

SYSTEM 6

Parks and Reserves

Guide to the Darling System Report



CONTENTS

	Page
Introduction	1
Why provide for conservation and recreation?	4
The aim of the Study	7
Identifying areas for conservation and recreation	7
Conservation and other land uses	10
Planning and management of open space	12
Open space resources in System 6	14
Forests and valleys of the Darling Range	14
Avon Valley and Darling Scarp	18
Swan Coastal Plain	19
Perth's inner suburbs	19
Estuaries	20
Wetlands	21
Islands, reefs and coastline	22

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Virgin jarrah forest at Dwellingup, 1926.

John E D Fox
sep 1981

INTRODUCTION

The Darling System, or System 6, consists of Perth, its hinterland, and the surrounding agricultural land and State Forest. It contains more than three-quarters of the State's population and extends from the Moore River in the north to the Blackwood River in the south, and inland from the coast for about 80 kilometres.

It has been the subject of a comprehensive study on which a report has now been published: *The Darling System Western Australia: Proposals for Parks and Reserves. The System 6 Study Report.*

This booklet is a guide to the System 6 Report. It outlines briefly the main issues raised in it and the recommendations relating to them.

Conservation through reserves

The Report marks the end of a series of studies initiated by the Environmental Protection Authority (EPA) in 1972. The Conservation Through Reserves Committee was established to consider the provision of a set of reserves to represent the major communities of natural wildlife and flora types in Western Australia.

To facilitate this work the State was divided into twelve systems. Reports on the other eleven have been completed. Many of the recommendations made in these reports have now been implemented.

System 6 presented special problems. The State's main centres of urban and industrial growth are centred in it, and economic growth and development will certainly intensify pressures on the land resources for water, timber, minerals, limestone, rock, clay, and urban and industrial sites.

The Darling System provides a unique opportunity to establish a scientifically valuable and essential system of conservation reserves, as well as natural areas for outdoor recreation. This opportunity could be lost under pressure of development unless proper provision is made now.

Government policies are now moving towards multiple use of the land, with no single use having priority over all others. The System 6 Study has aimed at recognition of conservation and recreation in a multiple use framework.

Study procedure

For this study the EPA set up six specialist committees, representing commercial and productive users, local government, urban and recreational planners, and the tourist industry, to support the System 6 Committee.

The committees assessed 365 submissions from the public, provided an inventory of the natural ecosystems and current land uses, and made proposals for reservation for conservation and recreation, and for planning and management.

The Study Report

The Report outlines the background to the Study, its organisation and committee structure, and its terms of reference.

The Darling System is described in terms of its landscapes, natural ecosystems and human impact on the environment. Existing procedures for setting aside land for open space are discussed and recommendations made for new strategies for planning and management. The main competing land uses in the Darling System are considered in so far as they affect provision for conservation and recreation. Some recommendations are made for the resolution of potential conflict.

The open space resources of the Darling System are described in general terms.

Finally, 101 country localities and 108 metropolitan localities are described in detail. There is a map for each locality and descriptions of its landform, flora and fauna and other matters affecting the land. Detailed recommendations are included.

The Report contains a great deal of information about the Darling System which has not previously been available in accessible form. In addition it discusses the opportunities for conservation and recreation in the area, and the pressure from competing land uses which make it so important to establish proper policies and procedures before it is too late.

Public response

The System 6 Report has been released for public discussion, and further submissions are invited. Submissions should be made in writing to the Environmental Protection Authority, BP House, 1 Mount Street, Perth. A submission form and guidelines for making a submission are available from the Department of Conservation and Environment.

After consideration of the submissions the EPA will make its final recommendations to the Government, so completing a plan for a total system of reserves throughout the State.

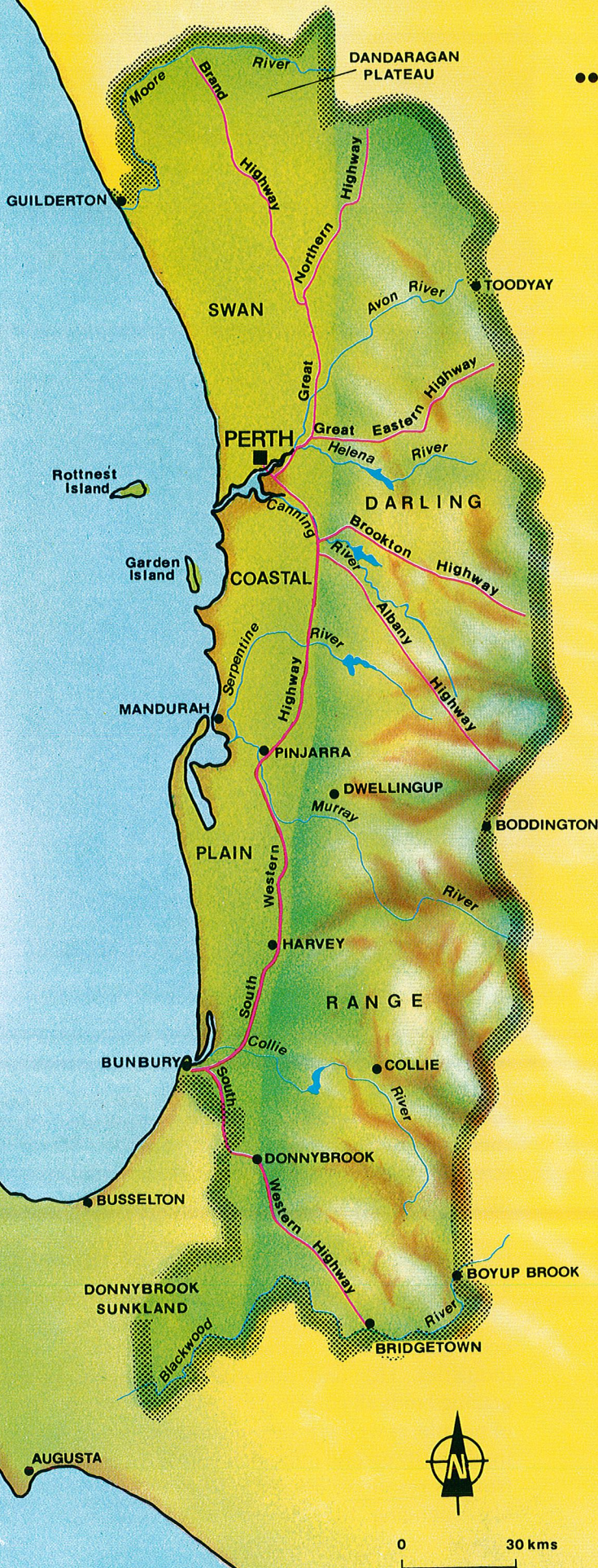
This is your opportunity to influence the decisions which will determine the kind of environment in which your children and grandchildren will live.

Copies of the Report have been distributed to public libraries, local authorities, tertiary institutions and members of Parliament. Copies can be purchased from the State Government Information and Inquiry Centre, Superannuation Building, 32 St George's Terrace, Perth, and from the South West Regional Administrator's Office, Bunbury, at \$10 each.

Further enquiries may be made at the Department of Conservation and Environment, BP House, 1 Mount Street, Perth. Phone: 322 2477. Reference copies of the Report are held in the department's Information Centre, ground floor.

SYSTEM 6

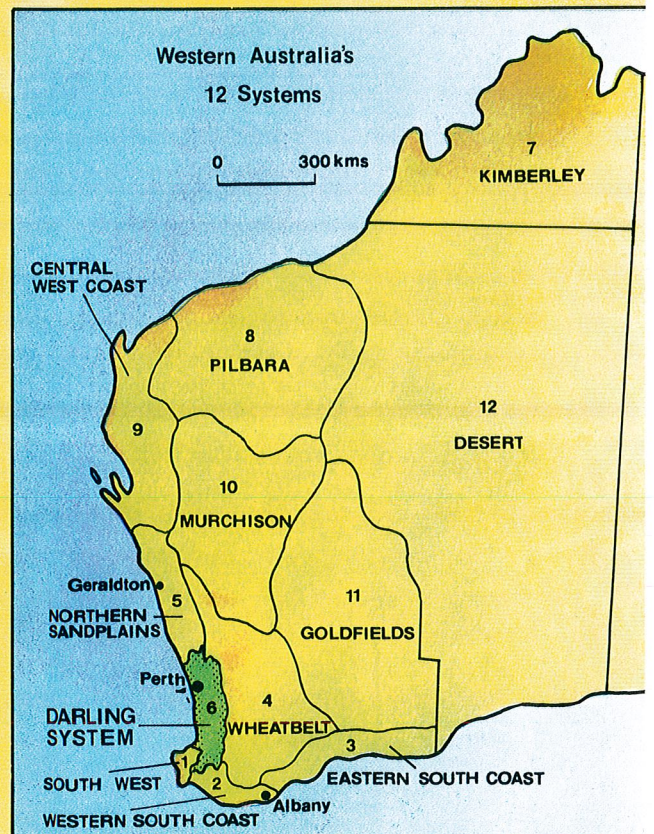
...The Darling System



... A PLAN for the future

"Only by working with nature can man survive; conservation is in the main stream of human progress"

... Sir Peter Scott on the World Conservation Strategy 1980.



WHY PROVIDE FOR CONSERVATION AND RECREATION?

Balance

The balance between man and his environment achieved by the Aboriginal people in Australia was disturbed by the arrival of large numbers of Europeans. Their impact on a fragile environment has been considerable. While change is inevitable, what is needed now is a new and stable balance between man and his environment, in which irreversible adverse effects of development are minimised and natural areas preserved as far as possible.

Development involves modification of the environment and the utilisation of its resources to satisfy human needs and to improve the quality of life. Current concern is not about development, but about non-sustainable development which takes insufficient account of social and ecological factors, and concentrates on short term economic returns with insufficient concern for the long term consequences.

How to strike a balance between development and the conservation of resources so that short term economic needs are met without destroying the potential for continuing utilisation is an issue which affects everyone.

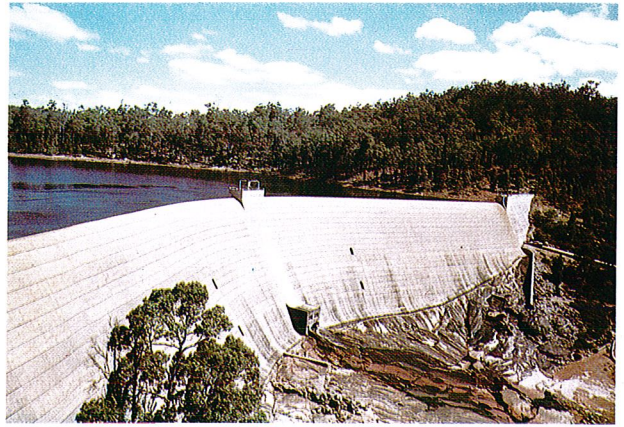
Conservation

Conservation is defined in *World Conservation Strategy* as the management of human use of the biosphere (the thin covering of the earth that contains and sustains life) 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. Needs and aspirations are not necessarily for material things; non-material and intangible things can also be important.

