basis of identified need, and based on biological data (Section 4.0).

Recommendations from Conservation Through Reserves Committee (CTRC)

The following proposed reserves (11.1 - 11.4) were recommended by the CTRC in the "Greenbook" in 1974. The recommendations were endorsed by the EPA "Redbook" and approved by Cabinet on 9/2/1976. Sixteen recommendations were made over CALM's Goldfields Region; of these nine have been implemented. One, Baker Lake Nature Reserve, has been revoked due to the issue of an Aboriginal special purpose lease. The remainder, with the exception of Weld Spring, which is more appropriate as an historic site than a nature reserve, are addressed below.

11.1 CARNARVON RANGE

Recommendation

That the proposed Carnarvon Range Nature Reserve (390 726 ha CTRC 12.9, Shire of Wiluna) be gazetted 'C' Class Conservation Park vested in the NPNCA.

Justifications and Implications

The Carnarvon Range is a spectacular sandstone landform, being the only arid zone mountain range proposed for conservation in the region; it is at the southern limit of several plant species with a more northern distribution. The Range has very high scenic values as well as numerous registered Aboriginal sites. Some biological work has been done (McKenzie and Burbidge 1979), but more is required.

Negotiation will be required with Ngangganawili Community (Inc.) of Wiluna who have a special purpose lease proposal, the former Blue Hills pastoral lease, adjacent to and overlapping the proposed reserve. The proposed boundaries are from the northeast boundary corner of Marymia pastoral lease (approximately 24° 52' S, 120° 18' E) east to 120° 52' E, south to 25° 19' 30" S, west to 120° 18' E), north to the starting point. The area of the proposed reserve is 390 726 ha.

Note that this recommendation differs from CTRC 12.9 in that it includes the vacant Crown land around the Miss Fairbairn Hills. It also involves a minor southward extension to include Ilyee pool which is incorrectly mapped as the H. Dowd waterhole on the 1:250 000 'Nabberu' sheet. The proposed extension is to incorporate several semi-permanent waterholes which support populations of Dinnerplate Tortoises, which are not present in any existing desert nature reserve.

Response to submissions

CALM will implement the proposal as a 'C' Class Conservation Park and consult with both Ngangganawili Community and The Western Desert Land Council on management of the proposed reserve. The original proposal for National Park was unacceptable to DOME and many mining companies.

11.2 LAKE THROSSEL

Recommendation

ANLA funding withdrawn.

That within the life of this plan, i.e. ten years, CALM will assess the nature conservation and Aboriginal heritage values and appropriate boundaries of the proposed 'C' Class Lake Throssel Nature Reserve (409 000 ha CTRC 12.15, Shire of Laverton), (Map 3). This assessment will also take into account whether the proposed reserve duplicates or complements the existing Yeo Lake Nature Reserve.

Response to submissions

CALM will proceed with assessment of nature conservation and aboriginal heritage values and an appropriate boundary in conjunction with Ngaanyatjarra Council for the proposed reserve and then decide if implementation is warranted. Preliminary results indicate that the proposed reserve does not duplicate Yeo Lake; and that 'C' Class conservation park is a likely outcome due to aboriginal and tourist interest in the area.

11.3 LAKE DISAPPOINTMENT

Recommendation

That the proposed Lake Disappointment Nature Reserve (612 000 ha CTRC 12.8, Shire of Wiluna), which is a rectangle bounded by 23° 31'S to 24° 00'S and 122° 20'E to 123° 00'E, be deferred and addressed in the Pilbara Regional Management Plan.

Justifications and Implications

The proposed reserve is subject to intense interest from Aboriginal people who identify with the Pilbara rather than the Goldfields. Additionally the proposed reserve is within the scope of the government's Social Impact Study; it would be inappropriate and confusing to Aboriginal people for the CALM's Goldfields Region to become involved in negotiations on tenure and land access for this proposed reserve.

11.4 WINDICH SPRING

Recommendation

That a small reserve of 150 ha centred on Windich Spring (CTRC 11.1, Shire of Wiluna) be gazetted A Class Conservation Park, vested in the NPNCA.

Justifications and Implications

Windich Spring is an important historic site associated with the Canning Stock Route and the Heritage Trail, with high conservation values (e.g. the Dinnerplate Tortoise) and recreational potential for Stock Route travellers. As a semi-permanent freshwater pool in a creek lined with River Gums, the Spring has great aesthetic and wildlife value. The proposed reserve will require fencing to exclude cattle from Cunyu Station and feral herbivores. An arrangement for maintenance of the fence and construction of a new bore will be required with the lessee of Cunyu Station. Note that this recommendation is smaller in area than the original CTRC recommendation because of the requirement to fence the proposed reserve. The conservation and historical values identified in CTRC 11.1 can still be protected by the smaller reserve.

Response to submissions

CALM will proceed with implementation of this proposal.

11.5 RESERVE No. 16153 IN THE COMET VALE AREA

Recommendation

That unvested 'C' Class reserve No. 16153, Comet Vale Common, Shire of Menzies become a miscellaneous (5g) 'C' Class conservation reserve vested in the NPNCA (Map 4). The area of the reserve is 5 058 ha.

Justifications and Implications

Comet Vale common, originally proposed as a Timber Reserve in the early 1970's, incorporates areas of greenstone which is poorly represented in conservation reserves.

Results from the biological survey of the Eastern Goldfields, highlighting the high conservation values of the area, have resulted in recommendations for a proposed nature reserve. Notable fauna species include two species of native hopping mice (*Notomys alexis* and *N. mitchellii*), two species of dasyurid marsupial (*Sminthopsis dolichura* and *S. crassicaudata*), two species of fairy-wren (*Malurus splendens* and *M. pulcherrimus*) and an outlying population of an arid zone skink (*Ctenotus brooksi*) and the Scarlet-chested Parrot (*Neophema splendida*). Other threatened fauna recorded from Comet Vale are Mallee Fowl (*Leipoa ocellata*) and Ramsay's Python (*Aspidites ramsayii*). Important flora records include three mallees with restricted ranges centred on the Comet Vale area (Henry-Hall 1990).

During the survey, long-term biological monitoring sites were established in the Comet Vale area. The majority of these survey sites are located to the south-west of Salt Dam, on the southern portion of Jeedamya Pastoral Lease, outside the proposed nature reserve. These sites will become increasingly important in monitoring changes in the region's flora and fauna, particularly the changes in land under pastoral use.

Key Features:

The rich flora and fauna present on a series of sandplain dunes in the north-eastern corner of the proposed reserve.

Three eucalypts with restricted distributions, including the rare *Eucalyptus jutsonii*, occurring on sandplain in the area.

Long-term monitoring sites established within the proposed reserve and on the adjacent Jeedamya Pastoral Lease. The inclusion of the poorly reserved greenstone landform, present along the western margin of Lake Goongarrie.

Enclave reserves No. 13763 - recreation, No. 13737 - rifle range, No. 11107 - cemetery and No. 13500 - explosives could either be cancelled and added to the reserve if they no longer fulfill their function, or remain unchanged if they do.

Response to submissions

The Shire of Menzies, DOME and many mining companies were unsupportive of the original proposal for an A class nature reserve. In addition the lessee of Goongarrie pastoral lease grazes part of the common. However, CALM remains convinced of the area's conservation values and will further discuss an appropriate form of tenure to accommodate both mining and conservation. Implementation will be deferred until an agreed position is reached.

11.6 ADELONG DUNES

Recommendation

That a new 'A' Class nature reserve in the Shire of Menzies be created for the purpose of conservation of flora and fauna vested in the NPNCA, and defined as the area bounded to the west by the eastern boundary of Riverina pastoral lease (3114/1017) along 120° 46'E for 4.5 km; north by 29° 47'15"S for 7.5 km, then along 120° 50'30"E for 3.5 km to 29° 45'30"S for 11 km; east by the Adelong pastoral lease (3114/801) boundary along 120° 57'30"E for 11

km; and south by 29° 51'S for 8 km and for 10.8 km to join the western boundary. The area of the proposed reserve is 15 956 ha (Map 4).

Justification and Implications

The proposed nature reserve has been selected to incorporate an entire representative dunefield system, unlike the small dunefield to the south-east at Comet Vale (Henry-Hall 1990).

A preliminary fauna survey in 1989 compiled a species list that consisted of four native mammals, 15 reptiles and 26 birds (N. McKenzie and A. Chapman, field notes: 1989). A variety of habitats including lakeside dune slopes, interdunes and dune crests were sampled. The small list of fauna recorded is consistent with the preliminary nature of the survey and short duration of sampling.

Key Features:

Representative dunefield surrounded by sandplain.

Most extensive system of dunes in the area.

Reptile and small mammal fauna associated with the dunes.

Mining would be restricted according to Government Policy. A small portion of Adelong pastoral lease No. 3114/801 is within the proposed reserve (Map 4). Negotiation with the pastoral lease holder will be required.

Response to submissions

CALM will proceed with implementation of this proposal subject to a satisfactory outcome following negotiations with the Menzies Aboriginal Corporation and AAPA, who have recently acquired control of Adelong Pastoral Lease.

11.7 RESERVE No. 27655 AT WALLAROO ROCK

Recommendation

That Government Requirements Reserve No. 27655 of 1214 ha at Wallaroo Rock in the Shire of Coolgardie become 'A' Class conservation park vested in the NPNCA.

Justifications and Implications

This recommendation is in part a response to a request from the Shire of Coolgardie for CALM to manage the area which has become excessively degraded by recreational use. The rock itself and the constructed dams offer considerable recreational opportunities which if managed will take some pressure from other recreation sites, e.g. Cave Hill and Burra Rock. The reserve has important historical associations with woodline operations and is also a System 11 biological survey vegetation monitoring point (see Dell *et al.* 1985).

Negotiations with Westrail, DOLA and the Shire of Coolgardie will be required with respect to access to the reserve, assistance with management and change of tenure.

Response to submissions

CALM will proceed with implementation of the conservation park but there will be no further development of facilities or encouragement of use until arrangements to use an alternative access to the Trans Access road have been developed.

11.8 GOLDFIELDS WOODLANDS NATIONAL PARK

Recommendation 1

That a Goldfields Woodlands National Park vested in the NPNCA be gazetted in the Shire of Coolgardie as in Maps 3 and 4 with a total area of 213 772 ha, between Boorabbin, Woolgangie and Diamond Rock. Cancellation of the following small reserves and their incorporation into the proposed National Park is also recommended:

Reserve No. 2917 for Water at Boorabbin Rock

Reserve No. 6078 for Water at Boondi Rock

Reserve No. 2918 for Water at Woolgangie

Recommendation 2

That CALM negotiate with DOME over an appropriate form of tenure for the 69 000 ha to be excluded from the proposed national park.

Justifications and Implications

This recommendation is a package of several components to establish a regional national park of great significance because it would combine conservation of arid-zone eucalypt woodlands with other high conservation and historical values, with recreational and tourist opportunities.

The components are:

- a) the existing Boorabbin National Park
- b) an extension eastward including Woolgangie Firewood Reserve No. 10829 and vacant Crown land but excluding pumping station No. 8 (Reserve No. 8232) and service reserves for the Goldfields pipeline and Great Eastern Highway
- c) a southward extension including 154 590 ha of vacant Crown land and the existing Victoria Rock Nature Reserve No. 8480 Map 3. The final boundary of the national park has been amended to exclude greenstone areas as follows:
from a point 2.5 km south of Yerdarnie Rock at 120° 38.00'E, 31° 12.50'S thence 14.5 km south to 120° 38.00'E, 31° 20.40'S, thence 9.0 km east to 120° 42.80'E, 31° 20.40'S, thence 5.5 km south to 120° 42.80'E, 31° 23.50'S, thence 19.0 km east to 121° 55.0'E, 31° 23.50'S, thence 10.0 km at 135° to 121° 00.00'E, 31° 27.00'S, thence north to 121° 00.00'E, 31° 12.50'S and from here to the starting point.

