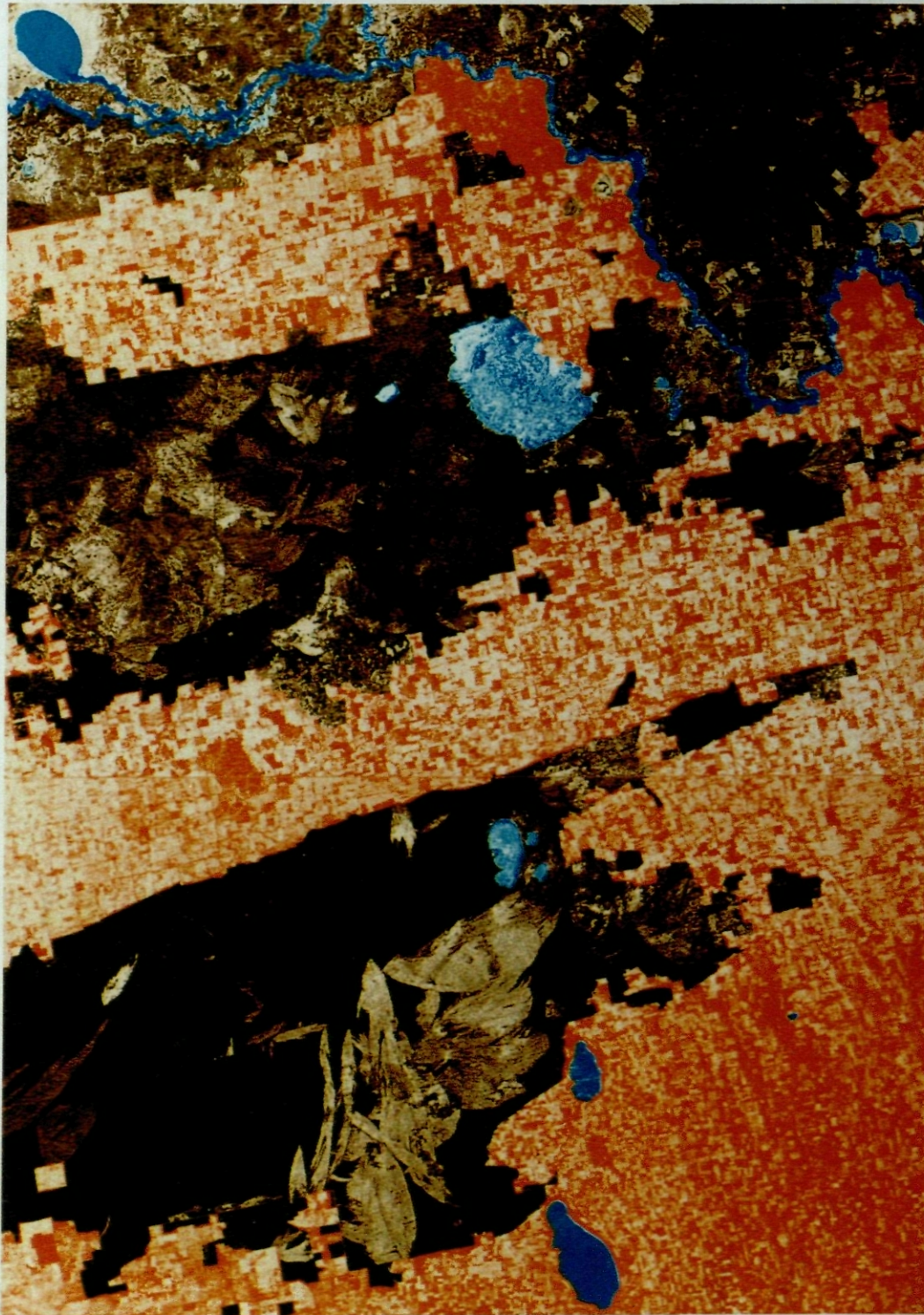


MALLEE AREA

REVIEW

FINAL RECOMMENDATIONS



LCC LAND CONSERVATION COUNCIL

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REVIEW

FINAL RECOMMENDATIONS

AUGUST 1989



**LAND CONSERVATION
COUNCIL**

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Cover:

Landsat image of the western portion of the Mallee.

Landsat imagery provided by the Australian Centre for Remote Sensing, Division of National Mapping, Department of Administrative Services.

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Introduction

The Land Conservation Council was established by the *Land Conservation Act 1970*. As one of its three functions, it makes recommendations to the Minister for Planning and Environment with respect to the use of public land, in order to provide for the balanced use of land in Victoria. Notices showing the boundary of the Mallee study area and advising that an investigation was to be carried out were published in the *Victoria Government Gazette* of 19 June 1985 and in local and other Victorian newspapers in June 1985. A descriptive resources report was published on 26 November 1987.

Submissions

Following the publication of the report, the Council received 201 submissions on the future use of public land. Individuals, associations, companies, and local and State government bodies, representing a wide cross-section of the community, made helpful submissions covering possible forms of land use for the area. In addition, discussions have taken place with many individuals and groups, both in the Mallee and in Melbourne prior to the formulation of recommendations.

After considering these submissions, and having visited the study area, the Council formulated its proposed recommendations, which were published on 21 September 1988. The Council subsequently received 2095 submissions and letters commenting on these proposals and had further input from various groups and individuals. A list of those who made submissions is provided in Appendix I. After due consideration, the Council has now prepared these final recommendations for presentation to the Minister and Parliament.

Availability of submissions

All submissions received by the Council are available for inspection at the Council's office, 4th Floor, 464 St Kilda Road, Melbourne.

The content of any submission marked by the author as 'confidential' would be made available for public inspection under the *Freedom of Information Act 1982*, but only after removal of any information that would identify authorship.

Report contents

This report contains the Council's final recommendations concerning the use of public land in the Mallee area. The recommendations in the text are grouped under major headings, such as Parks, State forest, and so on. Accompanying the text is a pair of maps at the scale of 1:250 000 which cover the whole study area and give a broad view of the recommended land uses. More detailed maps show the location of recommended land uses in the vicinity of Mildura and some of the areas recommended for agriculture (by alienation). Additional information on boundaries is held by the Land Conservation Council.

Land uses

The Council recommends the continued use or establishment of: parks in areas of particular importance for recreation and nature conservation; reference areas and education areas (covering part of the range of land types found in the study area); flora reserves and flora and fauna reserves for areas of value for conservation of representative plant communities and habitat; and wildlife reserves for sites containing valuable faunal habitats. Substantial areas are recommended as State forest.

Where demands from competing uses vie for a given area of land, it may not be possible to satisfy them all. Wherever possible, these recommendations attempt to achieve balance in providing for the present needs of most forms of use while retaining flexibility and the opportunity to adjust to future changes in such needs. They do so by placing as much of the public land as possible under forms of use that do not have a major impact on the natural ecosystem.

Flexibility in planning is essential. Our knowledge of many resources (for example, minerals) and of the distribution and ecology of plants is imperfect. There must be many places in Victoria where special values remain unrecognized and for which no special provision can be made in present planning. Furthermore, future needs for resources or environmental protection on public land may

require alteration or modification of these recommendations, which are based on the best information presently available.

Table 1 summarizes the recommendations in terms of the major forms of use.

It is important to realize that each primary use

has a number of compatible secondary uses. In addition to nominating the best uses for the land, the recommendations indicate what is considered to be the most appropriate form of tenure for the land and the most appropriate management authority.

Table 1: Public land use

Land use categories	Area (ha)	Percentage of land covered by these recommendations	
		All land	Public land
National parks	961 360	22	57
State park	1 680	< 1	< 1
Regional parks	12 160	< 1	< 1
Wilderness area	113 500	2	6
Reference areas	42 310	1	2
Wildlife reserves	25 790	< 1	1
River Murray reserve	9 200	< 1	< 1
Agriculture—alienation	28 780	< 1	1
—research/education	1 520	< 1	< 1
Flora and flora and fauna reserves	76 000	1	4
Education areas	2 535	< 1	< 1
Bushland reserves	15 360	< 1	< 1
Scenic and streamside reserves	40	< 1	< 1
Mineral and stone reserves	8 370	< 1	< 1
Water supply and drainage reserves	7 660	< 1	< 1
State forest	347 700	8	20
Lake reserves	4 880	< 1	< 1
Historic areas	580	< 1	< 1

Notes:

1. The study area covers a total of 4 323 000 ha, of which 1 670 000 ha is public land.
2. Other land uses collectively make up the balance.
3. Figures are rounded.

Significance of the Victorian Mallee

The term 'mallee' is often used to describe a wide range of vegetation communities dominated by multi-stemmed species of *Eucalyptus*, and it is clear that species composition varies considerably between south-eastern Australia and Western Australia. In fact, quite marked differences exist between the New South Wales and Victorian mallees.

Altogether, about three-quarters of Australia's mallee vegetation (including semi-arid woodlands such as those dominated by *Casuarina* species and native pine) has been cleared, mainly for agriculture. Sizeable areas still exist in New South Wales and Western

Australia, but these are subject to grazing by stock and the vegetation structure and botanical composition have been considerably modified by this grazing and by altered fire regimes. As animal habitat, mallee vegetation is changed in major ways.

At the time of European settlement, mallee is estimated to have covered about 10.4 million ha of the Murray-Darling Basin, with around 4.2 million ha of that in Victoria. A continuous belt extended from southern New South Wales and north-western Victoria to the eastern edge of the Flinders Ranges in South Australia.

In Victoria, mallee vegetation (including semi-arid woodlands) originally occupied some 19%

of the State. Approximately one-third (1.6 million ha) of this remains as public land, mostly within the Big Desert and Sunset Country blocks. The remainder has been alienated and substantially cleared for agriculture. The public land portion of the Mallee Area of Victoria comprises about 15% of the former extent of Murray-Darling mallee vegetation.

In South Australia, virtually the only uncleared mallee occurs in conservation reserves. In New South Wales, while only a relatively small proportion of the original mallee has been physically cleared, much of that in the south-west of the State has been greatly modified by heavy grazing by domestic stock, and most uncleared mallee is still grazed. An embargo on the clearing of mallee in south-western New South Wales was lifted in May 1988.

Some 13% of the original area of mallee in the Murray-Darling Basin is included in existing conservation reserves (New South Wales 3.1%, South Australia 5.5%, Victoria 4.7%). The significance of the Victorian region is therefore very high as it provides the only opportunity to further protect relatively unmodified examples of mallee vegetation and faunal habitats in south-eastern Australia. It is also one of the few semi-arid regions of the world where relatively large tracts of undisturbed vegetation remain.

In the Victorian context, the Mallee region makes an important contribution to the broad range of natural environments occurring in the State. The Mallee environment differs markedly from the outstanding natural values of the Alpine and East Gippsland areas of the State, but it has equally significant nature conservation and land protection values that are important components of Victoria's natural heritage.

Unfortunately, however, there is very little representation on public land of the once-extensive mallee environments of heavier (clayey) soils. These were among the first areas to be alienated as they were more favourable for agriculture.

New information

The Council is aware that not all needs for the use of public land can be foreseen, and that the value of environmental resources will change

as exploration, research, and technology progress. For these reasons, the Council believes that periodic reviews of public land use in the State are desirable, and it must be expected that areas will be re-allocated or adapted to meet changed demands.

Since the publication of the Council's final recommendations for the area in 1977, considerable new information about the Mallee has been collected and the impact of regional salinization has emerged as the single greatest threat facing Victoria's environment. This has generated a number of issues about the way that public land in the region should be used. The new information is described below.

Flora and fauna

Until recently, few surveys of the natural resources in the Mallee had been undertaken, and the available information covered only part of the study area.

No vegetation mapping or detailed descriptions of the plant or animal communities were undertaken for the Council's original investigation of the Mallee area, and discussion was limited to a very general description of the component species of the major structural forms. From the outset of this review, the Council recognized that it required a comprehensive study of the vegetation and fauna on public land, to provide an objective base for future land-use decisions.

The Department of Conservation, Forests and Lands undertook a major study to determine the nature and location of the plant communities on public land in the Mallee area and to prepare a floristic map of the region. Interpretation of aerial photographs and Landsat images was undertaken as well as a co-ordinated sampling of the vegetation types by botanists and analysis of the information to determine the vegetation communities.

In all, some 1300 individual plots (quadrats) were included in the analysis. No such intensive investigation of a large expanse of semi-arid vegetation has been undertaken elsewhere in Australia.

The Council employed other botanists to provide information on the nature and status of the vegetation on the small blocks of public land within the predominantly agricultural

region as well as the vegetation on the banks of the River Murray. Information on the Mallee has been integrated with the compiled by the Department of Conservation, Forests and Lands.

Concurrent with the vegetation survey, the National Parks and Wildlife Division of the Department undertook surveys of the fauna of the region. The habitat of most species of native fauna is strongly vegetation-dependent, and the plant communities identified in the flora survey were used to describe the major faunal habitats.

Approximately 1000 species of native plants have now been recorded for the study area and, of these, some 200 are regarded as rare or endangered. More than 100 distinct floristic sub-communities have been described and these have been combined to form 30 major communities. Several of these communities are rare, with 15 of them accounting for less than 10% of the vegetation on public land.

Furthermore, only 20% of the vegetation on public land is within a conservation reserve and several communities (sand-plain grassland, gypseous-plains grassland, gypseous-rise woodland, alluvial-plain shrubland and alluvial-rise shrubland) are unreserved at present.

The Council considers that the reserve system should include adequate representation of all plant communities, and this has been an important consideration in the additional areas proposed for parks and other reserves.

The protection of native fauna depends on the availability and protection of suitable habitat. The Mallee area includes a range of habitats for native animals and supports a number of significant faunal assemblages as well as rare or notable species.

Three small terrestrial mammals have been recorded since 1974 as a result of increased survey work and the use of new trapping techniques. The mallee ningauai was first captured in Victoria in 1977, and the paucident planigale was found in 1985 during the survey for this review. The little pygmy-possum was identified as occurring in the Mallee in 1977; previously this animal was confused with the western pygmy-possum.

Recent surveys have also clarified the distribution and identity of several other species, including a number of bats.

The mammalian fauna of the Mallee area is distinctive in at least the following three respects.

- Many species known here either do not occur elsewhere in the State (red kangaroo, mallee ningauai, paucident planigale, and Mitchell's hopping mouse) or are limited to this and closely related areas (silky mouse, western pygmy-possum, and greater long-eared bat).
- More species have disappeared from the study area since European settlement than from any other part of Victoria.
- The composition of the fauna within historical times differs distinctively from that in the rest of the State. Families well represented include the Dasyuridae (carnivorous marsupials comprising eight species), the Macropodidae (kangaroos, wallabies, and rat-kangaroos—six species), and the Muridae (rodents—seven species). The Phalangeridae and Petauridae (large possums and gliders—two species), however, are poorly represented in comparison with southern Victoria. The diversity of bats (families Emballonuridae, Molossidae, and Vespertilionidae—twelve species) is similar to that in other parts of Victoria, but the species composition differs.

The relatively hot and dry environment of the study area supports a distinctive element of Victorian avifauna that comprises mallee-dependent birds such as the malleefowl, red-shouldered whistler, mallee emu-wren, and black-eared miner and the typically inland species such as the inland dotterel, grey falcon, white-winged fairy-wren, and crimson chat.

Altogether, some 300 bird species have been recorded in the Mallee with more than 75% of these known to presently breed in the area. Particularly prominent groups, both in numbers and diversity, are the raptors, parrots, and cockatoos throughout the Mallee and, in the Big Desert, the honeyeaters.

In the south-east, the extensive Kerang wetlands provide habitat for many water-birds and waders, while along the Murray many hollow-dependent species, including the regent parrot, live and breed in the large old river red gums.

Widespread clearing of mallee and *Callitris-Casuarina* woodland has resulted in the severe decline and near extinction of some

bird species. These include the black-eared miner, Kori bustard, western whipbird, and spotted bower-bird.

The conservation status of birds in the Mallee is currently threatened by:

- existing and increasing isolation and fragmentation of populations, leading to potentially disastrous genetic consequences for some species
- degradation of remaining natural habitat by introduced grazing mammals and modified fire regimes
- pesticide accumulation in the food chain
- egg collectors, wild-bird fanciers and dead-bird traders
- introduced carnivores

The 77 species of reptiles currently recognized in the Mallee represent nine families. These comprise three fresh-water tortoises (family Chelidae), nine geckos (Gekkonidae), nine legless lizards (Pygopodidae), seven dragon lizards (Agamidae), three goannas (Varanidae), 22 skinks (Scincidae), eight blind snakes (Typhlopidae), one python (Boidae), and 15 venomous snakes (Elapidae). This far exceeds the number found in any other Victorian region.

The Mallee contains 19 vertebrate species regarded as 'significant' as well as a further eight that are 'notable' and for many of these there is inadequate habitat protection. Knowledge about the Mallee fauna is still far from complete and further research is required so that effective protection and conservation can be achieved.

Land systems

Information on land systems for the Council's initial investigation of the Mallee area was based largely on the 1963 report 'A Study of the Land in North-western Victoria' by J.N. Rowan and R.G. Downes.

By using more detailed aerial photography than was previously available, topographic maps, and recent geomorphic data, verified by some field checking, a greater degree of resolution of the land systems for the area has been achieved.

Land systems across the State have recently been standardized so that land with similar characteristics is included in the same system

irrespective of where it occurs in Victoria. This was not the case previously. Some 900 land systems have been identified for Victoria. The Mallee area contains 42, of which only 14 are represented in the existing parks. A further 14 are very small or have little or no representation on public land. Some of these, however, have limited representation in other areas set aside for conservation, such as wildlife and flora reserves. Land systems in the Mallee vary greatly in their susceptibility to different erosion hazards. The potential for deterioration can be increased or decreased, depending upon the management regime applied.

Wilderness

A survey of wilderness quality conducted in 1987 (Preece and Lesslie) indicated that the largest areas of highest wilderness quality in south-eastern Australia are centred around the Big Desert and Sunset Country; the largest area being the Big Desert Wilderness.

The survey used four indicators to assess wilderness quality and focused on two major attributes of wilderness—remoteness and naturalness:

- remoteness from settlement—that is, from settled (cleared) land or points of permanent occupation
- remoteness from access—that is, from constructed vehicle access routes
- aesthetic naturalness—the degree to which the landscape is free from the presence of the permanent structures of modern technological society
- biophysical naturalness—the degree to which the natural environment is free of biophysical disturbance caused by the influence of modern technological society

The results of the survey support the findings of an inventory of wilderness in Victoria conducted in the late 1970s (Feller *et al.*, 1979).

Other information

The Council commissioned several other studies relating to the Mallee area, covering the identification of sites of historical significance, Aboriginal history and associations with public land, and agricultural use of public land. Although unpublished, the reports of these studies are available for inspection at the Council's office.

Following preparation of the proposed recommendations, the Council engaged Michael Read and Associates to prepare an economic evaluation of the broombush industry and to assess the impact of the proposed recommendations on broombush harvesting. The report from this study is also available for inspection. The main findings of the study are addressed in Chapter S—State forest.

Major land-use issues and recommendations

A number of important issues regarding the use of public land have arisen during this review and indeed, the review was brought forward in response to community concern about the clearing of public land for agriculture and the lack of detailed ecological information about the region.

Salinity

Salinity has been recognized by the government as the single greatest threat facing Victoria's environment. The study area contains some of the worst-affected land in the State.

Extensive clearing of trees and the introduction of large-scale irrigation are the main factors that have contributed to rising groundwater levels, the primary cause of regional and local salinity. The problem has been further exacerbated by the change from deep-rooted native perennial plants to shallow-rooted annuals.

A recent study by the Department of Conservation, Forests and Lands, indicates that, between 1972 and 1987, a total of 246 000 ha of predominantly native forest has been cleared from public and private land in the State, an average rate of 16 000 ha per year. Some 209 000 ha of this is from freehold land. Taking into account reforestation programs, which on public land balance the rate of clearing, the average loss of forest cover from freehold land is 11 000 ha per year, mostly in western Victoria.

In the department's Mildura region, which is included within the Mallee area, the net loss from public land over the period was some 5 000 ha, reflecting clearing under improvement purchase leases and cultivation

licences and a gradual deterioration of licensed grazing areas; on freehold land, the net loss of forest cover here was almost 29 000 ha.

The Council emphasizes the important role of natural vegetation on public land in reducing the effects of salinity and supports a co-ordinated approach on both private and public land to resolve the problem. It has made several recommendations about salinity in Chapter O—Water supply and drainage, and other recommendations take into account the need for the use and management of public land to complement the efforts of government and the community to control salinity on private land.

Wildlife corridors and the black-eared miner

Concern expressed early in 1985 over the clearing of Mallee land for agriculture (especially in some areas that formed corridors between major blocks of public land) and the lack of detailed ecological information for much of the public land in the region led to the Council's current review. The government also decided not to proceed with the allocation of land recommended by the Council in 1977 for cultivation leases, as well as some of the areas recommended for alienation, until comprehensive flora and fauna surveys had been undertaken. Elimination of the corridor between the Sunset Country and the Annuello block was regarded as a further fragmentation of faunal habitat. The Council acknowledges the importance of such corridors and has recommended their retention and protection. It has also endeavoured to minimize further fragmentation of public land.

Limited cultivation leases

In its 1977 final recommendations (Recommendation F1) the Council identified some 73 200 ha that could be alienated for agriculture. Much of this land had been cleared, fenced, and cultivated in good faith in the expectation that it would eventually be alienated, although in a few cases unsuitable land was cleared and some areas were cleared without permission. The Council took into account the necessity to rationalize public land boundaries and many of the scattered parcels were not recommended for sale; instead, areas for development were consolidated where possible, principally in the Parishes of Wymlet

and Kia, north of Ouyen. Most of this land has now been alienated and cleared under Improvement Purchase Leases.

A further 34 000 ha were approved for Limited Cultivation Leases (then Recommendation F2) in 1977, but concentration on the alienation of F1 areas and the need to develop management plans for the cultivation areas has delayed the implementation process and, to date, none have been issued. Council acknowledges the concern that has been expressed in the region that cultivation licensees have been substantially disadvantaged in comparison with those who were able to purchase land outright. The main reasons for this concern have been non-implementation of the previous recommendations, lack of secure tenure, controls on clearing, and the belief that much of the F2 land is similar in nature to the F1 areas.

As part of this review, the Council commissioned a group of consultants (McGowan International and Australian Biological Research Group) to provide detailed information on the F2 areas and has obtained further information from discussions and submissions. As a result the Council has adopted a number of guidelines to deal with the areas and these are set out in Chapter F—Agriculture. In general terms, however, Council is recommending that all areas that were cleared and under cultivation prior to 1988 be alienated, except for some that form corridors between major blocks of public land. In line with the broad thrust of the Council's recommendations that no further areas of native vegetation be cleared and that disturbed areas be rehabilitated, those portions of the F2 blocks that are vegetated would remain in public ownership, subject to the need to rationalize public land-private land boundaries.

Grazing on public land

Grazing of native forage on public land has been an important factor in the agricultural development of Victoria. In the early days considerable time was required to clear and develop land, and the native pastures on that cleared land had limited productivity. Public land grazing was therefore an important source of income for many farmers.

The situation is different now. With improvements in technology and management, much of the freehold land is cleared and sown to crops and pastures. The general importance of grazing on public land has declined, although it remains important to some farmers and is occasionally used in times of emergency when feed is scarce on the farms. At the same time, community attitudes towards the public lands have changed, and many people now expect these to be used and managed in a way that will conserve the natural ecosystems.

At present more than 500 000 ha of public land in the Mallee is held under annual grazing licences issued under the *Land Act* 1958 or, in the case of the forests along the rivers and streams, under agistment rights or annual licences issued under the *Forests Act* 1958. However, less than 50% of the total area held under grazing licence is actually used. Grazing of the native forage in these areas is usually an adjunct to farming on freehold land, but some of the holders of large licences have little or no freehold land.

In its final recommendations for the Mallee in 1977, the Council stated its belief that the grazing of public land carrying native vegetation could continue at a low intensity. In addition, it considered rabbit control, reclamation of damaged areas, and the fencing out of some areas for regeneration to be essential if public land were to be managed as a community asset. In 1977 it recommended the granting of long-term grazing licences where appropriate, but none have yet been issued in the Mallee area.

In 1987, the Land Conservation Council commissioned ACIL Australia Pty Ltd to conduct a study of the larger areas of public land in the Mallee that are used for grazing, to provide information on the way they are used and their condition. Some 40 separate licensed areas of 1000 ha or more were investigated; these are licensed to less than 20 individual enterprises. The total area of public land actually used for the grazing of domestic stock in the Mallee represents less than 50% of that held under licence.

The grazing of native vegetation by domestic stock may produce several effects that reduce the land's potential for regional land protection and a number of future uses, especially those involving nature conservation and recreation.

Council is also aware of the concern among graziers in the Mallee regarding the long period of uncertainty with respect to the future of public-land grazing and the problems this has created in terms of financial decision-making and effective management of the licensed areas. It is recognized that, with few exceptions, grazing licences have been managed in accordance with government policy and in co-operation with departmental officers, based on the best available information.

However, deterioration of public-land values has occurred. In most cases this has been inadvertent and brought about by a lack of information in the past about the impact of grazing by domestic stock, rabbits, native herbivores, and other pest species. It has affected such values as salinity control, nature conservation, and recreation.

In the light of information then available, the Council indicated in 1988, in its proposed recommendations, that it considered domestic-stock grazing to be incompatible with the protection and maintenance of important nature conservation values. It was particularly concerned that grazing was inhibiting the survival and regeneration of the native grasslands, woodlands, and chenopod shrubland communities in the region and was contributing to regional land degradation problems. The Council therefore recommended that, apart from the riverine woodlands, grazing be removed from the other large blocks of public land by 1999 at the latest.

Submissions to the Council about the proposed removal of grazing included concern about the economic impact on licensees, about transfer of those costs of management currently borne by licensees more directly to the government, that insufficient resources would be provided for proper land management, for the increased fire hazard, and for increases in rabbit and kangaroo populations.

A number of people in the Mallee also rejected the Council's view that domestic-stock grazing inhibits the regeneration and subsequent growth of native overstorey trees and the understorey and they cited examples they believed to show the contrary. Each of these was investigated by the Council and in every case it was clear that seedling establishment and initial growth occurred only in the absence of grazing stock. The Council also sought

further information and evidence in the Mallee, and adjoining areas in South Australia and New South Wales, and this also supported the Council's view.

Field observations of grazed plant communities in Victoria and interstate, observation of exclusion plots, and information in submissions have reinforced Council's view that continual grazing of domestic stock is detrimental to the floristic composition of Mallee communities and to the processes of regeneration of both the overstorey and the understorey. However, in areas that are destocked completely for a period of time, regeneration and re-establishment of some species can occur. Although rabbits and kangaroos also have an impact, it has been found that regeneration occurs where stock is excluded and these other species are present but controlled.

No example has been drawn to Council's attention where regeneration and re-establishment of native vegetation have occurred under continuous domestic-stock grazing even where it is coupled with control of rabbits and kangaroos.

These statements are derived from observations, submissions, and discussions with landholders, licensees, and land managers; but, unfortunately, very few quantitative or monitoring data are available about the Mallee environment to support or reject them. The Council recognizes that, in the absence of such data, the case for the total exclusion of domestic stock from all dryland areas in the Mallee requires careful consideration based on further scientific information.

The Council acknowledges that the lack of regeneration and re-establishment of native overstorey and understorey vegetation is due to combined grazing pressure—involving domestic stock, pest species such as rabbits and goats, and native fauna such as kangaroos—and is in turn leading to further land degradation. A co-ordinated effort is required by the Department of Conservation, Forests and Lands and the licensees to achieve the required level of control.

These final recommendations confirm the proposal that domestic-stock grazing be removed from the parks and other major conservation reserves. The Council is also recommending that stock grazing under

existing licence conditions cease on the remaining areas of State forest in the dryland region of the Mallee.

Any future grazing on these areas (within the lands marked S1 on the maps) may only be permitted under a new strategy in which a licence is issued in accordance with a management plan that seeks to achieve the establishment of a sustainable—although not necessarily natural—ecosystem based on native vegetation to reduce the effects of wind erosion, local and regional salinity, and other land degradation problems. (See the recommendations outlined in Chapter F—Agriculture.) The new strategy involves discontinuous grazing, so that at any one time a portion of each licensed area remains free of stock to allow regeneration and the re-establishment of native overstorey and understorey species—a key factor in reducing the effects of land degradation. Depending on the sizes of the excluded portions relative to the size of the licensed areas, it could be several decades before a whole area is adequately revegetated.

Controlled grazing would also be permitted in the riverine woodlands (Recommendation S2). These recommendations are also discussed in more detail in Chapter F—Agriculture.

Rivers, wetlands, and environmental flows

Regulation of natural water supplies for irrigation and stock and domestic use, combined with the establishment of extensive agricultural areas, has changed the nature of many of the Mallee's streams and wetlands. While some of these changes might have benefited some native plants and animals, others have made the region's wetland areas less suitable as habitat for native species.

Although water regulation and distribution works have altered wetland conditions in a number of circumstances, the Rural Water Commission, in co-operation with the Department of Conservation, Forests and Lands, has attempted to preserve and enhance wildlife habitat wherever practicable.

However, concern is growing about the environmental condition of streams and wetlands in the Mallee, especially the Wimmera and River Murray systems. The Council

believes that the need to improve conditions in these streams is urgent and that additional water should be allocated for environmental purposes (see Chapter O—Water supply and drainage).

Exploration and mining

The Council's policy with respect to exploration and mining is that public land other than reference areas and other areas as determined by the government continue to be available for these uses, subject to a number of principles and guidelines.

This policy is based on the government's responsibility to establish the existence and extent of the State's mineral resources. It is also related to the fact that, without detailed knowledge of specific proposals for exploration and mining, it is not possible to ascertain whether such activity would be compatible with the maintenance of environmental values.

The Council's policy therefore includes the following important principle.

'Some areas of land surface—because of their inherent instability or special public significance (for example, community assets or areas with important scenic, archaeological, historical, recreation, or nature conservation values)—warrant permanent or temporary exclusion from exploration and/or extraction of minerals. The Department of Industry, Technology and Resources and the land manager should together determine these areas.'

This process may not be working satisfactorily as there is considerable concern about the damage to areas of public land with significant conservation values and about the standard of rehabilitation in some areas. An objective assessment of these matters would be helpful in the debate. The mining industry has also expressed concerns regarding the difficulties being experienced in gaining access for exploration and mining on public land.

The government is currently reviewing the *Mines Act 1958*. Its present policy precludes exploration and mining in national parks, State parks, and wilderness parks unless these had commenced prior to the area being scheduled as a park. Furthermore, the State Conservation Strategy notes that 'in parks and reserves set aside primarily for the protection of natural ecosystems, no further mining, forestry, grazing or other commercial activities will be allowed'.

Council acknowledges that, although its current policy is generally in support of exploration and mining in parks and other reserves, government policy could exclude these activities from large areas of the Mallee that are recommended for inclusion in the park and reserve system. Notwithstanding the Council's general policy on exploration and mining, it is recommending that extraction of salt and gypseous material should be excluded from flora and fauna reserves, particularly in the eastern Mallee where the few parcels of public land are relatively small in area.

Apiculture

Apiculture is an important industry on public land in the Mallee for honey production and the overwintering of hives. Horticultural and agricultural enterprises also benefit from the apiculture industry, as the bees are used for pollination of fruit and seed crops.

Although apiculture has been regarded as compatible with most other uses of public land, some evidence suggests that introduced bees have an impact on the natural environment and may compete with native fauna for nectar and nesting and roosting sites and that honey bees are less species-specific during foraging, with the result that cross-pollination may lead to hybridization between native plant species. The Council considers that further research is required into these matters.

Two other problems cause concern: the industry opens new tracks into mallee and heathlands; and feral bees occur around popular tourist destinations. Council believes that these aspects should be closely monitored by the Department of Conservation, Forests and Lands.