Conservation is a positive management process which should operate in a mutually dependent relationship with development. The idea that conservation and development are incompatible ignores the fact that sustainable development depends on wise conservation of resources.

Conservation of renewable resources has three specific objectives:

- to maintain essential ecological processes and life-support systems on which human survival and development depend. For example, the protection of soil from excessive erosion and quality loss; and recognition of the role of forests in maintenance of soil and water quality.



Recent bans on clearing in Wellington Catchment area aim to maintain water quality through preservation of forests.



The quokka has been widely used in biological and medical research.

- to preserve the genetic diversity essential if plant and animal species are to survive. Agriculture, forestry and fisheries depend on maintenance of species and improvement of strains. Much scientific and industrial innovation (in medicine, for example) depends on our understanding of the properties and behaviour of plants and animals. For many people the preservation of species is also a matter of moral principle.
- to ensure the sustainable utilisation of species and ecosystems which support people as well as industries. Fish and other wildlife, forests and grazing lands all contribute directly to the support of people, as well as providing the raw materials for industry. By careful utilisation a society can benefit from its resources almost indefinitely. It is rather like spending the interest while keeping the capital.

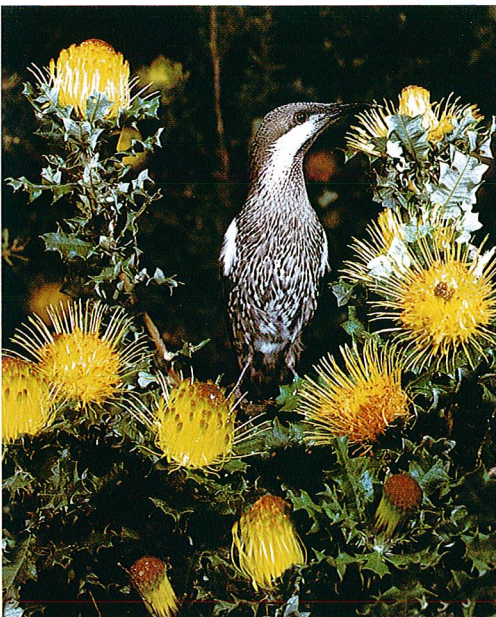
Western Australia

Among ecosystems of exceptional diversity needing protection World Conservation Strategy lists the Mediterranean-type ecosystem of Western Australia.

It is an environment characterised by weathered infertile soils and regular summer drought, in which native plants and animals have developed remarkable adaptations. The ways in which the balance has been achieved are only just beginning to be understood; it can be upset through ignorance as well as by intention.



The jarrah forest is uniquely adapted to drought conditions. The jarrah's ability to tap deep underground water sources has an important effect on water table levels and therefore on soil salinity.



The familiar little wattle bird feeding on dryandra.

Already some of the plant and animal species in System 6 are endangered. Two small reserves at Upper Swan, for instance, provide a sanctuary for the few remaining western swamp (short-necked) tortoises in the world.



Boggy feeding grounds and leaf litter for summer aestivation are essential elements in the short-necked tortoise's habitat.

Other rare fauna species include the mardo, a marsupial rat; the quokka, common on Rottnest Island but still surviving in mainland forest thickets; the numbat, the State's official animal emblem; the pigmy and ringtailed possums; the freckled duck and many insects, fish, reptiles and frogs.

There are rare plant communities of scientific importance, such as that around the freshwater spring at the source of Gingin Brook which supports plants normally found at places far distant. At Anglesea Island in the Leschenault Inlet at Bunbury is the only stand of white mangroves south of Shark Bay, thought to be a relic of an earlier time when the climate here was tropical.

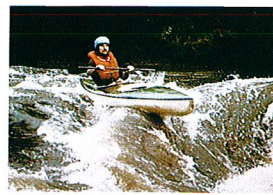


The very rare orange hibbertia, known only from a few localities.

Recreation

The growing demand for recreation will result in increased pressure on natural areas. Natural areas are important for recreation, providing opportunities for physically strenuous activities which often require special skills, such as rock climbing, caving, canoeing, diving, bushwalking and orienteering. Less energetic activities include picnicking, camping, sightseeing, touring by car and nature study. The natural setting can provide relief from society's urban life style.

People in Western Australia are engaging in a wider variety of outdoor recreation activities, with camping and travelling showing significant growth.



Forest management may include provision for recreation. The Forests Department has facilities such as picnic areas and nature trails.

Overall, recreation demand is increasing at a much greater rate than population. It is estimated that a doubling of population in System 6 by the year 2000 will **treble** recreation needs.

Catering for entertainment and recreation is already a major industry and was the seventh largest employer in 1979-80 in Western Australia. The direct benefits of setting aside national and regional parks and other recreation areas will contribute much to the health and well-being of an increasing population.



THE AIM OF THE STUDY

The aim of the System 6 Study was to identify areas of land within and near System 6 for national parks, nature reserves and major associated recreation areas, and to make proposals for their protection. The approach is very much in accord with the World Conservation Strategy, accepted in principle by the Western Australian and Commonwealth Governments.

Where the land identified by the Study is, for the most part, already owned by the State, reservation under the Land Act, or, if part of State Forest, dedication under the Forests Act, can secure the required areas, and ensure their management primarily for conservation and recreation.

In addition the System 6 Study has developed proposals to improve the existing machinery for planning and management of open space.

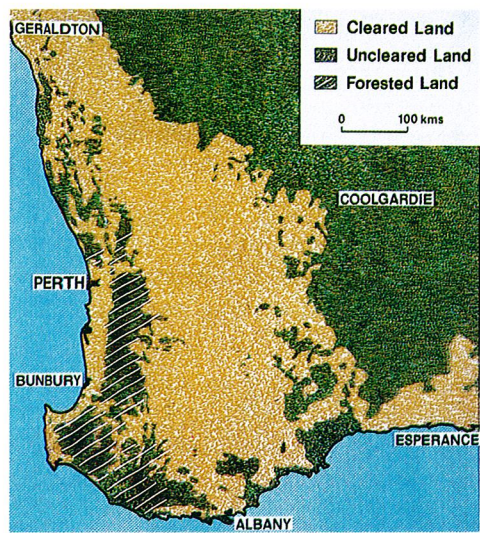
The Study was not intended to be a total land use study. The use of the land for other purposes was not considered in detail, but only in terms of the effects of the Study's proposals on these uses.

IDENTIFYING AREAS FOR CONSERVATION AND RECREATION

The extent of existing areas for conservation and recreation in System 6, and the additions proposed in the specific recommendations, are shown in Table 1 below.

If all the recommendations for the specific localities are accepted and implemented, 14.6% of the area of System 6 will be dedicated in some way to major parks and reserves. This should not be seen as excessive. It would compensate in part for the extremely low proportion of reserved land in inland agricultural areas, especially as much of the area proposed for reserves is in the eastern low rainfall section of the State Forest. In addition, the various vegetation types within the System 6 area are at present unevenly represented in reserves, especially in the western high rainfall region of the jarrah forest and on the Swan Coastal Plain.

Much of the land within the existing and proposed reserves cannot be alienated and cleared, as it falls within key catchments for the metropolitan and country water supply systems. As extensive clearing would have disastrous effects on the quality of the water supplies, these reserves fulfil at least a double purpose.



Because of extensive clearing for agriculture the original forests are now largely confined to catchment areas and State Forest.

	km ²	% Area of System 6
State Forest MPAs for conservation and recreation	2063	7.9
Proposed additions to be managed as if MPAs	323	1.2
	<hr/> 2386	<hr/> 9.1
Existing Land Act Reserves for National Parks or Nature Reserves	536	2.1
Additions to or new National Parks, Nature Reserves and Parklands	624	2.4
	<hr/> 1160	<hr/> 4.5
Freehold areas with conservation or amenity value identified as potential additions to Land Act reservation		
Government owned	54	.2
Privately owned	207	.8
	<hr/> 261	<hr/> 1.0
Total	<hr/> 3807	<hr/> 14.6



Samson MPA was set aside to preserve the high quality bullock.

Management Priority Areas for Conservation and Recreation in State Forest

A considerable number of Management Priority Areas (MPAs) for conservation of flora and fauna have been set aside by the Forests Department in State Forest in the Darling System. They were selected to give as full a representation as possible of the many different types of vegetation which characterise the region. They are described according to their dominant use, and managed so as to give priority to that use. (See *Forest Focus* No. 22 for a full discussion of these MPAs.)

The Report is concerned only with those MPAs managed primarily for conservation of flora and fauna, and for recreation. Conservation MPAs within State Forest afford one of the most valuable opportunities for reservation within System 6.



Turtle Pool near the Canning River is in Eagle Hill MPA, where virgin jarrah forest and black gin are special features.

National Parks and nature reserves

Vested in the National Parks Authority, National Parks are managed for use by the public. They are usually selected for their interesting or diverse natural features. Ideally they should be large enough to maintain natural plant and animal communities. The Study recommends extension of a number of National Parks mainly by the inclusion of adjacent vacant Crown land and Reserves (see Table 2).

Nature reserves, usually vested in the Western Australian Wildlife Authority, are declared under the Land Act for the conservation of flora and fauna. By protecting habitats they provide sanctuaries for rare and endangered species.

Other reserves protect areas of special scientific interest such as unique geological formations, for example, the fossil deposits at Minim Cove, Mosman Park. Public access is either limited or prohibited.



The honey possum lives in teatree thickets in Yanchep National Park.



Morrison in Moore River National Park.

Table 2 National Park Proposals

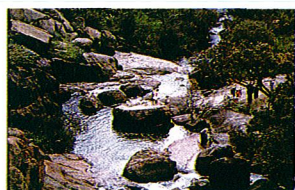
NATIONAL PARK	IMPORTANT FEATURES	STUDY'S PROPOSALS
Moore River	sandplains; wildflowers	extend southwards; recognise mining and water supply potential
Yanchep	most popular National Park in W.A.; contains lakes, caves, tourist attractions and facilities	re-align proposed Mitchell Freeway; add Pipidinny Swamp; use adjacent State Forest to relieve visitor pressure on Park
Neerabup	jarrah and tuart woodland; long narrow shape; old stock route	add land to link Park with coast; treat Park as potential regional park, for increased recreational use
Avon Valley	scenic valley; has plants that are only found in the region	add several large adjacent reserves and an enclave of private land
Walyunga	steep-sided valley; very popular for white water canoeing	add several adjacent reserves and private land, while recognising mining and water supply potential
John Forrest	Darling Scarp, flora, granite outcrops, waterfalls; popular for swimming, picnics	add land to the north, belonging to the Metropolitan Region Planning Authority
Greenmount Hill	extensive views of Helena Valley, Scarp and Perth; small and close to residential areas	to be extended, and become an annexe to Kings Park, for growing native plants which prefer heavier soils
Kalamunda/ Gooseberry Hill	secluded slopes of Helena Valley; granite outcrops	treat as part of potential regional park in Helena Valley
Lesmurdie Falls	attractive waterfall on Darling Scarp	treat as part of potential regional park along Darling Scarp from Kalamunda to Armadale
Serpentine	steep slopes, waterfall, and several rare eucalypts	add adjacent reserves and private land, to make boundaries to the Park more rational
Yalgorup	contains Lake Clifton and Preston and portions of coastline	small pieces of land to be added to make boundaries more rational



The popular Serpentine Falls and swimming hole, Serpentine National Park.