Area of proposed exclusion is 69 000 ha of the proposed total area of 282 772 ha.

The proposed national park includes a diversity of landforms and vegetation types which were studied during System 11 biological surveys including sandplains, chenopod lake frontage shrublands, eucalypt woodlands and granite complex. These studies recorded the richest assemblage of agamid reptiles for the Eastern Goldfields in Boorabbin National Park, as well as 14 species of native mammals in the southwards extension.

The proposed national park would be zoned according to CALM policy and an area management plan produced to accommodate conservation, appropriate recreation and tourist interests. As such it would be a major regional tourism resource within the Goldfields, Coolgardie Shire in particular. Recreational nodes and campsites could be developed and managed on existing sites such as Boondi Rock and dam, Woolgangie Dam and Yerdarnie Rock.

A tourist route could be designed to include historical features, e.g. woodlines and dams, eucalypt woodlands and granite outcrops. To succeed, this proposal would require community support and a major allocation of CALM resources.

Response to submissions

CALM will implement the national park proposal on the amended boundary subject to a formal resource assessment by DOME and further discussion with WAWA, SECWA, MRD and the Shire of Coolgardie to ensure their future requirements are not jeopardized by the proposal. CALM will also negotiate with DOME over an appropriate form of tenure for the remainder.

11.9 HOMESTEAD CAVE

Recommendation (Joint with South Coast Regional Plan)

That a 10 x 10 km 'A' Class miscellaneous reserve vested in the NPNCA for protection of cave system be established in vacant Crown land over Homestead Cave in the City of Kalgoorlie-Boulder (Map 3).

Justifications and Implications

The Australian Speleological Federation believes that Homestead Cave has the potential to be the longest in the world; in order to afford some protection to the cave system it is necessary to establish a reserve over the cave. As a miscellaneous reserve surface activities - except possibly water extraction - would not be restricted under the CALM Act.

11.10 WOODLINE HILLS

Recommendation (Joint with South Coast Regional Plan)

The proposed Woodline Hills Nature Reserve should be 'C' Class, for the purpose of conservation of flora and fauna and vested in the NPNCA. It is defined as the area bounded to the: west by 122° 17'E for 36 km to include Reserve Nos. 17629 (Yardina soak) and 8847 (Moochabinia Spring) and 17631; north by 31° 37'S for 38 km; east by 122° 42'E for 36 km; and south by 31° 56'S for 38 km. The proposed reserve is in the City of Kalgoorlie-Boulder and the Shire of Dundas, with an area of 136 800 ha (Map 3). Note that this proposed boundary differs from that in CALM (1991) because the boundary was re-considered in a consultant's report (Henry-Hall 1990) to better represent the area's conservation values.

Justifications and Implications

The Woodline Hills are a quartzite landform not represented in a nature reserve elsewhere in the Goldfields Region. The vegetation includes poorly known eucalypts *Eucalyptus websteriana* and *E. carnei* as well as a rare species *Brachycome billardierei*. The proposed reserve includes some of the Goldfields woodlines which are of historical and recreational interest. The northern and part of the western boundary adjoins Madoonia Downs pastoral lease therefore negotiations with the pastoralist on fencing and dog control will be required. Mining on the reserve will be according to Government Policy for "C" class nature reserves. It is proposed that the Goldfields Region would manage this reserve.

Response to submissions

CALM will proceed with implementation of this proposal as a 'C' Class nature reserve.

11.11 LAKE HARRIS

Recommendation

The proposed Lake Harris Nature Reserve should be a 'C' Class nature reserve, vested in the NPNCA for the purpose of conservation of flora and fauna, and is defined as the area bounded to the: west by 123° 28'E for 16 km along the eastern boundary of Coonana Station (3114/566); north by 31° 14'S for 27 km to include Harris Lake; east by 123° 45'E for 30 km to include Spy Hill; and south by 31° 30'S for 16 km, west by 123° 35'E for 13 km then south by 31° 23'S for 11 km to the starting point. This excludes that portion of Fraser Range pastoral lease originally included in the proposed reserve. The proposed area of 64 870 ha incorporates 18 605 ha of land from Dundas Shire and 46 265 ha from the City of Kalgoorlie-Boulder (see Maps 3 and 4).

Justifications and Implications

There are some biological data for the proposed reserve and it includes two monitoring sites arising from the System 11 biological surveys in 1978 (Newbey *et al.* 1984), who have also drawn attention to the biological importance of this proposed reserve as a partial refuge for nomadic south-west birds as it occurs on the edge of many of these birds' ranges. Mining will be in accordance with Government Policy for 'C' Class reserves. The proposed reserve would be managed by the Goldfields Region of CALM. Fencing will be required along 26 km of common boundary with the pastoral lease when the northern part of the lease is developed.

Response to submissions

CALM will implement the amended proposal.

11.12 NULLARBOR RESERVES

These proposed reserves fall across the Goldfields/South Coast regional boundaries. They are also addressed in CALM's South Coast Regional Plan, CALM (1991).

Recommendation 1

That a new 'A' Class conservation park vested in the NPNCA between the State border and the former Brambah pastoral lease with an area of 501 163 ha be gazetted (see Map 3).

Recommendation 2

That a new 'C' Class nature reserve vested in the NPNCA east of Kybo and north of Madura pastoral leases with an area of 976 234 ha be gazetted (see Map 3).

Justifications and Implications

The Nullarbor karst landform is the largest of its kind in the world and has many unique features including caves and a 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 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 six are represented in the existing reserve system; an additional six 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, rail and Telecom reserves and Loongana townsite reserve. The excision area required by Loongana Lime Pty Ltd is defined by the northwest corner at 127° 01'03.8"E, 30° 55'43.1"S; the north east corner at 127° 03'03.8"E, 30° 55'31.0"S; the south east corner at 127° 03'12.7"E, 30° 56'33.8"S; and the south west corner at 127° 01'12.7"E, 30° 56'45.9"S. This is an area of 310.5 ha. Existing access within the proposed reserves, e.g. Madura to Loongana, will remain open but any further access would be subject to environmental impact assessment and CALM's concurrence.

Dingo control on the proposed reserves could be undertaken with CALM's approval if it can be substantiated that dingoes from within the reserves are causing problems to neighbours. In this case barrier control to the east of Kybo pastoral lease (priority 2 zone in A.P.B. Wild Dog Zone 9 species management plan) would be acceptable to CALM with CALM prescription 1080 baits and shooting but not strychnine baits or steel jaw traps.

Basic raw materials, e.g. gravel or road base for road construction or maintenance within the reserves may be obtained by issue of a CALM lease, subject to rehabilitation prescriptions. The effective management of these two reserves will require the input of CALM's Goldfields and South Coast regions as well as liaison with pastoralists and with the South Australian National Parks and Wildlife Service.

Response to submissions

CALM will proceed with implementation of the nature reserve proposal and exclude the area required by the Loongana Lime mining operation. Further negotiation with DOME will be required over potential prospectivity of the southern portion of the proposed conservation park.

PROPOSED RESERVES AND EXTENSIONS FROM SECTION 11

A. NATIONAL PARKS	
Goldfields Woodland National Park (includes Boorabbin National Park extensions)	213 772 ha
B. CONSERVATION PARKS	
Cave Hill (extension)	1 398 ha
Wallaroo Rock	1 214 ha
Windich Spring	150 ha
Carnarvon Range	390 726 ha
Lake Throssell	409 000 ha
Nullarbor Reserve b) *	501 163 ha
Goongarrie National Park	<u>12 150 ha</u>
(extension as 'C' Class nature reserve)	1 315 801 ha
C. NATURE RESERVES	
Lake Disappointment	612 000 ha
Nullarbor Reserve a) *	976 234 ha
Adelong Dunes	15 956 ha
Homestead Cave	10 000 ha
Mt Manning Range (extension a)	132 400 ha
Mt Manning Range (extension b)	91 650 ha
Temporary Reserve 1971 addition to Mt Manning Range	13 130 ha
Woodline Hills *	136 800 ha
Lake Harris *	<u>64 870 ha</u>
	2 053 040 ha
D. OTHER RESERVES	
Comet Vale	5 058 ha
Greenstone areas originally proposed in Goldfields Woodlands National Park	<u>69 000 ha</u>
	74 058 ha

Total proposed additions and extensions 3 656 671 ha

* These reserves overlap into South Coast Region

Proposed reserves and extensions would increase CALM managed lands in the Goldfields Region to 10 627 230 ha or 13.1% of the region.

12. SITES WITH HIGH CONSERVATION VALUES NOT INTENDED FOR RESERVATION

The rationale for this section is that on-going biological and inspection work does identify particular areas which, although having high conservation values, are usually relatively small and so it is not practical to formally gazette them as conservation reserves. These are often in pastoral leases and Aboriginal land. The intention of this section is to identify these areas, put CALM's interest on public record and request that CALM have an advisory and monitoring role in any major change in land use proposed for these areas. Section 16A of the CALM Act provides a mechanism for CALM and pastoral lessees to enter into an agreement to manage for conservation purposes, specified portions of pastoral leases.

12.1 SITE EM22 JEEDAMYA STATION (SHIRE OF MENZIES)

This site is near the south west corner of pastoral lease 3114/828 at 29° 56'S 121° 08'E or 4 km north east of Comet Vale townsite. The vegetation comprises three species of mallee: *Eucalyptus concinna*, *E. leptopoda* and *E. transcontinentalis* on deep sands. With 19 lizard and 3 snake species recorded it is the richest reptile assemblage in the Eastern Goldfields (Dell and How 1988).

12.2 ERAYINIA HILL, COWARNA DOWNS STATION (CITY OF KALGOORLIE-BOULDER)

Erayinia Hill is an extensive and prominent granite exposure on pastoral lease 3114/617 at 122° 38', 31° 01'. It has a diverse flora of about 93 species (Newbey *et al.* 1984) including threatened species *Eucalyptus kruseana*, *E. brachyphylla* and *Melaleuca coccinea*.

12.3 GUM CREEK, RIVER RED GUM SITE, 15-20 KM WEST OF WILUNA ON MILLBILLILLIE STATION (SHIRE OF WILUNA)

This site includes the finest stand of River Red Gums, *Eucalyptus camaldulensis*, in the Goldfields. It is a major provenance area for this species which is, "perhaps the world's most widely used tree species for plantings in arid and semi-arid lands" (Midgley *et al.* 1989). These trees are a genetic resource of considerable importance because they are more salt tolerant than *E. camaldulensis* from elsewhere except De Grey River (W.A.) and Silverton (N.S.W.).

12.4 SERPENTINE LAKES PALAEOCHANNEL W.A. - S.A. BORDER (SHIRE OF LAVERTON)

The South Australian National Parks and Wildlife Service has expressed interest in the conservation of this palaeochannel in WA. In SA, where most of it occurs, it is conserved in an unnamed conservation park. The area is presently vacant Crown land but there are Aboriginal interests in the area.

12.5 RANGES OF WESTERN DESERT (SHIRES OF NGAANYATJARRAKU AND LAVERTON)

The Western Desert Ranges are included in Aboriginal Reserve No. 17614. The Conservation Through Reserves Committee "green book" drew attention to their value for conservation, landscape and Aboriginal cultural material. These are summarized in Section 4.6. A recommendation (No. 12.19) that the EPA and Aboriginal Affairs Planning Authority liaise to achieve multiple use management was endorsed by Cabinet in 1976. Access for mining is an issue in the reserve and Ngaanyatjarraku Council has indicated that there is a role for CALM in this issue.