The Council is recommending that no new bee sites be established on public land pending the results of further research into the impacts of feral and commercially-managed honey bees (see Chapter F—Agriculture).

Broombush harvesting

Mallee broombush (*Melaleuca uncinata*) is harvested from extensive areas—primarily in the Big Desert—to produce broombrush panels used for fencing, feature panels, and shadehouses. Six commercial licensees operate

in the Mallee, supplying markets in Adelaide and, to a lesser degree, in Melbourne.

Although there is some concern as to the biological impacts of broombush harvesting—particularly on animals requiring mature broombush—its major known impact is the proliferation of tracks intruding progressively into previously untracked parts of the Mallee, compromising nature conservation and wilderness values.

The industry has been operating without detailed information about the available resource and sustainable level of harvesting, and without adequate supervision. Reorganization of the industry is now under way, supervision has improved, and a broad assessment of the broombush resource in part of the Big Desert has been made. Further refinement of the resource data is, however, required.

The assessment included those stands of broombush, identified on the map of the floristic vegetation (published with the resources report in 1987), outside the existing and proposed additions to the conservation reserves and wilderness area in the Big Desert. It also included the area in the eastern portion of the Big Desert (moratorium area) that the Council indicated, in its proposed recommendations, should be unavailable for broombush harvesting pending a review of its conservation values and potential contribution to the sustainable output of broombrush.

Following the proposed recommendations, the Council reviewed the uses of the Big Desert, taking into account the recent assessment of the broombush resource, the evaluation of the economics of the industry, and the natural values of the region.

Council believes that the industry should be confined to specific areas and in these final recommendations has identified five areas within the Big Desert where broombush harvesting may take place (see Map A), each of which either has been entered and cut-over in the past or lies close to tracks. The moratorium area is to be included with the western addition to the Wyperfeld National Park and will not be available for further broombrush production.

Based on the broad estimates provided by the Department of Conservation, Forests and Lands, the areas now identified for broombush harvesting should be able to support a sustainable output of broombush at or close to the current legal harvest from public land in the Mallee (see Chapter S—State forest).

Harvesting should be conducted in accordance with the guidelines specified in these recommendations and, following a more complete assessment of the resource, harvesting levels should be based on the annual sustainable yield from the areas now available.

A current project for a Master's Degree at the University of Melbourne is investigating the feasibility of growing broombush from seed, with a view to its cultivation on private land. Council supports this initiative, which may provide a valuable source of income from some marginal farmlands. It has recommended that if the trials show this to be economically and technically feasible, there should be more widespread production of broombush from private land as an alternative to public land.

Final recommendations

In formulating these recommendations the Council has considered all the available information from a wide range of sources and has taken into account the various issues raised above. All the information on natural resources in the area was evaluated bearing in mind their significance on a State-wide basis. Aspects such as representation of land systems and major land types, vegetation communities, fauna, and wilderness areas were considered, as well as the State-wide and south-eastern Australian significance of the Mallee with respect to nature conservation, land degradation, and the protection of wilderness quality. In the light of that evaluation, the Council now proposes to extend the existing reserve system in order to incorporate the full range of values represented in the Mallee.

Issues related to regional land protection and the need to reverse the current trend towards the long-term deterioration of public-land values have also been important considerations. As a consequence, Council believes that the overriding consideration in deciding on land use in the Mallee is concern to retain as much as possible of the remaining perennial deep-

rooted natural vegetation. This is an essential measure in the regional strategy to reduce the problems of rising water tables and associated land degradation.

Major extensions to the Wyperfeld National Park and a large national park covering most of the Sunset Country and extending north to include Lindsay Island on the River Murray are proposed. A new State park, a regional park, and several new reserves set aside to protect flora and fauna are also recommended.

Under the *Land Conservation Act* 1970, the Council has the responsibility to make recommendations on the use of public land in order to provide for the balanced use of land in Victoria. In making its recommendations, the Council must have regard to both the present and future needs of the people of Victoria in relation to several criteria that emphasize the need to protect significant conservation and recreation values.

Council has also taken the view that it must achieve a balance between these and other needs required by the community from public land from a local, regional, State, and even national perspective. At the same time, it must also ensure that other public land is available for other legitimate uses such as the harvesting of forest produce and mineral extraction.

It has been suggested that the multi-purpose management of public land can provide for the protection of all the significant values that are identified while still allowing commercial use of the natural resources—in other words, that there is no need to create national parks and other conservation reserves.

The concept of national parks is internationally recognized and embraces the notion that representative examples of the major land and vegetation types, together with the outstanding features occurring on public land, should not be subjected to commercial exploitation nor the environmental disturbance associated with such enterprises. These areas should, because of their significance, be afforded the maximum possible protection in legislation.

In national and State parks, the aims of management are to provide recreational and educational opportunities consistent with the preservation and protection of the natural environment, indigenous species, and other

conservation values. Developments associated with the recreational use of these parks is confined to small areas to minimize disturbance. However, in State forest, where management aims differ and timber production or grazing can be a major use, larger areas may be subject to modification, linked to particular vegetation types and locations. Protection of natural values is an essential part of the management of most public land and uses must be consistent with the aim of avoiding predictable long-term environmental damage such as salinity. In some cases, however, decisions often favour one form of use over another and the maintenance of biological diversity and protection of natural values can be reduced when resource utilization is the primary use.

The Council believes that in parts of the public land estate, pressures to modify the natural environment should be minimized. Consequently it has adopted the policy of setting aside areas of public land for parks, to be used in ways that are consistent with nature conservation.

Many people and conservation groups have requested that virtually all of the larger parcels of public land in the Mallee be placed in some form of major conservation reserve. An important aim of the Council is to maintain the community's high regard for our conservation reserve system in Victoria by ensuring that this is representative and viable, and contains particularly those areas that are outstanding or significant. The areas in the Mallee defined by the Council for inclusion in the national park system contain such outstanding and significant biological, scenic, and recreation values.

The Council nevertheless recognizes that many areas of public land in the Mallee that are not included in new or existing conservation reserves have important conservation values that need to be protected. Most of these are specifically identified in the recommendations for State forest, where protection has been, and will continue to be, provided to such values. Indeed, State forest plays a crucial role in conservation of the State's resources and, considering it occupies about two-thirds of all public land, it is of utmost significance as floral and faunal habitat. The government has placed greater emphasis than ever before on the

protection of other values outside the reserve system and this is reflected in the aims of the State Conservation Strategy in relation to such areas. These are to:

- maintain essential ecological processes and life-support systems
- preserve genetic diversity
- maintain renewable resources
- protect and manage natural systems and their diversity for the non-material needs of society

Public land in the region has special significance with respect to the conservation of semi-arid vegetation and faunal habitats in south-eastern Australia and the need to maintain or restore an adequate vegetation cover over large areas of public land to minimize the risk of wind erosion and increasing salinity.

Many woodlands and shrublands in the Mallee have suffered a dramatic decline in vegetative cover. Overstorey trees are senescent and regeneration is virtually non-existent. Perennial native understorey shrubs and grasses are being replaced by annual exotic species. These changes need to be reversed to ensure reduction of the contribution public land makes to the regional salinity problem in the Mallee. This requires restoration and retention of both the perennial overstorey and understorey species.

Wind erosion has long been of concern in the Mallee. Semi-arid lands such as these tend to erode when soils are exposed to strong winds. The main reasons for this are that the soil surface is only weakly bound by humus and is frequently dry.

The more susceptible lands are those with east-west or irregular sand dunes in the drier north and the Big Desert, many of which still occur on public land. These usually comprise deep infertile sands. Soils in the south-east of the study area are more stable due to their higher clay fraction, but they can be badly affected when poorly managed, particularly during droughts. Erosion becomes significant where the projected ground cover of standing vegetation is less than about 25 per cent.

Given the high risk of wind erosion associated with the larger blocks of public land, it is important to protect and, where possible, enhance the existing vegetation cover on these areas and minimize activities that disturb that

cover. This includes minimizing the impact of fires, which can also expose large areas to the risk of wind erosion.

Public land and the Aboriginal people

Aborigines have lived in south-eastern Australia for more than 40 000 years and they have strong emotional and cultural ties to the land. Archaeological sites providing evidence of their occupation include middens, stone tool scatters, scarred trees, rock art sites, ceremonial stone arrangements, stone quarries and camp sites. Such places are part of Australia's cultural heritage.

Aboriginal groups believe certain areas (such as sacred sites and ceremonial grounds) have a particular significance. Other sites that provide valuable evidence of occupation and Aboriginal culture are also regarded as highly important. The evidence to date suggests that occupation was centred on the river systems, although numerous sites have been identified in the drier mallee areas and further studies are needed in order to prepare a comprehensive register of sites. The Council believes that such studies should be carried out in association with the flora and fauna surveys conducted by the Department of Conservation, Forests and Lands. In addition, it is important that a detailed oral history of Aboriginal culture and history of the area be prepared as soon as possible, before valuable information is lost forever.

Under the *State Archaeological and Aboriginal Relics Preservation Act 1972*, all archaeological relics and sites are protected. Damage or disturbance (whether deliberate or inadvertent) without a permit is prohibited.

Under Commonwealth legislation—the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*—Aboriginal communities are empowered as decision-makers in relation to the protection of Aboriginal places and objects. In accordance with this Act, land-management works or activities that have the potential to affect Aboriginal archaeological sites, places, or objects should only be carried out with the permission of the relevant Aboriginal community.

For the Mallee region, these communities are:

- Sunraysia and District Aboriginal Corporation (Mildura)
- Murray Valley Aboriginal Co-operative (Robinvale)
- Swan Hill and District Aboriginal Co-operative (Swan Hill)
- Goolum-Goolum Aboriginal Co-operative (Horsham)

While government departments employ some Aboriginal people, prospects do exist for additional employment in the government sector, particularly in connection with the establishment of interpretive facilities.

The Council welcomes the commitment of the Department of Conservation, Forests and Lands to public participation in the preparation of management plans. It suggests that special attention be given to the involvement of the Aboriginal community, particularly with respect to the identification, protection and management of sites of particular significance.

The Australian Heritage Commission

This Commonwealth statutory authority was established under the *Australian Heritage Commission Act 1975* as the government's policy, advisory, and administrative body responsible for the National Estate. The National Estate is defined in the legislation as 'those places, being components of the natural environment of Australia, or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations, as well as for the present community'.

Australia's National Estate is thus a wide-ranging concept that covers a variety of features.

The natural environment includes:

- national parks, nature reserves, and other places for the protection of flora and fauna
- the coastline and islands
- inland water expanses, rivers, lakes, and other wetlands
- special land forms, geological features, caves, forests, woodlands, and grasslands
- areas of scientific interest

The cultural environment includes:

- Aboriginal rock art sites, ceremonial grounds, and sacred sites
- Aboriginal quarries and shell mounds, camp sites, and fishtraps
- important historical and archaeological sites (both Aboriginal and European) such as old missions and cemeteries
- historic buildings and structures, either individual or in groups, including sawmills, tramlines, loading wharves, derricks, punts, equipment, and their relics
- historic towns and precincts

Establishment of the Heritage Commission

Public response to the original Committee of Inquiry into the National Estate (which reported to the Commonwealth Parliament in 1974) demonstrated that Australians do have a strong concern for the environment and that the cause of much previous neglect and destruction was a lack of public education regarding the need and means to preserve the National Estate. The Committee of Inquiry therefore recommended the establishment of a national body to be concerned with national policy and co-ordination. As a signatory to several international conventions and recommendations (the most important of these being the World Heritage Convention), Australia also has an international responsibility to protect its National Estate. Accordingly the *Australian Heritage Commission Act* was passed in 1975 and the first Commission was appointed in 1976.

Functions

One of the Commission's major responsibilities is to prepare and maintain a Register of National Estate places. The Register is thus an inventory of the significant parts of the cultural and natural environment of Australia.

Compilation of the comprehensive Register will take many years and will be a continuing process, but all registrations will have the same status irrespective of the time of their entry. There are no gradings between different categories of places in the Register and all places registered are professionally assessed in terms of the National Estate values.

The effect of registration

Registration of a place formally recognizes its National Estate values and in turn imposes some constraints on the actions of Commonwealth Ministers and authorities. The Act provides that Commonwealth Ministers and their agencies must not take any action that would adversely affect any place in the Register—unless there is no feasible or prudent alternative, unless all action is taken to minimize damage where no such alternative exists, and unless the Commission is informed and given time to comment. The Commission, under its Act, has no power with respect to the action that might be taken by State governments, local governments, private land-owners, or institutions, nor does it imply any particular attitude by the Commission or the Commonwealth to the ownership, management, or use of a place listed in the Register. Registration of a natural area does not, for example, mean that the Commission or the Commonwealth holds a view that the area should be a national park or public reserve. Rather, it means that the place has been recognized as an important component of the National Estate. The significance of the area may have been retained or enhanced because of or in spite of past management. Registration, therefore, should not be interpreted as endorsing or condemning any particular management practice or regime.

Traditional uses such as forest harvesting and silviculture, farming, fishing, recreation, and water regulation would be permitted to continue, as these have influenced the landscape as it presently exists and have played a role in the development of Australia.

In essence the Register is an alerting and educational inventory compiled on the single criterion of National Estate significance, which is being developed to be as comprehensive as practicable, and which has implications for protection where actions by the Commonwealth are concerned. It is a list of the nation's heritage resources available to all decision-makers to assist them to make better-informed decisions.

Nomination of places for the Register

Any member of the public is entitled to nominate a place for the Register, and a special form has been prepared to assist in this regard. As the Register is an on-going project, places may be nominated at any time.

Before a place is entered in the Register, the Commission is required to enter it on an interim list and to inform the community of this through a public notice. Any individual or organization may lodge in writing to the Commission an objection to the proposed registration of a place. The minimum time for public comment is 3 months from the date of public notice.

Six areas in the Mallee area are listed in the National Estate Register. These are Lake Albacutya, Big Desert Wilderness Area, the Wathe and Wandown Reserves, the Hattah Lakes system, and the Pink Lakes State Park.

The Department of Conservation, Forests and Lands

The Department of Conservation, Forests and Lands was formed in 1984 by amalgamating the Forests Commission, National Parks Service, Fisheries and Wildlife Division, Department of Crown Lands and Survey, Soil Conservation Authority, and part of the central administration of the Ministry for Conservation.

The primary role of the Department is to manage Victoria's public land so as to ensure that its resources are protected and used properly, and to care for the State's water catchments and assist landholders to conserve soil, fauna and flora, and general amenity.

Head Office, located in Melbourne, consists of seven Divisions, four of which are the functional arms—now known as the National Parks and Wildlife Division, Fisheries Division, Public Land and Forests Division, and the Land Protection Division. This last Division comprises staff formerly in the Soil Conservation Authority, the Vermin and Noxious Weeds Destruction Board, and the tree-growing extension group within the Forests Commission.

The functional arms are responsible for policy development and the preparation of State-wide

plans and programs, technical standards, guidelines, and prescriptions, and for monitoring implementation in the regions.

Public-land management is implemented by the Regional Management Division in accordance with the approved annual programs and the guidelines and technical standards provided by the Head Office functional groups.

The State has been divided into 16 regions and each regional group is responsible for the management of public land in that region, irrespective of whether an area is national or State park, State forest, or some other reserve set aside for a particular form of community use. Management plans will be prepared by staff from the regions and functional arms working together.

Particular attention has been given to fire prevention and suppression. Fire-protection services for public land are provided and co-ordinated by the Regional Management Division. The amalgamation provides significant additional benefits: direct involvement of much larger forces of staff and employees in fire prevention and suppression, and better co-ordinated and more readily available support forces of manpower and equipment. All these elements collectively enable more effective fire-prevention and fire-suppression programs to be achieved on the public lands of the State.

Under the *Conservation, Forests and Lands Act* 1987, the Director-General of the Department of Conservation, Forests and Lands assumed the statutory responsibilities of such bodies as the Forests Commission (under the *Forests Act* 1958), the Soil Conservation Authority (under the *Soil Conservation and Land Utilization Act* 1958), and the Vermin and Noxious Weeds Destruction Board (under the *Vermin and Noxious Weeds Act* 1958). Although the various functional arms of the Department exercise particular responsibilities, their roles in the administration, planning, and management of public land are closely interwoven and consequently reference in the text will be to the Department rather than to specific sections.

General recommendations

The following recommendations qualify those in the body of the text.

The Council wishes to stress the need for adequate management and protection of public land, as it has made its recommendations on the assumption that sufficient manpower and finance will be provided for the appropriate management. Unless these resources are provided, the Council's recommendations cannot be effectively implemented.

The Council therefore recommends:

- I That the authorities responsible for managing and protecting public land be given the resources necessary for the task.

Regardless of present or recommended land uses, noxious weeds and pest animals, including native animals, are exerting varying degrees of impact on natural and agricultural land values. In some cases, they cause considerable environmental damage and presently available resources are inadequate to facilitate an acceptable level of control. Particularly for pest animals, a broad control strategy that incorporates the most practical, humane, and efficient methods available should be developed and implemented. Such a strategy may involve licensed hunters.

The Council recommends:

- II That a strategy be developed and implemented by the Department of Conservation, Forests and Lands in conjunction with local government, farming, and other interest groups for the efficient and humane control of those pest animals that are effecting public and private land values to unacceptable degrees

Following Council's proposal that additional arrangements be made for protecting public land from fire, an amendment to the *Forests Act* 1958 has created the designation 'protected public land', which may include public land that is not State forest or national park. The amended Act provides for the protection from fire of all three categories. The role of providing fire-prevention and fire-protection services has now been assumed by the Department of Conservation, Forests and Lands.

Under the provisions of the *Forests Act* 1958 and notwithstanding anything to the contrary in any other Act, fires in every State forest and national park, and on all protected public land,

must be suppressed. This includes, for example, all areas included in the schedules to the *National Parks Act* 1975.

In the event of fire in any State forest, national park, or area of protected public land, powers of entry are provided under both the *Forests Act* 1958 and the *Country Fire Authority Act* 1958. Decisions as to the most appropriate course of action required to suppress the fire and as to the most appropriate equipment to be used, are the responsibility of the Department of Conservation, Forests and Lands.

The two organizations that carry out fire prevention and suppression in rural Victoria—namely, the Department of Conservation, Forests and Lands and the Country Fire Authority—have closely co-ordinated arrangements for mutual co-operation. The Council acknowledges that the control and suppression of fires in the Mallee rely heavily on the manpower and machinery resources of the volunteer fire brigades in the region.

The Council recommends:

- III That, for fire-protection purposes, public land that is not State forest or national park be examined, and appropriate areas be declared protected public land under the *Forests Act* 1958 or under any future Acts that replace it

Council recognizes that parts of the Mallee area have potential with respect to future mineral exploration and mining operations.

The Council recommends:

- IV That mineral exploration licences held over the area continue except in so far as they affect Reference Areas.

Many Aboriginal sites (particularly burial sites) on public land in the Mallee are suffering from erosion, aggravated by current land uses. In addition, a large number of sites have cultural, archaeological, and/or educational importance. Council believes that the land manager, in consultation with the Aboriginal community and the Victoria Archaeological Survey, should draft and implement appropriate management plans for Aboriginal sites on all public land regardless of the primary land use.

The Council recommends:

- V** That the appropriate land management authority, in consultation with the Aboriginal community and the Victoria Archaeological Survey, draft and implement plans for the management of Aboriginal sites, places, or objects on public land commensurate with their cultural, archaeological, and/or educational value.

The Council expects that, as a result of further study and investigation, many more areas with special values will be identified. Present planning cannot specifically provide for the conservation or utilization of these values. The Council therefore recommends:

- VI** That, when significant new discoveries are made on land within their administration, government agencies enlist the best advice available on the importance of such discoveries and how they should be managed. Advice from organizations other than government authorities and academic institutions should be sought whenever appropriate.

The Council also recognizes that in some cases existing legislation will have to be amended in order to effectively implement the recommendations in this report. It is aware that this may result in a delay, perhaps of several years, before some of its recommendations can be implemented. It is concerned that, where implementation of the recommendations would involve a change of land tenure, management efficiency could be reduced during the delay

period. The Council believes that the government should direct that the intent of the recommendations should be followed until they are implemented.

The following recommendations concern the implementation of recommendations.

- VII** That the present legal status and management responsibilities for public land continue until the resources required to implement the recommendations are available, except that the land be managed in accordance with those recommendations approved by government while formal procedures for their implementation are in progress.
- VIII** That, as they have not been precisely surveyed, the boundaries of many areas be subject to minor modifications, road excisions, easements, and other adjustments that may be necessary.
- IX** That, in cases where occupation does not agree with title, the Department of Conservation, Forests and Lands may at its discretion make adjustments to boundaries of public land when implementing these recommendations.
- X** That the recommendations in this publication do not change the status of roads passing through or abutting public land that are at present declared roads under the *Transport Act* 1983.
- XI** That, where areas of public land are not specifically referred to in these recommendations, present legal uses and tenure continue.

A. Parks

Victoria contains substantial areas of public land that have been retained in a relatively natural state. The number of people using these areas for recreation is increasing and will probably continue to do so. Pressures for the use of public land in ways that would change its condition are also increasing. Council believes that it is essential to reserve, now, viable samples of the various land and vegetation types, together with outstanding natural features, that occur on public land. These areas can best be reserved in a system of parks.

In contrast to the rest of Victoria, the Mallee retains large areas that are essentially natural and contain examples of the landscape and flora and fauna virtually undisturbed by human activities since European settlement. Such lands are a valuable part of our heritage and must be dedicated for nature conservation and the benefit, education, and enjoyment of present and future generations. This principle of land use is a major consideration in determining that areas should be reserved as parks.

A park is defined here as 'an area of land in a natural or semi-natural condition reserved because of its scenery, floral and faunal content, historical interest, or other features, which is used by the public primarily for open-space recreation and education'. This definition encompasses many different types of parks; they vary mainly in size and content and in the types and intensity of uses to which they are subjected. Definitions of different types of parks are needed to clarify the main purposes for which each one is created, and will help planners, managers, and users of parks.

It is necessary to establish the management aims that apply to areas or zones within parks. Among these, the conservation of native flora, fauna, and other natural features would be an essential part of national and State park management. This should include the identification and strict protection of significant ecological systems as well as the development and use of techniques (including husbandry techniques and population manipulation) to enable species of particular interest to be studied and special values associated with flora and fauna to be maintained or enhanced.

The location and management of areas zoned for intensive recreation will require special care to prevent damage to the environment.

This publication presents recommendations concerning parks in terms of the uses to which the land should be put and places them into categories according to the scheme of classification suggested below.

Park categories

National park

An extensive area of public land of national wide significance because of its outstanding natural features and diverse land types, set aside primarily to provide public enjoyment, education, and inspiration in natural environments

The conservation of native flora, fauna, and other natural features is an essential part of national park management. Interpretative services would be provided. Development of facilities would be confined to a very small portion of the park as activities largely consist of sightseeing and the observation of natural features. Wilderness zones, which are relatively undisturbed tracts of land used for solitude and wide-ranging forms of recreation, could be designated within a national park.

State park

An area of public land, containing one or more land types, set aside primarily to provide public enjoyment, education, and inspiration in natural environments

State parks should include samples of major land types not already represented in national parks and, as in national parks, the conservation of native flora and fauna is an essential feature of management. Interpretative services would be provided. Development of facilities would be limited to a very small portion of the park as activities largely consist of sightseeing and the observation of flora, fauna, and other natural features. State parks recommended by the Council are intended to complement the national parks so that together they form a State-wide system.

Regional park

An area of public land, readily accessible from urban centres or a major tourist route, set aside primarily to provide recreation for large numbers of people in natural or semi-natural surroundings

These parks would be intensively developed for informal recreation and could include road systems. Although natural beauty would enhance their value, closeness to an urban centre is more important than natural attributes. Other uses—such as stone extraction or timber harvesting—may be permitted where they are compatible with the primary use.

Park management

Council recognizes that wildfires, however caused, must be prevented from threatening life, property, and natural resources in the State. The measures necessary to control wildfires must be taken in parks as in other areas. In all parks the suppression of fires remains the responsibility of the Department of Conservation, Forests and Lands.

Fire-prevention measures such as maintenance of fire-access tracks and protective burning will also be required in those areas of parks that have strategic importance for fire-control. The particular measures to be taken in individual parks will be incorporated in the protection plans prepared by the Department of Conservation, Forests and Lands.

The two organizations that share the duty of fire-prevention in rural Victoria—namely, the Department of Conservation, Forests and Lands and the Country Fire Authority—have closely co-ordinated arrangements for mutual co-operation.

Control of vermin and noxious weeds within parks will continue to be the responsibility of the Department of Conservation, Forests and Lands, and will be carried out in accordance with plans prepared by the Department.

Pest animals, such as rabbits, goats, pigs, and, in some instances, kangaroos, cause particular concern in some parts of the Mallee—both inside and outside parks. Control measures may become necessary at times and may involve the use of firearms by hunters (if within parks, under special permit from the land manager) to reduce populations at times and in areas specified by the land manager.

With sensitive and responsive planning and management, the Council believes, parks should be able to cater for a broad spectrum of public recreation activities without prejudicing their other major functions—namely, long-term conservation and protection of the special natural features.

Parks in the Mallee

In 1977, the Council recommended the enlargement of the Wyperfeld and Hattah Lakes National Parks, the establishment of the Pink Lakes State Park, and the establishment of two regional parks—in all, covering some 201 700 ha.

Wyperfeld National Park, on the eastern fringe of the Big Desert, contains examples of the irregular and east-west trending dunes of the desert and a chain of (usually) dry lakes on the floodplain of Outlet Creek—the northern extension of the Wimmera River. Within this park, the river red gum forests and black box woodlands on the floodplain, slender cypress pine and buloke woodlands bordering the lower reaches of the floodplain, mallee scrub, and heathlands provide habitats for a wide variety of faunal species as well as being an important recreational resource.

Hattah-Kulkyne National Park receives a very high visitor use, much of which is based on the fresh-water lakes, which provide stark contrast to the nearby mallee and woodlands which typically occupy this semi-arid environment. This park is one of only three established world biosphere reserves in Victoria.

On the southern margins of the Sunset Country, Pink Lakes State Park is centred on a group of picturesque pink salt lakes. It includes samphire flats, woodlands growing on copris, fields of mallee-clad irregular dunes, and grasslands. Visitor use of this park is rapidly increasing.

Lake Albacutya is the focus of a regional park which, when the lake is full, is intensively used by local people and tourists for picnicking, swimming, boating, fishing, and hunting. The Murray-Kulkyne Regional Park, included with the Hattah-Kulkyne National Park in a world biosphere reserve, borders the River Murray and is highly popular for river-based recreation and camping.

New park proposals

In formulating its recommendations for major nature conservation reserves in the Mallee, the Council evaluated all the information on the natural resources in the area, bearing in mind their significance in a State-wide and south-eastern Australian context. Representation of important features and values in the existing park system was also taken into account.

Council is now recommending the establishment of a major new national park that includes the Pink Lakes State Park and incorporates the Sunset Country and Lindsay Island, embracing more than 600 000 ha. Although about 20% of this new park is used for licensed grazing, these areas include some of the most significant and vulnerable vegetation communities and faunal habitat.

The recommendations also include large extensions to the Wyperfeld National Park and a new State park and regional park. In total, the recommended additions to the park system in the Mallee comprise 773 500 ha and increase the area within national parks here to more than 961 000 ha.

The large additions will provide representation in the park system of native plant and animal communities of the semi-arid environment of south-eastern Australia as well as those that are unique in Victoria, many of which are currently inadequately protected. They give recognition to the outstanding nature conservation and recreational values of the Mallee. Each addition to the park system is discussed further below.

The recommendations concerning national parks require the removal of stock grazing, and this is discussed in detail in Chapter F—Agriculture.

The Council is aware that many of the new park proposals contain areas that are disturbed by grazing of domestic stock, rabbits, and native fauna and past land management practices, such as timber harvesting. Considerable resources will be needed to bring the rabbits down to an acceptable population and to foster adequate revegetation of these disturbed areas.

Park Use

The Council has always stressed that one of the aims in the reservation of parks is to provide for the enjoyment, recreation, and education of

the public in the natural environment. This philosophy is particularly relevant to the very large parks in the Mallee, with their diversity of complex environments and the varied public uses they support.

Some community concern has been expressed that many popular activities, such as four-wheel-drive touring or camping, will be unduly constrained in these parks. This is not so, and the Council has made its recommendations on the understanding that management plans will provide the opportunity for the continued enjoyment of a wide range of recreational activities, and wishes to emphasize the necessity to involve user groups during the preparation of such plans.

Council believes firmly that the Mallee parks should not become the exclusive preserve of the young and fit, the bushwalker, and the naturalist, but that all sections of the community, including those on horses or in vehicles, should have the opportunity to enjoy examples of the unique features that they offer.

With sensitive and responsive planning and management, the Council believes, the park system should be able to cater for a broad spectrum of public recreation activities without prejudicing the other major functions—namely, long-term conservation and protection of the area's special natural features.

Public access

An essential aim in the reservation of parks is to provide for the enjoyment of the public, and therefore public access will be maintained. Indeed, additional access may be provided to interesting areas by way of nature trails, walking tracks and bicycle tracks.

Motorized recreation

The Council believes that the Mallee park system should offer a wide range of recreational uses. There is a place not only for photography, bird-watching, nature study, etc., but also for activities such as scenic driving, and for touring using the tracks through rough terrain and into relatively isolated areas as well as using the system of formed roads.

Because of its extensive network of roads, the region has particular value for motorized recreation. The Council considers that the park

system should continue to contain a series of linked roads, mainly of four-wheel-drive standard, available for use by registered vehicles in order that extended touring throughout the Mallee is possible. As well as this system of linked roads, subsidiary tracks should be maintained for community use where this does not conflict with other park values. However, it must be appreciated that, in accordance with regulations under the *Land Conservation (Vehicle Control) Act 1972*, motorized vehicles (including motorcycles) may only be used on public land if they are registered and on roads or tracks formed for the passage of vehicles having four or more wheels. Driving vehicles off such roads is prohibited. This applies to all public land in Victoria, whether it is in parks, State forest, or other reserves.

The Council points out, however, that the existing system of seasonal road closures, for reasons such as safety and erosion hazard, should continue, after consultation between the managing authorities and user groups.

Camping

Dispersed camping occurs throughout the region in association with many outdoor recreational activities. The Council considers that, subject to the management plan developed for each park, large areas should remain available for dispersed or bush camping within the park system. That is, in these parks, users should generally be allowed to camp where they choose as well as in camping sites delineated by the managing authority. However, it may be necessary to prohibit camping in particularly sensitive areas.

A number of schools and community groups currently use the area for camping and other activities. Locations within the park system should continue to be available for these uses. Consideration will need to be given to the type of camping facilities that may be developed.

Horse-riding

Horse-riding is becoming an increasingly popular recreational activity and trail-riding clubs as well as individual riders visit the area. Camel-riding is also attracting some interest in the Mallee. In general, Council believes that

the use of horses and camels could be permitted within the park system. It may be necessary, however, to place conditions on the time, location, and manner in which these activities can be undertaken in order to minimize conflicts with other park users, to prevent the spread of weeds, and to protect environmental values. It may also be necessary to prohibit this activity in particularly sensitive areas.

Apiculture

Public land in the Mallee includes several areas of major importance for the production of honey and the overwintering of bees. Where areas that have been traditionally licensed in the past are recommended as part of parks, apiculture should be permitted where this does not conflict with other park values—particularly in areas of high recreational use. The number of apiary sites should also be maintained subject to park management requirements and pending the outcome of research into the ecological impacts of the industry. This is further discussed in Chapter F—Agriculture.

NATIONAL PARKS

Wyperfeld National Park

Recommendation

- A1** That the area of 95 970 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Additions to the Wyperfeld National Park

Several areas are recommended for addition to the existing Wyperfeld National Park. These contain features and attributes that add to or enhance the values already found in the park. The particular attributes of each are described below. As well as the recommendations below that apply to all the additions, specific recommendations apply to each of them.