A rangers' trail along the boundary of a National Park. Management problems are increased where National Parks are bordered by agricultural land.



Left. Martin Tank with the southern end of Lake Clifton in the background, in Yalgorup National Park.

Right. Rock pool in John Forrest National Park.

Setting aside new areas for conservation is only the first step towards protecting their flora and fauna. The next important step is their proper management and maintenance. If the Study's proposals for new reserves are adopted, there will need to be major increases in staff for managing and planning the reserves. Over the past ten years there has been rapid growth in the number and area of National Parks and nature reserves in Western Australia, but there have been very small increases in staff and resources. Many rangers are located in the popular National Parks closest to Perth, while very large parks in outback areas have no permanent rangers.

Freehold areas

The freehold land identified as having conservation or amenity value is owned by the Government or by private landholders. Since the cost of purchasing such land on the open market would be prohibitive, the Study recommends joint management procedures. Owners would receive specialist advice on management, making possible continued use of their land, while retaining its conservation or amenity value and allowing some form of public access.

In addition to the above, but not shown in Table 1, there is a considerable area of land 'reserved' or zoned by the Metropolitan Region Planning Authority (MRPA) for parks and recreation 'reserves' under the Metropolitan Region Scheme. The MRPA has considered this to be the most suitable use for this land.

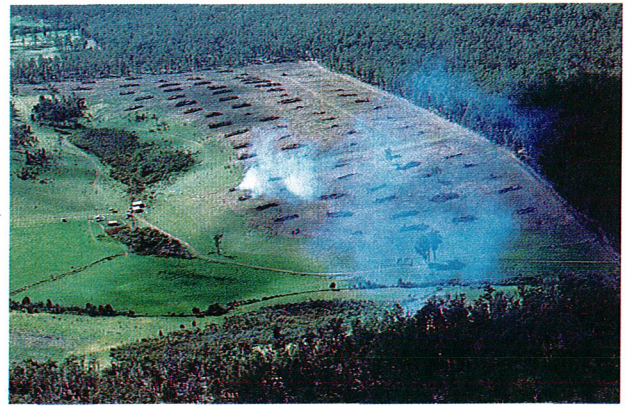
Regional parks

The concept of a regional park is new to Western Australia. The term has been used elsewhere to describe areas which are largely, though not entirely, in a natural state, sometimes including privately owned land. Management of the privately owned land is essentially by consultation and agreement with owners, and by adoption of public planning procedures. The users of regional parks are drawn from a wide area, so that the parks are a recreational facility for the general rather than the local community. They allow for a greater variety and intensity of recreational activities than do National Parks.



Regional parks would cater for greater numbers of people than National Parks.

The Study has indicated nine areas within the Metropolitan Region which it believes should be considered as potential regional parks. In Western Australia, regional parks may include existing National Parks, nature reserves, other Crown land, MRPA-owned land, or land identified by the MRPA as future open space, some of which may be privately owned. The Study considers that each potential regional park should be planned and managed as a complete unit, providing for recreation and for conservation of both the natural environment and attractive man-modified landscapes.



Agricultural land in jarrah forest, newly cleared and ready for burning.

CONSERVATION AND OTHER LAND USES

Conflicts and compatibilities

Reservation of land for any purpose implies that other uses may be partially or completely foregone.

The main objections to recommendations for conservation and recreation reserves in specific localities were from interests and authorities concerned with water supplies and with potential for mining or extractive industries. Almost all State Forest in System 6 is covered by bauxite mining leases.

Not all competing land uses are incompatible with conservation and recreation. For example, conservation of the natural environment is generally highly compatible with surface water resource conservation, and water catchments may be used for recreation. Forest management policies broadly recognise the need to provide for recreation and conservation as well as protection of water catchments and timber production. Agricultural clearing has destroyed natural bushland and threatened water catchments, but results in some pleasantly varied landscapes.

Other land uses, such as provision for urban and industrial expansion, are frequently in direct conflict with proposals for reservation of land for conservation purposes.



Bauxite mining in the catchment area near South Dandalup Dam.



Quarrying for limestone on future urban land near Joondalup.

Strategies for Crown land

Because the value to be attached to such competing uses, now or in the future, is often not known, the Study developed strategies intended to provide protection while postponing decisions on the final use of the area in question until adequate information is available. It proposes that in the meantime Reserves could be vested jointly in the appropriate Ministers for the three purposes of conservation or recreation, water supply and mining. Management policies to protect conservation and other values would then be decided by agreement of the Ministers concerned. Any disagreement would be considered by the EPA. Decisions on the final purpose of a Reserve would be made by Cabinet.



Lake Coogee, fringed by saltwater paperbark, with market gardens and cement works in the background.



Subdivision on coastal sand dunes. A considerable area has been cleared for roads and other services.



The rufous tree creeper is common in open forest where it feeds on tree trunks and logs, searching for insects under the bark. It occurs in MPAs in eastern wandoo forests.

Different procedures would be required for conservation MPAs. The Forests Department has already set aside 78 MPAs in State Forest where conservation or recreation is the first priority of management. Of these, 46 are considered in the System 6 Study. These MPAs have great security of tenure, i.e. they cannot be taken out of State Forest without approval of both Houses of Parliament. But they do not have security against activities such as mining which would destroy the forest, or against forest management practices which could substantially change it from its natural state.

The Study suggests that MPAs should be given greater security as natural areas, and recommends a way of doing this by regulatory powers under the Forests Act. This would make them the equivalent of Class A Reserves.

If these recommendations are accepted, then 9.1% of the land area of System 6 will be dedicated in this way to conservation or recreation MPAs.



Chuditch or native cat, one of the few carnivores amongst Australian marsupials. Once widespread throughout Australia but now almost restricted to the jarrah forest of System 6 where the MPAs may afford some protection.

PLANNING AND MANAGEMENT OF OPEN SPACE

Open space defined

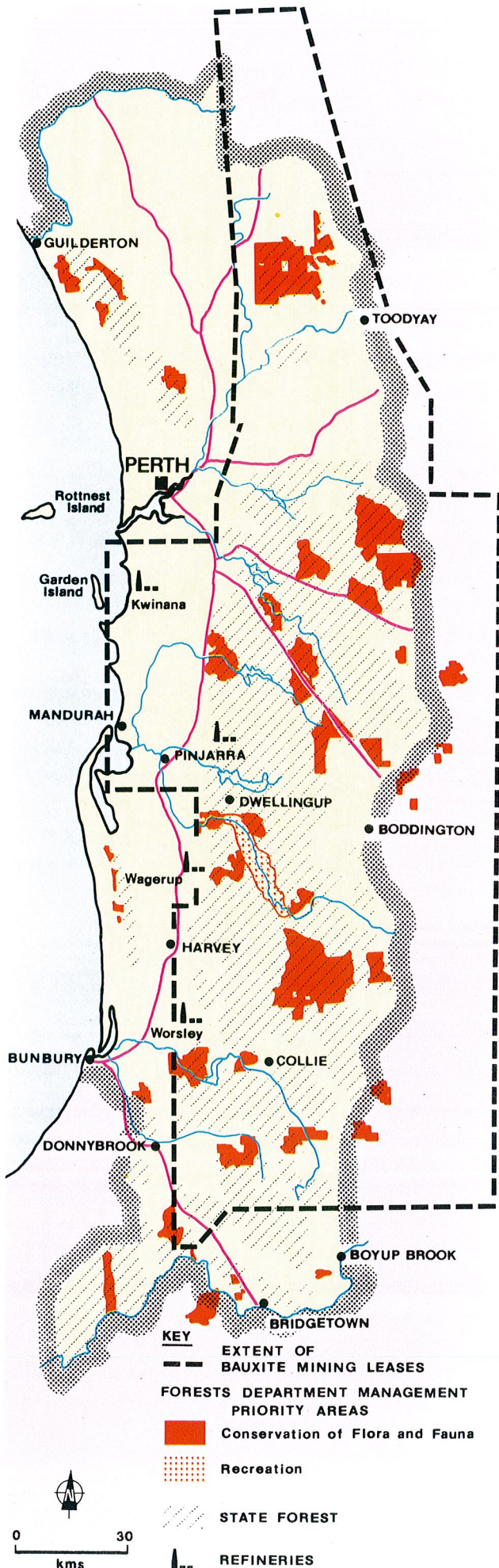
The term 'open space' can be used in a general sense to refer to land which has conservation and recreation value, though it may not be set aside primarily for that purpose. Water supply catchments and State Forest are examples.

It also includes areas reserved under the Land Act for a variety of purposes and vested in appropriate Ministers or Government agencies, as well as areas 'reserved' by the MRPA under the Metropolitan Region Scheme.

Concepts

To facilitate the planning and management of open space the Study suggests the adoption of several different concepts:

Wild and scenic rivers: It is proposed that legislation be enacted to designate rivers as 'wild', 'scenic' or 'recreational'. 'Wild' rivers are inaccessible, primitive and undammed; 'scenic' rivers have some vehicle access, are largely primitive and are undammed; 'recreational' rivers are readily accessible, may have been developed on their banks and have been dammed.



The Murray Valley, the last large undammed valley close to Perth.

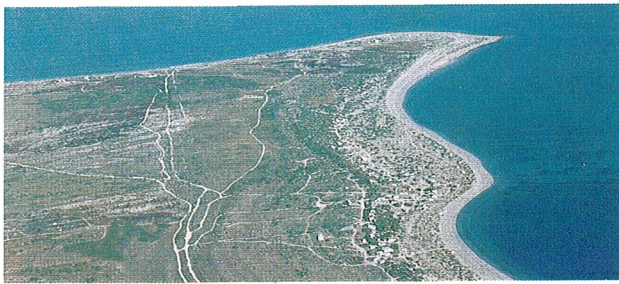


Conservation of attractive landscapes in the northern Darling Range could also protect potential water catchments.