12.6 FORMER PROPOSED EXTENSION TO CARDUNIA ROCKS NATURE RESERVE (CITY OF KALGOORLIE-BOULDER)

The granite outcroppings surrounding Cardunia Rocks contain threatened flora *Eucalyptus kruseana* and *Melaleuca coccinea*. The proposal in the Draft Plan to extend the existing reserve has been withdrawn (see Section 10.7), however the area remains of sufficient conservation value to be put on record.

ISSUES OF CONSERVATION AND LAND MANAGEMENT IN THE GOLDFIELDS

13. CONSERVATION

13.1 FLORA CONSERVATION

Of an estimated total of 12 000 vascular plant species occurring in WA, only 7 954 are described and scientifically named, of these approximately 2 600 occur in CALM's Goldfields Region. A brief description of the flora of the region is in Section 4.0.

Two policy statements refer: No. 9 Conservation of Threatened Flora in the Wild and No. 27 Conservation of Native Vegetation in Rural Areas. The former refers to species of particular concern declared under s.23F of the Wildlife Conservation Act 1950. These are flora declared by the Minister to be either rare, threatened with extinction, or in need of special protection.

At August 1994 there were 11 species of gazetted threatened flora in the Goldfields Region, including one presumed extinct:

Conospermum toddii
Daviesia purpurascens
Eremophila caerulea merrallii
Eucalyptus articulata ms.
Gastrolobium graniticum
Grevillea inconspicua
Hemigenia exilis (presumed extinct)
Myriophyllum petraeum
Tetratheca aphylla
Tetratheca harperi
Tetratheca paynterae ms.

This compares with 88 species in the South Coast Region and 102 in the Wheatbelt. In addition to the species above, an additional 119 Goldfields species are on the Priority Flora list as poorly known and a further 12 are rare and recommended for monitoring.

"Taking" Declared Rare Flora

Under the Wildlife Conservation Act, special protection is afforded Declared Rare Flora by the requirement for a permit from the Minister for the Environment before such flora can be taken. In the Wildlife Conservation Act (subsection 6 [1]) the following definition is given:

To take in relation to any flora includes to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means.

Thus, taking declared rare flora would include not only direct injury or destruction by human hand or machine but such activities as allowing stock to graze on the flora, introducing pathogens that attack it, altering water tables such that the flora is deprived of adequate soil moisture or is inundated, allowing air pollutants to harm foliage etc.

In the case of threatened plants which need fire for regeneration, burning at an appropriate time may not adversely affect the survival of the population. However, burning would injure existing plants and constitutes "taking" under the Act. Therefore, Ministerial approval is required prior to conducting a prescribed burn which involves any species of declared rare flora. A fine of up to \$10 000 may be imposed for a breach of the Act.

Flora

Under the Wildlife Conservation Act all native flora is protected and native flora on Crown land is deemed to be the property of the Crown. The Department administers control of the taking and sale of flora in accordance with three types of licence:

- Commercial Purposes Licences, which allow the taking of protected flora from Crown land
- Commercial Producers 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 from Crown lands for non-commercial purposes.

These licences allow the picking of all but declared rare flora (for which a special Ministerial permit is required). Commercial picking is allowed in State forest, but not in nature reserves, national parks or conservation parks. Pastoral leases are considered Crown lands for these licences.

Currently there are numerous seed collectors operating in the Goldfields Region. Mining company rehabilitation requires a Commercial Purposes Licence.

STRATEGIES

In addition to implementing departmental policies and guidelines for flora conservation, the Goldfields Region will:

- 1. Implement protection strategies, e.g. fencing or roadside markers, where they are required to protect particular populations of declared rare or threatened species.*
- 2. Make available a means of identification of all threatened and priority listed species to regional staff and others.*
- 3. Allocate funding for surveys of threatened and priority listed species.*

13.2 SANDALWOOD CONSERVATION AND MANAGEMENT

Sandalwood (*Santalum spicatum*), which is highly valued for the aromatic qualities of the oils contained in the heartwood, occurs throughout the Goldfields Region and forms the basis of a substantial export industry.

The current sandalwood industry is stable, harvesting a maximum of 2 000 tonnes per annum, 1 800 tonnes from Crown land and 200 tonnes from private property. Harvest is mainly from vacant Crown land and pastoral leases in the Yilgarn, Goldfields and Paynes Find area with additional operations in the central desert areas and on the western edge of the Nullarbor plain.

The sandalwood harvesting industry throughout the State is supervised in the field by Goldfields Region staff while contracts and licences are issued from CALM's Head Office under the CALM and Sandalwood Act. These are issued in accordance with the sandalwood management program which outlines resource information, research, and strategies for management and conservation of sandalwood.

As outlined in CALM's Wildlife Management Program No 8, The Management of Sandalwood (Kealley 1991), the overall objectives are:

To conserve sandalwood as a species in WA, and at the same time maintain the sandalwood industry by reducing harvest of the natural green wood resource and supplementing the natural resource by the increasing use of plantations.

Further specific objectives and strategies for Sandalwood are in Kealley 1991.

13.3 FAUNA CONSERVATION

Declared Threatened and Specially Protected Fauna

Section 6 of the Wildlife Conservation Act affords protection to all native fauna on all land within State boundaries. CALM's Policy Statement No. 33, Conservation of Endangered and Specially Protected Fauna in the Wild, has strategies covering research, monitoring, habitat protection and management plans for those fauna which are declared threatened or which are specially protected. In the Goldfields Region the following species are subject to special management considerations; in particular data on numbers and distribution as well as habitat management and status within conservation reserves are required.

DECLARED THREATENED FAUNA

Mammals

Mulgara or Minyiminyi	<i>Dasycercus cristicauda</i>
Sandhill Dunnart	<i>Sminthopsis psammophila</i>
* Golden Bandicoot or Wintarru	<i>Isoodon auratus</i>
* Desert Bandicoot or Walilya	<i>Perameles eremiana</i>
* Pig-footed Bandicoot or Kantjilpa	<i>Chaeropus ecaudatus</i>
Dalgyte or Bilby or Ninu	<i>Macrotis lagotis</i>
* Lesser Bilby or Tjunpi	<i>Macrotis leucura</i>
* Brush-tailed Bettong or Woylie	<i>Bettongia penicillata</i>
* Burrowing Bettong or Boodie	<i>Bettongia lesueur</i>
* Spectacled Hare Wallaby or Wampana	<i>Lagorchestes conspicillatus</i>
* Rufous Hare Wallaby or Mala	<i>Lagorchestes hirsutus</i>
* Central Hare Wallaby or Kuluwarri	<i>Lagorchestes asomatus</i>
* Crescent Nailtail Wallaby or Tjawalpa	<i>Onychogalea lunata</i>
Black-footed Rock Wallaby or Warru	<i>Petrogale lateralis</i>
Plains Rat	<i>Pseudomys australis</i>
* Lesser Stick-nest Rat	<i>Leporillus apicalis</i>

* These species are presumed extinct in the Goldfields Region.

Birds

Mallee Fowl	<i>Leipoa ocellata</i>
Freckled Duck	<i>Stictonetta naevosa</i>
Grey Falcon	<i>Falco hypoleucos</i>
Princess or Alexandra's Parrot	<i>Polytelis alexandrae</i>
Night Parrot	<i>Geopsittacus occidentalis</i>
Scarlet-chested Parrot	<i>Neophema splendida</i>
Crested Shrike-tit	<i>Falcunculus frontatus</i>
Nullarbor Quail-thrush	<i>Cinclosoma alisteri</i>
Thick-billed Grass-wren	<i>Amytornis textilis</i>
Grey Honeyeater	<i>Conopophila whitei</i>

SPECIALLY PROTECTED FAUNA

Birds

Peregrine Falcon	<i>Falco peregrinus</i>
Naretha Blue Bonnet	<i>Northiella haematogaster narethae</i>
Pink or Major Mitchell's Cockatoo	<i>Cacatua leadbeateri</i>

Reptiles

Woma, or Ramsay's Python	<i>Aspidites ramsayi</i>
Carpet Python	<i>Morelia spilota imbricata</i>

In addition to declared threatened fauna and specially protected fauna, the Goldfields Region also includes the following species which, on the basis of further knowledge, could be added to the above list of protected categories.

Mammals

Long-tailed Dunnart	<i>Sminthopsis longicaudata</i>
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Birds

Square-tailed Kite	<i>Lophiotinia isura</i>
Bush Thick-knee	<i>Burhinus magnirostris</i>
Hooded Plover	<i>Chadradrius rubicollis</i>
Long-toed Stint	<i>Calidris subminuta</i>
Masked Owl	<i>Tyto novaehollandiae</i>
Slender-billed Thornbill	<i>Acanthiza iredalei</i>
Spotted Nightjar	<i>Eurostopodos guttatus</i>

Reptiles

<i>Diplodactylus kenneallyi</i>
<i>Rhamphotyphlops margaretae</i>
<i>Lerista puncticauda</i>

Declared Native Fauna

The following native species occurring in the Goldfields are declared under the Agriculture and Related Resources Protection Act 1976 (ARRP Act): Red Kangaroo, Grey Kangaroo, Euro, Dingo, Wedge-tailed Eagle, Galah and Emu. Although Section 39-41 of the ARRP Act requires a government department to control declared plants and animals on or in relation to public land under its control, native fauna are not treated as declared within CALM managed lands unless a specific management program is approved. With the possible exception of the Dingo, control of declared native fauna on CALM lands in the Goldfields Region is not required.

Kangaroo Management

Red and Western Grey Kangaroos and the Euro are subject to CALM's wildlife management programs, approved at State and Commonwealth Government levels, which describe management procedures. The aims of these programs are the same as those endorsed nationally by Commonwealth, State and Territory Ministers responsible for wildlife conservation, namely:

To maintain populations of kangaroos over their natural range in Western Australia; to contain the deleterious effects of kangaroos on other land management practices; and where possible, to manage kangaroo species as a renewable resource providing the conservation of the species is not compromised.

An annual quota (i.e. upper limit to the commercial harvest) is set for each species, based on harvest and other data including the results of triennial aerial surveys of Red and Grey Kangaroo populations. Particular emphasis is given to directing the harvest in pastoral areas

into special rangeland management areas, which are usually paddocks or groups of paddocks spelled from grazing by domestic stock for rehabilitation purposes, and a proportion of the quota may be held in reserve for this purpose.

Management of Emus and Wedge-tailed Eagles

Emus and Wedge-tailed Eagles, which formerly were subject to an open season, can now only be controlled subject to a damage licence, issued by CALM. Policy Statement No. 23, Conservation and Management of Emus, details CALM's approach to all aspects of emu conservation and management, including control of emus causing damage and overseeing the farming of emus for their leather, meat and other products.

Dingo Management

Control of dingoes on CALM managed lands can only be approved under the following circumstances:

It could reasonably be assumed that dingoes from within reserves were directly responsible for predation on stock;

No adequate buffer exists outside the reserve;

The effect of control measures on non-target species can be controlled (e.g. metal traps are not to be used except in exceptional circumstances). Bait and 1080 dose must follow CALM specifications;

Control measures occur at specific known dingo locations within reserves or within a nominated buffer area within the reserve boundary;

Control may also be necessary to meet conservation objectives (e.g. predation on endangered species).

Two wild dog management plans have been prepared by the Agriculture Protection Board, a Statewide one and one for their Zone 9 (which covers CALM's Goldfields Region and also includes the Shires of Sandstone and Dundas). CALM has had the opportunity to comment on both plans. CALM will prepare a policy statement on dingo management within the life of this plan.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

- 1. Contribute to the Agriculture Protection Board's Wild Dog Management Plans.*
- 2. Identify particular areas for research into presence and status of threatened animals.*
- 3. Initiate a local public awareness program in the media on threatened animals.*

4. *Where possible undertake management to enhance or maintain populations of threatened species.*

13.4 CULTURAL AREAS

Protection of cultural sites is an intrinsic aspect of land management. In most instances the inclusion of these sites within a reserve might not have been the principal reason for reserve selection; however their protection is increasingly important. Cultural sites fall into two broad categories: European sites include historic sites - wells, soaks, dams, blazed trees, buildings, engineering heritage and mining sites; Aboriginal sites include artefact scatters, burial, occupation, sacred and ceremonial sites as well as rock shelters with paintings or etchings.