Recommendations

- A2-
-A4** That the areas indicated on Map A and described below be used to:
- (i) provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments
 - (ii) conserve and protect natural ecosystems
 - (iii) protect sites of archaeological and historical importance
- that
- (iv) apiculture be permitted on traditionally licensed sites and the number of sites maintained subject to park management requirements and pending the outcome of research into the ecological impacts of the industry (see Chapter F—Agriculture)
 - (v) harvesting of forest products not be permitted
 - (vi) legal access continue to be available to freehold land enclosed within the park
 - (vii) a range of recreational activities, including those mentioned in the preamble, be permitted where they do not conflict with other park values
- and that they be included in a schedule to the *National Parks Act* 1975 and be managed by the Department of Conservation, Forests and Lands.

Western addition

Topography and land systems

Relatively high irregular sand dunes interspersed with sandplains and closely spaced east-west dunes make up the major topographic features of the Big Desert and comprise the two main land systems (IPRc3 and EPRc3 respectively). Further topographic diversity is provided by rocky outcrops of Parilla Sand and broad swales of less permeable sands among the east-west dunes.

The recommended western addition to the Wyperfeld National Park extends its representation of these major land systems—

particularly of the irregular sand dunes, which comprise more than half of the Big Desert. It also adds broad sandplains of the central Big Desert, which were previously under-represented in the park.

Vegetation

Three sites of botanical significance that also complement the park's representation of Big Desert environments are incorporated here. The northern portion contains the largest remnant of scrub-pine (*Callitris verrucosa*) woodland in the Mallee. The large size of the individual plants and limited species composition of this woodland indicate its great age—an unusual occurrence given the fire history of mallee scrub.

A number of natural water soaks occur along the northern fringe of the Big Desert. These would have been important to Aborigines utilizing the resources of the dune-fields. A number of stone artefacts have been found at several of them. Three soaks (including Majorlock and 12-mile) are included in this park addition and associated with them are small stands of pine-buloke woodland and black mallee-box (*Eucalyptus porosa*). Both of these plant communities are now limited in extent on public land, being associated with soils with good agricultural potential; the latter is poorly represented in nature conservation reserves. An outcrop of Parilla Sand is also included in this addition, near Majorlock.

The largest undisturbed example of broombush mallee in the State is located in east-west dune-fields, south-west of Wirrengren Plain—only portion of which lies within the existing park. The addition ensures that the whole of this stand as well as a contiguous band of this community in the south is protected. Elsewhere in the Big Desert, broombush is being utilized for the broombrush market.

Large, broad plains in the irregular dune-fields of Lowan Sand extending across the centre of the Big Desert support a sand-plain heath community. The botanical importance of these heathlands stems from their wide species diversity and, in spring, they flower profusely, making them scenically very attractive. These heathlands are under-represented in the existing park.

An extensive stand of red-swale mallee is included in the south. The community is much depleted in the Mallee as the heavier soils on which it is found are highly suited to agriculture. This area includes Milmed Swamp, Arnold Springs, and Chinaman Flat.

Fauna

The Big Desert supports a rich diversity of fauna; the semi-permanent water resources along the northern spring line, for instance, are extremely important to wildlife and the variety of habitats offered by the old scrub-pine, heathlands, broombush, and red-swale mallee particularly, are valuable for their respective faunal communities.

Red-swale mallee, for example, supports four species of small mammals, malleefowl, the southern scrub robin, and a number of significant and notable reptiles, including the skink *Ctenotus brachyonyx*, the burrowing legless lizard *Aprasia inaurita*, and the coral snake.

Mallee heath, on the other hand, supports six species of small mammal and is utilized by a remarkable diversity of honeyeaters. Other important bird species here include the red-colored whistler (rare within an extremely restricted range in Australia), mallee emu-wren, slender-billed thornbill, and southern scrub robin. The reptile fauna include the only known occurrence of the earless dragon in mallee vegetation, the dragon *Amphibolurus norrisi*, the common scaly-foot, the very rare legless-lizard *Aprasia aurita*, Rosenbergs goanna, the skink *Ctenotus brooksi*, the bardick, Masters snake, and the small burrowing snake *Unechis spectabilis*.

Other species of particular interest found here include western pygmy-possum (an uncommon species in Victoria, which depends on heaths, mallee-heaths, and broombush communities), silky mouse (which is also heath-dependent), Mitchell's hopping-mouse, Mallee ningau, which is restricted to mallee with a porcupine grass (*Triodia* sp.) understorey, and malleefowl. The regent parrot, another significant bird species for Victoria, also utilizes the mallee eucalypts as a major source of food.

Wilderness values

Portions of the Big Desert were recognized by Preece and Lesslie as having high wilderness quality. The largest is contained within the Big Desert Wilderness Area. Two other large areas, one between the Milmed and Chinaman Well Tracks and the other immediately north of the Milmed Track and including the broad sand-plain heaths, fall within this addition to the park. Because of their undisturbed nature, these areas have high conservation and recreational value, and they should be managed to maintain and enhance their wilderness values. Smaller areas are located south of the Chinaman Well Track and outside the park addition. These fall within one of the three semi-arid wilderness areas identified in the 1979 inventory of wilderness in Victoria by Feller *et al.*

Other

Portions of this area are accessible by four-wheel-drive routes, including the relatively popular Milmed Track, but much is suited to more remote, non-mechanized recreation. The area offers the 'outback' experience within a day's drive from Melbourne and the wide variety of native plant and animals found here are increasingly popular for nature study and photography, particularly the extensive heathlands.

Recommendation

A2 That the area of 182 270 ha, shown on Map A, be added to the Wyperfeld National Park and be used in accordance with the general recommendations outlined above and to:

(i) protect areas of high wilderness quality

and that

(ii) grazing not be permitted.

Note:

A large number of excavations for road-surfacing material have been opened up beside the Murrayville Track, some of which are now located within the park. Suitable material to stabilize this road is scarce and the cost of importing alternative materials would be high. The road maintenance authority should be

permitted to continue to extract material from pits along this road. However, where possible, the pits should be screened from the road, with vegetation, and disused pits rehabilitated and test holes back-filled.

Other additions to Wyperfeld National Park

A number of small parcels of public land, listed in the schedule below, adjoin the eastern portion of the Wyperfeld Park and have conservation and recreational values that would complement those of the park.

Recommendation

- A3** That the areas totalling 7560 ha, listed in the following schedule and shown on Map A, be added to the Wyperfeld National Park and be used in accordance with the general recommendations outlined above and that grazing, where it is currently licensed, be terminated by 1 July 1990.

Schedule of additions

- A3 (a)** 2800 ha in the Parishes of Tyamoonya and Nyapo.

This area is currently part of the Lake Albacutya Regional Park, but does not receive the high recreational use for which that park is set aside. It contains an unusual occurrence of yellow gum woodland with a porcupine grass understorey, stands of slender cypress pine and buloke, as well as black box woodland and river red gum forest on the floodplain. Regent parrots, bush thick-knees, and wedge-tailed eagles nest here. Its addition to the Wyperfeld National Park would rationalize the boundary between the two parks and recognizes the conservation emphasis of management that the land should receive.

- A3 (b)** 900 ha, being Allotments 12 and 13, Parish of Wyperfeld.

This long-unburnt area contains a range of intact Big Desert floral communities associated with the east-west sand dunes. It is readily accessible by two-wheel-drive vehicles.

- A3 (c)** 1630 ha, being Allotments 9 and 9B, Parish of Dattuck, and Allotments 8 and 8A, Parish of Yallum.

This incorporates a section of the now-disbanded Hopetoun-Patchewollock railway and extends the Wyperfeld Park boundary to the Hopetoun-Patchewollock Road. It contains loamy-sand mallee, tea-tree scrub, and scrub-pine woodland.

The old railway clearing provides a convenient firebreak in this area.

- A3 (d)** 1270 ha in the Parishes of Yallum and Patchewollock.

This unmodified area of loamy sand mallee has inliers of scrub-pine woodland, red-swale mallee, heath, and broombush mallee.

- A3 (e)** 960 ha, being Allotments 30 and 38 and part of Allotment 43, Parish of Baring.

This area straddles one of the main access routes to the northern end of the Wyperfeld Park. It is in a relatively natural state and contains a good example of loamy sand mallee—a community prevalent in much of the eastern part of the present park but somewhat less accessible to conventional vehicles.

Pine Plains

In its 1977 Final Recommendations, Council noted that the recreational, scenic, and nature conservation values of Pine Plains were outstanding and that the area should eventually be added to the Wyperfeld National Park. It also indicated that the pattern of agricultural use here is likely to gradually reduce the nature conservation values of the area, in particular the wildlife habitats on the grassy plains and pine ridges.

The Pine Plains area includes the terminal lakes of the Wimmera River system and as such is of considerable geomorphological interest. In contrast with the salt lakes at the termination of Tyrrell and Lalbert Creeks, Lake Agnes and Wirrengren Plain are fresh-water herbfields, although their flooding frequency is probably now much diminished. Chapter O—Water supply and drainage—discusses the frequency of flooding of the Wimmera River and Outlet Creek system and the issue of provision of environmental flows in the system to assist in the rehabilitation of the riparian vegetation here.

The lake-bed herbfields form open plains that support a small but distinctive fauna, with the adjacent mallee and ecotonal areas providing additional habitat. Woodlands of pine and buloke in the north and east of this addition are of major importance to the pink cockatoo, a species of limited occurrence in Victoria and highly susceptible to disturbance. The white-browed treecreeper also depends on the pine-buloke woodlands here. This bird has suffered massive decline in numbers with the loss of its preferred habitat. Both the regent parrot and peregrine falcon have also been observed feeding in this area.

The nature conservation values of Pine Plains are continuing to diminish through progressive death of the woodland species and as grazing pressure (from both domestic stock and rabbits) continues to suppress regeneration.

Recommendation

- A4 That the area of 28 860 ha shown on Map A be added to the Wyperfeld National Park and be used in accordance with the general recommendations outlined above

and that

licensed grazing be terminated according to the schedule and map in Chapter F—Agriculture, but no later than 1 July 1996.

Note:

The Wyperfeld National Park and the recommended additions have potential for heavy mineral sands (Parilla Sands), which are currently being investigated elsewhere in the Mallee. Areas in the west have potential for gold and base metal mineralization. A petroleum exploration permit is also current for most of the Big Desert, including the existing park and recommended extensions.

Other park proposals

A number of other proposals for additions to the Wyperfeld National Park were considered by Council. These ranged from relatively small areas to major additions that would have encompassed much of the balance of the Big Desert.

Of particular note is the 'Paradise' block in the Parishes of Wyperfeld and Nypo. This is regarded as a major refuge for malleefowl and contains a number of active malleefowl mounds. The black-eared miner was sighted here and the block supports a number of other mallee fauna. Its inclusion with the park, however, would create a large inlier of cultivated freehold land within the park. Nevertheless the area requires particular protection and the Council has recommended that it should be set aside as a flora and fauna reserve (see Recommendation G49).

The recommended additions to the Wyperfeld park, together with the existing park, the other nature conservation reserves, and the Big Desert Wilderness, ensure the protection of the special attributes of the Big Desert and contain representation of its key vegetation types, habitats, and land systems. Given Council's charter for recommending balanced land use and the need to allow for other uses of the Big Desert, it is not considered necessary to add further major areas to the nature conservation reserve system here.

Hattah-Kulkyne National Park

Recommendations

- A5 That the area of 46 160 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

In its 1977 recommendations, the Council noted that this area had suffered the worst rabbit infestation in Victoria. Enormous resources have been and continue to be used to control the pest. An intensive plan for rabbit control has been in operation here since 1981 and it is expected that this will achieve an acceptable level of control within areas of the park that are fenced against re-infestation.

However, the high population of western grey kangaroos here also imposes severe grazing pressure on the natural vegetation—inhibiting revegetation programs and limiting habitat for other fauna. This population is sustained by food sources, which previously had been kept low by the rabbit population, and the availability of water.

Council believes that the over-riding consideration here is the protection and maintenance of the total plant and animal community. To achieve this it may be necessary to cull the kangaroo population in the park. Otherwise park values will continue to suffer and the periodic events in which a large proportion of the kangaroo population perish will also continue. It must be recognized that human impact has had a major effect in bringing about such events and it has been necessary to impose a high level of management to overcome these problems. Part of that management involves the control of population numbers of certain native species, such as the grey kangaroo, until something approaching the natural balance is achieved once more.

The Department of Conservation, Forests and Lands has experimented with a variety of methods to control kangaroo numbers.

A5 (a) That, in order to protect and maintain the important conservation values in this park, effective control measures, which could include culling, be imposed to reduce the kangaroo population to a level that ensures the re-establishment and maintenance of the natural system.

Other park proposal

A proposal to include the Liparoo forest with this park was considered. This area, immediately upstream of the Hattah Park, has high recreational use and contains an interesting invertebrate fauna and Council decided that it should more appropriately be managed as part of the adjoining regional park (see Recommendation A11).

Murray-Sunset National Park

This new national park incorporates the existing Pink Lakes State Park, the Wymlet flora and fauna reserves, and the Raak flora reserve. It extends from the South Australian border and the River Murray in the west and north-west, takes in the Sunset Country, and links with the Hattah-Kulkyne National Park in the east. The new park encompasses a broad range of environments, providing representation of the Murray Basin mallee of south-eastern Australia as well as the riparian vegetation of the River Murray, which contrasts sharply with the semi-arid vegetation through which the river flows.

Topography and land systems

The Sunset Country and the Lindsay Island area embrace a variety of topographic features, each of which is expressed in the land systems identified for the region. The new park incorporates all the major land systems described below, many of which are either not represented or only partially represented in existing major conservation reserves.

Lindsay Island is formed by an anabranch system of the River Murray and includes the Lindsay River, Mullaroo and Toupnein Creeks, and a large number of billabongs and wetlands. Other topographic features here include meanders, meander scrolls, channel-bordering dunes, terraces, and natural levees. These all form part of the floodplain land system (Ffc2).

South of Lindsay Island, the park includes Lake Wallawalla, which is filled periodically when the Lindsay River floods. East of the lake, its associated lunette (land system Lf3) is one of very few such structures on public land in the State; two other lunettes are located in this park west of Lake Wallawalla. The recommended park also includes representation of the higher terrace (Pf2), of which, again, very little remains as public land. This terrace is above the general level of flooding but is thought to be a relict floodplain of Pleistocene age.

South of this higher terrace, the land surface rises some 20 m to an elevated plain carrying subdued calcareous east-west dunes (land system RPEfc2). This land system is used extensively for agriculture and is occupied by the Millewa croplands; the portion remaining as public land is confined principally to the far north-west of the Mallee area.

The undulating plains of the western Millewa included in the park comprise calcareous earths (PREfc12)—which, in South Australia particularly, are extensively cleared for agriculture. These plains are associated with small saline areas and gypseous (copi) dunes (PYfz2) derived from the evaporative basins of the Noora depression.

Relatively subdued, closely spaced, east-west calcareous dunes comprise the northern half of the Sunset Country. In the west, calcrete (limestone concretions) are evident in the loamy soil (EPfc12), while in the north-east the

limestone is absent (EPfc2). Across the centre, the soils are sandier and the dunes more evident (EPRcf2 and EPcf2). The loamy soils are used extensively for agriculture in South Australia and the east Millewa. Little of the sandier soil (EPcf2 and EPRcf2) is used for agriculture except towards the fringes of the better wheat country near Berrook, Wymlet, and Annuello.

Siliceous dunes form the southern half of the Sunset Country. Fields of high irregular dunes (Berrook Sands) have formed throughout this band (IPc2 and IPRc2) and, in the east, are encroaching on the flat, saline Raak Plain.

Closely spaced east-west dunes comprise most of this siliceous dune-field and again, in the west, limestone is evident in the soil profile (EPcl2); limestone (calcrete) ridges also occur here. These soils support agriculture at Berrook and in South Australia. However, agriculture occupies very little of the siliceous sands without limestone (EPRc2 and EPc2), which also comprise the Big Desert dune-fields. There is some representation of these siliceous dunes in the existing Pink Lakes park; this dune-field extends east into the southern portion of the Hattah-Kulkyne National Park.

A series of sandplains (Pfc2) have formed across the centre of the Sunset Country dune-fields, aligned with the Danyo Fault. It is presumed that these plains, which include the Sunset, Mopoke, and Last Hope Plains, formed as sand was blown over saline depressions or boinkas.

In the east, saltpans (Pz2) and associated sandplains (Pcz2) have formed in the Raak depression. All these sandplains are currently used for licensed grazing. Gypseous dunes (PYfz2) also occur here and more extensively in the south around the Pink Lakes. Mining operations are concentrated on the gypsum deposits in the Raak Plains; the current mining tenements are excluded from the park.

Other geomorphologically interesting areas here include Rocket Lake, the active Berrook dune-front encroaching on the Raak Plain, the Raak Plain itself, Pink Lakes (of State significance), and the ferruginized sandstone outcrops (probably used by Aborigines as a source of ochre) such as those on the edge of the Raak Plain. Limestone ridges outcropping near Berrook add both botanical and geomorphological interest as do an outcrop of Parilla Sand in the south-west and a band of

silcrete—known as 'Rock Holes'—presumed to be an Aboriginal watering place.

Vegetation

The vegetation types in the Mallee and their distribution are determined by soil types and the availability of moisture.

River red gum and black box, for instance, require more water than is provided by rainfall in the northern Mallee and depend on floodwaters. Upstream, in the Nyah and Barmah forests, extensive areas are frequently inundated and river red gum has established over the broad floodplain. In the Lindsay Island system, however, the main channels are more incised and there is much greater surface relief than in some of the upstream locations. The frequently flooded area is consequently much more restricted and river red gum is usually found only on the lowest terraces, immediately adjoining watercourses and water bodies.

Black box—chenopod woodlands occur on the intermediate terraces of the floodplain, where the increased elevation substantially reduces the frequency and duration of flooding. These woodlands occupy much of Lindsay Island. The highest terraces carry treeless chenopod shrublands (alluvial plain and alluvial rise shrublands).

The only occurrence of chenopod shrubland in Victoria is in the north-western Mallee. Although this community is substantially disturbed in certain areas, that portion included in the park is in better condition than elsewhere on this land system in Victoria or the adjoining States. The presence of riverine species in the semi-arid north-west of the State provides valuable biological contrasts, enhanced by the rapid transition into woodlands and mallee scrub on the ridge to the south of the floodplain.

The western portion of Lindsay Island has greater topographic diversity than the east and so contains a wider variety of plant species, although the eastern portion contains more extensive *Sporobolus* grasslands on its lower-lying areas. These grasslands are uncommon in South Australia and do not occur in the lower reaches of the Darling River in New South Wales.

The Darling River appears to have influenced plant dispersal in the area—as suggested by the

presence of twiggy emu-bush (*Eremophila polyclada*) and hairy Darling pea (*Swainsona greyana*) here, but not elsewhere on the River Murray floodplain above the Darling confluence.

To date, investigations on Lindsay Island and the adjacent public land around Lake Wallawalla have established the presence of more than 20 significant plant species, such as the Murray lily—Victoria's largest native flower. Thirteen of these plants are classified as rare and a further two, bignonia emu-bush (*Eremophila bignoniiflora*) and erect peppercress (*Lepidium pseudopapillosum*), are at risk of extinction under current land uses.

With 95% of the State's native grassland communities eliminated or grossly modified, the sand-plain grasslands found at Sunset, Mopoke, and Last Hope Plains are of State-wide significance. The grasslands of the Sunset Plains have shown considerable improvement since the exclusion of grazing in the 1982 drought. Extensive work is required, however, throughout all the plains areas as well as the woodlands to reduce the impact of grazing pressure from all herbivores—native, domestic, and feral—particularly on the regeneration of the woodland species—pine, belah, sandalwood, and cattlebush—associated with these plains.

Gypseous plains grasslands and gypseous rise woodlands are not yet represented in conservation reserves. Both are degraded by past land management and long-term grazing pressures. These rare plant communities, threatened with extinction by continued grazing pressure, are included in the north-western part of this park.

Extensive stands of *Eucalyptus cyanophylla* grow on the low east-west calcareous dunes in the west of the recommended park. This eucalypt is limited in distribution in Australia to here, south-eastern South Australia, and south-western New South Wales; agricultural activities in the other States mean that the Victorian community is of high conservation significance.

In the west, the influence of limestone in the soil profile has produced uncommon subcommunities of both shallow-sand mallee and chenopod mallee and, to date, 20 significant plant species have been identified in

this portion of the park. These include the rare *Acacia colletioides*, *Cheilanthes lasiophylla* (a fern growing on a rocky ridge in the south-west), *Dodonaea hexandra*, *Helipterum polygalifolium*, *Stuartina hamata*, and *Zygophyllum crenatum*. The prostrate annual forb *Phlegmatospermum eremaeum*, found here, is vulnerable Australia-wide.

Sunset Country subcommunities of broombush mallee and red-swale mallee are included in the north central part of this recommended park and a diverse chenopod shrubland grows under mallee near Last Hope Tank. Chenopod mallee, particularly, and the shallower sand and loamy sand mallees elsewhere have been extensively cleared for agriculture, enhancing the importance of those samples included in the park.

Representation of the Raak Plain has been included in the north-eastern portion of the park. Saline shrubland is growing here in probably the most diverse saline and gypseous environment in the State. Although a number of the significant plant species occur on similar soils within the existing Pink Lakes Park, at least eight additional ones are found on the Raak Plain; these include the rare twin-flower saltbush (*Dissocarpus biflorus*), elacanth (*Elachanthus glaber*), wiry glasswort (*Halosarcia lylei*), and the three-winged saltbush (*Maireana triptera*).

Associated with *Eucalyptus gracilis* in chenopod mallee communities in the north-eastern extremity of the park are stands of the rare spiny goose foot (*Rhagodia ulicina*) and the vulnerable silvery emu-bush—*Eremophila scoparia*. Because of extensive clearing of chenopod mallee soils for agriculture, these species are becoming seriously threatened. The endangered swainson pea (*Swainsona stipularis*)—which is susceptible to grazing—is also located here.

The recommended park's representation of the semi-arid environment of south-eastern Australia and its contiguous nature, large size, and wide diversity of plant communities make it a biological reserve of national importance.

Fauna

Faunal species dependent on the wide variety of plant communities here are similarly varied

and include a distinctive representation of the fauna of inland Australia. Many of the important ones are mentioned below and, as the park contains the habitat of several others, the potential for the identification of further species is high.

The chestnut-crowned babbler, pied butcher bird, and tessellated gecko are found on the floodplain in the north as well as a fauna unique in Victoria and confined to the alluvial shrublands: inland dotterel, an apparently undescribed species of legless lizard, and the paucident planigale and curl snake—all being important and notable species.

Other important, notable, and significant species include the barking owl and bush thick-knee, which have been reported from Lindsay Island; also, when it contains water, Lake Wallawalla provides excellent waterfowl feeding and breeding habitat.

The Sunset Country supports significant vertebrate species such as the red kangaroo and greater long-eared bat (sand-plain grasslands), the distinctive fauna of the margins of the saline areas and *Ctenotus brachyonyx* of the dune-fields. The black-eared miner has, to date, been found at four sites in dune-fields of the northern Mallee, three of which are located in the park.

The contrasting vegetation at the interface between the east-west dune-fields of the northern section of the park and the high, irregular dunes of the south with the Raak Plain provides a particularly rich diversity of habitat.

A wide range of raptors breed in this area, including the wedge-tailed and little eagles, black-shouldered kite, and collared sparrowhawk, while the coppi plains support the notable species rufous calamanthus. The only Victorian records of the small skink (*Hemiergus millewae*) have been made in the porcupine grass of the deep-sand mallee community in the south of the park. The rare red-lored whistler has been found in the southern dune-fields here and malleefowl nests occur in a number of locations. The western pygmy-possum and the fat-tailed dunnart have been found in the south-west.

The regent parrot uses the area extensively, occupying hollows in the river red gums of the floodplain and feeding in the mallee areas.

Wilderness values

The area between the Sunset, Underbool, Pheeny, and Millewa South Bore tracks included in the park comprises a tract of predominantly irregular dunes of the Berrook dune-field, which has not been accessed and which, because of its isolation, has high conservation significance. It has been identified by Preece and Lesslie as having high wilderness quality, and is also one of the three semi-arid wildernesses identified by Feller *et al.* This area should be managed to maintain and enhance its wilderness value.

Other

The park contains a number of important archaeological sites, including several on lunettes and dunes above the floodplain that are suffering damage by grazing stock. One of these sites has been dated at some 3500 years.

Historical artefacts indicating the efforts at early development of the Mallee include the cypress-pine log tank remains at Trinita and the Nowingi-Rocket Lake railway formation—both ranked highly by the Council's consultant on historic sites. 'Taparoo' homestead and the Millewa South Bore site also reflect their history, as does the grid of tracks in the west Millewa installed in preparation for its subdivision for agriculture.

This park straddles the Sturt Highway and, where it abuts the Calder Highway, links with the Hattah-Kulkyne National Park.

Access throughout the park is facilitated by an extensive track system; on the riverine plain this is more suited to dry weather and is principally suitable only for four-wheel-drive vehicles away from the more heavily used areas. The portions at Pink Lakes, Wymlet, Trinita, along the Sturt Highway, at points along the South Australian border, and Millewa ensure that tourists in conventional vehicles can enjoy some of the park's attributes at any time.

The existing Pink Lakes park is increasing in popularity for camping and nature study as public awareness of Victoria's 'outback' increases; considerable numbers of people visit the Raak Plain and Rocket Lake. Camping away from the more popular sites also occurs

throughout the area and many excursions have been conducted here by field naturalists and other nature-study groups. It is highly popular for the observation of parrots.

Recreation in the north is based on the water bodies but the whole area is of increasing interest for nature study. River transport provides good access to the River Murray and lower Lindsay River portions of the park. The Lindsay River provides probably the best inland fishing waters for native fish species in the State.

Recommendation

- A6** That the area of 600 540 ha, shown on Map A, be used to:
- (i) provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments
 - (ii) conserve and protect natural ecosystems
 - (iii) protect sites of archaeological and historical importance
 - (iv) protect areas of high wilderness quality
- that
- (v) apiculture be permitted on traditionally licensed sites and the number of sites maintained subject to park management requirements and pending the outcome of research into the ecological impacts of the industry (see Chapter F—Agriculture)
 - (vi) legal access continue to be available to freehold land and the gypsum-mining site enclosed within the park
 - (vii) the range of recreational activities, including those mentioned in the preamble, be permitted where they do not conflict with other park values
 - (viii) licensed grazing be terminated according to the schedule and map in Chapter F—Agriculture, but no later than 1 July, 1995, except in the existing Pink Lakes State Park where it will be removed in 1989
 - (ix) harvesting of forest products not be permitted
 - (x) salt-harvesting not be permitted

and that the area be included in a schedule to the *National Parks Act 1975* and be managed by the Department of Conservation, Forests and Lands.

Notes:

1. Council in 1977 recommended that salt-harvesting be permitted from Lakes Crosby and Kenyan—within the Pink Lakes State Park; this is now considered to be an inappropriate use of those lakes.
2. The underlying pre-Cainozoic sedimentary rocks have potential for oil and gas, and a petroleum exploration permit is current for the southern half of the Sunset Country. In the west of the recommended park there is potential for gold and base metal mineralization. The area also contains gypsum and salt deposits.
3. Some parts of this recommended park, particularly the grasslands, woodlands, and shrublands, are heavily disturbed by past land use practices and grazing pressure. The rabbit populations here are high and considerable resources will be required to achieve an acceptable level of control and maintenance.
4. Council is aware that an input of highly saline water to the River Murray occurs in the region of the Lindsay River and that salinity-mitigation works may be considered as part of the Murray-Darling Basin Salinity and Drainage Strategy to combat salinity levels in the River Murray. Any decision to proceed with such works here would be subject to detailed environmental impact studies. No firm proposals have been forwarded, however, and the Council considers that any proposals should not compromise the values of this part of the park.
5. Proposals have been received about a suitable name for this park and it is suggested that local Aboriginal groups whose ancestors traditionally occupied the area and other interested parties, including the Victoria Archaeological Survey, be consulted on this matter.

Other park proposals

Council received many suggestions for additions to this park, which essentially would have included all public land in the vicinity.

The recommended park incorporates representation of the important land systems, vegetation types, and faunal habitats of the Sunset Country and lower River Murray as well as many other sites of significance. Although important in their own right, the suggested additions provided little in the way of new values to the park as it is recommended. Many of them are compromised by intensive agricultural activity. The area on the Raak Plain west of Hattah, for instance, is in biologically poor condition as a result of past grazing pressures and requires considerable rehabilitation (see Chapter S—State forest).

STATE PARK

The existing Pink Lakes State Park is incorporated in the new Murray–Sunset National Park.

Leaghur State Park

Topography and land systems

Located on the floodplain of the Loddon River in the higher-rainfall zone of the study area, this park provides representation of a land system (Ffc3—floodplain) that, away from the River Murray, is poorly represented on public land.

Vegetation

The grassy woodland subcommunity of black box wetland is very uncommon and restricted in the region. It comprises the major vegetation type of the park, and is poorly represented elsewhere in conservation areas that are not subject to extensive alteration to water regimes or quality.

Periodic flooding has produced a range of age classes in the black box, from young regrowth to old mature trees. Small areas of mallee, buloke, and yellow gum also occur here.

Significant plant species within this park include trim flat-sedge (*Cyperus concinnus*), long eryngium (*Eryngium plantagineum*), smooth minuria (*Minuria intergerrima*), and swamp buttercup (*Ranunculus undosus*).

Fauna

The presence of old trees here and the periodic flooding make it an important breeding area for waterfowl and it is a refuge area for a range of other species, such as the eastern grey kangaroo.

Other values

Many of the old trees carry scars derived from Aboriginal activities and a range of other sites indicate Aboriginal occupation of the area.

The recommended park is readily accessible from a main road and is intersected by a number of tracks.

Recommendation

- A7 That the area of 1680 ha, shown on Map B, be used to:
- (i) provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments
 - (ii) conserve and protect natural ecosystems
 - (iii) protect sites of archaeological importance
- that
- (iv) apiculture be permitted on traditionally licensed sites and the number of sites maintained subject to park management requirements and pending the outcome of research into the ecological impacts of the industry (see Chapter F—Agriculture)
 - (v) the range of recreational activities, including those mentioned in the preamble, be permitted where they do not conflict with other park values
 - (vi) controlled grazing by domestic stock be permitted only on such areas and at such times as the managing authority considers necessary for management purposes
 - (vii) timber-harvesting not be permitted
- and that the area be included in a schedule to the *National Parks Act 1975* and be managed by the Department of Conservation, Forests and Lands.

Note:

Management of the adjoining Lake Meering lake reserve (Recommendation T7) should complement management of this park.

REGIONAL PARKS

Lake Albacutya Regional Park

Recommendation

- A8 That the area of 7830 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Note:

Portion of the existing regional park is proposed for inclusion in the Wyperfeld National Park (see Recommendation A3 (a)).

Addition to Lake Albacutya Regional Park—Ross Lake

This proposed addition includes Ross Lake and the 2.5-km stretch of Outlet Creek that links Ross Lake and Lake Albacutya. It carries a range of vegetation types, including savannah mallee and savannah woodland, black box woodland, river red gum forest, and lake-bed herbfield.

Mature river red gum and black box trees here and along Outlet Creek provide important faunal habitat as well as acts as a corridor for the movement of, particularly, birdlife. A pair of bush thick-knee is known to reside in the area.

The pattern of use here is very similar to that of Lake Albacutya: boating, fishing, duck-shooting, picnicking, and camping when the lake contains water; shooting, picnicking, and camping when dry (it last contained water in 1980). These uses and its management would be complementary to those of Lake Albacutya.