Wetland regional parks could provide opportunities for canoeing.

Regional parks: These perform three functions — they provide for recreation, conservation of the natural environment and conservation of attractive man-modified landscapes. Their purpose is to provide for a variety of outdoor recreation activities in a largely natural setting. Potential areas for regional parks include the Helena Valley, Darling Scarp, Wanneroo and Cockburn wetlands, Lakes Cooloongup and Walyungup, and Port Kennedy at Rockingham.



Plans for Port Kennedy include sporting facilities and holiday accommodation.



Historic features such as this lime kiln near Wanneroo could be incorporated in regional parks.

Landscape conservation areas: Landscapes may be important for their scenic, historic, educational, recreational or environmental value. Much of this land is privately owned but acquisition is not suggested by the Study. It is proposed that planning and management authorities negotiate with private land owners to identify ways in which these areas can be developed and managed while safeguarding their landscape value.

Pathway systems and linear parks: Pathway systems would provide for the needs of walkers, cyclists or horse riders, often within a natural setting or within a linear park, following a linear feature such as disused railway lines or a river.



The Middle Swan provides an ideal opportunity for pathway systems in linear parks.

Conservation buffer zones: Conservation reserves may be jeopardised by incompatible activities on adjacent land. The need for buffer zones to protect certain nature reserves, National Parks and areas reserved for parks and recreation is becoming more urgent. Restrictions may have to be placed on private land owners, and compensation paid. The Ellen Brook and Twin Swamps wildlife sanctuaries are examples of areas in need of a buffer zone.



Agricultural lands can be managed to protect wetlands and their fringing vegetation.

Road corridors: These include not only the roadside, but the whole road reserve and its relationship to the surrounding land. Objectives for the planning and management of road corridors include the conservation of flora and fauna, provision for such activities as sightseeing, walking, cycling and picnicking, provision for a readily accessible educational resource, and helping to maintain the general landscape through which the road passes.



In rural areas the only remaining vegetation may be that along road verges.

Deficiencies

At present, planning legislation provides for land to be set aside as open space at the regional level only within the Metropolitan Region. Under the Metropolitan Region Scheme land may be 'reserved' for various purposes. Some of the land 'reserved' for parks and recreation under the Scheme is controlled by State agencies and local government authorities. Some is owned by the MRPA, and a small proportion is still privately owned. The MRPA has recommended additions to the areas already 'reserved'.

There is at present no machinery for setting aside land for regional open space outside the Metropolitan Region. This is a serious deficiency, not only in System 6 but in the State as a whole. Local authorities have power to make town planning schemes incorporating land set aside as open space, but this covers local provision only.

The main deficiencies in the present system are summarised in the Report. In general they demonstrate a lack of adequate planning provisions and a lack of co-ordination between the existing diverse management bodies.

A secretariat

As a solution to these deficiencies the Study recommends the establishment of a small secretariat to co-ordinate planning and management of open space for the whole State, to be attached to an appropriate ministerial portfolio.

The secretariat would develop policies on procurement and classification of open space and would play a key role in providing technical advice to management bodies. Some of the urgent tasks to be undertaken by the secretariat would be:

- to recommend improvements to existing legislation and the roles of management bodies.
- to advise on future funding of open space management.
- to investigate legislative means of achieving planning and conservation aims without public acquisition of land.
- to develop a State-wide Recreation Areas Strategy Plan, together with the Department for Youth, Sport and Recreation. The plan would be based on an assessment of current and future recreation demand, taking into account the needs of various sections of the community, and trends such as population growth, income levels, education and modes of transportation, likely to affect recreation patterns.

The secretariat would also be asked to investigate ways and means of establishing regional parks, landscape conservation areas, pathway networks and conservation buffer zones, and to classify wild and scenic rivers and road corridors.

OPEN SPACE RESOURCES IN SYSTEM 6

This section of the Report looks at some of the key regions in System 6, describing their value for conservation and recreation. Strategies for securing their conservation and recreation value are outlined and examples of specific localities are given.

There are still great opportunities for setting land aside for conservation and recreation, especially when compared with the wheatbelt inland from System 6.

FORESTS AND VALLEYS OF THE DARLING RANGE

The greatest opportunity for setting aside parks and reserves in System 6 lies within the forests of the Darling Range, which cover over one-third of System 6 and provide a continuous belt of natural vegetation from Mundaring to Collie.

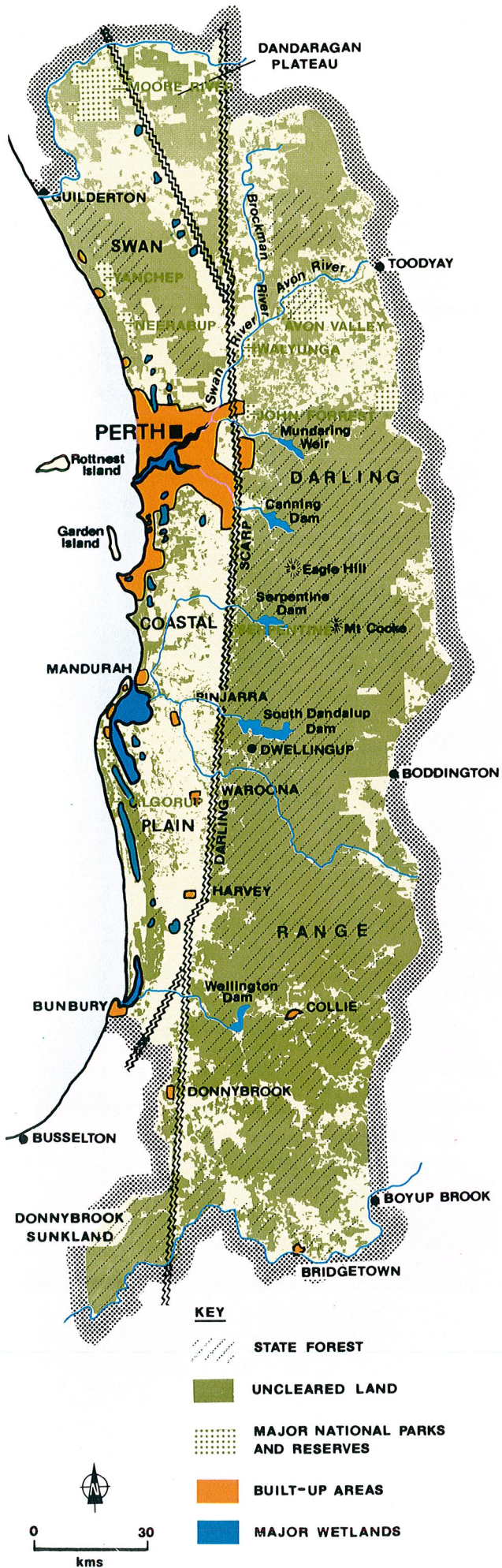


Forest landscape with monadnocks and granite slopes.

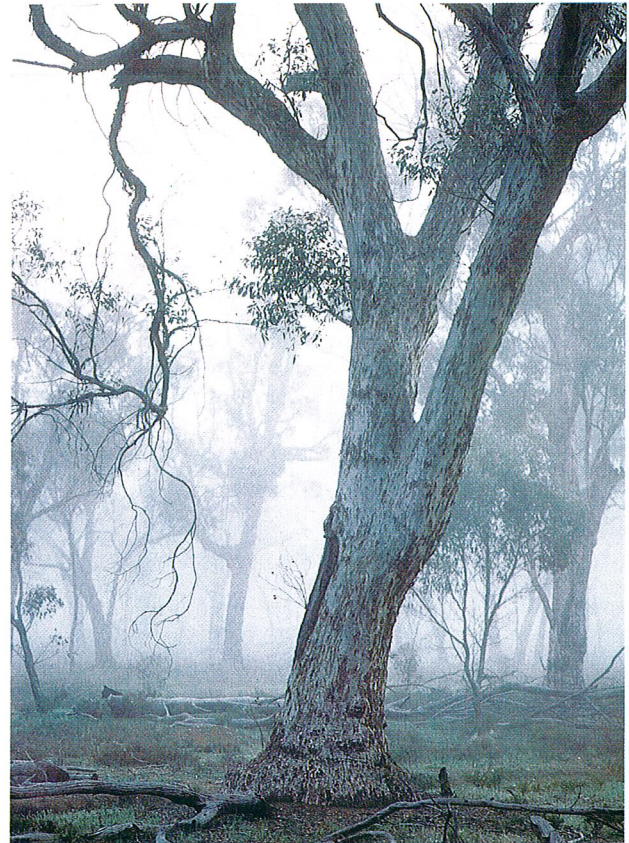
The forests, almost on Perth's doorstep, survived initially because early settlers found that the lateritic soils were too infertile and the forests too difficult to clear. These forests are now vital as they protect water catchments for metropolitan and country supplies.



Typical jarrah forest, with coral creeper, prickly Moses and zamia palms.



The MPAs which the Forests Department manages primarily for conservation represent the range of forest ecosystems in System 6. They include the granite domes, called monadnocks, such as Eagle Hill, Mt Dale and Mt Cook, which can be seen from the Brookton and Albany Highways. The largest conservation area, involving four adjacent MPAs, is to the north-east of Collie (see C82 to C85*).



Wandoo woodland, where hollow logs provide termites for numbats to feed on.