Aboriginal sites and objects in WA are protected under the Aboriginal Heritage Act 1972, which is administered by the trustees of the WA Museum. All sites and objects on land managed by CALM are subject to that legislation. Policy Statement No. 11 Protection of Aboriginal Sites specifically refers to protection of sites and objects on CALM managed lands.

STRATEGIES

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

1. *Subject to requests from appropriate Aboriginal groups seek to identify and locate Aboriginal sites and objects on CALM-managed land, and report them to the Trustees of the W A Museum.*
2. *Take account of known Aboriginal sites and objects in management plans.*
3. *Take all steps to care for and protect known Aboriginal sites and objects against damage by human and natural causes.*
4. *Subject to requests from appropriate Aboriginal groups liaise with the W A Museum and appropriate Aboriginal community groups about access to and use of Aboriginal sites and objects.*
5. *Subject to requests from appropriate Aboriginal groups encourage and facilitate research on Aboriginal sites and objects, insofar as may be consistent with approved management and protection programs and the views of the appropriate Aboriginal community groups.*
6. *Subject to requests from appropriate Aboriginal groups encourage and facilitate use of Aboriginal sites and objects as a resource for developing public awareness and understanding of Aboriginal life, history and cultural traditions, but only insofar as this is consistent with approved management and protection programs and the views of the appropriate Aboriginal community groups, and conducted in a manner which is respectful of Aboriginal cultural values.*

7. *Collate existing information on historic sites located on land managed by CALM in the region and maintain an up-to-date register of them in the regional office.*
8. *In accordance with the Burra Charter¹, develop management guidelines for historic sites on land managed by CALM in the region in liaison with the W.A. Museum, National Trust, Heritage Commission, tertiary institutions and historical societies.*
9. *Maintain liaison with local historical societies regarding volunteer work and other activities.*

European cultural sites in WA were not, until recently, specifically protected by legislation (except buildings, which can be registered with the National Trust). Heritage legislation has recently been passed by the WA Parliament and this will protect certain designated Heritage Sites.

14. ENVIRONMENTAL PROTECTION

14.1 FIRE

Fire management is a significant and controversial aspect of conservation and land management in W.A. CALM, as a major land manager, has specific responsibilities under the Bush Fires Act 1954. In particular, there exists a legal and moral obligation to comply with those provisions relating to fire prevention and control of wildfires on or near CALM managed lands, and protection of life and property. Policy Statement No. 19, Fire Management, sets out departmental objectives and policies.

Fire has been and still is a natural phenomenon and ecological factor in the Goldfields Region. There is no doubt that in desert regions in particular, the fire regime has changed dramatically since Aborigines left, so that large areas of vegetation in pyric uniformity are now subjected to intense, large summer fires usually started by lightning (see Kimber 1983 for a general discussion of this topic). These changes are now considered a major factor in the decline of desert dwelling mammals (Burbidge and McKenzie, 1989). See also Section 18.0 Research.

The other Goldfields biological sub-regions, eucalypt woodlands, mulga woodlands and the Nullarbor Plain, are not as prone to fire due to less flammable fuels. However, in spite of this, there were major fires in all these sub-regions in the summer of 1975/76 after two well above average rainfall years caused a proliferation of native grasses. In the event of this occurring again local fire response plans will be used in conjunction with CALM fire response plans.

¹ The Australian ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) contains principles concerning the preservation of structures considered to have historical value.

Fire control in the Goldfields Region is carried out according to a Fire Control Working Plan which is reviewed annually. Fire suppression in the Goldfields does not assume the high priority that it does in other CALM Regions because a) vegetation is much less flammable, b) lesser values are potentially at risk, and c) constraints of remoteness, lack of access, communications and sparse population apply. On account of these factors and the Regions low suppression capability in remote areas, the strategy has been to conduct aerial and hand prescribed burning on Goldfields reserves. In the absence of area management plans for Goldfields reserves, all prescribed burning operations are subject to approved necessary operations and Interim Management Guidelines (Section 3). Manual and aerial prescribed burning operations have so far been conducted in Gibson Desert Nature Reserve, Neale Junction Nature Reserve, Wanjarrri Nature Reserve and Queen Victoria Spring Nature Reserve.

Aerial incendiary burning has been conducted on an experimental basis in Gibson Desert, Queen Victoria Spring and Neale Junction Nature Reserves to achieve the dual objectives of wildfire control and re-establishing environmental 'patchiness' as a precursor to an experimental mammal reintroduction project.

Even for less remote reserves, any effective suppression could only be carried out after liaison with and the assistance of local brigades, neighbouring pastoralists and the Bush Fires Board. See also Section 7.3 Management Capability Zones.

The overall objectives of fire management within CALM are to:

- **Protect community and environmental values on lands managed by the Department from damage or destruction from wildfire.**
- **Use fire as a management tool to achieve land management objectives, in accordance with designated land use priorities.**

DEPARTMENTAL STRATEGIES

Fire Suppression

1. *Meet legal obligations under the Bush Fires Act and the CALM Act by responding to fires occurring on or near CALM managed land to a degree that is appropriate to the values at risk.*
2. *Assess response to a fire in the light of potential damage to the following values, in order of priority:*
 - a) *human life*
 - b) *community assets, property or special values (including environmental values)*
 - c) *cost of suppression in relation to values threatened.*
3. *Where values dictate the Department will encourage communication and liaison which will give timely warning of the presence of a fire threatening a community or environmental values.*

Use of Fire

4. *Use planned fire only where this use is in accordance with an approved management plan, or, where such a plan does not exist, to protect and maintain the designated priority land use.*
5. *Prepare written prescriptions in advance, for approval by senior designated officers, before any planned fires are undertaken.*
6. *For areas where primary land use is wildlife conservation, use fire in such a way as to promote the greatest possible diversity and variety of habitats within prevailing physical or financial constraints.*

In small conservation reserves and where information on the impact of fire is limited, fire will be used conservatively. In such areas the use of fire will be restricted to:

- a) *protection of neighbouring community assets; and*
 - b) *as far as is achievable and within safe limits, ensuring that different seral stages following fire are represented.*
7. *Use prescribed fire or other methods to reduce fuels on appropriate areas of CALM lands, where it can be demonstrated that this is the most effective means of wildfire control, and where undesirable ecological effects do not result.*

The frequency of fuel reduction measures will be governed by the rate of build-up of fuels; the degree of risk to human lives; the value of the assets to be protected; the known sensitivity to fire, or dependence on fire, of the kinds of plants and animals present; and the resources available to carry out the work.

Liaison

8. *Ensure effective liaison with neighbours, Bush Fire Brigades, Shires, Bush Fires Board and other fire control organisations.*
9. *Promote mutual aid interagency agreements for fire control on lands of mixed tenure with common fire problems.*

Public Awareness

10. *Provide for public education in relation to the prevention of fire and the role and use of fire in ecosystem management, and hazard and risk reduction.*

Research

11. *Undertake research into fire prevention and control, fire ecology and fire behaviour on CALM lands to improve the scientific basis for, and effectiveness of, fire management programs.*

REGIONAL STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

12. *Monitor environmental conditions, particularly rainfall which might cause Goldfields vegetation to be at increased fire risk, and prepare an appropriate capacity to respond.*
13. *Maintain a program of prescribed burning to provide and maintain biological diversity and to favour habitat for specific flora or fauna where this does not compromise other species.*
14. *Assist with research into fire ecology and behaviour in Goldfields ecosystems.*
15. *Assist in monitoring the effectiveness and impacts of fire management strategies.*

14.2 WEEDS

CALM has responsibility for weed control on lands under its control for two reasons. There is legal responsibility for land-holders to eradicate plants declared under section 37 of the Agriculture and Related Resources Protection (ARRP) Act. Other plants may have weed status for reasons of visitor safety or comfort, aesthetics or conservation in a local situation and may require control or eradication according to interim management guidelines or an area management plan. Policy Statement No. 14, Weeds on CALM Lands, defines a weed as "any plant which is disadvantageous from the viewpoint of effective management for the land use concerned". It may be either a native or exotic species.

Declared plants in the Goldfields Region:

Cape tulip	<i>Homeria breyniana</i> (L.) Lewis and <i>H. miniata</i> Sweet
Mexican Poppy	<i>Argemone mexicana</i> L.
Hoary cress	<i>Cardaria draba</i> (L.) Desv.
Camelthorn	<i>Alhagi camelorum</i> Fisch.
Horehound	<i>Marrubium vulgare</i> L.
Mintweed	<i>Salvia reflexa</i> Hornem.
Thornapple	<i>Datura</i> spp.
Bathurst burr	<i>Xanthium spinosum</i> L.
Saffron thistle	<i>Carthamus lanatus</i> (Tourn.) L.

In addition to these species there are many 'environmental weeds' or other introduced plants, some of which, e.g. Ward's Weed (*Carrichtua annua*), present problems in environmental management.

STRATEGIES

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

1. *Prepare a weed control management program.*
2. *Maintain an inventory of weeds on CALM managed lands in the region.*
3. *In conjunction with the Agriculture Protection Board and adjacent landholders, develop programs to control declared weeds as resources allow.*
4. *Maintain liaison with neighbours to optimise control of boundary weed infestations.*
5. *Carry out monitoring and control programs, as resources allow, on declared and non-declared environmental weeds.*

14.3 FERAL ANIMALS

Control of feral animals is viewed as one of the most important strategies by which conservation objectives on CALM managed lands can be achieved. Feral animals have potential for serious impact on natural systems, through direct effects such as predation, habitat destruction, competition for food and territory or generally through environmental degradation by selective grazing and disease spread (e.g. dieback). Feral animal control is also an issue in maintaining good relationships with neighbours.

The Department also has responsibilities for control of declared animals on CALM managed lands under Sections 39-41 of the Agriculture and Related Resources Protection Act (ARRP) 1976, viz "A Government Department shall control declared plants and declared animals on or in relation to public land under its control", but notwithstanding the Agriculture Protection Board Act, 1950 Sections 22(1), (2) and (3) preserves the "rights, powers, authorities or duties of any Government department".

CALM distinguishes between declared native species which are dealt with under Section 13.3 Fauna Conservation, and feral animals which are introduced species that have become established as wild or naturalised populations. The following species are feral in the Goldfields:

Mammals

Rabbit*, red fox*, house mouse, feral cat, donkey*, goat*, camel*, cattle, horse, sheep and feral dog.

* Declared animals under Agriculture and Related Resources Protection Act 1976.

Note: Cattle are never legally considered feral in Australia and control measures must be undertaken with due consideration to assumed ownership.

Birds

Feral Pigeon, Spotted Turtle-dove, Senegal Turtle-dove.

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. Impacts include predation on native fauna, destruction of native vegetation, and introduction of disease.

If a species is declared, the landholder, including CALM, has a legal responsibility for control on that land. CALM also has a considerable interest in control, or eradication in some circumstances of non-declared feral animals. This applies particularly to the introduced feral cat. Research within CALM and elsewhere has documented the effects that foxes and cats can have on native fauna, e.g. Jones and Coman (1981) and Kinnear *et al.* (1988). Research on methods of control of feral cats is a current research priority. There is also a case for public education of the threat cats pose to native fauna. A departmental policy statement on feral animals will be produced during the life of this plan.