Recommendation

- A9 That the area of 470 ha, shown on Map A, be added to the Lake Albacutya Regional Park and be used to:
- (i) provide opportunities for informal

recreation for large numbers of people

- (ii) protect and conserve the natural ecosystems to the extent that this is consistent with (i) above

that

- (iii) the existing pattern of legal recreational use be permitted to continue
- (iv) controlled grazing by domestic stock be permitted only on such areas and at such times as the managing authority considers necessary for management purposes
- (v) the collection of dry firewood be permitted at the discretion of the managing authority

and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

Note:

The managing authority should zone the park to provide for its various uses, similar to the zoning of Lake Albacutya.

Murray-Kulkyne Regional Park

Recommendation

- A10 That the area of 1550 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Additions to the Murray-Kulkyne Regional Park

Retail Island (150 ha) abuts the existing regional park, but the current main channel of the River Murray has essentially isolated it from the Victorian side. Nevertheless, this island is readily accessible by boat and, when the river is sufficiently low, by land from the New South Wales side. It has potential to reduce some of the recreational pressure from the present park.

The 1830-ha parcel of public land immediately upstream of the existing park—at Liparoo—supports a remarkable spider fauna, which includes an undescribed genus in a new family, a tropical species at its southernmost known locality in Australia, and two species previously only found in Madagascar. It is also the most southern known occurrence of the tessellated gecko. This recommended addition to the regional park receives high recreational use.

Recommendation

A11 That the areas totalling 1980 ha, and shown on Map A, be added to the Murray-Kulkyne Regional Park and be used to:

- (i) provide opportunities for informal recreation for large numbers of people
- (ii) protect and conserve the natural ecosystems to the extent that this is consistent with (i) above

that

- (iii) the existing pattern of legal recreational use be permitted to continue
- (iv) controlled grazing by domestic stock be permitted only on such areas and at such times as the managing authority considers necessary for management purposes

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

Note:

The disposal of waste-water from irrigation areas onto the floodplain of the Liparoo addition should be monitored to ensure that salinity levels do not modify the natural system. This is discussed in Chapter O—Water supply and drainage; see Recommendation O226.

Other park proposal

Tarpaulin Island has a high diversity of river red gum and black box plant communities that include examples with chenopod understoreys. It is isolated from the Victorian side of the River Murray and, although considered for

addition to the regional park in the proposed recommendations, it is now recommended as a reference area (see Chapter C).

New regional park—Green Lake

Located within 10 km of the township of Sea Lake, Green Lake is highly popular for recreation and a number of facilities have been developed here based on its recreational use. The area is also popular for passive pursuits away from the lake, such as picnicking and nature study, and numerous tracks provide access.

Vegetation surrounding the lake includes savannah mallee, pine-buloke woodland, and black box-chenopod woodland, which supports a variety of native fauna.

The lake receives channel-outfall water from the Wimmera-Mallee Stock and Domestic Water Supply System and this function should continue whenever surplus water is available. At other times water for the lake has been purchased by the Shire of Wycheproof.

Recommendation

A12 That the area of 330 ha, shown on Map B, be used to:

- (i) provide opportunities for informal recreation for large numbers of people
- (ii) protect and conserve the natural ecosystems to the extent that this is consistent with (i) above

and that

- (iii) the existing pattern of legal recreational use be permitted to continue
- (iv) controlled grazing by domestic stock be permitted only on such areas and at such times as the managing authority considers necessary for management purposes
- (v) Green Lake should continue to receive channel-outfall water

and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

B. Wilderness area

In its final recommendations for the Mallee published in 1977 the Council set aside almost 114 000 ha in the western part of the Big Desert as Victoria's first designated Wilderness Area. The area has since been scheduled under the *National Parks Act* 1975, along with the Avon Wilderness in the Alpine area. Such areas provide opportunities for solitude and unconfined forms of recreation in unmodified natural environments.

The wilderness experience involves the perception of being part of nature, of an environment unaltered by human intervention, of isolation, and of being exposed to the challenge of the elements.

The main elements of the appeal of wilderness are:

- spiritual refreshment and an awareness of solitude arising from close contact with the uninhabited, substantially undisturbed, natural environment
- the knowledge that there still exists a large natural area in which plants, animals, and soils can survive and interact with minimal human interference
- refuge from the pressures, sights, and sounds of modern urban life
- the adventure and challenge of putting one's powers of endurance and self-reliance to the test in substantially undisturbed natural environments.

In the context of the Council's present recommendations, wilderness is therefore based on those attributes of the land that make it valuable for the wilderness experience from a human point of view.

It is necessarily large, providing for recreation of an unconfined nature and enabling a walking trip of several days' duration within it. The land should retain its primeval character, without human modification or habitation.

To preserve these wilderness values, it is necessary to protect the natural ecosystems and maintain the landscape in an undisturbed state. As a result, a wilderness area has considerable value for nature conservation.

Uses and management

Wilderness use may include such activities as canoeing, hiking, rock-climbing, caving, fishing, and cross-country skiing. Vehicles (other than those essential for management), timber production, grazing and mining would be excluded from wilderness areas.

In order to maintain the value of a wilderness area for solitude and unconfined types of recreation, it may ultimately be necessary to control the number of people using the area at any one time. Experience in the United States has shown that tourism and the more conventional forms of outdoor recreation commonly associated with parks are among the greatest threats to wilderness, and should not be accommodated in such an area. It may also be necessary to place restrictions on some activities so that conflict between wilderness users is minimized.

Wildfires, however caused, must be prevented from threatening life, property, and natural resources in the State, and the measures necessary to control them must be taken in a wilderness area as in any other. Some pre-suppression measures such as maintenance of fire access tracks and protective burning will be required, at least in areas of strategic importance for fire control. Prevention and suppression of fires remains the responsibility of the Department of Conservation, Forests and Lands.

Vehicular use of existing tracks, where they occur, should not be permitted except for essential management operations. By careful maintenance, many tracks can continue to be passable for fire-fighting, rescue, and management vehicles, without clearing all vegetation. Construction of helipads may be an alternative to maintaining all of an extensive track system.

Users of wilderness areas must be prepared to face difficult and challenging conditions, and Council stresses the need to bring to the attention of the public the potential hazards associated with the use of these areas. In general, the lack of vehicle access and the

remote location of these areas should ensure that the users are self-reliant and capable of looking after themselves.

Wilderness in the Mallee

The Big Desert Wilderness was identified by Feller *et al* in 1979 as one of the 12 areas in the State with high wilderness values. Two others in the Mallee, one in the central Big Desert and the other in the Sunset Country, were also identified as having high wilderness values, although those of the former have been modified over the last 10 years by the development of tracks and other activities associated with bee-keeping and broombush harvesting.

In their 1987 survey of wilderness quality in Victoria, Preece and Lesslie expressed it as a continually varying parameter determined by the four indicators mentioned in the introduction. For mapping purposes, the continuum of this quality was divided into classes. The areas of highest wilderness quality indicated by this survey roughly coincide with the three identified by Feller *et.al.*, and these are complemented by larger ones that, although lower down on the scale of the continuum, also retain high wilderness quality.

The Council endorses its previous recommendation for the Big Desert Wilderness and is recommending that the two other areas of high wilderness value be included in extensions to the Wyperfeld National Park and the proposed Murray-Sunset National Park.

Adjoining conservation parks in South Australia, if managed to complement the Big Desert Wilderness, could substantially increase its effective size. Council believes that the government should hold discussions with its South Australian counterpart to investigate this possibility.

Public land bordering the Big Desert Wilderness provides an important buffer against activities that would conflict with the use of the wilderness. Its depth from the Murrayville track, for instance, reduces the intrusiveness of vehicular movement and noise. Other conflicting activities would similarly be buffered—the depth depending on the activity. It may also be necessary to exercise careful vermin and noxious weed control in the buffer,

to ensure that adjoining land is not threatened by pest species from within the area, and conversely that these do not invade the area from outside.

State-wide investigation of wilderness

The State Conservation Strategy lists as one of its goals 'to preserve remaining areas of high wilderness quality'. In accordance with this goal, the Council has been requested by the government to carry out a special investigation of the State and to make recommendations on the identification, reservation, and use of wilderness areas and other areas of high wilderness quality. In making its recommendations, the Council must have regard to the natural recreation and social values of wilderness.

The Council's identification of such areas must further take into account naturalness, remoteness, size, ecological viability, and capability for appropriate recreational activities. Other uses of the areas and the economic and social implications of the recommendations must also be considered.

The identification of wilderness for this State-wide study therefore emphasises its intrinsic values. However, the Council's current definition and the one used in the review of the Mallee area emphasises the recreational values. This definition will be reconsidered in the State-wide investigation of wilderness.

The areas of high wilderness quality described above and other parcels of public land are included in this new investigation, as too will be the requirement for and uses of buffer areas.

Recommendations

- B1 That the area of 113 500 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.
- B2 That the government enter into discussions with the South Australian government with a view to reaching agreement on the sympathetic management of conservation parks

adjoining the Big Desert to ensure that its wilderness values are protected and its effective size is increased.

- B3** That public land surrounding the wilderness be managed as a buffer, with the depth to be determined by the land manager depending upon the particular uses permitted.

Note:

A popular four-wheel-drive track parallels the fence on the Victoria-South Australia border. It is not proposed that this track be closed, even though such closure would effectively expand the wilderness area to the west into South Australia.

C. Reference areas

Reference areas are tracts of public land containing viable samples of one or more land types that are relatively undisturbed and that are reserved in perpetuity. People concerned with studying land for particular comparative purposes may then refer to such areas, especially when attempting to solve problems arising from the use of land. Reference areas include typical examples of land types that have been modified elsewhere for productive uses such as agriculture, mining, or intensive timber production. The course and effects of human alteration and utilization can be measured against these relatively stable natural areas.

In common with references and standards used in other fields, these areas must not be tampered with, and natural processes should be allowed to continue undisturbed. Reference areas should be sufficiently large to be viable and should be surrounded by a buffer, the width of which would vary according to the activity occurring on the adjacent land. The role of the buffer is to protect the areas from damaging or potentially damaging activities nearby. It will also protect important values in the surrounding land from potentially damaging natural processes occurring within the reference area.

Access should be restricted, and experimental manipulation should not be permitted. Setting aside such areas will enable continued study of natural features and processes: for example, fauna, hydrology, and nutrient cycling. These studies are important in increasing our knowledge of the ecological laws and processes on which humanity's survival may ultimately depend.

The preservation of some species in the long term requires the setting aside of areas free from human interference (in the form of productive or recreational use of land). These areas preserve a valuable pool of genetic material. Wild species are often used to genetically strengthen inbred races of domestic plants and animals—and the future use of gene pools will probably expand far beyond this.

The *Reference Areas Act 1978* provides for reference areas to be proclaimed by the Governor-in-Council, and for the Minister to

issue directives for their protection, control, and management. An advisory committee, established under the Act, assists the Minister.

The selection of the reference areas listed here is based on current knowledge of the land types in the study area, and additional areas may be needed as better information on ecology and land use problems becomes available.

Each new reference area listed below is described in terms of the vegetation types and land systems it represents. The land systems descriptions incorporate symbols that correspond to those set out in the report on the 'Mallee Area—Review', published by the Council in November 1987.

The vegetation in some cases has been altered considerably, principally by grazing pressures. The land systems and vegetation types these particular areas represent are particularly important, however, as agricultural practices elsewhere are continuing to modify them.

Relocated reference areas

C1 Millewa

Fencelines divide the existing reference area into three parcels. Relocation rationalizes the boundary of the reference area to the existing fencelines. Grazing of this area will cease when this activity is removed from the recommended Murray-Sunset National Park that surrounds it.

C2 Lake Wallawalla

The existing site lies close to a well-used road (Mail Road) and its environs are frequently used by people driving to Lindsay River. The area is severely degraded by rabbits and stock.

The new site encompasses the same land system as the original—the red-brown duplex soils of the higher alluvial plains (Pf2)—but adds a lunette (Lf2) and portion of the present floodplain of the River Murray (Ffc2). Represented vegetation types are expanded to include black box—chenopod woodland in addition to the original alluvial plain and alluvial rise shrubland. Protection can be achieved by the closure of a management track

and the removal of licensed grazing from the recommended Murray-Sunset National Park that surrounds the reference area.

C3 Sunset

Originally delineated for the Central Mallee land system, refinements of both the land systems and vegetation information indicate that, while the reference area represents one of the major land systems of the Sunset Country, the predominant vegetation type is a subcommunity that, although of botanical interest, is atypical of the region. The reference area is also divided by a well-used north-south track, which provides ready access into the Sunset Country, and a lesser east-west track.

By retraction of the reference area from the west and expansion eastwards, conflict with unregulated access is avoided; major vegetation types, including shallow-sand and east-west dune mallees are represented, while the area still contains elements of the Sunset Country subcommunities of broombush mallee and red-swale mallee.

Recommendations

**C1-
-C3** That the reference areas listed below be relocated to the sites indicated on Map A and be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

- C1** Millewa (630 ha)
- C2** Lake Wallawalla (1060 ha)
- C3** Sunset (8650 ha)

Unchanged reference areas

Recommendations

**C4-
-C10** That the areas listed below, and indicated on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

- C4** Chalka Creek (400 ha)
- C5** Kia (990 ha)
- C6** Purnya (1090 ha)

- C7** O'Sullivan Lookout (1910 ha)
- C8** Lake Jerriwirrup (400 ha)
- C9** Dattuck (1500 ha)
- C10** Telopea Downs (2500 ha)

Additional reference areas

Recommendations

**C11-
-C22** That the areas described below and shown on Map A:

- (i) be used to maintain natural ecosystems as a reference to which those concerned with studying land for particular comparative purposes may be permitted to refer, especially when attempting to solve problems arising from the use of land
- (ii) be surrounded by a buffer, and that delineation of the buffer be by joint arrangement between the advisory committee and the land manager of both the area itself and of the land adjacent to the reference area

that

- (iii) activities (such as grazing, exploration for minerals, mining, broombush-harvesting, firewood-cutting, and beekeeping) that conflict with the purposes of a reference area not be permitted, and any such activities in the reference areas described below cease when these recommendations are adopted

and that they be proclaimed under the *Reference Areas Act 1978* and managed by the Department of Conservation, Forests and Lands.

Note:

Some of the reference areas fall within land currently used for stock grazing under licence. Grazing will cease in these areas when this activity is terminated in the surrounding land (see Chapter F—Agriculture).

C11 Toupnein Creek (1660 ha)

Land systems: Floodplain and higher alluvial plain beside the River Murray (Ffc2; Pf2).

Vegetation: Black box–chenopod woodland; floodplain grassland—some including lignum, river red gum forest, and alluvial-plain shrubland. This area supports floodplain vegetation in a semi-arid environment.

C12 Morkalla (990 ha)

Land systems: scattered east–west calcareous dunes with calcareous earths and shallow loams over copi on the northern plains (PYfz2; PREfcl2).

Vegetation: grassland, saline shrubland, gypseous rise woodland, chenopod mallee, savannah woodland, and savannah mallee.

C13 Settlement Road (2580 ha)

Land systems: closely spaced east–west calcareous dunes on plains and depressions in the north with shallow, red, duplex soils—used for agriculture in South Australia and the Millewa (EPfcl2; EPRfc2).

Vegetation: shallow-sand mallee including *E. cyanophylla*, chenopod mallee, and east–west dune mallee.

C14 Millewa South (2400 ha)

Land systems: shallow loams on copi (gypseous) dunes and sandy red duplex soils (PYcf2) and calcareous earths on sandplains with scattered east–west dunes (PEcf2) of the Noora depression; closely spaced east–west dunes of reddish-yellow sands (EPcf2) and pale sands with limestone (EPcl2); irregular dunes of pale sands (IPc2). These land systems are subject to agricultural use in South Australia.

Vegetation: chenopod mallee, shallow sand mallee, east–west dune mallee, and dune and swale associations of deep-sand mallee.

C15 Berrook (2580 ha)

Land systems: irregular and east–west siliceous dunes including sandy mottled duplex soils with limestone—used for agriculture in South Australia and Berrook (EPcl2; IPc2).

Vegetation: chenopod mallee, shallow-sand mallee, and dunes and swales of deep-sand mallee.

C16 Danyo (1600 ha)

Land systems: closely spaced east–west dunes in the southern Sunset Country; comprising pale sands in the Raak Depression (EPc2) and on plains and ridges (EPRc2), as well as reddish-yellow sands on plains and ridges (EPRcf3). Soils of the latter land system, the main reason for this reference area, are used for dryland agriculture nearby.

Vegetation: deep-sand mallee on dunes and swales, shallow-sand mallee, chenopod mallee, and broombush mallee.

C17 Rocket Lake (2090 ha)

Land systems: closely spaced east–west calcareous dunes of predominantly fine (EPfc2) and coarse (EPcf2) sediments scattered east–west calcareous dunes with grey clays (PEfc2). The soils comprising the finer sediments are extensively cleared for agriculture in the east Millewa.

Vegetation: chenopod mallee, shallow-sand mallee, and east–west dune mallee.

C18 Raak Plain (1480 ha)

Land systems: saltpans, sandplains, and salt lakes in the Raak Depression (Pz2; Pcz2).

Vegetation: saline shrubland, grassland, and examples of savannah woodland–mallee.

C19 Tarpaulin Island (440 ha)

Land system: grey clays on the present floodplain of the River Murray (Ffc2).

Vegetation: river red gum forest and black box–chenopod woodland representative of the mid-mallee communities of the River Murray floodplain.

C20 Mt Crozier (2010 ha)

Land systems: irregular and east–west siliceous dunes and clay plains—very few of the latter remain as public land (Pfc2; IPc2; EPc2).

Vegetation: includes chenopod mallee, shallow-sand mallee, dunes and swales of deep-sand mallee, and pine–buloke

woodland, and a variety of sandplain grassland.

C21 Broombush (1600 ha)

Land system: closely spaced east-west siliceous dunes (EPRc3).

Vegetation: principally broombush mallee, as well as red-swale mallee, and

shallow-sand mallee-heath.

C22 Rudd Rocks (3750 ha)

Land system: irregular siliceous dunes (IPRc3).

Vegetation: sandplain heath, sandstone-rise broombush and dune-crest tree-heath.

D. Wildlife reserves

Wildlife conservation—a land use in its own right—cannot always be separated from other land uses such as timber production, forest grazing, water production, and recreation. These types of use often require large areas of land, much of which can be managed to retain its value as wildlife habitat. In the long term, wildlife conservation depends upon conservation of habitat covering areas that are sufficiently large and diverse to support genetically viable populations of species.

Animal habitats are generally described in terms of vegetation communities, although other characteristics—such as vegetation structure, ground cover, water depth, salinity, rock outcrops, and hollow trees—are also important. In the study area seven major animal habitat types have been identified, comprising dune-fields of the Big Desert and Sunset Country and those with underlying sandstone ridges, lunettes and ridges, boinkas, alluvial terraces, and riverine plains, and the agricultural and urban habitats.

The Floristic Vegetation map of the Mallee area (published with the resources report in 1987) illustrates the diversity of habitats and shows that no single community covers an extensive uninterrupted area, but rather that each community or habitat tends to be repeated over a wide area as part of a complex mosaic. This pattern is largely determined by the availability of water, soils, and physiography.

The distribution of an animal species depends on its behavioural and physical requirements for food, shelter, and breeding sites. Many species can utilize a range of habitats and consequently are widely distributed throughout the area. Some occupy their environmental range as residents. Others, such as certain bird species, are not year-round residents but migrate in and out of the area at regular intervals. Other birds visit the area infrequently in nomadic movements. It is obvious therefore that the conservation of fauna presents many difficulties, even for those relatively few species whose life history and behaviour are understood.

Council considers that wildlife conservation is an important consideration in the management

of the entire area and that management plans should make provision for the conservation of wildlife. This is especially important for animals that are essentially restricted to a particular habitat for feeding and breeding. The regent parrot, for instance, favours nesting sites in large, old, and dying river red gums near permanent water that are within 20 km of mallee vegetation.

Human activities that modify the natural environment have resulted in changes in the distribution and abundance of many species and some species have become extinct. These changes have depended upon the nature and severity of the modification, the particular habitat requirements of the species, and its adaptability to change.

The precise effects on many species, however, are not well documented. The Council considers that further research into the ecological requirements of species is necessary to determine the effects of various land management practices, particularly those where management is oriented towards more competitive uses such as timber production, forest grazing, and intensive recreation. The results of such research may mean the modification of management practices in some areas if wildlife values are to be adequately considered.

Although some forms of land use are compatible with wildlife conservation, it is necessary to set some areas aside specifically for their conservation, and for developing wildlife conservation techniques.

In all wildlife reserves the responsibility for the suppression of fires remains with the Department of Conservation, Forests and Lands, and fire-prevention measures will be carried out where necessary.

Progressive redefinition of those uses that are applicable to 'wildlife reserves' around the State has meant that this category is in most cases more appropriate for watercourses and wetlands that provide specialized habitat for large flocks of birds, fish, crustaceans, and some mammals. They may also be important elements of the

scenery of the region and may be used for agricultural water supplies or drainage, or harvested for salt when dry.

These areas may be selected for conservation of species that the community harvests or directly utilizes. They may contain the habitat of endangered species, have specialized breeding grounds or a high species diversity, or be of educational or scientific interest. They may also be selected because of their ecological significance for (or regional representation of) a species or faunal association, or for their value as a stop-over for migratory or nomadic species.

A number of the areas recommended in 1977 as wildlife reserves are important for the conservation of both flora and fauna, and the harvesting of any element of the ecosystem may be inappropriate. Where relevant, these areas are now proposed for flora and fauna reserves where the hunting of game species is not permitted.

Some of the wildlife reserves mentioned below, particularly those on the Loddon and Avoca River floodplains, form part of water-distribution, flood-mitigation, and/or salinity-mitigation systems. Where appropriate, the land manager and the Rural Water Commission should consult over the utilization, ponding, disposal, and movement of water in these areas.

In its salinity strategy for Victoria—'Salt Action: Joint Action'—the government stated that 'consistent with the principles of the Wetlands Conservation Policy, wetlands deemed by the Government to have high conservation value will not be adversely affected in the planning and execution of salinity mitigation works. Detrimental effects on all other wetlands will be minimized. New evaporation basins and other salinity control works will not be located in any existing wetlands unless a compelling public interest is demonstrated.'

Salinity-management plans are currently being prepared for the Kerang Lakes, Tragowel Plains, Nangiloc-Colignan, and Sunraysia areas and some options may potentially have an impact on some of the wetlands of the region. Nevertheless the principal that new evaporation basins and other salinity-control works should not be located in natural wetlands, unless compelling public interest is demonstrated, should continue to apply.

Council considers that the Department of Conservation, Forests and Lands should be consulted in the management of wetlands that are now used for the distribution and storage of water and for the disposal of saline water (see Chapter O—Water supply and drainage). As the salt content of those wetlands used for water disposal gradually increases, their value as habitat for wildlife will decrease until they become lifeless bodies of brine.

In the eastern Mallee, many of the public-land water-frontage reserves act as extensive linear reserves of native vegetation within the cleared agricultural lands and provide important feeding, breeding, and shelter areas for wildlife. This value is enhanced, particularly for waterfowl, when the streams carry water. Management of these reserves should recognize this importance (see Chapter J—Rivers and streams).

Existing reserves

Recommendations

D1,D2,D7–D12

That the areas listed below and indicated on Maps A and B, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

- D1** Kings Billabong (2140 ha)
This area is set aside as a wildlife sanctuary.
- D2** Lakes Powell and Carpul (680 ha)
- D7** Lake Lalbert (750 ha)
- D8** The Marshes (see note below—1560 ha)
- D9** Dartagook (450 ha)
- D10** Stevenson Swamp (90 ha)
- D11** Lake Murphy (230 ha)
- D12** Lake Yando (90 ha)

Note:

D3–D6, D13, and the north-western part of D8 (Yassom Swamp) are redesignated as flora and fauna reserves (see Chapter G).

Additions to existing wildlife reserves

Recommendations

D14- D16 That the areas indicated on Map B and described below be added to the existing wildlife reserves and be used:

- (i) primarily to conserve the habitat of native fauna associated with wetlands

and

- (ii) for public recreation (including hunting in season as specified by the manager) and education where this does not conflict with the primary aim

that

- (iii) grazing be permitted where it contributes to specified management goals
- (iv) if water management is necessary, this be undertaken through consultation between the land manager and the Rural Water Commission

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

D14 25 ha, comprising the floodway between Lake Powell and Bonyaricall Creek, Parish of Nenandie (for addition to D2—Lakes Powell and Carpul). Integrating the management of the floodway with the existing reserve will assist with control of water movement in this area.

D15 215 ha, being portion of Sheepwash Creek, Parish of Dartagook (for addition to D9—Dartagook Wildlife Reserve). This watercourse extends the floodplain habitat of the Dartagook reserve.

D16 165 ha, being portion of the Avoca River course downstream of Sandhill Lake (for addition to D8—The Marshes Wildlife Reserve). Extensive lignum swamps in this section of the watercourse are important habitat for waterfowl.

New wildlife reserves

Recommendations

D17- D30 That the areas indicated on Maps A and B and described below be used:

- (i) primarily to conserve the habitat of native fauna associated with wetlands

and

- (ii) for public recreation (including hunting season as specified by the manager) and education where this does not conflict with the primary aim

that

- (iii) grazing be permitted where it contributes to specified management goals
- (iv) if water management is necessary, this be undertaken through consultation between the land manager and the Rural Water Commission
- (v) harvesting of salt and other minerals be permitted at the discretion of the managing authority

and that they be permanently reserved under Section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

D17 1050 ha, being Mullroo Creek and environs, Parish of Wallpolla. With about 10 km of frontage to the River Murray and a large number of wetlands, this area is highly valuable to waterfowl. The aquatic values are enhanced by a range of plant communities, including broad *Sporobolus* grasslands, river red gum forest, black box—chenopod woodland, and alluvial-plain shrubland.

D18 459 ha, being Haywood Lake and associated bushland, Parish of Narrung. This lake formerly received floodwaters from the River Murray and investigations should be undertaken into the means whereby natural flows may again be introduced to the area. The

associated vegetation is at present in good condition, although the black box stands are starting to deteriorate, and is representative of that of the north-eastern Mallee and floodplains. (Previously bushland reserve I42.)

D19 15 000 ha, being the eastern part of Lake Tyrrell.

The extensive plant communities—saltbush grasslands and samphire shrublands—on the margins and islands support an outstanding example of a distinctive and significant fauna. Species of note include the birds—white-winged fairy-wren, rufous calamanthus, crimson chat, and orange chat, the earless dragon *Tympanocryptis lineata* (one of only three populations known in Victoria), and *Morethia adelaidensis*, a skink. Some of the islands are inaccessible and not grazed by domestic stock, their habitat values are therefore high.

Viewed from a number of vantage points around the lake and from the air, Lake Tyrrell is an outstanding scenic feature of the Mallee. It is also a major geomorphological feature, being the largest salt lake in Victoria, and includes other features such as the development of transverse gypsum dunes on the lake-bed. The lunette associated with the lake displays important phases of the geological history of the region, although only a small portion occurs on public land.

Lake Tyrrell and the lower end of Tyrrell Creek are important internationally for studies of hydrogeochemistry and are a natural laboratory providing new scientific data about the transport and deposition of minerals by groundwater.

Note:

Council is aware that the perimeter of the lake is used for the annual 'Mallee Rally'. It considers that this sporting event can continue subject to strict controls—particularly to prevent vehicle movement away from the defined route—and to ensure that rehabilitation works, where necessary, are a condition of use of the area.

D20 24 ha (Bulls Swamp) being the Water Reserve adjacent to Allotment 22, Parish of Kinabulla.

Intact black box woodland complements natural wetland.

Note:

Tank O170 is surrounded by this reserve.

D21 126 ha west of Allotment 37, Parish of Wangie.

An important waterfowl breeding area lies within a river red gum stand. (Previously bushland reserve I184.)

D22 230 ha (Brimy Bill) east of Allotment 40, Parish of Murnungin and east of Allotment 39, Parish of Wangie.

Black box woodland and two wetlands on the floodplain of Lalbert Creek provide important faunal habitat—particularly when flooded.

D23 95 ha, being Lake Mannaor, Parish of Boga.

This deep fresh-water lake is filled by flood-waters from the Avoca River.

D24 560 ha west of Lake Tutchewop, Parish of Boga.

The area is on the flood-path from the Avoca River to the Little River Murray and, in those years when the Avoca River is in high flood, provides high-quality feeding and breeding habitat for waterfowl and waders.

D25 825 ha, being Cullens Lake and the reserve to the north, Parish of Dartagook.

The lake receives water from Kangaroo Lake at the request of the Department of Conservation, Forests and Lands or from high floods. It is rated highly for its habitat and wildlife values.

It is also used to assist in managing water in the Kerang Lakes irrigation system.

Included in this reserve is the old school reserve, being Allotment 28, section D, Parish of Bael Bael, and the 28-ha saline wetland within Allotment 1, Parish of Dartagook, south-east of Lake Cullen; this is a nesting area for waterfowl and will require revegetation.

D26 43 ha, adjacent to Scotts channel, being the eastern portions of Allotments 3B

and 2A and the northern portion of Allotment 1, section B, Parish of Dartagook.

This comprises portion of the wetland upstream of Little Lake Charm, which provides wildlife habitat.

D27 390 ha, being Duck Lake and the wetland to the south, Parish of Dartagook.

The wide, muddy shores of these saline wetlands receive very high use by wading birds.

D28 120 ha, being Lake Elizabeth, north of Allotment 13, Parish of Meran.

This lake receives water from channel overflows and, although degrading from a fresh-water to a saline wetland, it provides a feeding area for water birds and is used for duck-shooting.

D29 40 ha, being Pelican Lake, north of Allotment 1, Parish of Meran.

A brackish wetland, and degrading; it is used by large numbers of waterfowl.

D30 70 ha, being Lake Wandella, west of Allotment 12, Parish of Meran.

This lake receives water from channel

overflows and, although degrading from a fresh-water to a saline wetland, it provides a feeding area for water birds and is used for duck-shooting.

D31 52 ha (Gilmour Lake), being Allotment 12B of section 2, Parish of Budgerum East.

This small salt-affected wetland, portion of which requires revegetation, was previously flora and fauna reserve G32 set aside in 1977, but, although used by water-birds, its condition mitigates against such a classification.

D32 140 ha, being the public land portions of Great Spectacle, Little Spectacle, Round and Tobacco Lakes, and Little Lake Meering, Parish of Meering West. Despite alteration by water management, these wetlands are in good condition and provide habitat for large numbers of waterfowl.

D33 170 ha, south of Allotment 37, Parish of Leaghur.

Portion of a braided stream, it contains a remnant example of floodplain vegetation comprising principally lignum; used by quail and waterfowl.

E. River Murray reserve

Public land in the immediate vicinity of the River Murray on both the Victorian and New South Wales sides has significant scenic, recreation, historical, and conservation values.

In association with the river, these lands provide a significant natural attraction for people wishing to engage in river-based recreation in an essentially natural environment, and provide an outstanding scenic landscape. A wide range of recreational activities is pursued on and adjacent to the river. Camping in secluded spots or adjacent to the many sandy beaches is very popular, as too is fishing, walking, nature study or in many cases just relaxing by the river. Swimming, house-boating, canoeing, rafting, and water skiing are also very popular pastimes. The enjoyment derived from various activities depends in large measure on the maintenance and protection of the 'riverine corridor': that is, the river itself and the treescape environment adjacent to it.

A number of sites of historical importance occur along the river and include pumping stations, punt landings, and localities associated with the riverboat era. Many archaeological sites of significance – such as Aboriginal middens and canoe trees – also occur and others will undoubtedly be identified.