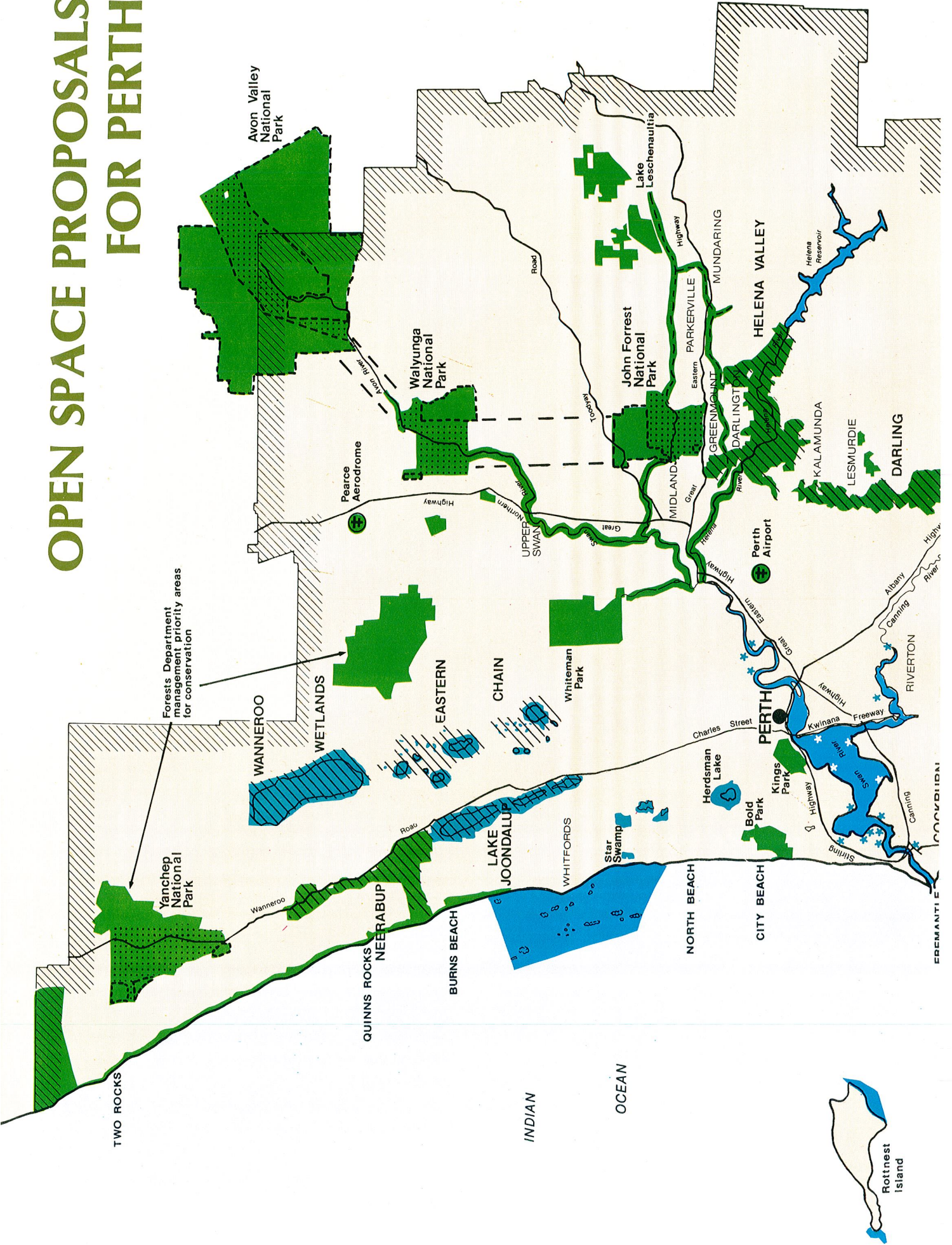
Some of the most popular recreation areas in the Darling Range are the large scenic river valleys which are not dammed, for example, the Avon River, the Murray River, and the Collie River below Wellington Dam. These valleys are popular for pleasure driving, picnicking, camping, hiking, swimming, marroning and white water canoeing, which is not possible anywhere else close to Perth.

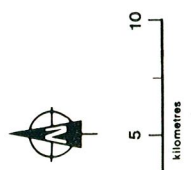
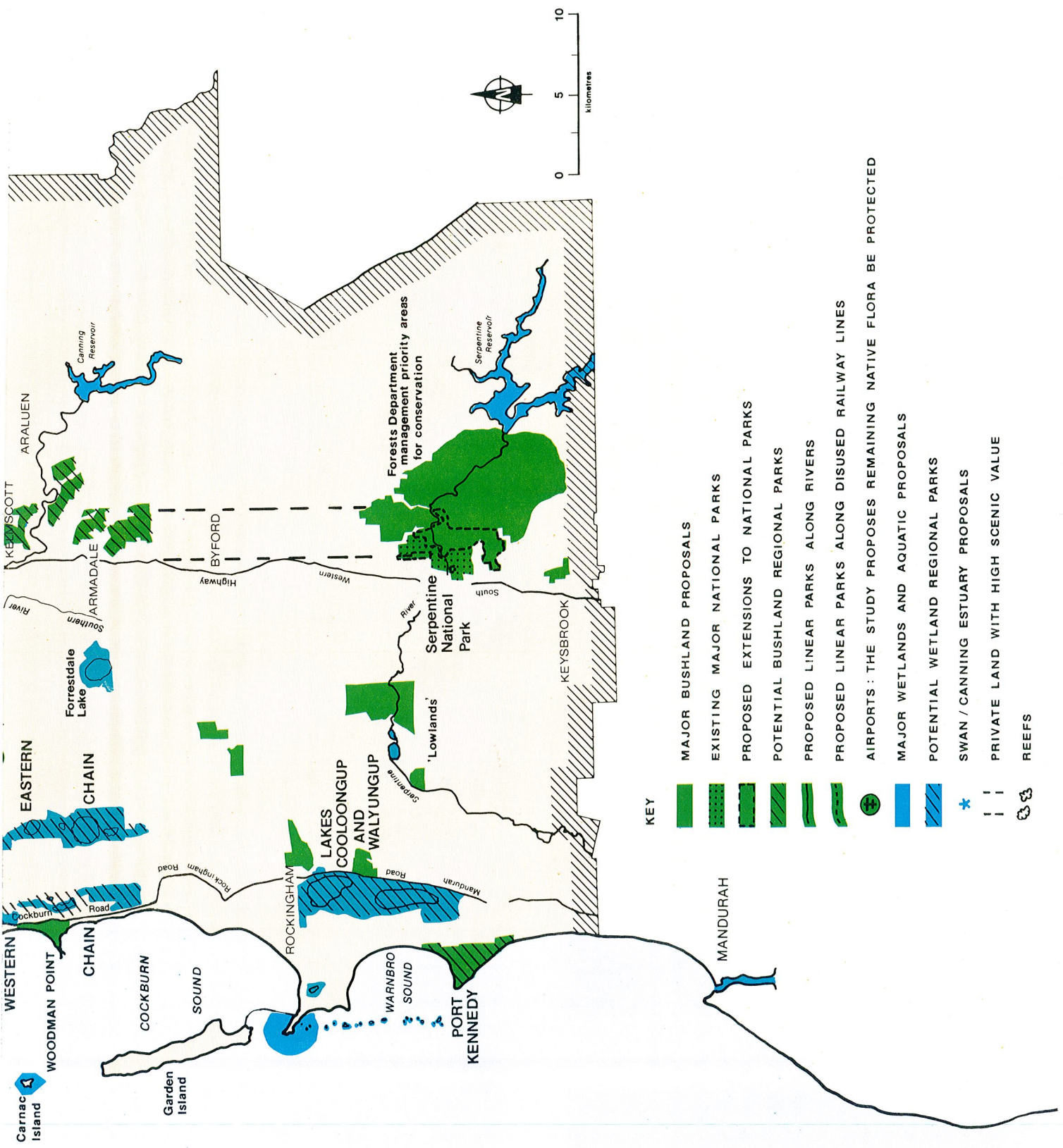
Land in the northern Darling Range is mostly in private ownership although there are a few parks and reserves, such as Avon Valley National Park and Lake Leschenaultia. Here there is an opportunity to protect attractive partly cleared landscapes and the Report recommends planning processes to achieve this, since acquisition of land for further reservation would be too costly.

The area contains important potential water supply catchments which need protection against salinisation.

*Reference numbers for specific localities (see maps on pages 24, 26).

OPEN SPACE PROPOSALS FOR PERTH





- KEY**
- MAJOR BUSHLAND PROPOSALS
 - EXISTING MAJOR NATIONAL PARKS
 - PROPOSED EXTENSIONS TO NATIONAL PARKS
 - POTENTIAL BUSHLAND REGIONAL PARKS
 - PROPOSED LINEAR PARKS ALONG RIVERS
 - PROPOSED LINEAR PARKS ALONG DISUSED RAILWAY LINES
 - + AIRPORTS: THE STUDY PROPOSES REMAINING NATIVE FLORA BE PROTECTED
 - MAJOR WETLANDS AND AQUATIC PROPOSALS
 - POTENTIAL WETLAND REGIONAL PARKS
 - * SWAN / CANNING ESTUARY PROPOSALS
 - PRIVATE LAND WITH HIGH SCENIC VALUE
 - ~ REEFS

AVON VALLEY AND DARLING SCARP

An outstanding area with potential for open space is the long strip of land extending for 100 km from the Avon Valley and Walyunga National Parks in the north, along the Darling Scarp to the Serpentine National Park in the south. The Darling Scarp is the sharply sloping, deeply indented edge of the ancient inland plateau. It forms an attractive visual backdrop to the city of Perth, rising steeply to a height of 300 m in eastern suburbs and offering broad views across the city.

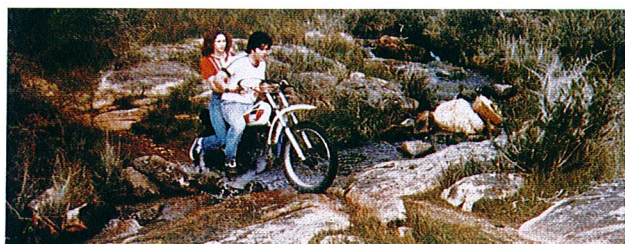
Its rocky outcrops and gullies are important for conservation and recreation, especially in the spring wildflower season, when streams are flowing and small rapids and waterfalls appear. Several rare white-trunked eucalypts grow only on the Scarp and its foothills.



The Darling Scarp rises abruptly from the flat coastal plain. Centuries of weathering have eroded the Scarp back from the original fault line which lies a few kilometres to the west.



The popularity of wildflowers in spring months has never diminished. This photo was taken between 1900 and 1910.



Trail bike riding is particularly damaging where the trails cross herblands and boggy patches on granite outcrops.



The rare salmon white gum on the Darling Scarp at Gosnells.

Largely because of planning by the MRPA much of the Scarp is uncleared in the Metropolitan Region. Although considerable areas to the north and south have been developed for farming, the opportunity still remains to retain their attractive character through planning strategies.

Many of the Report's recommendations refer to this part of System 6, including extensions to the Avon Valley, John Forrest and Serpentine National Parks, and identification of potential regional parks in the Helena Valley and along the Scarp between Gooseberry Hill and Bedforddale. There is also a proposal for an annexe to Kings Park at Greenmount Hill, and for linear parks with pathways for walking and horse riding along old railway reserves through Parkerville and Mundaring, and along rivers flowing from the Scarp, including the Swan River, Jane Brook, Helena and Canning Rivers. The Study sees the need for co-ordinated planning and management of all these areas.



Spring waterfall and wandoos in the Gosnells area.

SWAN COASTAL PLAIN

On the coastal plain to the south of Perth most of the original bushland has been cleared for agriculture, and only isolated remnants of the natural vegetation remain. However, there are several valuable conservation areas, including some tuart forest along the Old Coast Road. The landscape is often an attractive mixture of bush and parkland farms, with pasture among scattered trees.



A large part of the southern Swan Coastal Plain is seasonally flooded, providing important water-fowl breeding and feeding areas.

North of Perth there are several large uncleared areas, held as State Forest, National Parks or nature reserves. The largest National Park in System 6 is the Moore River National Park. This park, and others in the area, are especially important for their wildflowers, such as the bright yellow morrison and unique banksias.