CALM's primary operational objective is to:

Achieve the systematic and safe control or eradication of feral animals on CALM managed lands, in accordance with established priorities, and consistent with Departmental conservation objectives.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

- 1. Liaise closely with the Agriculture Protection Board (APB), including its Zone Control Authorities and Regional Advisory Committees.*
- 2. Maintain records of feral animal surveys. Records are to be kept of control measures undertaken, the success of the program and follow up required.*
- 3. Prepare and maintain a 5-year feral animal control plan. After consultation with an APB officer and/or the environmental protection officer the plan will form the basis for works programs.*
- 4. Use 1080 and other chemicals in accordance with 1080 guidelines, Health requirements (pesticide regulations) and guidelines in the Chemical User Manual.*
- 5. Understand and evaluate the effects of chemicals on non-target species in considering a control program. Information is available from CALM and APB research staff.*
- 6. Provide staff with training in feral animal problems, control measures and safety aspects.*

14.4 REHABILITATION

Rehabilitation in this context is the establishment of a stable, self-regulating ecosystem following disturbance. It is necessary to distinguish between a restored ecosystem, that is, one with an identical structure and function to that which existed before disturbance, and a rehabilitated ecosystem, that is, one in which the replaced ecosystem is best suited to the conditions prevailing following disturbance. In circumstances of drastic disturbance (e.g. overburden or tailings dam) a rehabilitated rather than a restored ecosystem is the more realistic objective. In situations of high conservation values a restored ecosystem should be the desired outcome of rehabilitation, which must always consider what the final land use will be.

The requirement for rehabilitation on lands managed by CALM derives from either an inherited situation in which disturbance occurred in the absence of any commitment to rehabilitate, or as part of a management program for activities imposed on lands managed by CALM.

Departmental policy is contained in Policy Statement No. 10 Rehabilitation of Disturbed Land. It is based on three principles:

CALM managed land should be managed as far as possible to avoid disturbance. Rehabilitation should be the last option in a series of management decisions designed to protect the environmental values of CALM land. (Other policy statements deal with this matter in more detail).

Rehabilitation should aim to restore original values, including indigenous communities where appropriate, and help to enhance all potential uses provided the priority uses are not adversely affected.

Policies on rehabilitation must be consistent with the five primary objectives of the CALM Strategic Plan (Section 1.0). Five Land Care District Committees operate within CALM's Goldfields Region providing a forum for addressing rehabilitation and land care in the wider community context.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

- 1. Develop a working plan for rehabilitation within the Region, allocate priorities, write prescriptions and commence works as resources become available.*
- 2. Negotiate with mining companies or other corporate sponsors to contribute to rehabilitation programs on lands managed by CALM.*

3. *Apply and assess time-bound, measurable performance indicators before bonds are restored in situations where performance bonds are applied to rehabilitation on lands managed by CALM.*
4. *Be represented, where possible, at Land Conservation District Committee meetings, with the purpose of being involved in rehabilitation and land care in the wider context.*

14.5 MINING ON RESERVES

Mining which, within the terms of the Mining Act 1978, includes exploration and fossicking, can be undertaken on lands managed by CALM under two principal statutes:

CALM Act - Leases can be issued for basic raw materials (i.e. gravel, sand, stone) in accordance with Policy No. 2 (Basic Raw Materials) and subject to Sections 97 to 100 of the Act.

Mining Act 1978 - Section 24 of the Act defines Ministerial responsibilities for approving mining on various land classes.

Special Agreement Acts are generally enacted for major resource projects (such as bauxite, iron ore and coal), with the Department of Resources Development as the principal managing authority assisted by the Department of Minerals and Energy. The Environmental Protection Act 1986 takes precedence over most other Acts. The Department of Minerals and Energy refers "significant" projects to the EPA according to agreed guidelines. CALM and individuals can also refer proposals for assessment.

Mining in National Parks and Nature Reserves

Government Policy on mining in CALM managed lands has the following implications for CALM's Goldfields Region:

1. 'A' Class Reserves and National Parks

Mineral exploration in 'A' Class reserves and national parks will continue to be subject to the concurrence of the Minister for the Environment. Significant ground disturbance may be referred to the EPA by the NPNCA if required. Mining will require the consent of both Houses of Parliament and EPA assessment.

2. 'B' and 'C' Class Reserves

Exploration and mining will be allowed subject to the recommendation of the Minister for the Environment and approval of the Minister for Mines and assessment by EPA for production mining.

3. State Forests and Timber Reserves

Proposed amendments to the Mining Act will enable mineral tenements on State Forests outside the South-west region to be granted on the Minister for the Environment's recommendation rather than with his concurrence with the Minister for Mines. Approvals are

subject to operational guidelines produced by CALM and DOME. Major mining may be referred to the EPA for assessment.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

- 1. Liaise with mining companies on an individual basis and the Department of Minerals and Energy on matters of impact assessment and environmental management on lands managed by CALM.*
- 2. Monitor existing mining and exploration activities that impact directly or indirectly on CALM managed lands and take any necessary action to regulate them.*
- 3. Evaluate the likely impact of any proposed mineral resource development activities on lands managed and proposed for management by CALM and make recommendations within the context of Government policy.*
- 4. Seek compensation and/or additions to CALM managed lands for losses incurred due to mining activity.*

14.6 GRAVEL AND INDUSTRIAL MINERALS

Separate policy and procedures apply to extraction of certain raw materials for prescribed purposes on lands managed by CALM according to Policy No 2, Basic Raw Materials.

The Departments of Conservation and Land Management and Minerals and Energy have agreed to a strategy concerning the extraction of certain minerals from land managed by CALM. The particular minerals involved are gravel, shale (not being oil shale), sand, clay, limestone or rock. These minerals are ones which are not minerals when on private land, but are minerals when on Crown land or reserved land as defined under the Mining Act.

It is proposed that such minerals on lands managed by CALM can be used by CALM or its authorised agents for any agricultural, pastoral, household, road making, or building purpose on that land if no mining tenement has been granted over the land, e.g. CALM may authorise gravel to be obtained from one part of a State forest, national park or nature reserve in order to effect road works in other parts of that forest, park or reserve [Section 9(2) of the Mining Act]. In the case of gravel, sand etc being required from national parks or nature reserves, requests may be accommodated by the issue by CALM of a lease (CALM Act, Section 100) provided that the use of the gravel is "necessary" for the management of the national park or nature reserve [CALM Act, Section 33(3)]. Doubtful cases are to be referred to the General Manager, CALM.

In the case of gravel, sand etc, being required by various shires, the Main Roads Department, the State Energy Commission or other agencies for services adjacent to, on, or servicing State

forests and timber reserves, it is proposed that they be accommodated by the issue from CALM of a lease (CALM Act, Section 97). The creation of such a lease will mean that the land will fall within the Mining Act definition of private land. Accordingly, any gravel, shale etc will no longer be minerals and the provisions of the Mining Act will not apply.

All operations of a commercial nature involving gravel and industrial minerals will be controlled under the Mining Act, and for this purpose a mining tenement will need to be obtained by the operator. These will be subject to approval by CALM's Minister, to conditions and to the payment of appropriate compensation to CALM, and royalties to the Department of Minerals and Energy.

The CALM policy and conditions on rehabilitation, compensation and royalties are stated in Policy No 2, Basic Raw Materials. This situation is under review with the Western Australian Municipal Association.

STRATEGIES

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

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

14.7 PUBLIC UTILITIES

Public utilities provide essential community needs but can have serious visual effects, and may cause permanent loss of conservation values. The main public utilities with responsibilities affecting land managed by CALM are:

WA Water Authority

State Energy Commission

Local Government Authorities

Westrail

Telecom

Main Roads Department

Department of Land Administration.

Existing public utilities will be maintained and new developments will be proposed during the period of this plan, for example, the Goldfields Gas Transmission pipeline.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

1. *Investigate alternative locations for public utilities consistent with sound environmental management and cost/benefit constraints.*
2. *Monitor the impacts of public utility developments on CALM managed lands.*
3. *Liaise with officers in charge of key public utilities to ascertain whether any proposals are likely to affect land managed by CALM.*
4. *Ensure that CALM managed land disturbed by the installation and/or maintenance of public utilities is adequately rehabilitated at the expense of the responsible authority.*

14.8 LANDSCAPE MANAGEMENT

The Departmental objective is to:

Ensure that all uses on lands and waters managed by CALM are planned and carried out in ways that sustain the beauty of the natural environment.

The term "landscape" refers to the appearance or visual quality of an area as determined by its geology, soils, landforms, vegetation, water features and land use history. This visual landscape resource can be assessed and managed in much the same way as other resource values such as fauna, flora, water, timber and recreation.

Managing the visual landscape resource is dependent on a knowledge and assessment of the landscape itself as well as a thorough understanding of proposed land use(s). After the various landscape elements have been identified and assessed, it is possible to evaluate how particular management alternatives will affect the appearance of any landscape, and subsequently to develop appropriate landscape prescriptions compatible with other resource management objectives.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

1. *Classify landscape features on lands managed by CALM according to the Departmental system.*
2. *Identify and protect important landscapes in the region.*
3. *Ensure that any developments on lands managed by CALM, such as road construction and recreation sites, are undertaken with due regard to their potential impact upon visual qualities of the environment.*

4. *Provide advice to neighbours and other agencies on minimising the visual impact of operations, especially on lands adjacent to or within the viewshed of lands managed by CALM.*

14.9 DISEASE

The Goldfields Region is outside the area of Western Australia considered susceptible to dieback disease due to both its aridity and the nature of the vegetation. In the south-west this disease is caused by a variety of soil-borne pathogens; the principal one being *Phytophthora cinnamomi*. Agents of spread are earthmoving machinery, animals, vehicles and to a lesser extent bushwalkers. Infection will also spread in moist soil conditions along drainage lines. Once infected the vegetation of an area will undergo considerable change in vegetation floristics and structure due to the differing susceptibility of plant species. Strategies to reduce the risk of infection, and contain it in already infected areas, are now the major consideration in management of some south-west forests, national parks and nature reserves. In spite of the Goldfields Regions reduced risk to dieback a high standard of hygiene is required in operations involving earthmoving machinery to prevent spread of plant propagules and possible unidentified soil-borne pathogens.

STRATEGY

In addition to implementing departmental policies and guidelines the Goldfields Region will ensure all earthmoving operations are done to a high standard of hygiene.

15. RECREATION AND TOURISM

Traditionally some categories of lands managed by CALM, particularly national parks, are extensively used for both recreation and tourism. There is a developing trend towards recreational and tourist use of other lands entrusted to CALM due to increasing interest in the natural environment, and improved access, particularly private use of four wheel drive vehicles. Under the CALM Act and in response to this trend CALM includes recreation management as one of its primary objectives. Policy Statement No. 18 (Recreation, Tourism and Visitor Services) establishes the following general principles:

Preservation of Land Values

The values of the land as a whole should be maintained. The natural systems (including landscapes, particular sites, biota) should be able to sustain the form of recreation, or ancillary activity, which is occurring or proposed.

Consistent with preservation of land values, facilities associated with recreation should be carefully controlled. Facilities for organised sports for example, should generally be minimal on most categories of land (see (ii)).

Consistent with preservation of land values, Section 33 of the CALM Act limits the Department's ability to carry out other than "necessary operations" on nature reserves, national parks and conservation parks unless there is an approved management plan in place.

The intensity of recreational activity should be controlled if necessary to ensure that it does not destroy the value and nature of the activity. Where access to CALM managed lands is sought for activities such as water skiing and stocking with introduced fish for recreational fishing, CALM would generally pursue a strategy of encouraging proponents to look for alternatives outside CALM managed lands.

Consistency of Recreation with Purpose of Vesting

Recreational activity should be compatible with the vesting purpose of the land or the established land use priority. This includes the relatively well known categories of land such as State forest, national park and nature reserve, but also includes allowance for new categories which may arise.

Equity

The widest range of activities consistent with the purpose of vesting should be allowed, but uses which impair other forms of use to an unreasonable extent or place the safety of other users in jeopardy, should be controlled or eliminated.