The river red gum forests, along with the many billabongs and floodways, provide feeding and breeding habitat for many species of native animals; they have particular significance in the conservation of such species as the regent parrot, which has specific nesting requirements. In addition, the numerous impressive river red gum trees epitomize the Australian riverine landscape.

Management and use of public land adjoining the Murray can affect:

- the degree of streambank erosion
- the flood mitigation capabilities of the land
- the maintenance of the riverine landscape
- water quality
- conservation and protection of flora and fauna
- preservation of historical and archaeological sites

- the recreational opportunities that the river and adjoining forest offer.

To conserve and protect the many values and capabilities of this land and to maintain the riverine corridor, Council is recommending the establishment of the River Murray Reserve, which, together with equivalent areas set aside in the Murray Valley and North-eastern areas, creates a reserve along the entire length of the River Murray in Victoria.

Management of the River Murray Reserve should be directed toward enhancing the scenic, recreation, and nature conservation values, protecting historical and archaeological features, and providing opportunities for a diversity of recreation activities in an essentially natural riverine environment. It will be necessary to co-ordinate the management of this reserve with that of other specific reserves along the River such as the Murray-Kulkyne Regional Park and the Lindsay Island portion of the Murray-Sunset National Park.

In addition, Council believes that the reserve should be zoned in order to provide for the range of permitted uses recommended below.

The recommended River Murray Reserve follows the river as well as the major anabranches that are used as alternatives to the main stream. It includes the existing 60-metre-wide Public Purposes Reserve and, in some locations, additional areas of reserved and unreserved Crown land considered necessary to maintain the treescape and the river environment.

In a number of sections however, the reserve comprises only the relatively narrow strip of public land consisting of the existing 60-metre-wide Public Purposes Reserve between private land and the River. In some cases, additional small areas of unreserved Crown land may be included.

Usually the public land in these narrow sections is licensed for grazing to the adjoining landholder under the terms and conditions of a water frontage licence. Where such licences are issued, recreational uses such as walking, fishing, and nature observation should be permitted, while activities such as camping,

lighting of fires, hunting, or using vehicles should be prohibited. This conforms with the recommendations made for similar water frontage areas throughout the State (see the section on water frontages in Chapter J—Rivers and streams).

A number of licensed pump sites, pumpline sites, regulators, and drainage lines associated with water management and use occur within the reserve and the use of these facilities would continue. However, Council believes that more stringent guidelines should be applied to the general appearance of these structures, particularly at pump sites so that the impact of these sites on the scenic riverine environment is minimized.

The Council considers that the authorities responsible for the re-issue of these licences should place certain conditions on the appearance of the sites in order to avoid the proliferation of unsightly structures along the river.

New South Wales land adjoining the River

Land in New South Wales that abuts the River Murray has characteristics, values, and uses similar to those of the recommended River Murray Reserve and it would be desirable if this land could be managed in a manner compatible with the management of the River Murray Reserve.

Under section 26(d) of the New South Wales *Water Act*, removal of trees within 20 m of the bank of the River Murray (or indeed any other stream) requires the approval of the Catchment Areas Protection Board. Removals are restricted to:

- trees that threaten to fall naturally into the stream
- trees that endanger persons or property
- selected trees, the removal of which will benefit the general stand vigour.

Prompt and careful removal of heads or other parts of trees that fall into the river as a result of any felling is strictly enforced.

Recommendation

- E1** That the areas totalling 9200 ha, indicated on the maps, be used to:
- (i) protect the natural and scenic values
 - (ii) conserve native flora and fauna
 - (iii) protect sites of archaeological, cultural, and historical importance
 - (iv) allow flood mitigation
 - (v) protect streambanks from erosion
 - (vi) provide opportunities for informal recreation
- that
- (vii) limited extraction of timber products be permitted only from those areas indicated on the maps and where it is consistent with (i), (ii) and (iii) above (the areas shown on the maps do not include the existing 60-metre Public Purposes Reserve)
 - (viii) apiculture be permitted
 - (ix) hunting be permitted at the discretion of the land manager where this is compatible with the zoning plan and the use of adjoining public land
 - (x) stock access to water and grazing be permitted at the discretion of the land manager where this is compatible with the zoning plan and subject to management plans that ensure three safeguards—that the natural vegetation does not sustain long-term damage, that regeneration of native species is fostered, and that particularly sensitive areas are protected
 - (xi) dispersed camping adjacent to the river be permitted at the discretion of the land manager where this is compatible with the zoning plan
 - (xii) use of existing licensed pump and pump-line sites be permitted to continue
 - (xiii) operations for the maintenance of bank stability and public safety continue to be permitted
 - (xiv) current legal access continue to be provided
 - (xv) in narrow sections of the reserve subject to grazing under licence, recreational activities such as

walking, fishing, and nature observation be permitted as outlined in Recommendation J1—Public-land water-frontage reserves (these sections consist of the existing 60-metre-wide Public Purposes Reserve plus, in some instances, small areas of currently unreserved Crown land)

and that the reserve be zoned in order to provide for the range of uses outlined above, be permanently reserved under section 4 of the *Crown Land (Reserve) Act* 1978, and be managed by the Department of Conservation, Forests and Lands.

Notes:

1. Some pump sites may need upgrading or replacement with new ones. In accordance with Council's previous statements, the impact of

these sites on the riverine environment should be minimized.

2. Salt-interception schemes are discussed in Chapter O—Water supply and drainage. Schemes being considered at present include Mallee Cliffs (in New South Wales) and the Lindsay River. Additional sites for similar schemes may be identified in the future, some of which may affect land included within the River Murray Reserve. Any sites identified as part of the Murray–Darling Basin Salinity and Drainage Strategy would be subject to detailed environment impact assessment.

3. Bottle Bend, near Red Cliffs, supports extensive areas of black box. The understorey includes the only Victorian stands of *Hibiscus brachysiphonius* and *Abutilon oxycarpum* as well as *Ptilotis nobilis*. These are vulnerable or endangered plants in Victoria, and the stands should be protected.

F. Agriculture

Agriculture is a major form of land use throughout the 43 230 sq.km of the Mallee area. About 31 000 sq.km (72%) comprise freehold land, principally used for dryland cropping and grazing. In addition, grazing licences cover more than 5000 sq.km of the public land, and a further 295 sq.km are cultivated.

CULTIVATION LICENCES

Prior to formulating its recommendations in 1977, the Council examined the use of public land held under the then-existing grazing and cultivation tenures. Subsequently, Council recommended that the cleared and developed parts of most of the leases and licences should continue to be used for agriculture—either through alienation or under a special Limited Cultivation Lease.

The Council also took into account the necessity to rationalize public land boundaries. Many of the parcels of licensed land were in scattered blocks, some extended into the Hattah-Kulkyne National Park, and others included land that, although rolled or even cleared in preparation for ploughing, contained soil types considered unsuitable for development. Areas for development were consolidated where possible—principally in the Parishes of Wymlet and Kia (north of Ouyen).

On the advice of the (then) Soil Conservation Authority, areas designated for cultivated agriculture were divided into two groups based on the inherent hazard to soil deterioration. Those allotments in which less-productive land with high erosion or salting hazard are interspersed with good agricultural land were recommended as Limited Cultivation Leases and it was specifically stated in the 1977 final recommendations that these areas were not to be alienated.

Some 73 200 ha of land were identified in 1977 for alienation (F1), representing—at that time—about 4% of the total area of public land. A further 35 820 ha were approved for Limited Cultivation Leases (then designated as Recommendation F2).

By the commencement of this review, most of the land for alienation had been allocated for that purpose.

The preparation of management plans for the Limited Cultivation Lease areas was to be considered next, followed by the grazing licences. The necessity to develop management plans for both cultivation leases and grazing licences had delayed action on granting the long-term grazing licences and this is discussed later in this chapter.

Public land south of Robinvale, in the Parishes of Bumbang and Toltol, was recommended in 1977 to be held for possible future extension of the Robinvale irrigation settlement. The demand for land at that time depended largely on the availability of water for allocation from the River Murray. It is now improbable that large new allocations of water will be made, although transferable water rights may mean that some of these areas may be used for irrigated agriculture at some time.

Most of the F2 and Robinvale land is under dryland agriculture and is substantially modified.

During the course of this review the Council has sought further advice from government agencies, community groups, and individuals about the most appropriate way of dealing with F2 land.

In addition, during 1987, the Council commissioned McGowan International Pty Ltd, in association with Australian Biological Research Group Pty Ltd, to investigate those parcels of land recommended for Limited Cultivation Leases, and the cultivated public land near Robinvale, to determine: the stability of the land used for agriculture, the dependence of the licensees on these areas; and the extent and nature of the indigenous vegetation present. The majority of the areas carry indigenous vegetation to varying degrees—one is completely uncleared. The consultants observed that in most cases the land had been maintained in a sound condition. Some licensees had halted land degradation processes, although problems still exist in other areas.

Further areas of cultivated public land have been brought to the Council's attention. For the purposes of these recommendations, the following guidelines for F2 areas refer also to the Robinvale land and other parcels of cultivated public land.

Licensees' degree of dependence on the cultivation blocks varies considerably. For instance, one licensee is wholly dependent on the licensed area, whereas other parcels have not been cleared and are not contributing to the farming enterprises. Most of the areas now under cultivation are integral parts of the respective farming enterprises.

Much recent research highlights the need to retain native vegetation, or to introduce deep-rooted species to combat salinity and land degradation. There is also mounting concern about land-degradation problems, which are often the consequence of clearing and overgrazing and extend beyond the areas where such activities have occurred. The Commonwealth Department of Primary Industries and Energy has estimated that these are costing the nation \$600 million a year Australia-wide in lost agricultural production.

Subsequent to the Council making its final recommendations for the Mallee in 1977, a considerable volume of information about salinity and other problems associated with land degradation has become available. The clearing and inadvertent loss of native perennial vegetation in the Mallee and elsewhere is now recognized as an important causal factor in the salinity problem. Papers presented to the National Mallee Conference in Adelaide in 1989, for instance, indicate that recharge to the groundwater can be expected to increase up to a hundredfold as a result of clearing and present cropping practices. For this reason, the Council is opposed to further clearing of vegetated public land in the Mallee and recommends the re-establishment of perennial vegetation on other areas that are degraded.

Recognition of this increasing problem is now being reflected in many Commonwealth and State government policies and strategies and that the Council's policies and recommendations complement these initiatives. However, the Council is aware that its recommendations form only a small part of the fight against salinity.

There is also concern about the continuing fragmentation of mallee vegetation through clearing for agriculture.

Clearing has a major impact on resident wildlife populations. Few species can survive the loss of their habitat and individuals are either displaced or die unless remnants of native vegetation are retained. It further reduces the total extent of natural habitat and fragments it into disjunct patches.

The large blocks of mallee vegetation in Victoria—the Sunset Country and Big Desert—have great importance because extensive areas surrounding them in both Victoria and South Australia have been largely cleared and fragmented.

Clearing of mallee vegetation has also been selective, concentrating on those areas of greatest soil fertility and suitability for agriculture. In particular, woodlands of *Callitris* and *Casuarina* species have been largely removed and fauna typically associated with these habitats, such as the white-browed treecreeper and beaked gecko, have greatly reduced distributions in the study area.

Several parcels of land that form links between major blocks of public land are now also considered to be important biological corridors. The Council considers that these parcels should be retained, even though portions of them have already been cleared and are presently used for cultivated agriculture.

Concern has been expressed in the region that F2 licensees have been disadvantaged, in comparison with those people who were able to purchase F1 land, because of a lack of secure tenure, controls on clearing, and non-implementation of Council's previous recommendations for F2 land. As indicated above, in 1977 certain F2 areas were not made available because they contained less-productive land with significant hazards, interspersed with good agricultural land.

Some F2 licensees also argue that those who cleared public land prior to 1977 (in some cases allegedly illegally) were rewarded with alienation of the cleared land, while those who kept within the constraints of the previous recommendations are now unable to clear or are not permitted to purchase. The Council realizes that its recommendations will largely

prevent further clearing of suitable public land for agricultural purposes for the reasons outlined above. However, these recommendations, unlike those in 1977, provide for the alienation of most cleared and cropped land now held under licence. In addition, it appears that cleared freehold land is available on the market in the Mallee at or near the cost required to purchase, clear, and develop currently vegetated land, although such land may not necessarily be located in close proximity to a particular land-owner's current holdings.

With these matters in mind, the Council adopted the following criteria in making its recommendations for the F2 areas.

- No further alienation of public land carrying native vegetation should be permitted, except for some limited areas that may be included in parcels of land recommended for alienation, because of the need to rationalize public land-private land boundaries.
- Public land currently used for cultivation should be alienated—except for those parcels having important conservation values, including those that form part of wildlife corridors.
- Where required, areas with high erosion or salting hazard should be retained in public ownership and, if necessary, rehabilitated.

As a result, the following policy guidelines have been established:

- (a) All F2 land that was uncleared as at 1 January 1988 (including areas previously rolled and now regenerating) should be retained as public land, except where otherwise stated in these recommendations or for some small areas that may need to be alienated to rationalize public land/freehold land boundaries.
- (b) All F2 areas with important conservation values, including those that form part of significant wildlife corridors, should be retained. In some cases a phase-out period, temporary access to other areas, or an exchange of land may be appropriate.
- (c) If an area to be alienated contains parcels of native vegetation that are considered important to retain, but are difficult to reserve separately, provisions for their protection should be inserted

as a covenant on the title to the land before it is alienated.

- (d) Subject to (b) above, all F2 land that was cleared and cultivated as at 1 January 1988 should be made available for alienation, except where otherwise stated in these recommendations or where the Department of Conservation, Forests and Lands believes there is an unacceptable risk of erosion.

Policy guideline (c) proposes that where pockets of native vegetation occur on land proposed for alienation, and where the location of the vegetation would pose difficulties for separate reservation, provisions for their protection should be inserted as a covenant on the title to the land before it is alienated. In Victoria, conservation covenants may be undertaken through the *Victorian Conservation Trust Act 1972* and, once registered on the title to land, these covenants are binding on future owners.

The recommendations provide for the exchange or alienation of about 17 730 ha of the total area of land previously recommended as F2 (35 820 ha) in the Mallee. A number of other areas that are cleared and cultivated, including those near Robinvale, and totalling about 11 050 ha, are also recommended for exchange or alienation. All these areas are listed in Table 2 below.

The Council believes that, where possible, land available for alienation should be exchanged for parcels of freehold land that contain important values, in order to bring that land into public ownership or to add to the integrity, viability, or ease of management of reserves.

By ensuring that stands of native vegetation are either excised from an allotment that is to be alienated or are covered by a protective covenant on the title to the land, the Council has endeavoured to ensure that all areas of extant native vegetation are protected. Inevitably, some isolated trees or small pockets of vegetation will not be included under these provisions. However, there will be a net gain of vegetated public land in the Mallee, taking into account the parcels of cultivated land that are to be revegetated in biological corridors and on land retained during boundary rationalization and the revegetation of areas where much of the overstorey has been lost, as described later in this chapter.

Further extension of agriculture

Most of the land in the Mallee that is well suited to dryland cropping and grazing is already in production. The Council recognizes that most freehold land in the Mallee is managed efficiently, and is of the opinion that future developments in technology will lead to substantial increases in productivity if the problems of salinity and land degradation associated with rising water tables can be overcome.

Much of the remaining public land is considered marginal for agriculture and, as indicated by recent information, has important conservation values. The Council therefore believes that as a general principle, no further areas of vegetated public land in the Mallee should be alienated for agriculture.

Areas for exchange or alienation

Recommendations

- F1 That
- (i) the areas totalling 28 780 ha, listed in Table 2 below, be used for agriculture, and that they be made available for exchange for freehold land or alienation subject to the policy guidelines outlined above
 - (ii) in view of the particular circumstances relating to the tenure of these areas, the

government should consider giving the current occupants first right of refusal or the benefit of preferred tender arrangements

- and that
- (iii) disposal of the land be carried out in consultation with the Department of Conservation, Forests and Lands.

Notes:

1. Section 5(3) of the *Land Conservation Act* 1970 provides for the Council to recommend the best method of alienating land to ensure the most satisfactory use and management of the land in the public interest.
2. Council acknowledges that the implementation of recommendation F1 would involve an amendment to the *Land Act* 1958 to enable first right of refusal to be offered to the current occupiers of the land.
3. The Department of Property and Services is responsible for the sale of government land. However, in the case of the parcels of land described below, the Council believes that this Department should consult closely with the Department of Conservation, Forests and Lands.
4. Some areas will require new fencing to separate land to be alienated from that to be retained. In most cases fence relocation may not be immediately required and may take place during routine replacement work.

Table 2: Land for exchange or alienation

Parish (P) or Township (T)	Description (see note 1 below)	Area (ha)	Comments
Areas previously recommended for limited cultivation lease:			
Baring (P)	Parts of CAs 1 and 2	365.0	
	Part of CA 23	283.0	
	Part of CA 46	190.0	See Map 1; conservation covenant
Baring North (P)	Part of CA 11	153.0	See Map 2
Berbrook (P)	CAs 6, 10, 16-18, 26, 29, 30, 36, and parts of CAs 1, 2, 5, 8, 11-15, 19, 20, 22-25, 28, 31, 35, and 37-39	8360.0	See Map 3; conservation covenant
Bocool (P)	North-east of CA 16 - Parish of Burnell	250.0	See Map 4; conservation covenant
Burnell (P)	CA 15 and part of CA 16	530.0	
	North of CAs 16 and 19	770.0	
Dalrymple (P)	Part of CA 23	60.0	

Table 2: Land for exchange or alienation—continued

<i>Parish (P) or Township (T)</i>	<i>Description (see note 1 below)</i>	<i>Area (ha)</i>	<i>Comments</i>
Gnarr (P)	Part of CA 40	115-0	See Map 5
	Parts of CAs 32 and 32A	50-0	See Map 6; conservation covenant
Mamengorooock (P)	CA 10 and part of CA 6	327-0	See Map 7
	CA 17 and part of CA 18	371-0	See Map 7
Manya (P)	Part of CA 21	180-0	
	CAs 25 and 26	650-0	
	Part of CA 28	115-0	
Narrung (P)	Part of CA 10	175-0	See Map 9
Patchewollock (P)	CA 55A and part of CAs 56 and 59	550-0	See Map 8
	Part of CA 2	120-0	See Map 10; conservation covenant
Patchewollock North (P)	Part of CA 9	73-0	See Map 15
Pier-Millan (P)	Parts of CA 14	180-0	See Map 11
Pirro (P)	Part of CA 6	290-0	See Map 13; conservation covenant
	CA 20 and the reserve to its west, and parts of CAs 1A, 2, 3, 4 and 22	1140-0	See Map 12; conservation covenant
	Part of CA 69	370-0	
Purnya (P)	Parts of CA 6	150-0	See Map 14
	North of CA 11	91-0	See Map 7
Timberoo (P)	Part of CA 50	80-0	See Map 15
Tullilah (P)	Part of CA 21	193-0	See Map 16
Tyalla (P)	Part of CA 5	260-0	
Warrimoo (P)	Portions of CAs 6, 7 and 8	541-0	See Map 17
Wathe (P)	CA 15	295-0	
Winnambool (P)	CA 28	285-0	
Woorneck (P)	Part of CA 32	165-0	
Other areas:			
Albacutya (P)	Adjacent to Lake Albacutya	5-0	
Albacutya (P)	Within CA 3A	3-0	
Albacutya (T)	All Crown land within the township	6-0	
Ballapur (P)	Within CA 20	2-0	
Ballapur (P)	Within CA 3	2-0	
Bannerton (T)	CAs 1-3, 11, 15, 16, 18-20, section A, and CAs 1 and 5, no section	32-6	See Map 18
Boga (P)	Adjacent CA 2C	1-0	
Boga (P)	Adjacent CA 4A	7-0	
Boga (P)	CA 24, section 2	8-0	
Boorongie (P)	Water Reserve within CA 3	5-0	
Bumbang (P)	CA 83 A and D, section B	5-6	
Bumbang (P)	CAs 7-9 and 11-15; parts of CAs 4, 5, 7A, 10, 16, and 21; and part of public land west of CA 11	3323-0	See Map 18
Bumbang (P)	Part Crown land south-east of CA 62	6-0	
Carool (P)	Parts of CAs 1, 2, 9 and 10, Parish of Carool; CA 7, Parish of Nowingi; parts of CAs 33 and 34, Parish of Raak; and CA 55, Parish of Nurnurnemal	2165-0	See Map 19
Castle Donnington (P)	Within CA 11	1-5	
Cocamba (T)	CA 1A, section 1	1-0	
Curyo (P)	Stone Reserve, within CA 3	3-3	
Danyo (T)	Crown land north-west of sections 3, 4, and 5	60-0	
Dennyng (P)	CA 17A	43-0	
Duddo (P)	Recreation Reserve adjacent to CA 14	11-0	
Galah (T)	CAs 1 and 2, section 1 and the disused road adjoining section 1	1-7	

Table 2: Land for exchange or alienation—*continued*

<i>Parish (P) or Township (T)</i>	<i>Description (see note 1 below)</i>	<i>Area (ha)</i>	<i>Comments</i>
Galaquill (P)	Within CA 28	5.0	
Galaquill (P)	Within CAs 53 & 55	8.0	
Gama (P)	Within CA 11	7.0	
Gerahmin (P)	North of CA 42	3.5	
Goyura (T)	CAs 4, 7, 9, and 16–19, section 1; CAs 5–10 and 15, section 2; CAs 1–4, 7, 8 and 14–16, section 3; and CAs 12 and 13, section 4	3.0	
Karrawinna (T)	Parts of CAs 1–6 and CA 7, section A; parts of CAs 1–6 and CAs 7–20, section B; CAs 7, 9–21, section C; CAs 1–3, section E; CAs 1 and 2, section D; and the southern part of the Water Supply Reserve and land to its south	45.0	
Kia (P)	Water Reserve within CA 14A	6.0	
Kiamal (T)	CA 6, section 3	0.4	
Koimbo (P)	Within CA 32	1.0	
Kulwin (P)	Water Reserve adjacent to CA 29	39.0	Note: Contains tank O101
Lianiduck (P)	West of CAs 22 and 24	81.0	
Merbein (P)	CA 123	5.5	
Merbein (P)	CA 165C	10.6	
Merbein (P)	Channel Reserve adjacent CA 150A	0.2	
Merbein (P)	Part CA 148A	2.3	
Merbein (P)	Part CA 150A	2.0	
Merbein (P)	Part CA 156A	2.0	
Merbein (P)	Parts CA 3 and CA 6, section D	17.0	
Mildura (P)	Adjacent CAs 103 and 104, section A	2.5	
	CA 3, section 75, Block E	4.0	
	West of CA 21, section 48, Block E	1.4	
	CA 120C of A	1.6	
	CAs 2, 4 and 5, section 65, Block E	16.2	
Mildura (P)	CA 15, Block 46	4.0	
Mildura (P)	CA 3, Block 60	4.3	
Mildura (P)	CA 6, Block 42	2.0	
Mildura (P)	CA 7H, and Crown land south of CA 7B	4.0	
Mildura (P)	CA 8, Block 48	4.0	
Mildura (P)	CA 8C, section A	0.8	
Mildura (P)	CA 9, Block 32	3.0	
Mildura (P)	Part Crown Land west of CA 18, section C	2.0	
Moah (P)	Western part of CA 25	33.0	
Nyalla (P)	Within CA 25	5.0	
Nyang (P)	Gravel Reserve adjacent to CA 25	1.6	
Nypo (P)	Within CA 38	5.0	
Olney (P)	CAs 4, 8, and 9; and parts of CAs 5, 7, 10, 17, and 18	2000.0	Conservation covenant applies to all land supporting native vegetation. Cleared land is to be used only for dryland agriculture.
Ouyen (P)	Quarry Reserve within CA 26	4.0	
Paignie (P)	Crown land north-east of CA 10	24.0	
Panitya (T)	Crown land west of the Recreation Reserve and south of CA 8A, section 1	15.0	
Patchewollock North (P)	South of CA 26	24.0	
Patchewollock (P)	Adjacent CA 13	14.0	
Patchewollock (P)	Disused rubbish tip and sanitary depot	2.0	
Patchewollock (P)	North of CA 13	5.0	
Per-Millar (P)	Crown land adjacent to CA 34A	2.0	
	Crown land adjacent to CA 37	131.0	

Table 2: Land for exchange or alienation—*continued*

<i>Parish (P) or Township (T)</i>	<i>Description (see note 1 below)</i>	<i>Area (ha)</i>	<i>Comments</i>
Pirlta (T)	Crown land north of the Recreation Reserve Parish of Merrinee	16.2	
Pullut (P)	Two areas within CA 17	5.0	
Timberoo (P)	Crown land adjacent to CAs 4, 14 and 15	19.0	
Toltol (P)	CAs 8, 19, 22A, 23, 30, and 31, and parts of CAs 20, 21, 22, 24, 25, and 29	1915.0	See Map 20
Torrita (T)	CAs 10, 11 and the adjoining disused road reserve	1.0	
Towma (P)	Adjacent CA 14	4.0	
Turye (P)	South Western part CA 13	30.0	
Tyalla (P)	Reserve, being part of CA 19B	13.1	
Waichie (P)	Water Reserve adjacent to CAs 46 and 47	22.5	
Werrap (P)	Within CA 24	6.5	
Wirmbool (P)	CA 32A	3.0	
Wirmbool (P)	Water Reserve adjacent CA 32A	2.0	
Wirribibial (P)	Water Reserve adjacent to CA 5	13.0	
Woatwoara (P)	CA 5	42.1	
Worooa (P)	Stone Reserve, being CA 13A	2.0	
Wortongie (P)	North of CA 17	8.3	
Wyperfeld (P)	Part of CA 16	90.0	See Map 21
	Parts of CAs 1 and 18	325.0	See Map 21; conservation covenant applies within CA 1
Yallum (P)	CA 8A	27.0	
Yelta (P)	Part of CA 20	240.0	

Notes:

1. The cadastral descriptions of land employ the following abbreviation: CA - Crown Allotment.
2. Most of the larger areas listed for alienation are indicated on the maps. Many areas within townships, however, are too small to be mapped at the scales employed and the reader should refer to the appropriate cadastral map. Maps 1 to 21 at the rear of this report provide details of those areas where alienation is part of an allotment only and where the subdivision may be complex, or indicate those areas of remnant native vegetation that should be protected under a conservation covenant. In all cases detailed plans of the areas to be alienated are held by the Council.
3. Council has proposed the revocation of a number of townships; these are listed under Recommendation Q3. Where the public land within these townships carries no extant native vegetation and is not otherwise required for government purposes, it is included in Table 2. It is intended that the titles to these allotments should be amalgamated to form additions to present farms, not sold as individual lots. Recommendation Q2 lists public land associated with other townships, which may be used for urban purposes - including alienation if necessary.

GRAZING ON PUBLIC LAND

Grazing of native forage on public land has been an important factor in the agricultural development of Victoria. In the early days, when the length of time required to clear and develop land and dependence on native pastures limited the productivity of freehold land, it was an important source of income for many farmers.

The situation is different now. As a result of modern technology and management, much of

the freehold land is now cleared and sown to crops and improved pastures. The general importance of grazing on public land has declined, although it remains important to some individual farmers, and has been used in times of emergency when feed is scarce on the farms. At the same time, community attitudes towards the public lands have changed, and many people now expect these to be used and managed in a way that will conserve the natural ecosystems and will halt and reverse land-degradation processes.

At present the native forage on a large proportion of the public land in the Mallee is grazed under annual licences issued under the *Land Act* 1958 or, in the case of the forests along the rivers and streams, under agistment rights or annual licences issued under the *Forests Act* 1958. Such grazing is usually an adjunct to farming on freehold land, but some of the holders of the larger licences have little freehold land and grazing may be the only source of income.

In its final recommendations for the Mallee in 1977, the Council stated its belief that the grazing of public land carrying native vegetation could continue at a low intensity. In addition, it considered rabbit control, reclamation of damaged areas, and the fencing out of some areas for regeneration to be essential if public land were to be managed as a community asset.

The issue of a licence over public land only gives the licensee the right to use the specified resource (fodder, in the case of grazing) that is located on public land; it does not offer exclusive occupancy. A lease, on the other hand, gives the lessee a legal interest in the land itself and is usually interpreted as offering exclusive occupancy of the land. In all cases, the lessee or licensee is required to control vermin and noxious weeds.

Most of the grazing licences issued in the 1930s in the Mallee were on an annual basis and renewal occurred merely by the licensees paying the annual rentals. In the 1950s and 1960s, 21-year grazing leases were issued to about 40 licensees. As these came up for renewal in the years immediately prior to the Council's 1977 final recommendations, the then Department of Crown Lands and Survey converted them to annual licences so as not to prejudice subsequent government decisions. This conversion to annual licences continued after the recommendations, to achieve consistency of the licensing system.

Although the Council in 1977 recommended the granting of up to 21 year grazing licences where appropriate, none have yet been issued in the Mallee area. In implementing the Council's recommendations, the then Department of Crown Lands and Survey gave priority to those concerning land alienation.

It has been suggested that leases and longer-term licences generally tend to lead to the agricultural use becoming the dominant management goal of the land rather than the protection and preservation of the intrinsic values. A licence, however, is considered to be a sufficiently flexible form of tenure to manage grazing on public land.

In the extensive dryland areas of public land in the Mallee, control of grazing by annual licence has serious shortcomings, as inadequate limits are placed on stocking rates and the licensees have no security of tenure. There is a tendency to overstock some licensed areas, especially in dry years. In the past, 21-year leases gave reasonable security of tenure which allowed the lessees to undertake improvements, such as fencing and water supplies but little supervision of the lessee's management took place, particularly with respect to stocking rates, and in many places, vegetation and soils deteriorated.

In 1987, the Land Conservation Council commissioned ACIL Australia Pty Ltd to conduct a study of the larger areas of public land in the Mallee that are used for grazing. This provided information on the way they are used and their rangeland (agricultural) condition. Some 40 separate licence areas of 1000 ha or more were investigated; these are licensed to less than 20 individual enterprises.

The study revealed that, although some 500 000 ha of public land in the Mallee is held under grazing licences, not all of every licensed area is actually used for grazing. In fact, licensees use less than 50% of the total. The vegetation types in some parts are unsuitable for stock grazing, and some licensees stated that, in some cases, the land was being held under licence in the hope that it may be alienated in the future.

The impact of grazing on semi-arid ecosystems

The recent flora and fauna surveys and grazing-exclosure plots indicate that grazing pressure (the total influence of domestic and feral stock, rabbits, and, in places, native herbivores) is having a dramatic and detrimental effect on the quality and quantity of native vegetation, and hence faunal habitat, and is reducing the

public land's potential for a number of future uses, especially those involving nature conservation and recreation.

The native plants and animals of the Mallee have adapted to water stress brought about by the low and often irregular rainfall of the region and high rates of potential evaporation. Plants must be able to gather, retain, and make use of the small amounts of water available. The result is a community that has relatively few, but highly specialized, species with a comparatively low biomass (the total mass of plants and animals), in keeping with the limited availability of water.

Most semi-arid lands support plants with two contrasting strategies for survival. On the one hand, ephemeral plants germinate and grow rapidly following significant rain, then flower, seed, and die. The bulk of their life-span is spent as seeds in the ground, where they are far less vulnerable to environmental stresses, although they are exposed to harvesting by ants.

On the other hand, perennial plants, including lichens, shrubs, trees, and species of long-lived grasses, withstand high levels of water stress in a number of ways, including dormancy.

Most native perennials respond rapidly to good rains by a burst of growth. In general, however, they are slow-growing and set seed only irregularly following favourable climatic conditions. Plant survival depends on maintaining a potential for growth and response to favourable conditions; little, if any, surplus material is available for harvest without serious detriment to the individual. The perennial plants are vulnerable to over-use by grazing and browsing animals.

Native grazing animals in semi-arid areas generally occur in low numbers or are nomadic, following the availability of the ephemeral plants appearing with the rains. Thus, under natural conditions, grazing pressure on perennial plants is light.