Yellow morrison in banksia woodlands north of Perth.



Banksia sphaerocarpa, found in the northern parts of the Swan Coastal Plain.

PERTH'S INNER SUBURBS

Perth's original natural landscape has been transformed into a settled urban scene. Yet there are still natural areas which give some idea of what it was once like and create an individuality for the city that is appreciated by both residents and visitors.

The remaining pockets of natural vegetation in the city and suburbs are important even though many may be disturbed. Elevated areas offering extensive views such as Wireless Hill, Reabold Hill and Kings Park are readily available to people. In addition they provide refuges for the city's remaining native birds and animals.

The Swan and Canning Rivers and the many lakes and wetlands are key areas for conservation. Without them there would be no flocks of black swans or the hundred or so species of smaller birds in the Perth area.

The Study has recommended areas for conservation along the river foreshores, and a series of riverine linear parks further upstream, to allow public enjoyment of river bank areas.

The city's small but important natural areas face constant pressure from urban development, quarrying, mining and water extraction, which could either destroy them completely or change their character and conservation value. A number of these areas, where there is a conflict between conservation and development, were considered in the Study:

Star Swamp (M35): Local residents have been campaigning to prevent the encroachment of urban development. The Study suggests that bushland around the swamp should remain, as a buffer between the swamp and proposed development.

Herdsmen Lake (M43): The Study endorses the MRPA's concept plan which would allow peat to be mined. Areas of open water would be widened and deepened, and island habitats for birds created. It considers that the water level can be controlled to make the lake a permanent summer refuge for water-birds.

Swan River at Maylands (M51): The Swan River Drive proposed by the MRPA would pass through saltmarsh on the north bank of the river below Garratt Road Bridge. The marsh supports a wide variety of water-birds.

The Report recommends an MRPA management programme that would allow only passive recreation and encourage growth and regeneration of native plants to maintain the habitats.

Bold Park (M47): One of the least disturbed areas of bushland remaining in Perth's inner suburbs, Bold Park retains several distinct vegetation communities which support almost 100 species of birds, including the rare splendid wren (which has now disappeared from Kings Park) and the black-capped sitella. Reabold Hill, one of the high points of the Swan Coastal Plain, is popular for its views, and paths through the rest of the park are used by bushwalkers and joggers.

The Report supports Perth City Council plans to enlarge the park to about 5 km². It expresses concern about plans to extend a controlled access highway between Bold Park and adjacent Perry Lakes, and recommends regeneration of native flora, and improvement of fire control.



Limestone marlock (left) and the rare Fremantle mallee in Bold Park.

Wading Bird Habitats on the Swan River Estuary (M60 to M62): River foreshores at Alfred Cove, Pelican Point and South Perth are the only remaining river habitats for migratory wading birds. Twenty-two species have been recorded but only a few are plentiful. The red-necked stint, which is sometimes seen in thousands, has its breeding grounds in Siberia and Alaska.

The Report recommends that these three important areas should be declared Aquatic Reserves, vested in the Wildlife Authority.



Red-necked stints and curlew sandpipers.



Migratory birds.



Tidal flats at Alfred Cove are important feeding grounds for wading birds.

ESTUARIES



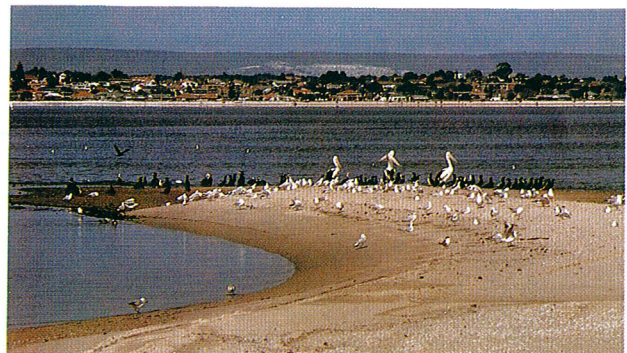
Stilts feed in shallow waters.

The Swan River Estuary, the Peel-Harvey Estuary south of Mandurah, and Leschenault Inlet at Bunbury are some of the most used recreation resources in System 6. Their shallow mudflats and reedy foreshores are important nursery areas, feeding grounds and refuges for crabs, prawns, fish and water-birds. All are popular for swimming, boating, sailing, fishing, crabbing and prawning.



Tidal flats, river channels and lagoons at Riverton are a vital part of the Canning estuarine system.

The Report recommends that remaining mudflats, saltmarsh and portions of foreshore with natural vegetation of the **Swan Estuary** be protected. The foreshores of the Swan and Canning Rivers have long been subject to landfill and road construction, making the preservation of the remaining natural areas even more important.



Pelicans, cormorants, terns and gulls at Pelican Point, Crawley.



The Harvey River forms a bird's foot delta where it enters the estuary.

The **Peel-Harvey Estuary** is the largest and most productive in System 6. Professional fishermen catch about 500 tonnes of fish a year, with amateurs taking an even heavier catch of fish, crabs and prawns. On a public holiday about 5000 boats are launched on the estuary. There is increasing pressure for urban and resort development.

The estuary suffers from excessive algal growth brought about by nutrients such as phosphorus and nitrogen washed into the estuary by the rivers. Rotting algae has to be cleared mechanically from beaches around the Peel Inlet.

The Study recommends that the reported findings of an EPA investigation into the causes of the weed growth and the workings of the estuarine system, should be a basis for future planning and management.



A white egret feeding in the Leschenault Inlet.

Coastal wattle on the narrow dunes between the sea and Leschenault Inlet.

The **Leschenault Inlet (C66)** is a habitat for more than 50 species of water-birds, some with populations of more than 1000. It is also an important nursery for commercial fish species.

The Report recommends that urban development should be restricted because of the adverse effects upon conservation and recreation, and that proposed dredging of the estuary channel should be prevented because of disturbance to the ecosystem and damage to fish nurseries and bird sanctuaries. It suggests that the inlet's management authority consider rehabilitating the dunes, maintaining water-bird and fish habitats, monitoring the effects of effluent disposal and allowing only passive recreation, rowing boats and slow-moving power boats.

WETLANDS

Only one-third of the original wetlands in System 6 remain. The rest have been drained or filled in the process of agricultural, urban or industrial development.

The importance of those that remain should be recognised. They support more than 100 species of water-birds as well as fish and tortoises. Their fringing reeds and scrub thickets provide refuges for other wildlife.

Wetlands, such as Lake Joondalup (M7) at Wanneroo, add interest to the landscape and provide a focal point within urban areas. Some are large and deep enough for water skiing, while others, such as Bibra Lake (M93), Perry Lakes and Lake Monger are popular as picnic areas. Even the densest swamp is a recreation spot for children, and wetlands are valuable for lessons in biology and ecology.



Lake Joondalup, showing the effect of prolonged drought conditions.



A regional park is proposed for the Cockburn wetlands, shown stretching south from North Lake.

The Study has recommended that the following wetlands be considered as potential regional parks: Lakes Joondalup and Goollelal (M7); Wanneroo wetlands (M8); Cockburn wetlands (M92, M93); and Lakes Cooalongup and Walyungup at Rockingham (M103). Each regional park would be planned and managed as a complete unit, with areas for conservation or recreation delineated.



An egret and gulls on mud flats in the Canning Estuary.



Sedge meadows, samphire flats and river sheoaks on seasonal wetland at Bennett Brook.

Although mining of wetlands may conflict with recreation and wildlife conservation, it is not always adverse in the long term. Deepening of selected wetlands might improve their value for water sports and as a drought refuge for birds, and could also compensate for any lowering of the water table through public use of groundwater. Recharging of wetlands should be regarded as a legitimate use of bore water.

The Report recommends that wetland conservation areas should include the water, fringing vegetation and a buffer zone. They should be fenced if necessary. Stock should be watered outside the reserve, or by strictly controlled access.



Succession of vegetation types, at the entrance to Bull Creek.



Seasonal swamp with lemna, a floating plant which blossoms in spring.

ISLANDS, REEFS AND COASTLINE

The islands and coastal beaches are major recreational assets for people in System 6 as well as tourists. Because of their fragile nature, careful management and siting of facilities is necessary.

Despite its ever increasing popularity, **Rottnest Island (C45)** has a great variety and abundance of birds because of the multiplicity of habitats, and a rich and diverse marine flora and fauna. On the inter-tidal reef-flats are tropical species not found so far south elsewhere. Australian sea-lions are found on Seal Island.

The Report recommends the inclusion of representatives of the Department of Tourism, and of scientific disciplines concerned with the study and protection of the island's flora, fauna and natural features, on the Rottnest Island Board. It also recommends that the Board should consider concentrating future tourist accommodation and facilities so they do not impinge on undeveloped areas.



Proposed aquatic reserve, west end of Rottnest Island.

Garden Island (M96) is owned by the Commonwealth and public access is limited because of the naval facility there. The Report recommends increased public access to historic Cliff Head, but warns that too many visitors could threaten the island's flora and fauna. Management plans should protect the vegetation and the threatened marsupial, the tamar. Feral cats, which use the causeway to cross from the mainland, should be eliminated. The historic site at Cliff Head should be developed.



Much of Garden Island is still covered with dense vegetation, as Rottnest Island once was.



Unusually undisturbed low closed forest of Rottneest cypress, at the northern end of Garden Island. The island's northern end has not been burnt for over 60 years.

The tamar, found on Garden Island and Goonac MPA, south of Collie.



Shanties set amongst wattle thickets on Garden Island.

Marine reserves should be declared to protect reefs between Ocean Reef and Trigg (M10); at Cape Peron (M101); at the western and south-eastern ends of Rottneest Island (C45) and surrounding Carnac Island (C46). Marine life should only be taken by fishing line. The reefs are all biologically rich. Those between Ocean Reef and Trigg are unsurpassed locally as an underwater spectacle; a rare cowrie shell is found there. Carnac Island is the home of a colony of seals. The Rottneest Island reserves would take in the reefs from Eagle Bay to Fish Hook Bay, and from Phillip Rock to Parker Point.



Turtle under offshore reefs.



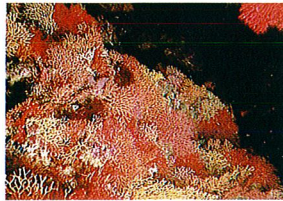
Offshore reefs, Mullaloo.



Bullseyes in cave.