Management

The Department should be capable of providing any necessary degree of supervision of the activity, particularly where land values may be impaired. If this cannot be done the activity should be restricted, relocated or eliminated.

POLICY GUIDELINES FOR RECREATION ON CALM-MANAGED LANDS

1. Recoup of Fees and Charges

No entry or facilities fees are charged at present in the Goldfields Region, though this could change in the life of this plan if the need arose.

2. Commercial Concessions

Appropriate commercial activities may be approved on lands managed by CALM and are subject to conditions and permits.

3. Leases for Associations and Clubs

None current or proposed in the Goldfields Region.

4. Overnight Stays

Campsites with facilities are provided at Burra Rock, Cave Hill, Rowles Lagoon and Victoria Rock Nature Reserves. Bush camping is permitted subject to certain conditions in larger reserves where impacts are minimal and constraints of distance apply. Accommodation is only available at Wanjarri Nature Reserve and Jaurdi pastoral lease where permission is required for use.

5. Visitor Safety

CALM has a "duty of care" to users of CALM managed land under the Occupiers Liability Act. Concession holders will be required to indemnify CALM against their activities and carry their own insurance cover.

6. Special Groups and Events

Special groups or events will be accommodated if they are not contrary to management plans or the four general principles listed above.

7. Filming and Photography

Filming and photography are recognized as a major component of recreation and a significant aspect of visitor use of lands managed by CALM. Filming and photography for commercial purposes are subject to a separate policy.

8. Public Access

Lands and waters entrusted to the department are generally open to public use. There are some areas restricted to the public for reasons of safety, disease control, water quality, protection of species, maintenance, etc. Access is generally determined by roads or tracks.

Access policies

- a. Access to all areas of lands and waters entrusted to the department will be open to public use, except where this contravenes the general principles discussed at the beginning of this document. In practice this allows access on foot to most areas and access by vehicle to many parts of reserves.
- b. Subject to Section 33 of the CALM Act, access on foot will be encouraged by construction of walk tracks in areas where features of interest justify their construction. Where appropriate, interpretive tracks will be constructed; construction standards will be determined from time to time by the Manager, Recreation and Landscape Branch. Construction will accord with policy on visitor safety (see above) and will, where possible, provide appropriate access for disabled people.
- c. Vehicle access will be generally determined within the constraints of Section 33 of the CALM Act. In most areas a system of roads and/or tracks exists before a management plan is prepared. Generally access along such roads/tracks will be permitted until a management plan is prepared, but in circumstances where the values of the land are under threat (e.g. for disease control) it may be necessary to

close or restrict vehicle access. In general vehicular access within nature reserves will be discouraged.

- d. Subject to resource constraints, and to urgency as "necessary operations", tracks will be upgraded, realigned or closed through the management plan process. However, it is recognized that in remote situations with limited use, unmade vehicle tracks can be stable and are a preferred option.
- e. Design standards will be determined from time to time by the Manager, Recreation and Landscape Branch, in conjunction with the Main Roads Department.
- f. Access by vehicles off roads and tracks will be limited to designated areas.
- g. Use of unregistered vehicles will not be permitted except in compliance with the Off Road Vehicles Act. Where a permit is provided under that Act by the Minister for Local Government, departmental approval is required for use on lands managed by this department. Such approval will be issued by Regional Managers. Guidelines for approval will be issued separately.
- h. Access by aircraft is subject to regulation by the Commonwealth Department of Transport. The department may impose additional conditions for access. At other than established airstrips, access by aircraft, including helicopters, will be by permit from Regional Managers.
- i. Airstrips will be constructed only in accordance with an approved management plan.
- j. Power boats will not be permitted in areas where their use is not already established. Permission will not be withdrawn except through the area management plan process. Management plans may seek to vary existing use where such use is not in accord with the principles discussed at the beginning of this document.

9. Facilities and Buildings

Facilities and buildings on lands managed by CALM will be constructed and maintained to a high standard, except in the case of feature buildings, e.g. Wanjarri Field Studies Centre which will be maintained in keeping with its rustic and historic value. Facilities and buildings not complying with the above standards will be demolished.

10. Protection of Recreation Site Values

Recreation sites will be selected and developed according to the criteria and procedures laid down in the Recreation Operations Manual of the Department. All recreation sites will be continually monitored to assess usage which may result in deterioration. Where there is evidence of recreation site deterioration or it is anticipated, visitor use will be directed to another site and there will be temporary closure and rehabilitation of the site.

Recreation sites and facilities will be protected from wildfires by the development of fuel reduced zones, prescribed burning or mechanical means.

11. Visitor Information

Dissemination of information is an integral part of CALM's land management. It informs the public of opportunities for recreation and services available. Visitor information and interpretation are the responsibility of all departmental staff backed by the expertise of Landscape, Recreation and Community Education Branch specialist staff. In the Goldfields visitor information is provided at the Regional office as pamphlets or informal advice and at designated recreation sites as information display panels. Pamphlets are also currently available at Victoria Rock Nature Reserve, and others will be provided as demand dictates.

12. Domestic Animals

Dogs, cats, horses and other domestic animals are prohibited from national parks and nature reserves, with the following exceptions:

- i) seeing eye dogs for blind persons in national parks
- ii) where specified zones are established in national parks.

Dogs and other domestic animals may be allowed on other types of reserves or specified zones in other reserves according to the plan for that reserve. For example, exercising of dogs is an acceptable activity in Kalgoorlie Arboretum provided the dogs are under control.

13. Visitor Interaction

CALM recognizes that staff are a major resource for visitor interaction and provision of information in field encounter situations. Staff are required to be well-informed and have the necessary interactive skills to positively promote CALM's objectives.

14. Research and Monitoring

The use of CALM managed lands for recreation is increasing in many areas and ways. To assist in the planning and development of recreational opportunities there is a need to have measures of overall demand for outdoor recreation. As well as predictive studies there is a need for information on current visitor levels, type of use, frequency and duration of use. This information is essential in ongoing management and should lead to improved allocation of resources and the identification of revenue opportunities.

Information on recreation is important to the establishment of the recreational value of the resources managed by the Department, and therefore in demonstrating the contribution of recreation to the economy of the State as a whole. Research is required to establish the attitudes and preferences of users so management can be responsive to user needs. There is a requirement for monitoring the capacity of various environments to cater for various recreational activities and the impact of activities themselves.

In the Goldfields Region visitor use is assessed at three levels: by using traffic recorders at frequently used sites; by recording visitor inquiries in an office log book; and

opportunisticly, by using a prescribed form (visitor statistics or VISTAT) when visiting recreation sites for maintenance and other purposes.

15. Liaison with other Agencies

Many other agencies are equally involved in the planning and provision of outdoor recreation opportunities in this State. It is recognised that there is a need to plan with local authorities and State Government Departments to ensure that recreational developments are complementary to those planned by other agencies and that management objectives are not compromised by lack of co-operation or joint planning.

Similarly, consultation is required with groups having commercial interests to ensure recreation developments and information services are compatible with management objectives.

User groups such as local clubs, State associations and community interest groups should have their aspirations represented in the planning and management of recreation resources. A considerable contribution to ongoing planning and management of recreation on Departmental land can be achieved through effective liaison with such bodies.

STRATEGY

In addition to implementing departmental policies and guidelines the Goldfields Region will prepare a Regional Recreation Plan to provide a conceptual framework for recreational activities and opportunities throughout the region.

16. PUBLIC PARTICIPATION AND LIAISON

16.1 COMMUNITY INVOLVEMENT

The CALM Act (Sections 13, 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-operating with schools, e.g. work experience and Arbor Day.

Various advisory committees, 'Friends of the Park', and volunteer groups;

- Involvement with land conservation district committees and catchment management advisory bodies
- Liaison with bushfire brigades
- Public workshops, seminars and talks to interested groups
- Landscape tours.

Public participation programs require considerable staff resources to plan, implement, review and follow-up.

STRATEGIES

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

- 1. Continue existing involvement with local individuals and organisations with an interest in conservation and land management.*
- 2. 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.*
- 3. Establish Advisory Committees or other appropriate community involvement programs to provide ongoing local advice where appropriate.*
- 4. Seek regular feedback from the community on Departmental policies and management practices through both formal and informal contacts.*

16.2 ABORIGINAL LIAISON

CALM is committed to the principle that it is managing public lands and indigenous wildlife on behalf of the people of Western Australia. Aboriginal people are of particular importance in land use planning because of their historical association with the land over a period estimated at 40 000 years. The reservation of lands and waters as conservation reserves recognises the natural and cultural significance of these areas and their relative immunity from changes imposed upon the landscape elsewhere. Aboriginal people maintain their traditional interest in the land, its resources and management. Thus CALM and Aboriginal people have a common interest in land management.

There has been effective collaborative research involving CALM scientists and Aboriginal people particularly with respect to the past and present mammal fauna (see for example Burbidge *et al.* 1988), use of fire and Black-footed Rock Wallaby studies in desert regions. Additionally, in some remote parts of WA, CALM has been negotiating various management arrangements with traditional Aboriginal custodians of the land. Now that CALM is putting resources into the management of desert nature reserves - with further reserves proposed in this plan - it is vital that Goldfields Region liaise and negotiate effectively with Aboriginal

people on land management and tenure issues. ATSIC Regional Councils are an appropriate forum for discussion of broad issues but for specific issues CALM will continue to liaise directly with the relevant communities.

CALM carries out its responsibilities under two principal acts - the Conservation and Land Management Act 1984, and the Wildlife Conservation Act 1950. The CALM Act does not provide specific mechanisms to recognise traditional Aboriginal land ownership nor does it provide for boards or other statutory bodies to be established over individual reserves. In the Wildlife Conservation Act, section 23 exempts Aboriginal people from the general provisions relating to taking of flora and fauna, and allows them, with the permission of the occupier, to take food from all land, except nature reserves, provided the food is not for sale. This provision does not permit the taking of fauna or flora which has been declared to be threatened or in need of special protection. One exception to this provision is the dugong which is permitted to be taken because of its special tribal and ceremonial significance to the Aboriginal people of mid-western and northern Australia.

The laws governing Aboriginal rights and interests in land vary between the different states and territories which is inconsistent and confusing to traditional custodians of land abutting state borders. Nevertheless, the Aboriginal people of the Goldfields communities have indicated that they would like to negotiate some mutually satisfactory arrangement which enables Aboriginal participation in the management of traditional lands and also provides secure tenure for residents.

From 1987-1989 CALM provided Aboriginal Community Ranger Training for remote Goldfields communities. This program proved difficult to sustain in the central reserves, but was eagerly received by Aboriginal people in the Great Victorian Desert region and has led to a strong relationship between the Department and people with traditional affiliation to the southern desert nature reserves.

Formal management arrangements with Aboriginal communities do not currently exist in the Goldfields Region although Aboriginal groups have established unofficial outcamps in two nature reserves. The Region does involve Aboriginal people in management operations in the Gibson Desert Nature Reserve and offers contract employment, with the assistance of Commonwealth funding, in a variety of areas. Of particular significance is the contribution made by aboriginal contractors to research programs in the desert areas with wildlife, ethnobotanical, geographic and cultural resource surveys being conducted. Road survey, patch burning and other fire management work has also been done by contract.

STRATEGIES

In addition to implementing departmental policies and guidelines the Goldfields Region will:

- 1. Liaise and negotiate with Aboriginal people regarding land and wildlife management and tenure issues in the Goldfields.*

2. *Promote opportunities for Aboriginal people to actively participate with CALM in planning and managing CALM managed lands.*
3. *Continue contract employment of Aboriginal people for projects involving management and seek opportunities for increasing funding of these projects.*
4. *Appoint an Aboriginal Liaison Officer to facilitate these initiatives as resources become available.*

16.3 COMMUNITY EDUCATION AND INTERPRETATION

There is an excellent opportunity to promote an awareness of conservation, land management and natural systems and processes within both the regional community, and to visitors to the Region. All CALM personnel in the Goldfields Region have some involvement with community education and interpretation work, mainly through provision of information to visitors, informal contact and presentations to community and school groups. A range of publications on recreation facilities and activities, and technical information, is available from the Regional office.