With increasing European pastoral development, these lands were used in a way that has led to a gradual loss of biological productivity. Part of this effect is due to the introduction of cattle and sheep, which have higher individual water and energy requirements than the endemic species and which are expected to yield wool or meat as surplus animal product.

Even during relatively wet periods, water generally must be provided for domestic stock. This additional water permits the animals to persist over long periods without rain. In the absence of rain and in the absence of ephemeral and other understorey vegetation, domestic animals subsist on the perennial plants, thereby subjecting this vegetation to even heavier browsing.

By both augmenting water supplies to stock and setting the level of grazing in accordance with economic rather than biological parameters, pastoral development attempts to derive from the land support for greater numbers of herbivores than would be sustained in a system regulated by the availability of renewable resources produced in the intact natural system.

In other words, the natural relationships of the biological system that characterizes semi-arid vegetation become distorted by human economic needs, developments (wells, tanks, etc.), and by the ability of the land to support fodder plants.

Pastoral development has also involved fencing or other means of reducing the movements of animals, so grazing pressure generally becomes constant throughout the year without times of rest for the vegetation. Stock confined to an area will first eat the most palatable species and then others sequentially as preferred plants disappear. Selective feeding at high stocking densities not only removes plant biomass but reduces species diversity over time as palatable perennial species succumb to a greater harvest than their growth can support. The result is the loss of those perennial species that are most palatable to stock.

Loss of perennial plants from intensively grazed areas destabilizes biological systems and transforms the land's productivity to a boom-and-bust economy. In addition, if the lichens, trees, shrubs, and perennial grasses are lost, little remains to hold the fragile soil in place during a drought. Small falls of rain evaporate rapidly or run off, and are lost to the remaining plants.

A solution to maintaining a pastoral industry in semi-arid lands while protecting the continued productivity of the natural system is to ensure that grazing removes no more resources than the land can produce in excess

of its essential biological requirements. The numbers of herbivores supported must be tied to the carrying capacity of the land at its least-productive times.

Management units for stock must be large or alternative grazing areas must be provided so that sub-units of land can be rested to allow regeneration of perennial vegetation. Infrequent times of high rainfall can trigger setting of seed or germination of woody plants. Subsequent protection of the young seedlings from stock is necessary to allow recruitment of the next generation of shrubs and trees.

Enhancement and protection of the productivity of the semi-arid lands benefit both pastoralism and wildlife dependent on native plant species.

There are also indications that, as their diets are similar, the greatest damage to the vegetation occurs when sheep and rabbits graze together. In addition to competing with each other for the same species, their different grazing patterns in combination markedly increase the intensity of grazing on some species. Sheep, being larger animals, are able to graze coarser, taller vegetation which is usually avoided by rabbits. However, once the plants are reduced in height, and growth of young foliage stimulated, the rabbits find the plants attractive and begin to compete with sheep for this herbage. Constant grazing by both animals may continue until the plant's death.

Effects of grazing on woodlands

Seedling and sucker regeneration of the dominant woody species of the woodlands (native pine, belah, buloke, sandalwood, and cattlebush) have been severely affected as all are palatable to stock. In the vast majority of occurrences of pine-buloke woodland, for instance, the extant mature trees are probably regrowth from the period prior to European settlement of the region. As these trees die (usually as a result of wildfire or being blown over by wind storms as stand density diminishes) and grazing pressure continues, the woodlands are converted to open grassy woodlands and finally, once all the trees are gone, to impoverished grasslands of exotic species.

From work conducted in 1988 by Westbrooke, and others, it appears that the regeneration of

many woodland trees and shrubs depends upon distinct climatic episodes comprising several consecutive years of good rainfall and relatively mild summers. If regeneration that establishes during these periods is not protected from intensive grazing pressure (including rabbits, goats, and kangaroos as well as domestic stock), very few seedlings or suckers will survive.

Although sandalwood has regenerated in some locations remote from stock watering points, or where stock grazing is discontinuous, no evidence has been presented to the Council that the woodland species can regenerate under continuous grazing in conjunction with the stocking levels generally practised in the Mallee. Where stock have been deliberately or accidentally excluded, even where kangaroo numbers are normal and rabbits subject to only routine control, regeneration is occurring.

Effects of grazing on understorey species and shrublands

Understorey species of the woodlands are also being adversely affected. Native perennial shrubs and grasses are under most stress from grazing during late summer and autumn. The cool-season rains that follow promote the growth of annuals (mostly exotic species—including weeds), which tend to exclude the less opportunistic perennial grasses. In the following summer, the annuals set seed and die and grazing pressure is again concentrated on the remaining native perennials. In this way, the diverse, native perennial understorey gives way to an unstable layer of annual exotic grasses and herbs. These may be dense in the spring of a good year, but disappear to leave the soil exposed to erosion in dry years.

Significant reductions in plant cover have occurred in the saltbush and bluebush shrublands of the higher terrace along the River Murray, in the west Millewa, and on the Raak Plains. The herbs and grasses, particularly the spear-grasses growing between the shrubs provide most of the grazing during late winter and early spring while the shrubs are only lightly browsed. However, the perennial shrubs, including some saltbushes, bluebushes, and copperburrs, become the principal diet in summer and the drier years.

Under moderate grazing pressure the shrubs are spelled over the winter when other more

palatable feed is available; then, once the annuals have disappeared, the bushes are grazed until rain renews the cycle. Rain can only do this if the country is managed on a sustainable ecological basis, otherwise the shrubs will not mature and produce seed for the next generation.

Bladder saltbush, an important component of the shrublands and a good indicator of shrubland condition, is drought-tolerant. As with most plants, it can absorb and use moisture in the form of dew or water vapour in the air. It also has a number of leaf adaptations that reduce water loss through evaporation. In severe droughts, the plants can drop their leaves without dying. This happens gradually as the drought lengthens and enables them to survive when many other species die.

The Soil Conservation Service of New South Wales has noted that during drought, or over the summer when fewer other species are available, bladder saltbush becomes an important part of the diet of sheep. It provides a maintenance rather than a production diet and the sheep, although they may not fatten on it, will remain healthy, produce good wool and even lamb. When other feed is available, such as in winter, bladder saltbush contributes very little to the diet. However, during extremely severe drought, bladder saltbush cannot be relied upon to provide drought forage due to its habit of dropping its leaves, and stock browse other plant species. Yet, even when it is in this condition, it can still reduce wind velocity at the ground and thus minimize erosion.

In less-reliable-rainfall areas, bladder saltbush is seen as a valuable plant, providing drought fodder, soil protection, and suitable sites for seedling growth. It is palatable enough for sheep to eat it but not so palatable that they will eat it all the time and kill it, provided other preferred fodder is available.

If grazed moderately, plants will actually improve in vigour—becoming more bushy, compact, and leafy than plants that are only lightly grazed. However, under continuous heavy grazing where other preferred species have been eliminated, the bushes die. As a rule of thumb, the bushes die once they are grazed to less than about 30 leaves per plant.

Loss of vegetative cover in the shrublands due to grazing pressure has exposed light topsoils

that are highly susceptible to sheet and wind erosion. Subsequent removal of the topsoil has exposed clayey subsoils that are difficult to revegetate. These effects are most obvious near stock watering points, such as billabongs and the anabranches of the floodplain.

Effects of grazing on communities dominated by mallee eucalypts

Grasses and other palatable herbs are uncommon in the main vegetation communities of the deep infertile sands resulting in these communities being little affected by grazing and, although included in some licensed grazing areas, are not used. Soils of intermediate fertility, such as those carrying chenopod mallee, shallow-sand mallee, east-west dune mallee, and loamy sand mallee, contain more palatable understorey species and, depending on the availability of water, these are grazed to varying degrees.

Where grazing pressure is high, little regeneration of shrub species is occurring. Seedling regeneration of mallees occurs only rarely and competition from mature plants or suppression through grazing may be factors in this, although indications are that good spring and summer rainfalls are also required for successful seedling recruitment.

In the longer term, as the extant mallees senesce, it could be expected that these areas, too, would degrade to exotic grasslands.

Land use aim

The existing condition of the affected vegetation communities and the importance of checking and reversing regional land-degradation processes, on both public and private land, necessitate development of a strategy that addresses these problems in relation to grazing. Any delay in implementing such a strategy could result in the loss of the land-protection values of these Mallee communities from substantial areas of public land in a relatively short time and an increase in land-degradation problems.

Because of the nature of salinity and other land-degradation problems, and related off-site effects, the benefits of implementing a new grazing strategy would extend beyond the land on which any revegetation works are undertaken.

The primary aim of the Council is to make recommendations on the balanced use of public land in the Mallee to ensure that public land values are protected. The Mallee contains the best examples of the remaining uncleared semi-arid vegetation in south-eastern Australia and the object of land use decisions is to preserve and, where necessary, foster the rehabilitation of disturbed communities.

With this in mind, the Council adopted the following guidelines in preparing its recommendations regarding grazing on public land.

- Those portions of the licensed areas that are rarely or never used for grazing should be excluded from the licence immediately.
- Grazing should be eliminated as soon as practicable from areas identified as having high conservation values.
- If grazing is to be removed from other areas over a longer term, the areas and the period over which this is to occur should be specified.
- Those areas where it is considered that grazing is a use compatible with the general goal of protecting public land values should also be identified.
- Where grazing may continue, it will be necessary for the managing authority to closely control stock numbers and to exclude grazing for appropriate periods to allow regeneration in favourable conditions. Such control should also be exercised over stock numbers during the period over which grazing is being withdrawn. This will require a greater degree of supervision by the Department of Conservation, Forests and Lands.

As a result of the Council's recommendations, which provide for major extensions to the park system, grazing is to be removed from substantial areas of public land. In all, some 150 000 ha of land on which licensed grazing actually occurs will become unavailable for that use. However, outside these nature conservation reserves, domestic-stock grazing could be permitted under a new strategy as outlined in the next section.

The Council considers that the removal of licensed grazing from nature conservation reserves should take into account the needs of individual licensees and the time required for

them to make alternative arrangements as well as the need to foster regeneration of native vegetation. A schedule for the termination of grazing licences follows Recommendation F2 and should be read in conjunction with Map D.

Artificial water reservoirs (channel-fed and catchment-fed tanks) have been constructed throughout the Mallee to provide water for grazing stock. In some cases these have become redundant through the provision of reticulated water supplies. These reservoirs support not only domestic stock but also feral animals, such as rabbits and goats, and artificially high numbers of native herbivores. Council believes that, with the termination of grazing from nature conservation reserves these catchment dams should be investigated for their potential to provide other community uses, principally fire fighting. Those that are not required should be made inoperative by the land manager.

Strategy for public land in the dryland areas of the Mallee

Aim

For areas in the dryland region of the Mallee, outside nature conservation reserves, that have been modified by grazing and other activities, and on which grazing may continue, the Council has established a long-term aim:

To maintain and improve the native perennial overstorey and understorey vegetation to reduce wind erosion, local and regional salinity problems, and other forms of land degradation—such as weed invasion—and to establish a sustainable (although not entirely natural) ecosystem based on the key elements of the original vegetation communities.

In its proposed recommendations, the Council stated that the best way to achieve this aim was to remove all grazing from these dryland areas, with the government assuming full responsibility for the proper management of the land, including vermin and noxious weed control.

Submissions to the proposed recommendations expressed concern about the possible effects of the total removal of grazing in terms of the impact on the licensees, transfer of those costs

of management currently borne by licensees more directly to the government, increased fire hazard, and increases in rabbit and kangaroo populations.

These final recommendations outline a different strategy that seeks to achieve the same object, but instead of removing all grazing, could allow it to continue:

- under a regime that provides a mechanism for the re-establishment of native perennial vegetation
- at an intensity compatible with the maintenance of perennial native vegetation once it has been re-established.

An advantage of this strategy would be that the on-going management of the land could be through a co-operative effort between the community and the government. Many such co-operative arrangements dealing with problems of land degradation are now under way in Victoria, including the Mallee. The intention of these arrangements is to provide for better stewardship of public land.

It must, however, be clearly understood that the primary objects for these areas are land protection and restoration and maintenance of native vegetation. Grazing could be permitted where it does not conflict with the primary object identified above. In other words, the Council believes that grazing is not the primary use of this land.

The distinction is made here between nature conservation reserves, from which stock grazing is to be removed, and areas where grazing may continue. In the latter, management is to be directed towards establishing an equilibrium between native vegetation growth and pastoral activities that, although not necessarily a 'natural' equilibrium, is none-the-less sustainable.

Information collected and observations made by the Council, both in Victoria and interstate, indicate that it is possible to restore and maintain such a sustainable ecosystem, which permits a low level of grazing without necessarily affecting either the reproductive capacity or the land-protection values of native vegetation. It is also apparent that such grazing must not be continuous in order that areas can be rested for sufficient periods of time to allow regeneration and recruitment of the semi-arid woodland and shrubland species.

In addition, there are inadequate scientific data about the impact of grazing on natural ecosystems in the Mallee. It is therefore difficult to justify its total exclusion from all dryland areas of public land in the Mallee.

It is recognized that the extensions to parks and other nature conservation reserves recommended by the Council include good representation of the major floral and faunal communities of the Mallee as well as the major land systems. Much of the remaining public land also has important conservation values and, where these occur, the aim of management should continue to be to protect those values. However, most of the dryland areas of public land that have been used for grazing in the past either have lost or are in the process of losing their native perennial vegetation and hence their conservation and land-protection values.

The initial loss of vegetation cannot be attributed solely to domestic-stock grazing. Considerable areas of public land were cleared of pine, *belah*, and *mallee* to provide fuel for riverboats and water-supply pumping stations as well as for timbers for fencing, buildings, and viticulture. In addition, rabbits have caused major depletions of the understorey vegetation and regenerating plants. However, grazing activities have exacerbated the deterioration of the native vegetation and in some areas have resulted in its total removal—particularly the perennial understorey species.

As a result, the biological values of most of those areas that have had a long history of grazing and other disturbances are severely reduced. In some cases, the areas were cultivated in the past but have since reverted to disturbed grassland or shrubland.

However, in view of the Council's commitment to combat salinity, wind erosion, and other forms of land degradation (including weed invasion), which is also a high priority of government, it is considered that every effort should be made to reduce the public land contribution to these problems. Many of the areas of public land concerned are large and occur in strategic locations in the landscape, particularly with respect to the salinity problem. Therefore, it is considered that the primary aim of management should be to restore and maintain deep-rooted native perennial vegetation on these areas. The current trend of

gradual deterioration of the native vegetation towards exotic annual grasslands must be reversed and this in turn will help retrieve the capacity of the land to mitigate the effects of land degradation.

The new land use strategy and its implementation

It must be understood at the outset that the Council is recommending that the existing arrangements under which public land is grazed are to cease. A new form of tenure should be negotiated for each area within the framework of a management plan, taking account of the primary aim stated above. Fees should accord with current market values for stock grazing, with appropriate rebates for management costs, including any associated with land-protection works, incurred by the tenants.

Grazing of public land should not be assumed as of right nor should a licence be sub-let or transferred during its term without approval of the Director-General of the Department of Conservation, Forests and Lands.

In the context of these recommendations, the term licence is employed to refer to the new form of tenure to be negotiated under the conditions outlined below. Although these new licences may extend for more than 1 year, it is not Council's intention that they should offer exclusive occupancy of the land—as is implied, for instance, under previous leasing arrangements.

It is suggested that for the larger grazing areas (generally 1000 ha or more) new licences (negotiated in accordance with these recommendations) could be issued for periods of up to 10 years in the first instance. These and subsequent licences would be conditional upon the licensee agreeing to exclude a substantial area of land within the licence from grazing for sufficient time to allow the restoration of native understorey species and the recruitment of young trees that are capable of replacing the aging overstorey. The period of exclusion will vary according to seasonal and other factors—a series of wet seasons may be critical for the successful establishment of certain species, for instance—and hence cannot be determined by the Council. However, it is

likely to be at least 10 years for woodland areas and 5 years for shrublands. In some cases, deliberate seeding or planting may be necessary where natural seed sources have been eliminated.

Following successful re-establishment of vegetation on the excluded land, controlled grazing could be re-introduced and another portion of the licence excluded. Successive exclusions would eventually lead to the whole of the licensed area being progressively regenerated. Depending on the relative sizes of the licensed area and the excluded portions, it could be several decades before the whole area is restored adequately.

The land to be excluded would be determined by the land manager in consultation with the licensee. An important factor in deciding which area or areas would be excluded first would be the presence of remnant native vegetation that could provide a viable seed source for re-establishment. In some cases small remnant stands or planted trees and other vegetation on the remainder of the licence could be fenced out or individual seedlings protected, in addition to the larger exclusion areas.

Stocking levels on the land that remains available for grazing in the interim would also need to be closely controlled, the level of grazing being based on vegetation condition rather than on the condition of the stock.

The exclusion of areas from the licence may involve additional fencing, installation or relocation of stock watering points, and other works associated with the re-establishment and maintenance of native vegetation. These costs should be borne by both the licensee and the government and the matter should be negotiated between the land manager and the licensee.

Current information indicates that, where a grazier has the flexibility to rest areas from grazing, by having access to either extensive parcels of land (such as in South Australia) or a mixture of public and freehold land (as for some licensees in the Mallee), and exercises this flexibility, the extant native vegetation is in a relatively better condition than where the licensee relies almost entirely on public land. This is usually because such flexibility allows for the destocking of areas for at least part of the year to permit the recovery of vegetation.

For that reason, grazing on public land in the Mallee should be considered as an adjunct to an enterprise based on freehold land; the public land could be used for grazing only as established in the management plan, rather than forming the basis of a farming operation.

Grazing on public land should only take place on land currently licensed for that purpose except where it is specifically excluded by other recommendations.

Numerous small parcels of public land, including bushland reserves as well as smaller areas of State forest in the dryland areas of the Mallee, are also currently licensed for grazing.

Many of the smaller areas of State forest (less than about 1000 ha) that are used for stock grazing have a history similar to the larger areas, in that past activities have depleted the overstorey and understorey vegetation and continued grazing is preventing regeneration.

Their future management should similarly strive to maintain and improve the native perennial vegetation to reduce land-degradation problems. For these smaller areas, however, the land excluded from grazing for a time, to permit regeneration to establish, may involve the whole of the licensed area. In other cases, existing fences may adequately partition a block to enable revegetation works to be undertaken progressively.

Licences for these areas would also be renegotiated in accordance with the recommendations outlined below.

Bushland reserves are set aside principally to retain the dominant vegetation type as one of the elements of the landscape of a region. Grazing could continue on such areas at the discretion of the managing authority and subject to any necessary revegetation and rehabilitation works, which may require new fencing or removal of grazing for a period to permit regeneration to establish. The form of licence on these areas would also be discretionary on the managing authority.

Monitoring

A key aspect of this strategy is the establishment of an on-going monitoring program that will provide data to assess the effectiveness of the new grazing strategy and also the relative

impacts of domestic stock and rabbits on the restoration and maintenance of native vegetation.

Data from the monitoring program should ensure that, eventually, the intensity of grazing on the licensed area is determined by the condition of the native vegetation, such that the native perennial understorey and overstorey are maintained in a sustainable balance.

A similar monitoring program in South Australia and New South Wales utilizes photographic reference points covering the range of vegetation types and seasonal conditions as well as using the condition and cover abundance of particular indicator plants.

This information, together with more detailed research data, should be collected to enable future decisions on grazing to be soundly based. Data collection should be conducted on a regular basis and sufficiently often to produce meaningful results. It is feasible that remote-sensing techniques such as those using data from satellites may assist in such a program. The research program should ensure that information is available for a range of vegetation types and conditions, and would include data from parks and other reserves where grazing is excluded.

The Council believes that, 5 years after its implementation, the Department of Conservation, Forests and Lands should prepare a comprehensive report for government on the effectiveness of the monitoring program and of the new grazing strategy. The report should include data on the mechanisms of the *implementation of the strategy* as well as those on weeds, regeneration and recruitment, and the status of the native perennial species subject to grazing.

Supervision and management

There must be a greater degree of supervision of grazing on public land in the Mallee and a higher level of co-operation and consultation between the land manager and the licensees.

The Council therefore believes that regular inspection of the licensed areas (at least twice-yearly) by the land manager is required and that, for the strategy to be effective, a full-time officer should be employed to carry out these inspections and liaise with the licensees.

Improved co-operation could be achieved by the appointment of a person from the local community to act as a 'facilitator', who would advise the Land Protection Regional Advisory Committee on grazing matters.

The licensee, in consultation with the land manager, should prepare and implement a comprehensive vermin and noxious weeds control program. It may be necessary for the government to contribute additional resources, at least in the initial stages, to ensure effective knockdown of vermin, particularly rabbits, in order that the licensee can concentrate on a continuing maintenance program.

Regular inspection and liaison with the licensee would enable the land manager to determine the degree of compliance with the licence conditions and would provide the opportunity for any inadequacy to be brought to the attention of the licensee and rectified prior to the next inspection. It should be clearly understood that on-going breach of the licence conditions would result in termination of the licence. The licensed area may then become available to another party.

Council also believes it would be beneficial to establish a committee (under the auspices of the Land Protection Regional Advisory Committee) to provide advice and exchange of ideas between licensees and the land manager and to accept some responsibility for the effective operation of the strategy and local community involvement in it.

Licensees should recognize that the long-term future of this grazing strategy will depend on the results derived from the monitoring program and further refinement of data about land-degradation processes, particularly those relating to the salinity problem in the region.

Licence fees should in the future reflect both the current market value of land rented for grazing and the costs of proper supervision and management. Consideration should be given to discounting against the licence fee other costs borne by the licensee, such as those associated with fencing of excluded areas, vermin and weed control, revegetation work, and actual expenditure on water and Shire rates applicable to the licensed area.

The Council has specifically recommended that grazing under current licence conditions should cease and that any future grazing of the

dryland areas of the Mallee only be permitted under new licences, which are subject to the conditions listed below.

Conditions to apply to grazing the dryland areas in State forest

- (a) A land management plan that identifies how the licence conditions may be met should be prepared for each licensed area by the prospective licensee in consultation with the land manager and agreed to before a licence is issued. Each plan must comply with the aim stated on page 60 of these recommendations.
- (b) A new grazing licence should only be issued if the applicant agrees to participate in any necessary land-care projects and associated monitoring on the licensed area in co-operation with the land manager. Such projects would include:
 - periodic and sequential exclusion from grazing of substantial portions of the licensed areas (in the case of the larger licences, about one-quarter to one-third) to allow the re-establishment and maintenance of native perennial vegetation
 - rehabilitation of unstable land such as mobile dunes
 - exclusion of stock from important stands of vegetation, or other necessary minor works identified by the land manager.

The licensee and the land manager should determine an equitable sharing of costs associated with any necessary capital works.

- (c) Grazing may be permitted where it does not conflict with the aim stated previously.
- (d) Cropping should not be permitted.
- (e) The term of each licence should be determined by the land manager, but should be no more than 10 years in the first instance. Subsequent licences would be conditional on satisfactory compliance with the conditions of the licence and the satisfactory progress of the grazing strategy.

- (f) A comprehensive vermin and noxious weeds control program is to be developed and implemented by the licensee for each licensed area in consultation with the Department of Conservation, Forests and Lands.

Principles of management

In order to ensure the preparation of management plans for each grazing licence and to make certain that the effectiveness of the grazing strategy is monitored, that good stewardship of the land is assured, and that regular communication is maintained between the licensees and the land manager, the following principles should be observed.

- The Department of Conservation, Forests and Lands should employ a full-time officer to work on a co-operative basis with the licensees with regard to licence conditions and their fulfilment. Consideration should also be given to the appointment of a facilitator and the establishment of a regional committee to advise the Department on land-protection matters associated with grazing and to provide an opportunity for exchange of views.
- Subject to satisfactory compliance with the conditions of the licence and satisfactory progress of the grazing strategy, first right of refusal should be offered to the incumbent licensee of an area at the time that renewal of a licence is being negotiated.
- Licensed areas should be inspected frequently (at least twice-yearly). In addition, regular contact should be maintained between the licensees and the land manager.
- Where appropriate, the management plan should incorporate specific provisions to protect areas of scenic and recreational value and encourage the use of and better access to such areas.
- The land manager should exercise general supervision of the management of the licences and, after consultation with the advisory committee (if one is established), may issue directions to the licensees on matters such as grazing management, stocking rates, subdivisional fencing, and water supply.

- An on-going monitoring program should be implemented by the land manager to provide data that: enable proper assessment of the effectiveness of the works undertaken; identify the sources and relative impacts of grazing pressure on native vegetation; and provide information relating to the suitability of the new grazing strategy in achieving the stated aim.

Public land grazing in the riverine areas

In the Mallee, grazing by domestic stock has less impact on the herbfields, shrubs, and tree species in the floodplains than in the dryland areas. This may be due largely to the exclusion of stock during the periods of high water, thereby enabling the vegetation to undergo some recovery.

Although river red gum and black box are regenerating in most of the licensed grazing areas along the floodplain, evidence suggests that continual grazing by sheep inhibits the establishment and growth of river red gum seedlings. In addition, damage to the soil surface at watering points is occurring and some vulnerable plant species are grazed.

The Council believes that licensed grazing on floodplain areas of State forest, outside nature conservation reserves (indicated as S2 on the maps), may continue at the discretion of the land manager. Such grazing would be subject to management plans for each area, which ensure that important sites (such as Aboriginal burial grounds or stands of vulnerable plant species) are protected, that regeneration of native plant species is fostered, and that the native vegetation does not sustain long-term damage.

Recommendations

F2 That:

- (i) for those licensed grazing areas and portions of others that are rarely or not presently used for grazing of domestic stock, the licences be cancelled on expiration of the licence current at the time of government acceptance of the recommendations (those areas now recommended for inclusion in the park system are shown on Map D)

- (ii) grazing be terminated on the currently used licensed grazing areas recommended for inclusion in national parks according to the schedule in Table 3 and as indicated on Map D
 - (iii) until grazing is terminated in the parks, stocking rates be determined by the land manager in consultation with the licensee on an annual basis, the intensity of grazing in these areas be strictly controlled to minimize further deterioration, and particularly sensitive areas be protected; vermin and noxious weeds control by the licensee should continue in accordance with a plan determined by the licensee in consultation with the Department of Conservation, Forests and Lands
 - (iv) except where otherwise specified, licensed grazing be permitted in floodplain forests and woodlands (see Recommendation S2) at the discretion of the land manager subject to the development of a management plan that ensures that the natural vegetation does not sustain long-term damage, that regeneration of native species is fostered, and that particularly sensitive areas are protected
 - (v) for areas of State forest in the dryland areas of the Mallee, shown on the map (Recommendation S1), grazing under current licence conditions cease within 2 years of government acceptance of these recommendations
 - (vi) subject to (v) above, future grazing be permitted under new licences, prepared in accordance with the conditions of grazing and principles of management outlined above
 - (vii) no further areas of State forest, other than those currently licensed, should be used for grazing
- and that
- (viii) five years after its implementation, the Department of Conservation, Forests and Lands prepare a report

to government on the effectiveness of the strategy and the associated monitoring program.

Notes:

1. Grazing on other public land is considered separately in the relevant chapters.
2. The management plan for the grazing licences on the Raak Plain should take into account the area's special scenic and recreational values and interpretative facilities should be provided (see the schedule of values to be protected in State forest—Chapter S).

Table 3: Schedule for removal of grazing

<i>Areas (see Map D)</i>	<i>Date</i>
1	On expiration of the licence current at the time of government acceptance of the recommendation
2	1 July 1990
3	1 July 1991
4	1 July 1992
5	1 July 1993
6	1 July 1994
7	1 July 1995
8	1 July 1996

Notes:

1. Grazing licences over areas little used or not currently used for grazing are to be cancelled on expiration of the licence current at the time of government acceptance of the recommendations (see Recommendation F2 (i) above).
2. Public land grazing is also affected by flora and fauna reserves (see Chapter G).

Council acknowledges that, with the termination of licensed grazing from the parks, the Department of Conservation, Forests and Lands will require an increase in resources to control vermin (particularly rabbits) and noxious weeds and to rehabilitate some areas. This factor has also been a determinant of the timed removal of grazing from the areas indicated on Map D.

The recommended additions to the park system in the Mallee cover 773 500 ha, about 412 000 ha of which have been held under




SCHEDULE FOR REMOVAL OF GRAZING

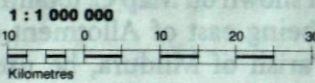
FINAL RECOMMENDATIONS

Mallee Area - Review



LEGEND

-  Unused portions of licensed grazing areas
-  Staged removal of grazing from area currently used [for details refer to Recommendation F2]
-  Public land



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grazing licence. However, only about 153 000 ha now included in the parks have been regularly grazed and 120 000 ha of this will require additional resources for control of vermin and noxious weeds and for rehabilitation.

It is believed that, with the efficient use of resources and the development of techniques applicable to the scale of the problem, as well as the flexibility to capitalize on disasters to the rabbit population such as drought, an effective rabbit-control program could be implemented for all public land in the Mallee.

Research centres

The Department of Agriculture and Rural Affairs' Mallee Research Station at Walpeup occupies 1036 ha of public land and the Sunraysia Horticultural Centre occupies 81 ha, while the Irymple Technical School operates a school farm on 94 ha of public land in the Parish of Mildura. The Council proposes no change in the use of these centres.

In addition, the Mildura TAFE College is seeking access to land in the west of the Parish of Mildura for dryland cropping as part of its curriculum. The area is already cleared and cropped and Council has no objection to this proposal.

Recommendations

- F3** That the areas totalling 1210 ha, shown on Maps A and C, continue to be used for agricultural research and education purposes as approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Note:

These areas include those reserved by the government after the Council's final recommendations for the Mallee area in 1977.

- F4** That the area shown on Map C, totalling 310 ha and being east of Allotment 6, section C, Parish of Mildura, be used for agricultural education by the Mildura TAFE College under licence issued under the *Land Act 1958*

Apiculture

The public lands of the Mallee, and especially the Big Desert, are important to the bee-keeping industry because of the range of nectar-producing plants here that flower at different times throughout the year as well as the region's mild winter climate. These provide a favourable situation for both honey production and the overwintering of hives. Apiarists can bring their hives to full strength during winter prior to moving them to sites that provide for late spring and summer honey production.

Currently some 300 bee sites, held by about 100 licensees, are located in the Mallee area. Of these, about 90 sites are permanent. Some of these licensed areas are held by commercial (full-time) apiarists, while others are held by people whose income is not wholly dependent on bee-keeping. It is estimated that the study area provides about one-third of Victoria's honey crop. In addition, bees provide pollination services for a number of agricultural and horticultural crops and the availability of properly prepared bee colonies early in the flowering season is important to the future expansion of these crops. Artificial feeding of hives is possible—at a cost—but the need for access to public land will continue.

Under the Council's recommendations, the only areas specifically excluded from apiculture are reference areas. However, because vehicles and bee sites are not permitted in the Big Desert Wilderness, apiculture is also excluded from the bulk of this area.

It is the current policy of the management of conservation reserves such as national parks and flora and fauna reserves that apiculture, where it is a traditional use of the area, may continue. However, concern has been expressed that honey bees are an exotic species that use a resource (nectar) in competition with the native fauna and that they are non-species specific and their foraging may lead to hybridization between native plant species. In addition, feral bee colonies occupy tree hollows and other cavities throughout the Mallee and may have displaced native fauna by reducing available nesting and roosting sites. The possible effect on native flora is superimposed over that imposed by commercially managed bees. Until the scale of these impacts is known, it is not

possible to determine whether commercial beekeeping is an inappropriate use of these parks and reserves.

The potential effects of honey bees on native flora and fauna have been investigated for some 10 years, but results are at present generally inconclusive and may not be applicable to the commercially managed bee population. A major environmental effect, however, stems from the proliferation of tracks made by beekeepers into extensive areas of the Big Desert. The Council considers that the network of tracks on public land should be planned and rationalized to minimize the number of tracks and prevent their inappropriate location, such as over sensitive sand dunes.