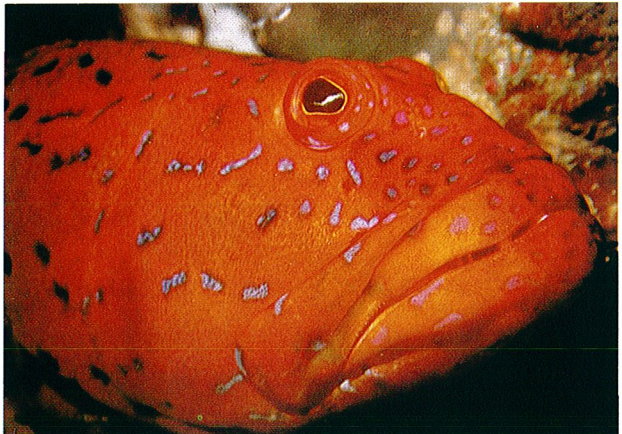
Polyps.



Gorgonian coral.



Crayfish.



Harlequin, Mullaloo.

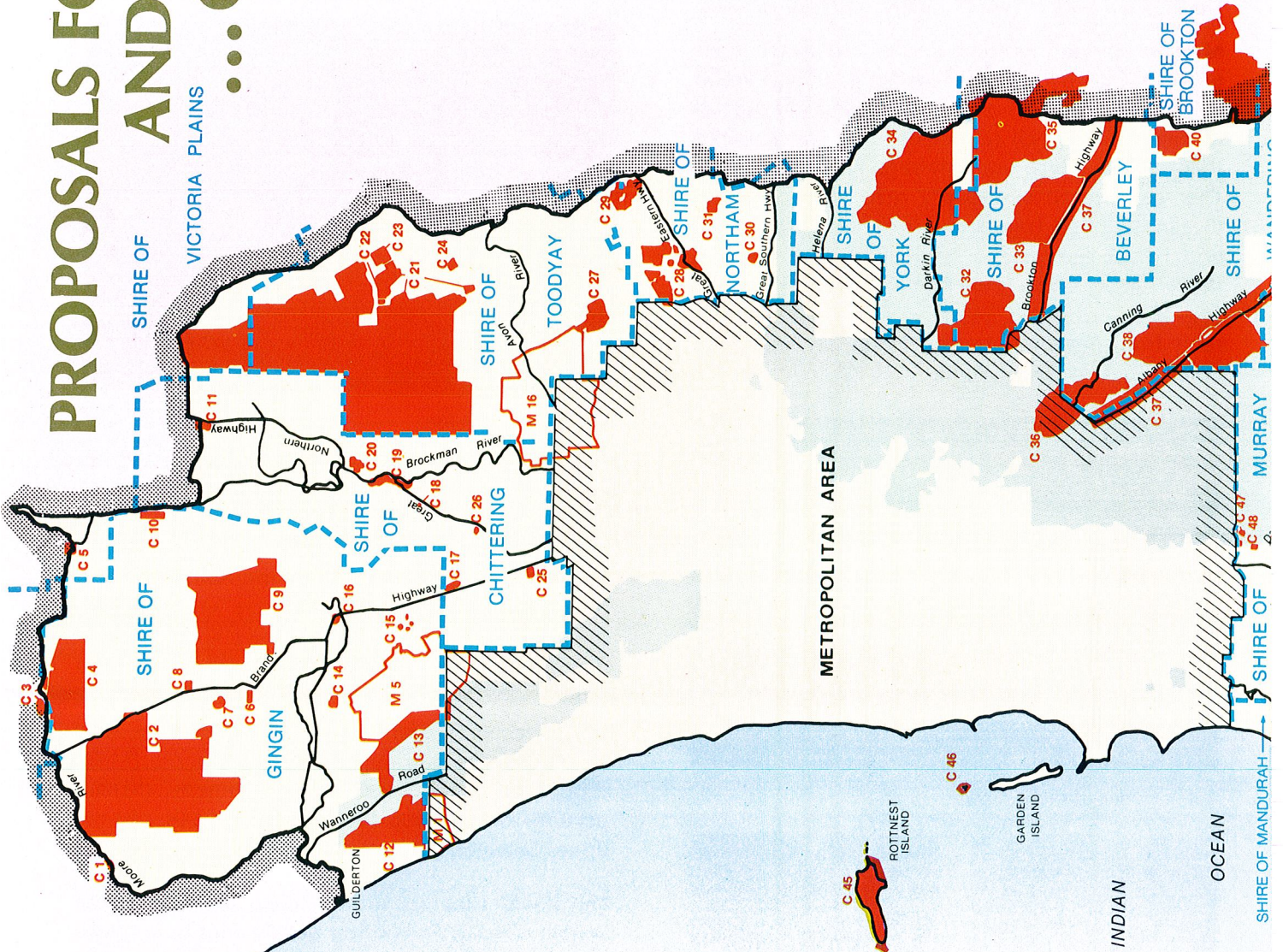
The Report endorses an MRPA proposal for a 25 km long coastal 'reserve' between Two Rocks and Mullaloo (M2). The relatively undisturbed coastal strip includes important wildlife habitats, limestone pinnacles, a freshwater swamp, the Alkimos wreck, picturesque beaches and limestone sea cliffs with specialised plant life. Access to the coastline should be by roads at right angles to the coast and not parallel to it.

Other recommendations for the coast cover sand dunes at Karrinyup (M36) and Swanbourne (M46); Woodman Point (M90); Port Kennedy (M106); portions of Yalgorup National Park (C54); and the dunes between Leschenault Inlet and the coast.

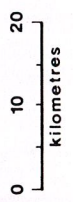
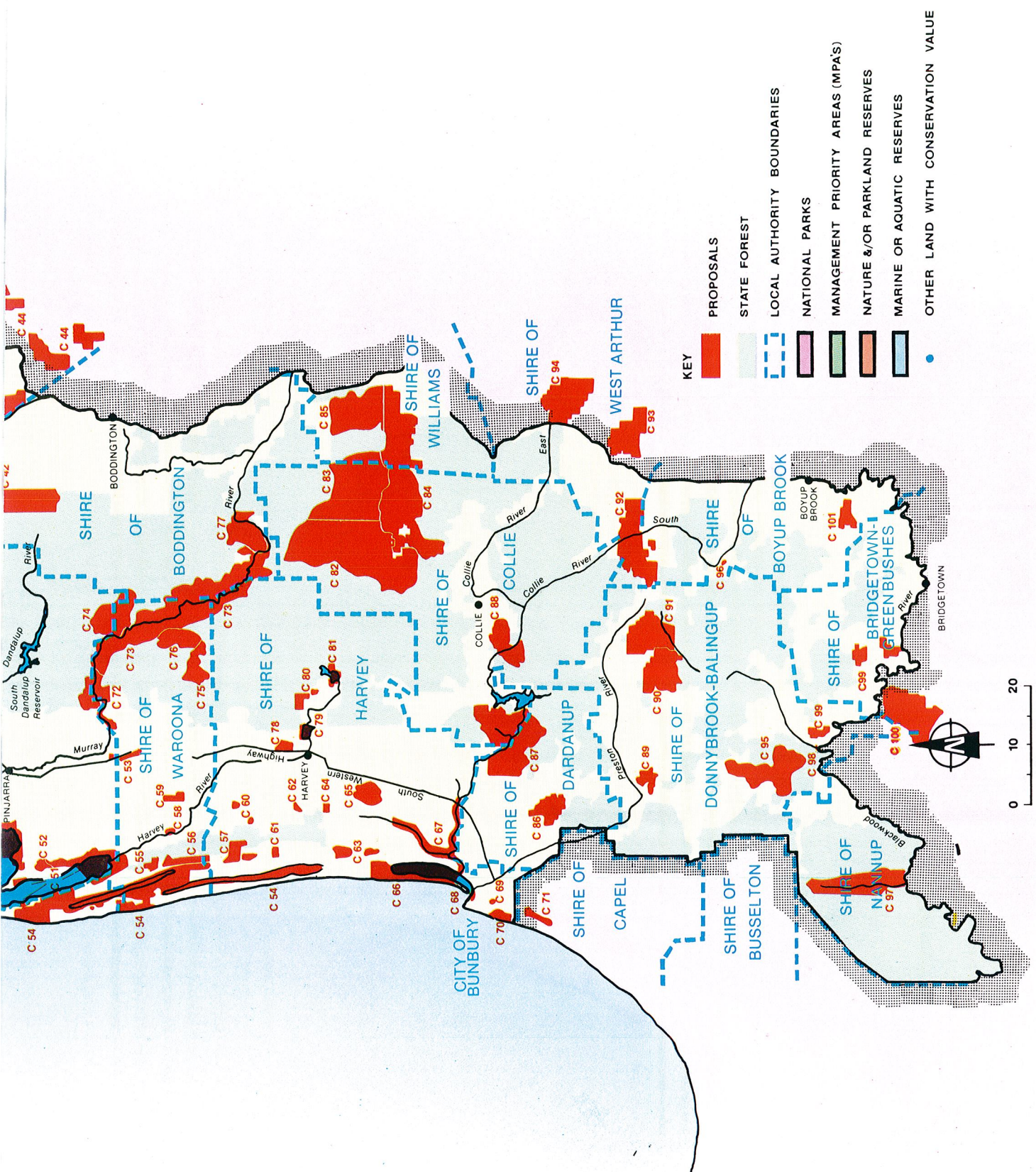
This booklet focuses on key topics discussed in the System 6 Study. For further details refer to the main Report. The maps on the following pages provide a guide to the Study's recommendations for specific localities.