STRATEGIES

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

1. *Prepare interpretive and community education plans for the Goldfields Region if resources permit.*
2. *Increase and improve on-site interpretive facilities in the region as resources permit.*
3. *Develop improved interpretive material, especially for high use areas.*
4. *Develop the Regional library to cover information and advisory needs.*
5. *Prepare a communications plan and distribute information on conservation and land management issues through various media.*
6. *Liaise closely with other agencies, organisations and individuals who have similar interests in the interpretation of land managed by CALM, such as tourism agencies, schools and museums.*

16.4 VOLUNTEERS

CALM has traditionally enjoyed support from volunteers working as groups or as individuals. Volunteer activities are of value to CALM not only because the department's work capabilities and skills base are expanded at minimal cost, but also because such activities build communication links and understanding between the department and the community. A volunteer may be defined as someone who undertakes work of their own free will, without payment for the benefit of the community.

CALM has a formal policy and administrative framework for volunteer activities (Policy No. 32, Volunteers) which includes initiatives to provide more volunteer opportunities, and to provide training to both volunteers and CALM staff in their management. Matters including industrial relations aspects of volunteer activities, workers compensation insurance and public liability are managed by a Perth based Community Involvement Co-ordinator.

Recent changes to the CALM Act will provide for honorary Conservation and Land Management officers, positions of considerable responsibility and privilege for volunteers of exceptional commitment.

Roles for volunteers in the Goldfields Region include: assistance with reserve management, e.g. clean-ups, usually in the form of busy bees, assistance with flora and fauna surveys or research, and with the rehabilitation of injured or orphaned fauna.

STRATEGY

In addition to implementing departmental policies and guidelines the Goldfields Region will provide opportunities for volunteers, in particular by organising events in which local groups and individuals can contribute to reserve management.

16.5 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, regional and Departmental level. Enquiries are referred to other departments and authorities when appropriate.

STRATEGIES

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

1. *Continue to provide information and advisory services on conservation, tree planting, wildlife management and land management matters on request.*

2. *When appropriate, continue to participate in workshops, seminars and displays.*

16.6 KALGOORLIE-BOULDER URBAN LANDCARE GROUP

(FORMERLY GOLDFIELDS DUST ABATEMENT COMMITTEE)

Since the first prospectors rushed to the Goldfields more than 90 years ago, dust has been an ever increasing problem. Trees were removed for firewood and mining timber and extensive domestic grazing occurred. The landscape became more barren as more domestic and industrial pressures were placed upon it. As a result severe dust storms occurred caused by the wind blowing across the mine dumps and exposed ground around and in the residential areas. A number of attempts were made in the past to overcome the serious problem.

In 1972, the State Government was approached and provided financial and technical assistance for further positive action. The outcome was the formation of the Goldfields Dust Abatement Committee (GDAC) in 1973, a body with representation from the Chamber of Mines, City of Kalgoorlie-Boulder, WA School of Mines, Environmental Protection Authority, and Department of Conservation and Land Management, Department of Agriculture and Department of Mines. Extensive study and experimentation by the GDAC and the adoption of a Strategic Plan (1988 - 2000) has allowed the Committee to take positive steps towards dust abatement. These include soil protection by fencing to exclude grazing animals and vehicles, direct seeding with funds from Greening Australia and dust monitoring. A Dust Abatement officer was appointed in 1989; originally under the Department of Agriculture, the officer is now responsible to the Regional Manager, Department of Conservation and Land Management and to the Goldfields Dust Abatement Committee. In 1993, GDAC was subject to a consultancy review on its future. The outcome was the formation of the Kalgoorlie-Boulder Urban Landcare Group, a Land Care District Committee convened under the Soil and Land Conservation Act.

STRATEGY

CALM will continue to be represented on KBULCG and will support the new committee by administering the employment of the Landcare Officer and management of funds for as long as the committee requires.

17. FOREST PRODUCTS

In addition to Sandalwood Conservation and Management (Section 13.2), there are a range of industries and activities involving harvest of forest produce.

Forest produce, as defined under the CALM Act includes :

trees, timber, sawdust, chips, firewood, charcoal, gum, kino, resin, sap, honey, seed, bees-wax, rocks, stone and soil, in or on any Crown land as defined in the CALM Act.

It does not include:

minerals within the meaning of the Mining Act; or protected flora for the time being within the meaning of that term in the Wildlife Conservation Act.

Forest produce on reserves, vacant Crown land and pastoral leases is controlled by CALM under the Act. Harvest of forest produce where permitted is controlled by issue of a forest produce licence (FPL), or contract for sale or harvesting which includes payment of royalty. Forest Produce Licence and contract harvesting in the Goldfields Region includes:

Firewood

The current regional policy is:

Householders who wish to obtain small quantities of firewood for their own domestic use may do so, except on conservation reserves, without obtaining a licence. Harvesting firewood for sale is controlled by CALM contracts of sale. Contracts allow a specified amount of firewood to be cut under certain conditions over a specified area. A royalty is payable.

General Conditions

Conditions are imposed on all domestic and commercial firewood cutting to protect the environment and ensure liaison with other land users.

Demand for firewood will continue to be satisfied by managed harvesting of dead wood and salvage operations ahead of developments. As resources diminish, suitable thinning of regrowth woodland will be considered for areas outside green belts and areas managed for conservation.

Mining Timber

The demand for mining timber required in the underground mines within the region can be supplied by harvesting under a CALM contract of sale. Demand will continue to be met by thinning regrowth woodland and minor cutting in uncut stands. Current operations are west of Higginsville. Products cut are firing sticks, lagging and logs. The industry is not expanding, with a current cut around 1 500 tonnes per annum.

Fenceposts

There is a small demand for mulga fenceposts in the Wheatbelt and Esperance agricultural area. Harvest is under CALM contract of sale and a royalty is payable. Limited cutting will

be permitted to meet demand, with cutting directed to areas where environmental, land use and product requirements can be met.

Pastoralists cutting posts for use on their pastoral lease can do so without a licence. This provision will continue.

Speciality Timber

Supplies of forest produce will continue to be made available under CALM contract of sale to satisfy the developing craftwood and specialty timber industry. Products harvested from a range of species include burls, saw-logs, walking sticks, craftwood, turning blanks and other minor forest produce. A royalty is payable.

Apiary Sites

All apiary sites on Crown lands and pastoral leases are allocated and registered by CALM. At present there are 252 registered apiary sites in the Goldfields Region; of these 13 are on lands managed by CALM. As a general rule beekeeping is an acceptable activity in State forest or timber reserve but not in national parks or nature reserves, due to possible direct and indirect effects on conservation values.

STRATEGIES

The Region will provide forest produce for public use and commercial sale according to Departmental policies and guidelines.

- 1. Priority will be given to satisfying local demand.*
- 2. Harvesting will be under established environmental principles of sustainability and maintaining biodiversity.*
- 3. Speciality timber harvesting will be on the basis of high value products with local processing wherever possible.*

18. RESEARCH

18.1 RESEARCH IN CALM

Research in the Department of Conservation and Land Management is conducted from Woodvale Research Centre, Como, three regional centres, Manjimup, Dwellingup and Karratha and the WA Herbarium. The Science and Information Division Five Year Plan (1991-1996) contains a comprehensive review of CALM's research programs. Regional staff in the Goldfields are not actively involved in research except to provide operational support.

A Regional Ecologist provides liaison between Research Division and Regional operations staff and is responsible for the transmission of research initiatives to operational work.

Research is conducted in 13 separate research programs; of these the following are relevant to the Goldfields Region:

- Biogeography
- Fauna conservation
- Fire
- Flora conservation.

The following indicates current CALM research in the Goldfields Region:

Program	No.	Research Project
Biogeography	63/91	Heterogeneity of Nullarbor quadrats
Biogeography	58/91	Eastern Goldfields Biological Survey
Biogeography	7/90	Landuse advice, Plumridge Lakes
Fauna Conservation		Nullarbor Quail Thrush Conservation
Fauna Conservation		Kangaroo management programs.
Fire	20/88	Effects of mosaic burns on birds
Fire	32/88	Effects of season of burn and fire size on desert vertebrates
Fire	38/88	Effects of fire season on medium-sized desert mammals
Fire	33/88	Effects of fire season on flora succession
Fire	34/88	Effects of patch-burning on lizards
Fire	60/90	Effects of patch-burning and feral predator control on the survival of rare mammals re-introduced to the Gibson Desert Nature Reserve
Flora	---	Merredin district survey
Flora	---	<i>Tetralthea</i> species
Flora	120/91	Rare and poorly known WA eucalypt survey.

A project combining aspects of the Fire and Fauna Conservation research programs is the proposal to re-introduce two species of locally extinct mammal, the Burrowing Bettong (*Bettongia lesueur*) and the Golden Bandicoot (*Isodon auratus*) into the Gibson Desert Nature Reserve.

In addition to these structured programs within Research Division there is the opportunity for silvicultural research in the Goldfields Region involving sandalwood growth rate, phenology and effect of grazing herbivores on germination and recruitment (Kealley 1991). Much of these data were completed and reviewed in a recent report (Loneragan 1991). In addition a Salmon Gum research plot established in 1917 provides the opportunity for on-going growth rate studies of this species, which are not available elsewhere in WA.

18.2 RESEARCH IN OTHER INSTITUTIONS

In addition to CALM, other government departments, organisations and individuals conduct research in the Goldfields Region which is applicable to land management. Current projects include the monitoring of rangeland condition (Department of Agriculture), and rehabilitation of minesite operations (Minerals and Energy Research Institute of WA, in association with Department of Agriculture).

Other current university sponsored research in the Region includes a study of species diversity and ecology of desert reptiles, by Professor Eric Pianka of the University of Texas; research into germination and life histories of *Eremophila* species by G. Richmond of Curtin University; and vertebrate community ecology of sandplain by P. Withers of University of Western Australia.

STRATEGIES

1. *Regional staff will provide logistical support for relevant research projects conducted in the Goldfields Region.*
2. *Regional management will assess and collate research results and integrate them into management prescriptions wherever possible.*

IMPLEMENTING THE PLAN

19. TERM OF PLAN, IMPLEMENTATION AND RESERVE DEDICATION

This plan once finalised and approved will direct the Goldfields Region to a course of action for the life of the plan - a period not to exceed 10 years. There is provision under Section 61 of the CALM Act for the plan to be amended as required. If significant changes to the plan are proposed the revised plan will be released for public comment.

All proposals to change land tenure or to reserve vacant Crown land will be referred to the NPNCA and the Lands and Forests Commission and will be subject to the normal review process 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, national parks or State forests. Actions for CALM in this plan are indicated under 'Response to submissions'; in many cases further consultation or assessments are notified here. The boundaries of proposed parks, reserves or State forests indicated in this plan may require minor adjustment during the consultative or legislative process described above. Additionally, boundary modification may be required in future area management plans within the life of this plan.

Integrated Regional Planning

Since other government agencies, and private enterprise produce various types of management plans it is desirable that this plan, as far as possible, be part of an integrated planning process for the Region. Examples of the types of plans which may affect CALM in the Goldfields Region are:

Commonwealth Government

Telecom: microwave links, optic fibre and telephone cable developments.

Australian National Railways: counter disaster plans and access to the Trans-Australian Railway.

State Government

Environmental Protection Authority: environmental protection policies and assessment reports.

Main Roads Department: proposals for major roadworks.

State Energy Commission: proposals for new electricity or gas pipelines.

Tourism Commission: regional and local tourist development plans.

Water Authority: proposals for new developments, storages and pipelines.

Goldfields Esperance Development Authority: regional and local development plans.