In addition, the presence of hive and/or feral bees in recreation areas is causing increasing concern in the Mallee—particularly during the drier months when the bees seek moisture wherever it may be available. Relocation of some bee sites may be necessary to overcome

this conflict, and the problem of feral bees monitored and control programs initiated where required.

Recommendations

- F5** That research be initiated by the government into the ecology of feral and commercially managed honey bees in the natural environment and their impacts on native flora and fauna and, pending the outcome of this research, no further sites on public land be permitted.
- F6** That tracking to existing bee sites be rationalized where necessary, with any new tracking subject to the approval of the land manager.
- F7** That the Department of Conservation, Forests and Lands continue to monitor the problem of feral bees on public land and, where necessary, initiate control measures.

G. Flora reserves and flora and fauna reserves

A number of areas contain native vegetation with considerable floristic importance in addition to the parks with high floristic and wildlife values that have been recommended in the Mallee area. Others are important not only for their floral values but also because of the significance of wildlife populations and habitat they contain.

Council has recognized the special conservation significance of these areas and has accordingly recommended their reservation as flora reserves or flora and fauna reserves. They are set aside primarily to conserve species that may be rare or endangered, and also other plant associations and animals that have particular conservation significance. Timber production from these areas would not be permitted.

In all such reserves, suppression of fires remains the responsibility of the Department of Conservation, Forests and Lands. Appropriate fire-prevention measures will be carried out where necessary as will the control of vermin and noxious weeds.

Some of the flora and flora and fauna reserves (existing and proposed) include salt pans and/or gypsum deposits (including copi rises). These reserves are set aside to protect plant and animal communities, some of which depend on the saline or gypseous soils. Extraction of these materials or alteration of soil profiles could be inimical to the preservation of these species.

Given the limited extent of public land in the eastern Mallee and the relatively small sizes of the reserves, it is considered that the harvesting of salt or gypseous material should not be permitted in flora or flora and fauna reserves. The availability of these resources elsewhere should be investigated.

Existing flora and fauna reserves

Recommendations

G1-G3, G6-G31, G33

That the flora and fauna reserves, totaling 1108 ha and indicated on the maps continue to be used for those purposes approved by the government

following publication of the final recommendations for the Mallee area in May 1977

except that

- (i) grazing not be permitted
- (ii) extraction of salt or gypseous material not be permitted

and that

- (iii) apiculture be permitted on traditionally licensed sites pending the outcome of research into the ecological impacts of this industry and subject to management requirements.

Notes:

1. Flora and fauna reserves G4 and G5 and the Raak Reserve are now included in the new Murray-Sunset National Park.
2. G32 is redesignated as a wildlife reserve—D31.
3. The tenement for the mining of copi in the Towan Plains reserve (G22) has expired and operations here are confined to removal of stockpiles and site rehabilitation.
4. Garbage disposal may continue at the currently cleared site to the north-west of G13 until the site is fully utilized or until December 1999, whichever is the sooner. Following rehabilitation it should be added to the reserve (see Recommendation P4).

Redefinition of wildlife reserves to flora and fauna reserves

For several areas recommended in 1977 as wildlife reserves, the harvesting of one of the elements of the ecosystem, such as plant species or animals, is not appropriate. Further, recent studies have indicated that both the floral and faunal values are of biological significance. Accordingly, it is proposed to redefine these areas as flora and fauna reserves.

Recommendations

G34- That the areas indicated on Maps A and -G38 B and described below to be used to:

- (i) to conserve native plants and animals

that

- (ii) apiculture be permitted on traditionally licensed sites pending the outcome of research into the ecological impacts of this industry and subject to management requirements
- (iii) passive recreation such as nature study and picnicking be permitted
- (iv) grazing not be permitted
- (v) extraction of salt or gypseous material not be permitted
- (vi) harvesting of forest products not be permitted
- (vii) hunting and the use of firearms not be permitted

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

G34 Wandown—2530 ha (previously D3)

Note:

This reserve now includes 943 ha of land recently purchased by the Department of Conservation, Forests and Lands, being Allotments 43A and 63A in the Parish of Koorkab.

G35 Bronzewing—12 415 ha (previously D5)

Note:

This reserve incorporates an area east of the Sunraysia Highway that was not part of the original wildlife reserve. However, the 3.2-ha stone reserve, west of Allotment 46, Parish of Pirro, is excluded.

G36 Wathe—5600 ha (previously D4)

G37 Red Bluff—8800 ha (previously D6)

G38 Wandella—1060 ha (previously D13)

Additions to existing flora and fauna reserves

Recommendations

G39- That the areas indicated on Maps A and -G47 B and described below be added to the

existing flora and fauna reserves and be used:

- (i) to conserve native plants and animals

that

- (ii) apiculture be permitted on traditionally licensed sites pending the outcome of research into the ecological impacts of this industry and subject to management requirements
- (iii) passive recreation such as nature study and picnicking be permitted
- (iv) grazing not be permitted
- (v) extraction of salt or gypseous material not be permitted
- (vi) harvesting of forest products not be permitted
- (vii) hunting and the use of firearms not be permitted

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

G39 63 ha, being all Crown land within the Township of Yarrara except that used for utility purposes (for addition to G1).

Note:

This addition does not include the existing public hall, its access road, and the railway station area.

G40 124 ha, being the eastern portions of Allotments 24 and 25, Parish of Toltol (for addition to G8).

G41 59 ha, being portion of the Township of Bannerton, Parish of Toltol (for addition to G9).

G42 48 ha, being public land in the south of the Township of Torrita, Parish of Nyang (for addition to G13).

G43 48 ha, being four areas within the Township of Walpeup, Parish of Walpeup (for addition to G14).

G44 13 ha east of Allotment 29, Parish of Patchewollock (for addition to G17)—a regenerating stand of *Hakea leucoptera*.

G45 8 ha, being Allotment 17B and the disused railway reserve adjoining Allotment 17, Parish of Patchewollock (for addition to G18).

G46 (Towan Plains) 266 ha, being part of Allotment 46A, Parish of Turoar (for addition to G22).

Notes:

1. The existing reserve and the recommended addition contain copi rises, which carry a characteristic plant community including rare gypsophiles (those that depend on gypseous soils). One such species—*Stipa nullanulla*—is vulnerable in Victoria and threatened elsewhere in Australia. Other species here include the rare *Calandrinia volubilis*, which is associated with disjunct stands of *Halosarcia nitida* and *Bromus arenarius* on the saline flats.

Large, old mallees on the copi rises contain hollows that are important nesting areas for bats, parrots, and tree martins, and the diversity of the plant communities—from salt-tolerant shrubs on the salt pans to chenopod mallee on the rises—provides valuable feeding and breeding areas. The value of the area is enhanced by the lack of other substantial areas of native vegetation nearby.

2. A 48-ha mining area available for the extraction of copi is excluded from this area (see Recommendation N6). Following completion of mining here and site rehabilitation, this area should be added to the reserve. Access should continue to be available through this and the existing reserve to the mining area.

G47 170 ha, being part of allotment 29, Parish of Chillingollah (for addition to G28).

Note:

This area is currently used for cropping and will require revegetation.

New flora and fauna reserves

Recommendations

- G48-** That the areas indicated on Maps A and
G51 B and described below be used:
- (i) to conserve native plants and animals

that

- (ii) apiculture be permitted on traditionally licensed sites pending the outcome of research into the ecological impacts of this industry and subject to management requirements
- (iii) passive recreation such as nature study and picnicking be permitted
- (iv) grazing not be permitted
- (v) extraction of salt or gypseous material not be permitted
- (vi) harvesting of forest products not be permitted
- (vii) hunting and the use of firearms not be permitted

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

G48 (Annuello)—35 030 ha in the Parishes of Kia, Burnell, Boolungal, Gingimrick, Geera, Wemen, Liparoo, and Gayfield. This eastern isolate of the dunefields of the Sunset Country exhibits a marked gradient from east-west dune mallee in the north, through chenopod mallee and shallow-sand mallee, to dune and swale associations of deep sand mallee in the south. It includes areas of broombush mallee, savannah woodland, and pine-buloke woodland.

It contains a number of plant species that are suffering depletion in the State as well as the rare *Maireana triptera* and several vulnerable species—*Atripex stipitata*, *Comesperma scoparium*, *Olearia subspicata*, and *Santalum acuminatum*.

The diverse fauna here includes the significant species: Mitchell's hopping mouse, Mallee ningau, black-eared miner, striated grasswren, and the coral snake. As well, the western brown snake is at the eastern edge of its distribution here. Regent parrots feed in the Annuello block from their nesting sites beside the River Murray to the north.

Revegetation works are under way in the public-land corridor linking this area with a southern extension of the (recommended) Murray-Sunset National Park.

- G49 (Paradise)—2320 ha in the Parishes of Wyperfeld and Nypo.

This area comprises mainly loamy sand mallee but includes red-swale mallee, broombush mallee, and native grasslands. Much of it is in a relatively natural condition and fire has been excluded for a considerable period. It is regarded as a major refuge for malleefowl and contains a number of active malleefowl mounds. The black-eared miner has been sighted here and the area supports a range of other mallee fauna.

- G50 (Birdcage)—2880 ha in the Parish of Nanowie.

Located in the south-eastern extremity of the Big Desert, and abutting Lake Hindmarsh, the widely diverse vegetation types here provide important habitat for an equally diverse faunal community. Sandplain heath and broombush mallee as well as mallee heath, scrub-pine woodland, red-swale mallee, and dune-crest tree heath are juxtaposed with river red gum forest and yellow gum and black box woodland.

Important fauna here include the regent parrot—which nests in the river red gum forests and feeds in the adjoining mallee areas—Mitchell's hopping mouse, and the silky mouse. The area also contains the habitat of the rare butterflies *Ogyris genoveva genua* and the desert blue (*Candalides hyacinthinus simplex*).

It is a popular site for field studies of bird life.

- G51 403 ha, being Allotments 10C, 16, and 16B and Yassom Swamp and associated water-frontage reserve, Parish of Bael Bael.

Yassom Swamp is an important breeding and feeding area for waterbirds and the grassland to the south is growing on red duplex soils of the higher alluvial plains of the Avoca River system. Very little of these grasslands and soil types

remains as public land, and although disturbed, this area is an important representation. The grasslands are also the habitat of the plains wanderer—a significant bird species.

Notes:

1. Portion of this area requires rehabilitation.
2. Stock may be moved west of the channel between Allotments 18A and 10D for as long as they remain under the same tenure and the channel may continue to be used to provide water to the tanks on Allotment 10D.

New flora reserves

These reserves are significant because they contain examples of native vegetation with considerable floristic value in a natural or relatively natural state. They are set aside primarily to conserve species that may be rare or endangered, and other plant associations that are of particular conservation significance.

Recommendations

- G52- That the areas indicated on the maps
-G72 and described below be used:

- (i) to conserve particular species or associations of native plants

that

- (ii) apiculture be permitted on traditionally licensed sites pending the outcome of research into the ecological impacts of this industry and subject to management requirements
- (iii) passive recreation such as nature study and picnicking be permitted
- (iv) grazing not be permitted
- (v) extraction of salt or gypseous material not be permitted
- (vi) harvesting of forest products not be permitted

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

- G52 62 ha, being public land north-west of Allotment 48, Parish of Malloren, and within the township of Meringur.

These relatively undisturbed communities of chenopod mallee, shallow-sand mallee, east-west dune mallee, and belah woodland contain the rare and threatened species *Rhagodia ulicina* and *Eremophila scoparia*.

- G53** 1.5 ha south of Allotment 7, Section C, Parish of Merbein (Map C).
To protect a stand of the vulnerable species—*Acacia melvillei*.

Note:

Nearby roadsides also support remnant stands of this species and these should also be protected. (See Chapter K—Roadside conservation).

- G54** 32 ha, being the public land portions of the Township of Yatpool.
These relatively undisturbed communities of chenopod mallee and shallow-sand mallee contain populations of the rare shrub *Rhagodia ulicina*. A subcommunity of *Eucalyptus gracilis* also occurs here on limestone soils.

Note:

The existing intermittently used rubbish tip should be closed and the site rehabilitated.

- G55** 980 ha, being Lambert Island, Parish of Karadoc.
In extensive black box-chenopod woodlands and small stands of *Callitris* and river red gum, notable species include the flood-dependent herb *Ammannia multiflora* and a large colony of the endangered herb *Ptilotus nobilis*.

Note:

This reach of the River Murray experiences high inflows of saline water, and interception works have been considered in the region. Sites for salt-interception schemes identified as part of the Murray-Darling Basin Salinity and Drainage Strategy would be subject to detailed environmental impact assessment (see Chapter O—Water supply and drainage).

- G56** 115 ha east of Allotment 27B, Parish of Karadoc.
A reasonably intact remnant of the higher river terrace carrying alluvial-plain shrublands together with the black box and river red gum terraces descending to the River Murray afford

this area significant botanical variety. The climbing herb *Calandrinia volubilis* and the subshrub *Dissocarpus biflorus*, both being rare plants usually associated with saline shrublands, are found here.

Note:

Use of existing pump and pump-line sites and drainage lines to the River Murray may continue.

- G57** 465 ha, being Allotment 13, Parish of Manya.
Relatively undisturbed communities of shallow-sand mallee, broombush mallee, and red-swale mallee contain the rare or threatened species *Microcybe multiflora* and *M. pauciflora*.
- G58** 230 ha north of the Township of Murrayville, Parish of Danyo.
This contains a regenerating woodland of *Callitris preissii* and mallee shrublands. Rare or threatened plant species here include *Microcybe multiflora*, *Olearia passerinoides*, and *Tragus australianus*.

Note:

The reserve does not include the rifle range in the east of Allotment 14.

- G59** 490 ha, being Allotments 1 and 2, Parish of Koonda.
This comprises relatively undisturbed communities of chenopod-mallee, shallow-sand (*Triodia*) mallee, and saline shrubland.

Note:

Harvesting of salt or minerals should not be permitted here.

- G60** 140 ha, being the reserve south-east of Allotment 43, Parish of Boinka, and the following land in the Township of Boinka: Allotments 1 and 3, no section; Allotments 1-6, 12, 13, 15-21, and 24, section 1; Allotments 5 and 7-19, section 2; Allotment 2-18, section 5; Allotments 1-6 and 9-16, section 6.
Examples of chenopod mallee, shallow-sand mallee and pine-buloke woodland remain relatively undisturbed.
- G61** 122 ha in Allotment 7, Parish of Gnarr.
The remnant belah (*Casuarina cristata*) woodland is a southern outlier of this

community. This species is much depleted from its former extent, being an indicator of good agricultural soil, and due to its suitability for fencing material and the continuing loss of its regeneration to grazing pressures.

- G62 10 ha in Allotment 38, Parish of Kattoong.
An intact woodland of *belah* (see G61) occurs here.
- G63 24 ha, being Allotment 59A, Parish of Tiega.
This contains a stand of *Eucalyptus porosa*—also an indicator of good agricultural soils and now much depleted from its former extent in the Mallee.
- G64 105 ha in the western part of Allotment 11, Parish of Kulwin.
The reserve comprises an isolated and relatively intact salt lake-lunette complex with the associated vegetation communities, which include savannah woodland.

Note:

Harvesting of salt or minerals should not be permitted here.

- G65 35 ha north-west of Allotment 3, Parish of Narrung.
River red gum forest grows on an island bend of the River Murray with a large population of the grass *Eulalia fulva*—the extent of this species elsewhere is much diminished through grazing pressures.
- G66 108 ha, Degrares Tank (also known as the Tati Tati Reserve, being Allotment 42, Parish of Manangatang.
This area contains a suite of relatively natural vegetation representative of the north-eastern Mallee, including saline shrublands, pine-*belah* woodland, and

stands of *Acacia melvillei*. (This land was recently donated to the Crown.)

- G67 23 ha, being Allotments 34A and 35C, Parish of Towan.
A relatively undisturbed mallee community contains *Eucalyptus behriana*, cattlebush, *belah*, and the vulnerable *Acacia melvillei*.
- G68 4.7 ha, being Allotment 4A, Parish of Kaniera.
This unused road reserve contains a relatively undisturbed example of the vegetation of the south-eastern Mallee.
- G69 20 ha, being Allotment 8A, Parish of Cannie.
A relatively undisturbed *Casuarina luehmannii* woodland and associated grassland grows on calcareous clays here. Very little of this vegetation and soil type remain as public land in the southern Mallee.
- G70 15 ha west of Allotment 10, Parish of Towaninny.
Relatively undisturbed grassland again occurs on calcareous clays, very little of which remains as public land in the southern Mallee. (Dumping of agricultural waste on this land should cease.)
- G71 65 ha, north of Allotment 33, Parish of Towaninny.
Black box wetland occupies a well-developed example of a gilgai soil—a feature that was common on Quaternary sedimentary land surfaces before ploughing became widespread.
- G72 10 ha south-east of Allotment 22, Parish of Marmal.
This contains relatively undisturbed woodland of yellow gum, black-box, and buloke.

H. Education areas

Environmental education is a fundamental step in the conservation of natural resources; it has become an important part of school curricula, and forms the basis of courses for tertiary and adult students.

Environmental education is indispensably linked with field studies. It is concerned with studying and appreciating all sorts of environments—natural ones undisturbed by human activities, natural ones manipulated to produce particular products such as hardwood timber, or drastically altered ones such as are found in urban and agricultural areas. One of its basic requirements is access to land.

Council, realizing that public land provides excellent opportunities for studies of a wide range of environments, has recommended that almost all public land (including parks, wildlife reserves, and State forest) be available for educational uses. Council believes that in most situations educational studies can take place without conflicting with the primary use for which an area is set aside. Indeed in some cases it is the manipulation of the land for the primary use that makes the area of value for environmental education. Council believes, however, that it is necessary for some relatively undisturbed land to be set aside specifically for educational uses, as unless this is consciously done, such environments will tend to be changed by other uses. In these areas education would be the primary use and other uses would only be permitted when not in conflict with the educational use. Activities permitted in education areas that may not be appropriate elsewhere would include long-term studies, collection of biological material, biomass studies, and the establishment of growth plots. They may also provide opportunities to demonstrate techniques of erosion control and the restoration of native vegetation and stream conditions to a more natural state.

In selecting land for education areas, the Council has sought to provide areas:

- giving examples of major land types
- with maximum diversity of vegetation types, soils etc., and with natural boundaries
- located with consideration of ready access by users

- located so as to minimize the danger that wildfires present to users
- located in proximity to other land types and to a variety of other land uses
- large enough to prevent over-use and to allow for zoning to protect areas of special value
- selected so as to minimize erosion and pollution hazard

No one organization should have the exclusive right to use a particular education area, as it is important that students have the opportunity to visit a number of education areas in various land types throughout the State rather than visiting the one site several times. Minimum facilities such as toilets and shelters would be required at each education area, and it would be desirable to have accommodation either on the area or at some nearby locality. Whether or not accommodation facilities are located on the education area will depend on its proximity to other areas of educational value in the region and also on the availability and location of existing accommodation. In forested areas accommodation and other permanent facilities should only be provided where adequate safeguards against fire can be made.

The Council believes that management plans for education areas should be prepared by the Department of Conservation, Forests and Lands. Planning and implementing the education aspects and co-ordinating the use of areas should be done in consultation with the Ministry of Education, with other user groups in the education system, and with community bodies that have an interest in environmental education.

Existing education areas

Recommendations

- H1-H4** That the areas indicated on Maps A and C and listed below be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.
- H1** Outlet Creek (710 ha)

- H2 Timberoo (320 ha)
- H3 Wemen (470 ha)
- H4 Koorlong (680 ha)

New education area

- H5 Darling Junction (545 ha)

Located adjacent to the River Murray, opposite the Darling River junction, this area contains quaternary alluvium of the present floodplain and adjacent higher terrace (land systems Ffc2 and Pf2 respectively) of the River Murray. It has an elevation of 35 m and an approximate rainfall of 250 mm. It supports a vegetation of river red gum forest and woodland, black box–chenopod woodland, floodplain grassland, and alluvial-rise shrubland. The water level in the billabong (within it) is kept artificially high by Lock 10—situated below the junction of the Murray and Darling Rivers—and the resulting wetland contains a range of interesting aquatic plant species.

Recommendation

- H5 That the area of 355 ha, shown on Map A, be used to provide opportunities for students of all ages to:
 - (i) study the nature and functioning of reasonably natural ecosystems in a manner such that the integrity of those ecosystems is maintained as far as is practicable
 - (ii) compare the ecosystems within education areas with other nearby natural and modified systems
 - (iii) observe and practise methods of environmental analysis, and the field techniques of the natural sciences
 - (iv) conduct simple long-term experiments aimed at giving an understanding of the changes occurring in an area with time
 and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978*, and be managed by the Department of Conservation, Forests and Lands.

I. Bushland reserves

Numerous small parcels of public land occur throughout the agricultural lands of the Mallee area. Vegetation types on them range from grasslands to woodlands and dense mallee. This vegetation, particularly the ground flora, has often been modified from the original by grazing and invasion of weeds. The native tree species remain, however, and these areas provide landscape diversity, particularly where more intensive agriculture is resulting in a gradual reduction in the numbers of trees on freehold land.

Council recommends that many of these small remnants of the native vegetation should become bushland reserves. Their major uses are to maintain the distinctive Australian character of the countryside and to provide diversity in the landscape. When accessible, they may also provide some opportunities for passive recreation in relatively natural surroundings, but it is not intended that they be developed for recreation. For some, the only access is via an unused road covered by an unused-road licence, which should continue subject to the approval of the Department of Conservation, Forests and Lands. These bushland reserves are generally too small to have major significance for fauna conservation, although some may be important for migratory birds.

Management should aim at the maintenance of the native flora, particularly the tree species. Limited gravel extraction and the cutting of small amounts of firewood are not necessarily incompatible with this primary aim, provided they are carefully planned and controlled and do not spoil the appearance of the reserves, particularly as viewed from roads and lookout points. These uses may not be appropriate to all reserves. In some instances the land manager may have to exclude them, at least temporarily, in order to permit regeneration of tree species.

In all bushland reserves the suppression of fires remain the responsibility of the Department of Conservation, Forests and Lands. Appropriate fire-prevention measures will be carried out where necessary. Similarly, vermin and noxious weeds will be controlled by and will remain the responsibility of the Department.

Traditionally, the Council has recommended that grazing in bushland reserves be permitted (subject to the approval of the management authority) or, in some cases, that it should be excluded for a period to permit regeneration of tree species.

A number of the bushland reserves in the Mallee contain valuable remnants of the heavier soils that were preferentially cleared for agriculture, and in the eastern Mallee, particularly, these reserves are often the only areas of land remaining in public ownership. As most of the surrounding freehold land has been cleared, the bushland reserves support the only native vegetation and habitat in the area.

Many of these reserves are under pressure from native and introduced herbivores, salinity, and gypsum-mining. Although the Council has recommended that grazing in bushland reserves be permitted (subject to the approval of the management authority), its intensity and frequency should be strictly controlled as indicated in Chapter F—Agriculture. In some cases, grazing should be excluded for a period to permit regeneration of native vegetation. If some bushland reserves are required for gypsum-mining in the future, the impact of mining should be kept to a minimum and the program of rehabilitation should ensure revegetation of mined areas.

Existing bushland reserves

Recommendations

I2-I10, I12-I18, I20-I26, I28-I31, I33-I42A, I44, I46-I61, I63-I69, I71-I73, I75-I144, I146-I183, I185, I188-I201, I203-I206, I208-I211

That the bushland reserves, totalling 9124 ha and indicated on the maps continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977

except that:

- (i) controlled grazing be permitted subject to the approval of the land manager and subject to an evaluation of whether grazing is appropriate in each case
- (ii) where gypsum-mining is permitted, the area affected be kept to the minimum necessary and all mined areas be rehabilitated and revegetated

Notes:

1. I133 is varied by alienating the portion in Allotment 42, Parish of Gerahmin (Recommendation F1).
2. I180 is varied by alienating that portion below the road (Recommendation F1).
3. Council considers that a land exchange proposal, involving exchange of 15.3 ha in the east of bushland reserve I192 for 10 ha of freehold to the west—facilitating ease of management of both freehold and public land and including a more intact stand of native vegetation within the reserve—should proceed.
4. Grazing may be excluded from some areas for a period to permit their regeneration.
5. A number of catchment dams and tanks are located within some of the bushland reserves and are used for fire-protection, stock water, or Shire purposes. Where appropriate, such as where the tank is not separately reserved, these should be managed by the Department of Conservation, Forests and Lands in consultation with the Rural Water Commission (see Chapter O—Water supply and drainage).

6. The incomplete number sequence in these recommendations reflects variations such as the redesignation of some of the previous bushland reserves as flora or other reserves.

Additions to existing bushland reserves

Recommendations

I2x, I3x, I44x, I48x, I55x, I64x, I67x, I69x, I80x, I90x, I92x, I108x, I129x, I130, I130Ax, I136x, I149x, I167x, I171Ax, I182x

That the areas indicated on the maps, and described in Table 4 below, be added to the existing bushland reserves as indicated, and be used to:

- (i) maintain the character and quality of the local landscape

that

- (ii) passive recreation such as picnicking and walking be permitted
- (iii) apiculture be permitted
- (iv) controlled grazing be permitted subject to the approval of the land manager and subject to an evaluation of whether grazing is appropriate in each case
- (v) where gypsum-mining is permitted, the area affected be kept to the minimum necessary and all mined areas be rehabilitated and revegetated

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and be managed by the Department of Conservation, Forests and Lands.

Table 4: Additions to existing bushland reserves

Recommendation	Parish (P) or Township (T)	Description (see note 1 below)	Area (ha)	Comments
I2x	Bambil (T)	Crown land in sections A, B and C and CAs 1-5, no section section	38.0	CAs 3-5, 8-11, 13 and 14, B and CAs 14-16, section C require revegetation
I3x	Karrawinna (T)	CA 3, section D; Water Supply Reserve; part of CAs 1-6, section A; and part of CAs 1-6, section B	6.0	
I44x	Annuello (T)	All Crown land within the township	17.0	This excludes utilities-purpose land
I48x	Kooloonong (T)	CAs 1, 2, 11-14, 16-19, section 1; CAs 7-13, section 2, section 3; and the State school site	7.0	
I55x	Natya (T)	CAs 1-20 and the adjacent road reserves to the north and west; CAs 22-37 and Crown land to the east; western part of railway station	15.0	

Table 4: Additions to existing bushland reserves—continued

Recommendation	Parish (P) or Township (T)	Description (see note 1 below)	Area (ha)	Comments
164x	Daryo (T)	Crown land in sections 2-5	14.0	
167x	Cowangie (T)	CA 60; Crown land within sections 4-15 (except CA 5, section 14) and Racecourse reserve, Recreation reserve and State school reserve	167.0	
169x	Tutye (T)	Reserve west of section 1; reserve south of section 1; Crown land in sections 4-9; CAs 11-17, section 2; CAs 5-16, section 3; reserve south of section 4; former State school reserve south of section 8	44.0	
180x	Tiega (T)	CAs 13A and 14, no section	91.0	
190x	Underbool (T)	Crown land: north of the railway station and east of the State school reserve, section 9; sections 10 (except CA 5) and 11; west of CA 26, section 6; west of section 3; and east of the Racecourse and Public recreation reserve; part of Crown land within the Road reserve between sections 5 and 6	25.0	
192x	Walpeup (P)	Part of CA 20	7.0	
1108x	Pirro (P)	Parts of CAs 1A, 2-4, and 22	406.0	
1129x	Pier Millan (P)	Part of CA 14	53.0	
1130x	Kia (P)	Within CA 7	4.0	
1130Ax	Kulwin (P)	Within CA 23	17.5	
1136x	Chinkapook (T)	Part of the State school reserve; part of Crown land south and west of the rubbish depot; Crown land west of section 3; CA 9, section 4 and CAs 10, 14, 15, 17 and 18, section 2; part of road reserve north-east of the railway station	20.0	
1149x	Chillingbilla (P)	CA 8A	34.0	
1167x	Kunat Kunat (P)	Part of the Timber and Drainage Reserves adjacent to CA 16 and to CAs 5A and 6A	43.0	Requires revegetation, contains part of the adjacent golf course
1171Ax	Yaapeet (T)	CAs 12-22, section 4; CAs 8-13 and 16 section 2; CAs 1-16, section 1; CAs 1-13, section 5; and the reserve north of section 5	13.0	
1182x	Berriwillock (T)	Plantation Purposes Reserve west of section 4	10.0	

Notes:

1. The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.
2. On the maps, each of these additions is suffixed by the letter 'x' against the number of the reserve to which it is added.
3. A number of dams, springs, and bores, located within some of the bushland reserves, are used for fire-protection, stock water, or shire purposes and these uses should continue.

Additional bushland reserves

Recommendations

1212-1300 That the areas indicated on the maps and described in Table 5 below be used to:

- (i) maintain the character and quality of the local landscape
- that
- (ii) passive recreation such as picnicking and walking be permitted
- (iii) apiculture be permitted

(iv) controlled grazing be permitted subject to the approval of the land manager and subject to an evaluation of whether grazing is appropriate in each case

(v) where gypsum-mining is permitted, the area affected be kept to the minimum necessary and all mined areas be rehabilitated and revegetated

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and be managed by the Department of Conservation, Forests and Lands.