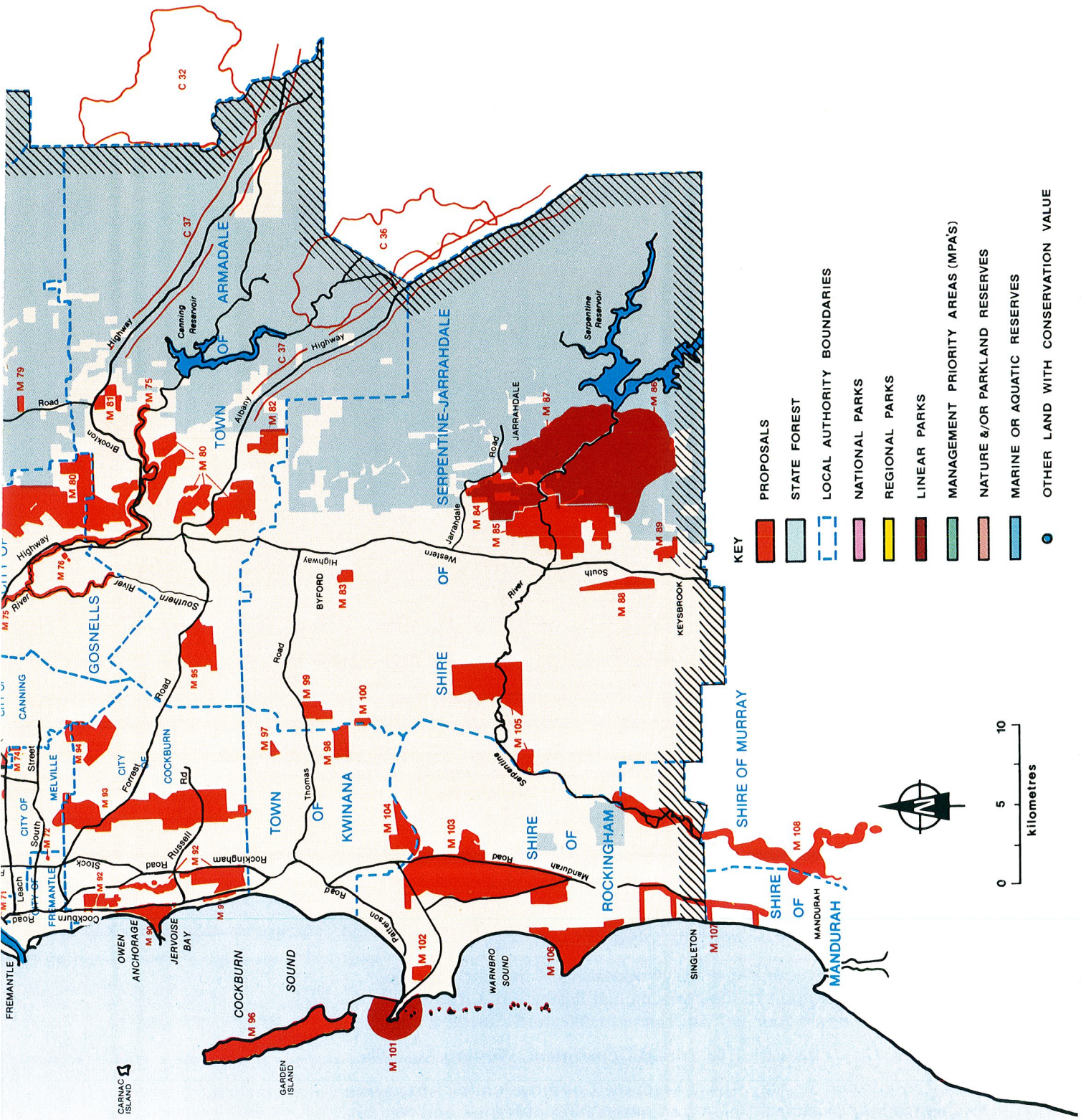
PROPOSALS FOR PARKS AND RESERVES ... COUNTRY

- C1 Reserve C 21164, Cowalla Bridge
- C2 Moore River National Park
- C3 Reserves C15816 and C25591, Moore River
- C4 Quins Hill
- C5 Reserve A3345, Moore River
- C6 Reserve C9676, Yurine Swamp
- C7 Beerullah Lake
- C8 Reserve C1224, Bartlets Well
- C9 Gingin and Boonamarring Brooks
- C10 Lake Wannamal
- C11 Reserves C965 and C27028, Uduung Brook
- C12 Caraban Management Priority Area (MPA 15.4)
- C13 Wabling Management Priority Area (MPA 15.3)
- C14 Reserves C20366 and C25431, Lake Muckenburra
- C15 Reserves C24257 and C26756, Gingin
- C16 Geological Sites, Gingin
- C17 Lake Chandala, Muchea
- C18 Reserve C42, Burruloo Well
- C19 Needonga and Chittering Lakes
- C20 Reserve C32807, Mt. Byroomanning
- C21 Julimar Management Priority Area (MPA 2.1)
- C22 Reserve C3156, Bindoon Spring
- C23 Reserve C22096, Culham
- C24 Reserve C19904, West Toodyay
- C25 Mound Springs, Muchea
- C26 Reserve C4070, North of Bullsbrook
- C27 Beelaring and Goonaring Springs
- C28 Reserves near Wundowie
- C29 Reserves north-west of Clackline
- C30 Reserve C30363, Inkpen Road
- C31 Reserves C25860 and C30393, Berry Brow Road
- C32 Dale Management Priority Area (MPA 2.6)
- C33 Russell Management Priority Area (MPA 2.5)
- C34 Gunapin Management Priority Area (MPA 2.3)
- C35 Sullivan Management Priority Area (MPA 2.4)
- C36 Eagle Hill Management Priority Area (MPA 8.1)
- C37 Brookton and Albany Highways
- C38 Cooke Management Priority Area (MPA 8.2)
- C39 Windsor Management Priority Area (MPA 8.6)
- C40 Boyagarring Management Priority Area (MPA 8.5)
- C41 Lupton Management Priority Area (MPA 8.8)
- C42 Duncan Management Priority Area (MPA 3.5)
- C43 Gyngoorda Management Priority Area (MPA 3.4)
- C44 Wandering Management Priority Area (MPA 3.10)
- C45 Rottnest Island
- C46 Carnac Island
- C47 Reserve C14629, North Dandalup
- C48 Reserve C19413, North Dandalup
- C49 Reserve C21038, North Dandalup



- C54 Yalgourup National Park
- C55 Clifton Management Priority Area (MPA 10.1)
- C56 McLarty Management Priority Area (MPA 10.11)
- C57 Myalup Management Priority Area (MPA 10.2)
- C58 Reserve A23172, Harvey River
- C59 Reserve C22199, Wagerup
- C60 Reserves C12049 and C12632, Harvey
- C61 Reserve C24472, Lake Preston
- C62 Reserve C2547, Harvey
- C63 Myalup Swamp and Miailla Lagoon
- C64 Reserve C2517, Harvey
- C65 Bengier Swamp
- C66 Leschenault Inlet
- C67 Brunswick, Collie and Wellesley Rivers
- C68 Anglessea Island
- C69 Big Swamp, South Bunbury
- C70 South Bunbury coastal land
- C71 Reserves near Dayellup
- C72 Teesdale Management Priority Area (MPA 3.7)
- C73 Murray Valley Management Priority Area (MPA 3.3)
- C74 Plavins Management Priority Area (MPA 3.6)
- C75 Samsom Management Priority Area (MPA 10.5)
- C76 Federal Management Priority Area (MPA 10.4)
- C77 Bell Management Priority Area (MPA 10.3)
- C78 Reserve C22977, Harvey
- C79 Reserve C15515, Harvey
- C80 Reserves east of Harvey
- C81 Reserve C25727, Harvey
- C82 Surface Management Priority Area (MPA 10.6)
- C83 Nalyerin Management Priority Area (MPA 10.7)
- C84 Trees Management Priority Area (MPA 4.1)
- C85 Stone Management Priority Area (MPA 10.8)
- C86 Dardanup Management Priority Area (MPA 4.4)
- C87 Lennard Management Priority Area (MPA 4.2)
- C88 Westralia Management Priority Area (MPA 4.3)
- C89 Donnybrook Reserves
- C90 Preston Management Priority Area (MPA 5.1)
- C91 Noggerup Management Priority Area (MPA 5.2)
- C92 Goonac Management Priority Area (MPA 4.5)
- C93 Muja Management Priority Area (MPA 4.8)
- C94 Bennelaking Management Priority Area (MPA 4.7)
- C95 Mullalyup Management Priority Area (MPA 5.4)
- C96 Reserve C29121, Wilga
- C97 St. John Brook Management Priority Area (MPA 12.2)
- C98 Reserves A25446 and A3412, Blackwood River
- C99 Greenbushes Management Priority Area (MPA 5.5)
- C100 Dalgarup Management Priority Area (MPA 12.1)
- C101 Nollalup Management Priority Area (MPA 5.6)





- M59 Point Resolution Foreshore, Dalkeith
- M60 Aquatic Reserve, South Perth
- M61 Aquatic Reserve, Attadale
- M62 Pelican Point, Crawley
- M63 Harry Sandon Park, Attadale
- M64 Wireless Hill Park, Avonross
- M65 Point Heathcote Foreshore, Applecross
- M66 Mount Henry, Manning
- M67 Canning River Foreshore, Saller Point to Clontarf
- M68 Canning River, Riverton Bridge to Nicholson Road Bridge
- M69 Kenwick Swamp
- M70 Heathland, Wattle Grove
- M71 Cantonment Hill, Fremantle
- M72 Sir Frederick Samson Park, Samson
- M73 Booragoon Lake
- M74 Bull Creek
- M75 Upper Canning and Southern Rivers
- M76 Mary Carroll Park, Gosnell
- M77 Reserve C22665, Kalamunda, and Reserve C20641, Bickley
- M78 Reserve C10601, Carmel
- M79 Reserve C21172, Canning Mills
- M80 Darling Scarp
- M81 Reserves C19662 and C32728, Karragullen
- M82 Reserve C5704, Wungong
- M83 Reserve C2457, Mundijong
- M84 Gooralong Management Priority Area (MPA 8.4)
- M85 Serpentine National Park
- M86 Serpentine Management Priority Area (MPA 3.8)
- M87 Serpentine Management Priority Area (MPA 8.7)
- M88 Land north of Keysbrook
- M89 Woodland east of Keysbrook
- M90 Quarantine Station and Explosives Magazine Reserve, Woodman Point
- M91 Reserve A24309, Coogee
- M92 Cockburn Wetlands - Western Chain
- M93 Cockburn Wetlands - Eastern Chain
- M94 Jandakot Airport
- M95 Forrestdale Lake
- M96 Garden Island
- M97 Reserve C36110, Wandl
- M98 Reserve C31874, Casuarina
- M99 Reserve A25886, west of Byford
- M100 Reserve C28167, south-west of Byford
- M101 Cape Peron, Shoalwater Bay and Wambro Sound
- M102 Lake Richmond, Rockingham
- M103 Lakes Cooloongup and Walyungup
- M104 Reserves C31102 and C33581, Leda
- M105 Lowlands Property, west of Serpentine
- M106 Point Kennedy
- M107 Peelhurst, Singleton and Madora
- M108 Goegrup Lakes

- KEY**
- PROPOSALS
 - STATE FOREST
 - LOCAL AUTHORITY BOUNDARIES
 - NATIONAL PARKS
 - REGIONAL PARKS
 - LINEAR PARKS
 - MANAGEMENT PRIORITY AREAS (MPAS)
 - NATURE &/OR PARKLAND RESERVES
 - MARINE OR AQUATIC RESERVES
 - OTHER LAND WITH CONSERVATION VALUE



NOTES



The white-eared honeyeater of woodland areas which makes its nest from animal hair and fur.

Further Reading

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Cover: Jarrah forest with understory of coral creeper and white myrtle.

Rottneest Island looking west, with the settlement and salt lakes.

Granite boulders in the Darling Range.

Blackboy in flower.

The western yellow robin, once widespread but now common only in wandoo woodland.

Young bull banksia.



Coastal tuart forest, in earlier times.



DEPARTMENT OF CONSERVATION
AND ENVIRONMENT

BULLETIN No. 87