Department of Industrial Development: regional and local development plans.

Department of Minerals and Energy: regional mining planning committee reports.

Department of Land Administration: townsites and development plans.

Department of Planning and Urban Development: region plans.

Local Government

Shire plans for new townsites or developments.

Private Enterprise

Mining companies: Environmental Impact Assessment documentation for new developments.

Tourist industry: accommodation and concession proposals.

Area Management Plans

Section 1.3 of this plan indicates the relationship of regional management plans to area management plans. To facilitate area management planning in the Goldfields Region the following is the priority - ordered list at October 1993, to be reviewed annually:

1. Wanjarrri Nature Reserve
2. Rowles Lagoon, Clear Muddy and Carnage Lakes Nature Reserves
3. Gibson Desert Nature Reserve
4. Goongarrie National Park
5. Goldfields State Forests (and proposed State Forests) including:
Kangaroo Hills, Yallari, Calooli, Scahill, Karramindie, Lakeside, Randell, Majestic, Kambalda, Bullock Holes, Coonana, Wallaby Rock and Emu Rock.
6. Goldfields Nature Reserves including: Kurrawang, Binaronca Rock, Dordie Rock and Kambalda.
7. Proposed Woodland National Park and adjacent Conservation Parks including:
Woodland National Park, Boorabbin National Park, Cave Hill Conservation Park, Burra Rock Conservation Park, Wallaroo Rock Conservation Park and Victoria Rock Nature Reserve.
8. Mount Manning Range Nature Reserve and proposed extensions and the adjacent Mt Elvire and Jaurdi proposed State Forests.
9. Queen Victoria Spring Nature Reserve.
10. Great Victoria Desert Nature Reserve.

GLOSSARY AND ABBREVIATIONS

AAPA	Aboriginal Affairs Planning Authority
Agamid	Reptile of family Agamidae, usually referred to as Dragons
ATSIC	Aboriginal and Torres Strait Islander Commission
CALM	Department of Conservation and Land Management
CTRC	Conservation Through Reserves Committee
DOLA	Department of Land Administration
DOME	Department of Minerals and Energy
Dasyurid	Carnivorous marsupial belonging to family Dasyuridae
EPA	Environmental Protection Authority
FPL	Forest Produce Licence
LFC	Lands and Forests Commission. The vesting body for all State Forests and Timber Reserves and some CALM act miscellaneous reserves in W.A.
MRD	Main Roads Department
NPNCA	National Parks and Nature Conservation Authority. The vesting body for all National Parks, Nature Reserves, Conservation Parks, Marine Parks, Marine Nature Reserves and most CALM act miscellaneous reserves in WA.
Palaeochannel	Former watercourse or river, effectively a 'fossil' river.
Phenology	The study of periodic events in the life cycle of organisms in nature.
Pleistocene	Period of geological time corresponding to the last two million years.
Pyric uniformity	Of the same age following past fire. Used in this plan for large areas of vegetation that have been long unburnt and have a high fuel level.
SECWA	State Energy Commission of Western Australia
VISTATS	A system of recording visitor use on CALM managed lands
WAWA	Water Authority of Western Australia

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APPENDICES

APPENDIX 1

GOLDFIELDS REGION EXISTING PUBLIC LANDS MANAGED BY CALM

NATIONAL PARKS

Name/Shire	Number	Vesting	Area (Ha)	Purpose
Coolgardie Shire				
Boorabbin Nt. Pk.	35004	NPNCA	26 000.0	National Park
Menzies Shire				
Goongarrie Nt. Pk.	35637	NPNCA	<u>60 335.5</u>	National Park
			<u>86 335.5</u>	

CONSERVATION PARKS

Name/Shire	Number	Vesting	Area (Ha)	Purpose
Rowles Lagoon	4274	NPNCA	404.0	Conservation Park

STATE FORESTS AND TIMBER RESERVES

Name/Shire	Number	Vesting	Area (Ha)	Purpose
City of Kalgoorlie - Boulder				
Majestic	195/25	LFC	2 226.2	Flora, Fauna and Landscape
Randell	194/25	LFC	16 350.0	Flora, Fauna and Landscape
Coolgardie Shire				
Kambalda	199/25	LFC	3 342.5	Flora, Fauna and Landscape
Kangaroo Hills	198/25	LFC	<u>6 656.8</u>	Flora, Fauna and Landscape
			<u>28 575.5</u>	
Karramindie	SF No.8	LFC	781.0	Flora, Fauna and Landscape

SANDALWOOD RESERVES

Name/Shire	Number	Vesting	Area (Ha)	Purpose
City of Kalgoorlie - Boulder				
Emu Rock	19645	LFC	8 187.0	Timber-Sandalwood.
Quartz Peak	19764	LFC	4 556.0	" "
Coonana	19640	LFC	37 061.0	" "
Bullock Holes	19825	LFC	13 441.6	" "
Lakeside	19214	LFC	3 787.0	" "
Coolgardie Shire				
Calooli	19211	LFC	3 121.0	" "
Yellari	19212	LFC	6 102.0	" "
Scahill	19621	LFC	<u>6 916.0</u>	" "
			<u>83 171.6</u>	

NATURE RESERVES

Name/Shire	Number	Vesting	Area (Ha)	Purpose
City of Kalgoorlie - Boulder				
Clear & Muddy Lakes	7634	NPNCA	1 926.0	Flora & Fauna
Queen Victoria Spring	A30491	NPNCA	272 607.0	Flora & Fauna
Cardunia Rocks	39148	NPNCA	38.0	Flora & Fauna
Coolgardie Shire				
Kurrawang	35453	NPNCA	621.0	Flora & Fauna
Burra Rock	7038	WSSD	809.0	Water, Flora & Fauna
Kambalda West	33300	NPNCA	3 680.0	Flora & Fauna
Binaronca Rock	32552	NPNCA	185.0	Flora & Fauna
Victoria Rock	8480	NPNCA	258.0	Flora & Fauna
Dordie Rock	3211	WSSD	121.0	Water, Flora & Fauna
Cave Hill	17804	WSSD	202.0	Water, Flora & Fauna
Menzies Shire				
Northern Nullarbor (Great Victoria Desert)	A30490	NPNCA	2 495 777.0	Conservation, Flora & Fauna
Plumridge Lake	A34605	NPNCA	308 990.0	Conservation, Flora & Fauna
Mt Manning	36208	NPNCA	153 293.0	Conservation, Flora & Fauna
Niagara Dam	5062	NPNCA	477.0	Water, Flora & Fauna

Laverton Shire

Neale Junction	A34720	NPNCA	723 073.0	Flora & Fauna
Yeo Lake	A36271	NPNCA	321 946.0	Flora & Fauna
De La Poer Range	41831	NPNCA	75 000.0	Flora & Fauna

Leonora Shire

Malcom Dam	8946	WSSD	400.0	Water, Flora & Fauna
Wanjarri	A30897	NPNCA	53 248.0	Flora & Fauna

Wiluna Shire

Mangkili Clay Pan	34604	NPNCA	3 635.0	Flora & Fauna
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Ngaanyatjarraku Shire

Gibson Desert	34606	NPNCA	1 859 286.0	Flora & Fauna
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Yilgarn Shire

Yellowdine	41936	NPNCA	<u>32 798.0</u>	Flora & Fauna
			<u>6 308 774.0</u>	

ARBORETA

Name/Shire	Number	Vesting	Area (ha)
City of Kalgoorlie - Boulder			
Kalgoorlie Aboretum	23 840	LFC	26.5
Coolgardie Shire			
Coolgardie Aboretum	31 983	LFC	24.0

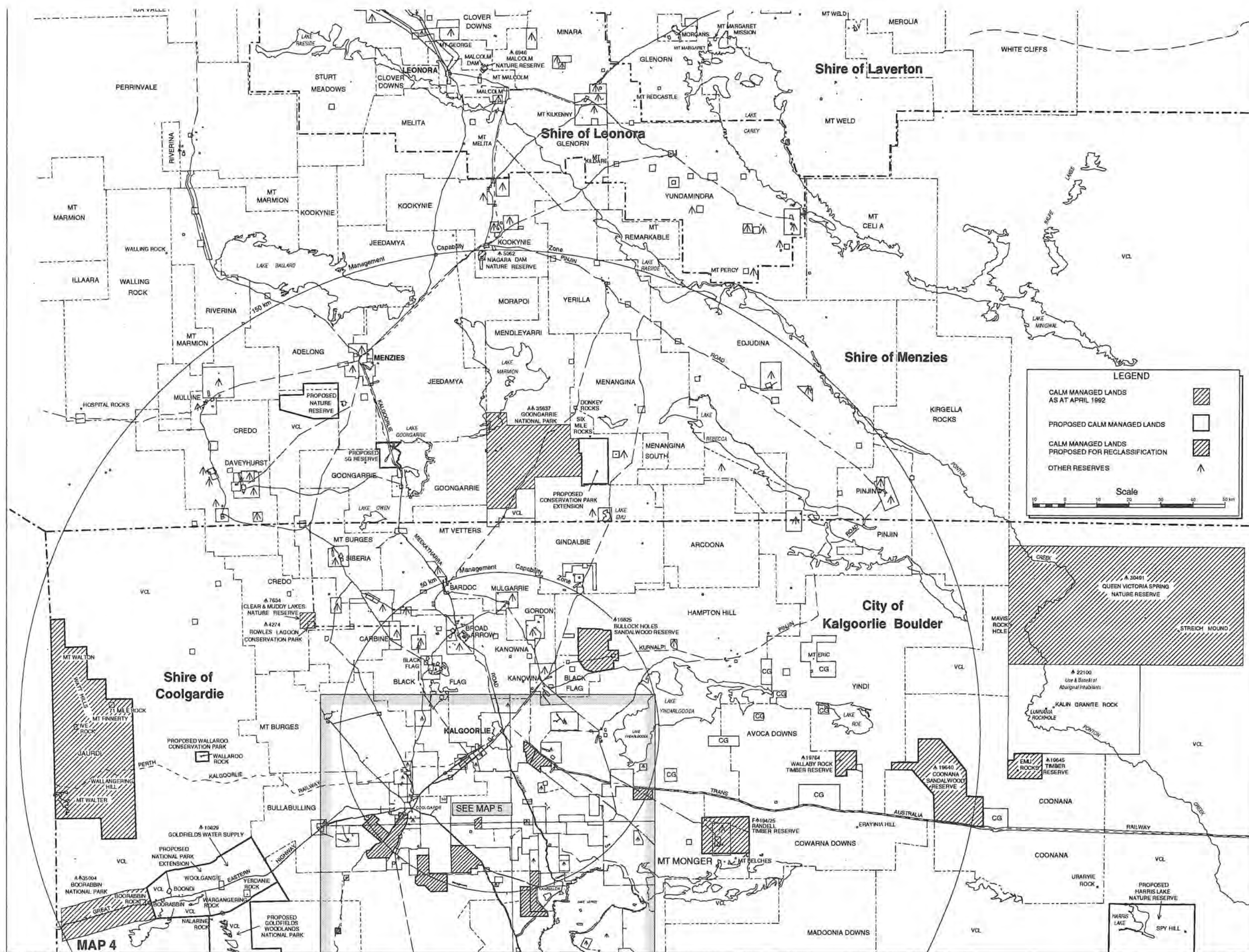
FORMER PASTORAL LEASES

Coolgardie, Menzies and Yilgarn Shires

Jaurdi	321 000.0 ha
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Menzies Shire

Mt Elvire	155 000.0 ha
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LEGEND

CALM MANAGED LANDS
AS AT APRIL 1992

PROPOSED CALM MANAGED LANDS

CALM MANAGED LANDS
PROPOSED FOR RECLASSIFICATION

Scale

For larger scale coverage of reserves over
the Kalgoorlie area refer to maps 4 & 5