Table 5: Additional bushland reserves

<i>Recommendation</i>	<i>Parish (P) or Township (T)</i>	<i>Description (see note 1 below)</i>	<i>Area (ha)</i>	<i>Comments</i>
I212	Morkala (T)	All Crown land within the township	38-0	
I213	Karween (T)	All Crown land within the township, sections 1 and 2	91-0	
I214	Werrimull (T)	All Crown land within the township north of the railway line; Police Purpose Reserve, section F; CAs 4, 5, 6 and 10, section D; CAs 1 to 13, 16 and 17, section E	84-0	This excludes the water supply reserve
I215	Merrinee (T)	All Crown land within the township	61-0	Portions require vegetation
I216	Tullilah (P)	Part of CA 21	38-0	
I217	Pirlta (T)	Sections 2-6; CAs 3, 5 and 8-10, section 1; Recreation Reserve; part of adjoining Road Reserve	37-0	
I218	Benetook (T)	Crown land within section A (except CA 25); Recreation Reserve; sections B, C and Crown land to the north	48-0	This excludes the cemetery reserve
I219	Merbein (P)	CA 97B and 97C, section A	10-5	
I220	Mildura (P)	CA 17, Block 65	4-0	
I220A	Mildura (P)	CA10, section 55, block E	48-5	
I221	Mildura (P)	North of CA 595, section B	19-0	
I222	Mildura (P)	CA 588L, section B	0-7	
I223	Mildura (P)	CA 519B, section B	0-8	
I224	Carwarp West (P)	CAs 16B and 16C	14-4	
I225	Booonoonar (T)	All Crown land within the township	12-0	
I226	Nurnurnemal (P)	Adjacent to CAs 55 and 84	54-0	
I227	Nowingi (T)	All Crown land within the township	44-5	
I228	Manya (P)	CA 27 and part of CA 28	790-0	
I229	Panitya (T)	Crown land in and adjacent to section 1 (except CAs 1, 3 and 8)	19-0	
I230	Carina (T)	CA 36A, and adjacent Recreation Reserve, Crown land in sec A, CAs 1-9, 14-18 No sec within the township	0-2	Portion requires revegetation
I231	Murrayville (T)	CA 9, section 19 and adjacent Crown land; Crown land within sections 8, 12, and 18; within section 3 (except CAs 20-22,24); the municipal purpose reserve and adjacent Crown land to the west; and Crown land west of Public Recreation and Showground Reserve	-72	
I232	Bunurouk (P)	CA 15	9-0	
I233	Worooa (P)	Bore Reserve adjacent to CA 17;	9-0	
I234	Worooa (P)	Bore Reserve being CA 1E; and Crown land adjacent to CA 1A and 1B	54-6	
I235	Linga (T)	CAs 1-17 and part of 18, section 4; CAs 2, 7-27, section 3; CAs 9-14 and 20, section 1; CAs 1-6, section 2; Crown land west of sections 1 and 2; and the Cemetery Reserve	28-0	
I236	Mamemgorook (P)	CAs 4, 5 and parts of CA 6	425-0	
I237	Gnarr (P)	Part of CAs 32 and 32A	29-0	
I238	Nyang (P)	Crown land, south-east of CA 18	1-0	
I239	Nyang (P)	Crown land north of CA 5	4-0	
I240	Galah (T)	CAs 10-17, section 2 and the adjoining disused road	5-0	
I241	Wymlet (P)	CAs 7 and 7A	37-0	Contains tank O27
I242	Kia (P)	Within CA 44	18-6	
I242A	Kia (P)	CA33	8-2	
I243	Kiamal (T)	Sections 2 and 4; CAs 4 and 5, sections 3; CAs 1-4, 10 and 11, section 1	21-0	
I244	Ouyen (T)	CAs 29-33, section 16; CAs 4, 9 and 10, section 18	2-0	
I245	Ouyen (P)	Crown land east of the Departmental Water Reserve ("Workmens Blocks")	5-0	

Table 5: Additional bushland reserves—continued

Recommendation	Parish (P) or Township (T)	Description (see note 1 below)	Area (ha)	Comments
I246	Woornack (P)	Part of CA 50B	9.0	Portion requires revegetation
I247	Woornack (P)	Water Reserve within CA 36	5.0	
I248	Pirro (P)	Part of CA 4	34.0	Contains tank O97
I249	Pirro (P)	Part of CA 6	23.0	
I250	Pirro (P)	CAs 78A and 78B	20.0	
I251	Pirro (P)	Part of CA 69	125.0	
I252	Baring (P)	Part of CA 2	150.0	
I253	Baring (P)	Part of CA 23	170.0	Adjacent to O152
		Part CA 36	17.0	
	Dering (P)			
I255	Dattuck (P)	Water Reserve CA 3A and Crown land south of CA 2 and CA 3	278.0	
I256	Wallowa (P)	Stone Reserve within CA 12	28.0	
I257	Albacutya (P)	Within CA 11 and part of CA 12	5.0	
I258	Yaapeet (P)	Reserve within CA 48A	6.0	
I259	Gutcha (P)	CA 9C	6.0	
I260	Byanga (P)	CA 39A	0.8	
I261	Bumbang (P)	North of Pethard Road and east of CA 2A, Section C	6.0	
I262	Bumbang (P)	Part of CAs 17, 20 and 21.	315.0	Portion requires revegetation Pistol club occupies the north-western corner—this use may continue
I263	Toltol (P)	Part of CA 20	200.0	
I264	Bumbang (P)	Part of CA 30	27.5	
I265	Winnambool (P)	Crown land west of CA 17	12.0	
I266	Bolton (T)	All Crown land within the township	13.0	
I267	Larundel (P)	Water Reserve adjacent to CA 17A	8.7	Legal access should be permitted to freehold land here
I268	Larundel	CA 16B and 16C; Water Reserve to the east	2.0	
I269	Manangatang (T)	CAs 1–4, section 9 and western part of Municipal Sale Yards; Crown land in section 6 north of the Water Supply Reserve	9.0	
I270	Piangil West (P)	CA 5A	84.5	
I271	Piangil West (P)	CA 24	188.0	
I272	Piangil (T)	CAs 12, 13, section 3	0.2	Council is aware of mining tenements over this reserve. Extraction should be concentrated on areas already denuded of woody vegetation and any further clearing should only be at the discretion of the land manager.
I273	Miralie (T)	Crown land within section 3	1.0	
I274	Cocamba (T)	CAs 2–8 and 10–19, section 1	2.0	
I275	Mittyack (T)	CAs 2 and 5, section 5; CAs 2, 15, 17 and 18, section 4; CAs 1–10, 19–21 and part of CA 22, section 3; CAs 4–20, 22, 23 and CAs 3–8, section 1; and Crown land north of CA 18, section 2	29.0	
I276	Eureka (P)	CA 14A	0.8	
I277	Eureka (P)	CA 72	104.0	
I278	Pier Millan (T)	CAs 3–7 and CA 10 and the disused road east of section 10	0.9	
I279	Nandaly (T)	CAs 1–6 section 1 and the unused road being part of Rowe Street	1.0	
I280	Lianlock (P)	Adjacent to CA 10	28.0	
I281	Lianlock (P)	Within CA 2	1.0	
I282	Turoar (P)	Reserve adjacent to CA 24	163.0	
I283	Pira (T)	All Crown land within the township	4.5	
I284	Woommen (P)	Within CA 18	1.0	

Table 5: Additional bushland reserves—continued

<i>Recommendation</i>	<i>Parish (P) or Township (T)</i>	<i>Description (see note 1 below)</i>	<i>Area (ha)</i>	<i>Comments</i>
I285	Woorinen (T)	CA 14, section 4 and the eastern part of the Public Recreation Reserve	9.1	This area receives intensive recreational and educational use.
I286	Wewin (P)	Crown land north of and adjacent to CA 10	153.0	Council is aware of mining tenements over this reserve. Extraction from this area should be concentrated in areas already denuded of woody vegetation, and any further clearing should only be at the discretion of the land manager
I287	Moah (P)	CA 5A, being the Water Reserve	66.0	Portion requires revegetation
I288	Meatian (P)	CA 16B	7.8	Contains tank O132
I289	Goschen (T)	All Crown land within the township except the Public Hall and Recreation Reserve	26.5	
I290	Mumbel (P)	Water Reserve adjacent to CA 29	4.0	
I291	Boga (P)	State Forest adjacent to CA 14, section 6; part of CA 9 and Crown land within the township of Mystic Park (except CAs 2, 2A of section 2 and the Rubbish Depot	660.0	
I292	Boigbeat (T)	CA 2	1.8	
I293	Woomelang (T)	CAs 5–11, section 9; CAs 9–16, section 10; CA 40, section 7; part of the railway station; and CAs 9–12, section 6	10.5	Portion requires revegetation Includes the Woomelang Group School plantation. Use of the area for horse riding may continue.
I294	Watchupga (P)	Within CA 19	2.0	
I295	Curyo (T)	Part of the Public Recreation and Public Hall Reserve, Crown land in section 4; CAs 4, 12 and 13, part of CAs 2, 7 and 11, section 2; CAs 1, 6–9, 17–22, and part of CAs 14–16, section 3	10.0	
I296	Karyrie (P)	Crown land south of CA 67	12.0	
I297	Karyrie (P)	Within CA 76	20.0	
I298	Titrybong (P)	Adjacent to CA 11B, section 2	14.0	
I299	Meering West and Gredgwin	Within CAs 61 and 24 respectively	30.0	
I300	Marmal (P)	CA 40A	0.7	

Notes:

1. The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.
2. A number of dams, springs, and bores, located within some of the bushland reserves, are used for fire-protection, stock water, or shire purposes and these uses should continue.

Linear bushland reserves

Vegetation along disused railway lines, some channels, and unused road reserves can have particularly high conservation and landscape values, especially in agricultural districts where most of the vegetation has been cleared. They often contain remnants of the original vegetation and can serve as habitat and corridors for native fauna.

Recommendation

I301 That unused road reserves (not shown on the maps) with extant native vegetation be used to:

- (i) maintain the character and quality of the local landscape
- and that
- (ii) passive recreation such as picnicking and bushwalking be permitted
- (iii) apiculture be permitted
- (iv) controlled grazing be permitted subject to the approval of the land manager and subject to an evaluation of whether grazing is appropriate in each case

and that

- (v) they be available for development for road purposes if required.

Recommendations

I302- That the areas indicated on Maps A and B and described below be used to:

(i) maintain the character and quality of the local landscape

that

(ii) passive recreation such as picnicking and walking be permitted

(iii) apiculture be permitted

(iv) no new grazing licences be issued over these areas and, where licences exist, controlled grazing be permitted subject to the approval of the land manager and subject to an evaluation of whether grazing is appropriate

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and be managed by the Department of Conservation, Forests and Lands.

I302 The disused railway reserve from Meringur to Morkalla.

Note:

Council is aware that the Red Cliffs to Meringur railway line is being considered for closure. The section of railway line between Meringur and Morkalla has already been closed. In the event that the remainder of this line is no longer required for railway purposes, it should be considered as part of Recommendation I302.

I303 Dennyng Channel (438 ha), Parishes of Piagnie and Wymlet.

Note:

This is an extensive reserve of native vegetation fringing the Dennyng Channel (Recommendation O22). Management of the reserve should be in consultation with the Rural Water Commission.

I304 Sections of the disused railway reserve from Piangil to Yungera.

J. Rivers and streams

Public-land water frontages

Along a number of rivers and streams in the State, a strip of public land has been reserved between the water and adjacent public land or freehold land. In most cases, no public-land water frontage adjoins land alienated before 1881, and some properties have titles that extend to the banks or even incorporate the bed and banks of a stream. Thus streams and rivers have either no public-land water frontage or a discontinuous one. The recommendations that follow do not apply to privately owned frontage.

The locations of public-land water frontages are shown on parish plans, which are available to the public from the Central Plan Office in the Department of Property and Services. These frontages may have a surveyed boundary of short irregular lines or be of specified width (varying in particular instances from 20 m to 60 m) along each bank. In some cases this land has been reserved for public purposes under the *Land Act 1958* and in others it is unreserved. The land usually comes under the control of the Department of Conservation, Forests and Lands while in all cases the Rural Water Commission controls the water.

Each of these authorities may delegate some of its responsibility to local bodies. The Department of Conservation, Forests and Lands may form committees of management for public purposes, while Management Boards or drainage trusts under the guidance of the Rural Water Commission may be formed in certain areas. The Department controls forest produce on public-land water frontages, except where a committee of management has been formed. Public-land frontages alongside artificial water storages and aqueducts are often controlled by the water supply authority that controls the water.

Adjoining occupiers often hold public-land water frontages under licence for grazing purposes. Special conditions may apply to the licences—for example, to permit cultivation. The licence system has advantages in that licence-holders are required to control noxious weeds and vermin on the frontage. This control

would be extremely difficult and expensive to achieve in any other way. When a frontage is held under licence, boundary fences are normally extended to the water's edge. In the past, licensees often discouraged public access because of an understandable fear of damage, intentional or otherwise, to property. Vandalism and littering are problems in many areas open to the public, and firm action by authorities with management responsibilities is often required. Control is obtained through the normal exercise of fire, litter, firearms, and other regulations, although it is evident that more effective policing is required, particularly at weekends. Education of the public to understand the rural environment is perhaps the best solution in the long run.

These licenced river frontages are, however, public land; they are often valuable for low-intensity forms of recreation such as walking, fishing and observing nature, and provide access to extensive lengths of streambank. Following the *Land (Amendment) Act 1983*, members of the public may 'enter and remain for recreational purposes' onto licensed frontages. Licensees are required to erect and maintain a suitable means of pedestrian access to the water frontage.

This condition had not been applied to the majority of existing licences and Council believes that in some situations, for example along popular fishing streams, the provisions of stiles would facilitate pedestrian access along public-land water frontages and would reduce damage to fences and avoid gates being left open. Public-land frontages that are unlicensed have no restriction on public access, although use of vehicles is controlled by the *Land Conservation (Vehicle Control) Act 1973*. They are, however, normally fenced off from adjacent freehold land. The landholder has no obligation to provide access through freehold land to the frontage, and nothing in these recommendations suggests that this situation should change.

The maintenance of a vegetation cover along stream banks is important in preventing soil erosion and in preserving the local landscape.

Public-land water frontages are sometimes valuable for nature conservation as well, as they may provide corridors for movement of nomadic and migratory species, or support native plants and animals that are no longer found in surrounding areas. In too many cases, however, the provisions of the relevant Acts have not been enforced effectively, and such public-land water frontages have been progressively cleared of native vegetation. This is the case in some parts of the Mallee, and much of the remaining vegetation on frontages adjoining freehold property is in a degraded condition.

Public-land water-frontage reserves

Water-frontage reserves are defined for the purpose of these recommendations as being all existing water frontages and other reserves or unreserved public land adjoining streams except for those areas, not currently reserved as a water frontage, that have been set aside elsewhere in these recommendations whether as part of a large reserve (such as national park or State forest) or for some special purpose (such as a flora, wildlife or streamside reserve).

Recommendation

- J1 That public-land water-frontage reserves, some of which are indicated on the maps, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977

except that:

grazing be permitted at the discretion of the land manager subject to strict controls of stocking levels and management regimes that ensure that the natural vegetation does not sustain long-term damage, and that regeneration of native species is fostered and particularly sensitive areas are protected.

Notes:

1. Portions of some stream frontages, previously recommended as public-land water-frontage reserves, are now recommended for inclusion in other reserves. These include:

Sheepwash Creek—now Recommendation D15, Outlet Creek—portion proposed as A9, and River Murray frontage—proposed for River Murray Reserve—E1.

2. Recommendations concerning the provision of environmental flows of water for those streams where the normal flows are altered by engineering works, are contained in Chapter O—Water supply and drainage.

3. Many of the public-land water-frontage reserves, particularly in the eastern Mallee, comprise extensive linear reserves of native vegetation within cleared agricultural land and as such provide important feeding, breeding, and shelter areas for wildlife. These areas are also particularly valuable for waterfowl when the streambed contains water. Management of these reserves should recognize and, where possible, enhance these important values.

Outlet Creek (Wimmera River) frontage

Public land abutting Outlet Creek has significant scenic, recreation, and conservation values.

The river red gum forests and black box woodlands here are highly significant as a biological corridor through the agricultural land between Lakes Hindmarsh and Albacutya. They allow the movement of migrant and nomadic species as well as the dispersal of the young of many species.

The Wimmera River system is characterized by great variability and unreliability of stream flow. This unreliability has been exacerbated by the diversion of some waters from the Wimmera River system into the Wimmera-Mallee Stock and Domestic Water Supply System. A discussion of environmental flows is included in Chapter O—Water supply and drainage.

It has been suggested that some of the water that would be saved if the Wimmera-Mallee pipeline project is implemented could be used for additional flows in the Wimmera River. This would aid stream flow, and reduce pollution and salinity problems currently being experienced in the river.

An interdepartmental team, comprising members from the Department of Water Resources, the Department of Conservation, Forests and Lands, the Environment Protection Authority, Royal Melbourne Institute of Technology, and the Rural Water Commission, is currently investigating the aquatic environment of the Wimmera River with a view to determining the benefits of increased flows for environmental and recreational purposes. The Council believes that improvement in river values would follow the allocation of a significant proportion of the water saved by pipelining to environmental flows in this stream.

In its final recommendations for the Wimmera Area in 1986, the Council recommended the establishment of the Wimmera River Reserve to protect the special values of this important inland river. It is recommended that the lower portion of the Wimmera River system—Outlet Creek—in the Mallee area should be managed similarly.

Outlet Creek Reserve

Recommendation

- J2 That the area indicated on Map A (including the bed and banks of the stream) be used to:
- (a) protect natural and scenic values
 - (b) conserve native flora and fauna
 - (c) provide opportunities for informal recreation, including hunting in season (where permitted by the land manager) and dispersed camping (except in areas of high significance for nature conservation)
 - (d) grazing be permitted at the discretion of the land manager subject to strict controls of stocking levels and management regimes that ensure that the natural vegetation does not sustain long-term damage, and that regeneration of native species is fostered and particularly sensitive areas are protected
 - (e) timber-harvesting not be permitted, other than firewood-gathering where this is consistent with (a) and (b) above

(f) sand extraction not be permitted

and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.

River management

River management authorities (usually River Management Boards or River Improvement Trusts) are constituted under the *River Improvement Act 1958*, as amended by the *Water Acts (Amendment) Act 1985*. There are two River Improvement Trusts in the Mallee area—Avoca and Pental Island.

Improvement works in rivers are designed to *maintain the carrying capacity* (for water supply or drainage purposes), to protect adjoining land from flooding and erosion, to maintain the security of structures such as bridges on the floodplain, and to prevent siltation of the lower reaches by control of upstream erosion.

The works carried out include:

- erosion-prevention works on the banks—for example, planting of trees, the use of various materials for bank protection, and the felling of trees that may be undermined (to prevent loss of bank material)
- clearance of waterways, by removal of snags within the bed of the channel, to maintain or improve discharge capacity

Such work is often made necessary by the changes that people have made to land use in the river catchment and on the floodplain. The following changes have generally reduced the value of the rivers for nature conservation:

- Clearing of vegetation has increased run-off and reduced time of concentration of storm flows. The situation is sometimes aggravated by overgrazing and unwise cultivation in the catchment and along the river banks, accelerating soil erosion and transport of sediment to the stream. Increases in urban development—with disposal of storm water directly to streams—have also altered flow regimes.
- Regulation of stream flow by water storages and use of streams to transport water for irrigation and domestic use also change the natural flow regime.

- The construction of barriers such as road embankments and bridges, through which the river must pass, has often resulted in substantial modification of the bed and banks. Present legislation requires that all proposed replacement or new structures across waterways, floodplains, and depressions are referred to the Rural Water Commission and to the River Management Board, where one is involved, for approval.

River management authorities, in attempting to cope with the consequences of these changes carry out works that sometimes adversely affect landscape and nature conservation values, but ultimately could enhance these values.

Removal of snags from the centres of wide streams damages fish habitat, but the tethering of these snags against the banks may provide alternative fish habitat, as well as protecting the banks from erosion. Realigning and regrading or eroding beds and banks often removes holes and back waters of value as fish habitat and for angling and swimming in a particular location. On the other hand, these operations, in preventing erosion, reduce transportation of silt.

River improvement works are sometimes aesthetically displeasing, particularly during construction and in the early stages after completion, but their ultimate aim is to prevent erosion and to allow re-establishment of vegetative cover along the stream banks.

River management authorities are required to act within their District as defined under the *River Improvement Act 1958*. Where such Districts encompass only the stream environs, or part only of the stream, they may be able to treat only the symptoms of problems, as the causes may lie in the catchments beyond the area of their responsibility. There is thus little opportunity in the design and implementation of works for consideration of their likely impact on areas outside the authorities' Districts.

The Minister for Water Resources recently established two task forces to investigate and make recommendations on stream and catchment management throughout Victoria. The first of these was appointed to review those recommendations of the Public Bodies Review Committee's Eighth Report (May 1983) that related to restructuring of River Improvement and Drainage Trusts. The Report of this task

force, now accepted by the Minister, recommended adoption or modification of the Review Committee's various proposals, to provide for the formation of River Management Boards with Districts embracing the whole or at least substantial parts of complete catchments. The report also recommended the establishment of Catchment Co-ordinating Groups, representing local interests and all appropriate agencies, to strengthen consultation and co-ordination between the numerous interests in stream management, with respect to catchment land use activities which impact on stream management. These recommendations are now open to implementation if acceptable to the local community. The *Water Acts (Amendment) Act 1985* enables implementation of these recommendations.

The second, known as the 'State of the Rivers Task Force' was established in 1984 to 'examine and recommend the future technical and financial arrangements for an effective regionally based river management system'. Its report—'Better Rivers and Catchments'—was published in 1987. It examines the requirements, costs, and funding arrangements for an accelerated program of catchment improvement and for a program of effective management of Crown river frontages. It also recommends catchment-based management and the establishment of catchment-co-ordinating groups.

In 1975, The Rural Water Commission (then the State Rivers and Water Supply Commission) formed a Standing Consultative Committee on River Improvement to advise the Commission on river works. This committee, convened by a representative of the Rural Water Commission, ceased in 1987. It comprised representatives from the Rural Water Commission, Department of Water Resources, Conservation Council of Victoria, Department of Conservation, Forests and Lands, and Association of Victorian River Improvement Trusts.

The Standing Consultative Committee prepared three documents that expand on the principles set out above. The first of these, 'Guidelines for River Management, 1979', requires plans for all works other than minor ones, together with an assessment of their environmental consequences, to be submitted

to all relevant agencies for consideration prior to the commencement of works. The aim of the guidelines is to ensure an optimum balance between structural improvements on the one hand and the maintenance or enhancement of the stream's landscape values and its value as habitat for wildlife and for recreation on the other.

In 1982 the Committee prepared 'Revegetating Victorian Streams', to provide government, semi-government, and local government bodies, community groups, and land-owners with information on the vegetation of stream systems, and to encourage maintenance and enhancement of the environment.

In 1983 the Committee produced 'The State of the Rivers' report, in which it recommended the establishment of the second task force referred to above. This report presents a general review of the state of Victoria's rivers, drawing attention to the undesirable changes in the river environment that have occurred over the past century. It develops the concept that river-management works should be based on a whole-catchment philosophy.

In response to the reports and recommendations of the two task forces, the government established in 1986 what is now the Rural Affairs, Conservation and Environment Committee of Cabinet (RACECC), which for its support set up in 1987 the Standing Committee on Rivers and Catchments. This Standing Committee has a key role advising the RACECC on priorities for catchment co-ordination around the State, approval of catchment management plans, and the resolution of disputes between agencies. The Committee includes representation from the Department of Agriculture and Rural Affairs, Department of Conservation, Forests and Lands, Department of Industry, Technology and Resources, and the Department of Water Resources, the Environment Protection Authority, the Ministry for Planning and Environment, and the Rural Water Commission. It also includes representatives of the Association of Victorian River Management Authorities, the Victorian Farmers Federation, and the Conservation Council of Victoria, and a recreation representative.

The flow regimes of some rivers must of course be modified and floodplains used for agriculture, but it is appropriate to look at the principles of the natural system in seeking solutions to the problems that thus arise rather than to move further from those principles. The Council believes that the following principles should apply in determining the need for and design of river improvements works.

- Where problems in river management arise, the whole catchment should be considered in seeking a solution.
- Where flood control in a catchment is necessary, planning strategies should include consideration of ways of reducing run-off from the catchment.
- Total flood control is seldom practicable. In the case of minor flooding it may often be appropriate to take action to minimize the consequences of flooding rather than attempt to prevent it.
- An adequate vegetation cover should be maintained along stream frontages to stabilize the banks and to reduce the velocity of flood-waters as they leave and re-enter the stream course.
- Structures such as road embankments and bridges on floodplains are a variation of the natural situation, and consideration should be given in their design to their effect on the flood pattern (see note 1 below).
- Works carried out within the bed and banks of a stream to change the alignment, gradient, or cross-section should be kept to the minimum necessary.
- Consideration should be given in the design of works to maintaining or enhancing landscape values and the value of the stream for recreation and as a habitat for wildlife.

Recommendations

- J3 That the assessment of the need for, and the planning and implementation of, any works involving changes to the beds and banks of streams incorporate the principles outlined above.
- J4 That the managing authority consult the Department of Water Resources when proposals that may affect the quality or quantity of water in streams are being considered.

Notes:

1. Information relating to the works that may be undertaken on floodplains is included in the report 'Flood Plain Management in Victoria', produced by the Victorian Water Resources Council.

2. The Rural Water Commission recently released a fourth publication 'River Management—a Glossary of Terms' to help explain the terminology of river management.

Streamside reserve

In many instances throughout the State, small blocks of public land adjoin streams but are not included in the public-land water frontage.

These blocks have, where appropriate, been designated streamside reserves. Some are currently reserved under section 4 of the *Crown Land (Reserves) Act 1978*; others are unreserved Crown land, although they may be licensed for grazing. Vegetation on these areas varies from open forests to grassland. Every effort should be made to conserve native trees on these reserves, where they exist, and to encourage regeneration or restoration where the vegetation has been depleted or destroyed.

Blocks of public land such as this have values for nature conservation and recreation. They allow public access to the river or stream, especially where access along the public-land water frontage is difficult. The land manager may provide facilities for activities such as camping on streamside reserves in areas where conflict with nature conservation values are minimal.

It is intended that public-land water frontages adjacent to or within a streamside reserve be managed by the authority responsible for that reserve.

Streamside reserves are separate and distinct from the public-land water frontages described earlier in these recommendations.

In the Mallee area, one such reserve has been proposed, at Culgoa near the crossing of Tyrrell Creek by the Calder Highway.

Recommendation

- J5 That the area shown on Map B and described below, be used to:
- (a) provide passive recreation such as picnicking, walking, and angling
 - (b) provide opportunities for camping at the discretion of the management authority if this does not conflict with the maintenance of the water quality of the adjacent stream
 - (c) provide a buffer zone for protection of water quality
 - (d) conserve flora and fauna
 - (e) maintain the local quality and character of the landscape
- and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands.
- J5 16.5 ha, comprising the Police Reserve, Crown land adjacent to the Recreation Reserve, and Allotments 1 and 2, section E, and the adjacent unused road reserves, Township of Culgoa.

Note:

This area has potential for development as a wayside stop for travellers on the Calder Highway.

K. Roadside conservation

The primary purpose of road reserves is obviously to provide for communication, transport, and access. However, vegetation along the road verges can have particularly high conservation, recreation, and landscape values, especially in agricultural districts where most of the native vegetation has been cleared. Geological features exposed in roadside cuttings are a useful adjunct to more detailed work involved in mapping the geology of an area and are often used as an educational resource.

Nature conservation

Vegetation on roads is important for nature conservation because in some parts of the State it often contains the only remnants of the region's native plant associations. Such remnants are valuable for preserving species with restricted distribution and genetically interesting variants of widespread species. They are often useful in land studies, as they may permit the original pattern of the vegetation to be pieced together. They also provide habitat (particularly in tree hollows) for some native animals, and have special significance as corridors permitting birds to move through the countryside on annual migration, or in search of food or nesting sites. While some roads retain wide strips of native vegetation, many are mostly cleared or otherwise greatly altered. Valuable remnants of native vegetation growing on the verges of some roads should be protected where possible.

The *Arthur Rylah Institute for Environmental Research, Technical Report Series No. 11*, September 1984, 'Conservation of Roadsides and Roadside Vegetation', gives a comprehensive review of values, methods of assessment, and management of roadsides for the purposes of nature conservation.

Accumulation of fuel along roadsides is a fire hazard of concern to fire-control authorities and it must often be reduced by burning off during cool weather. This burning off sometimes conflicts with scenic and conservation values and the Council believes

that such burning should be restricted to strategically important areas and kept to the minimum consistent with efficient fire protection.

The Roadsides Conservation Committee, which comprises representatives from various interest groups and government departments, has prepared a set of guidelines that provide for both conservation and fire protection.

Recreation and landscape

In rural districts, vegetation along roads is often a major component of the landscape, breaking the monotony of cleared paddocks and accentuating the contours of the land. It provides a pleasant, variable road environment for motorists, and shady areas for rest and relaxation. The Council believes that as much roadside vegetation as possible should be retained when roads are being upgraded. If a major upgrading is being planned, the feasibility of purchasing a strip of private land should be considered in order to preserve good stands of roadside vegetation.

Salinity prevention

In those areas where dryland salting is becoming an increasing problem, roadside trees play an important role in mitigating the effects and extent of salinization. These trees, often the only remaining trees in the area, play a vital part in the interception of saline subsurface moisture.

Management

Responsibility for the management of roadside vegetation is vested in various authorities, depending on the status of the road. The most important roads of the State (State highways, tourist and forest roads, and freeways) declared under the *Transport Act 1983* are completely under the control of the Roads Corporation (9000 km). Main roads (14 500 km) are also declared, but are controlled jointly by the Roads Corporation and local municipal councils. Vegetation on unclassified roads (about 98 000 km of mostly minor roads) is under the

care and management of municipal councils, although it is owned by the Crown. The Department of Conservation, Forests and Lands has the control of vegetation on unclassified roads that pass through or adjoin State forests. (Note: these figures are for all Victoria.)

Throughout most agricultural regions, livestock are walked along roads between holdings or to and from market places. However, in some situations—such as where fodder is depleted on farmlands through drought, fire, or floods—stock are grazed along roads and road reserves for extended periods and over considerable distances. In other situations, droving of stock along roads is used as an alternative or supplement to the grazing of farmlands.

Depending on its frequency and intensity, movement of stock between holdings would usually have less of an impact on the roadside vegetation than where the area is used as a source of fodder. During drought, the impact on the vegetation and, eventually, the soil surface, can be considerable.

Assessment of roadside vegetation for part of the State is being undertaken under the auspices of the Roadsides Conservation Committee, as the first step in developing roadside management plans. These would identify areas requiring conservation and provide guidelines for road managers. This Committee has also worked closely with the Country Fire Authority in developing guidelines for roadside conservation consistent with the need for fire protection.

Although little native vegetation remains along some roadsides, others support extensive tracts. In a number of cases rare or endangered plant species, such as those listed under K4 below, are located within road reserves, and measures should be undertaken to protect them. These protective measures may entail the construction of temporary or permanent fencing or the closure of a section of road reserve to travelling stock. Such action may also be required to foster regeneration of native species.

Back roads

With increasing population and use of cars, a tendency has developed for through-roads in the State to be continually upgraded. Tree-

lined back roads with gravel surfaces on narrow winding alignments are becoming increasingly uncommon. Yet for many people such roads best fulfil their need for contact with rural environments. The Council believes that a conscious effort must be made to maintain the character of these roads, particularly when upgrading or realigning is being considered.

Recommendation

- K1** That the road reserves throughout the study area continue to be used for communication, transport, access, surveys, and utilities.

A large number of used and unused road reserves throughout the Mallee still support native vegetation and frequently have high nature conservation values for a range of plants and animals. Particularly in the east, where few public land blocks remain, open roads and road reserves contain the great majority of trees in the landscape. West of Ouyen, in the central Mallee, these reserves are also important corridors for the movement of wildlife between the Big Desert and Sunset Country. In Chapter I—Bushland reserves—the Council proposes that the vegetation on these reserves be maintained and that they be managed as bushland reserves (see Recommendation I301).

Landscape, recreation, and conservation values can best be protected by observing the following guidelines. The Council recognizes that many of these are already being implemented by the bodies responsible for the construction and maintenance of roads.

- When improvements to a road are being carried out, trees and shrubs on the road reserve should be disturbed to the minimum extent consistent with the safe and efficient design and use of the road.
- Major works to realign minor roads carrying trees and shrubs should not be undertaken unless clearly warranted by the nature and volume of the traffic carried, and the managers of adjacent public land should be consulted regarding such works.
- Where re-alignment of a road results in a section of the old road being cut off, wherever possible that section should not be sold, but used as a recreation and rest area or incorporated into an adjacent appropriate reserve.

- Where a pipeline or overhead wires are to follow a road carrying trees and shrubs in a rural district, every effort should be made to locate the easements on private land alongside the road if this is already cleared, rather than clearing roadside vegetation to accommodate them.
- While recognizing the need for clearing or pruning vegetation close to power lines to reduce the associated fire risk, the State Electricity Commission should consult the Department of Conservation, Forests and Lands regarding the manner in which the risk posed by vegetation can be reduced, while at the same time reducing the environmental impact to a minimum.
- Road-making materials should not be taken from road reserves unless no suitable alternative sources are available. Any such removal should be controlled so as to ensure a minimum disturbance of the native vegetation, and the disturbed areas should be rehabilitated and revegetated, where possible, with plant species native to the area.
- Burning off, slashing, or clearing of roadside vegetation should be kept to a minimum consistent with providing adequate fire protection. (In many cases appropriate works on adjoining freehold land can achieve the desired level of protection).
- Weeds and vermin on roads should be controlled by means that do not conflict with the uses given above.
- The various road management authorities, when planning to upgrade roads that have heavy recreational use, should give due consideration to recreational requirements, and give priority along such roads (when funds are available) to the development of roadside recreational facilities.
- On soils of moderate to high erosion hazard, road management authorities should ensure that pre-planning, design, construction, and funding of roads cater adequately for erosion prevention and control. Advice should be sought from the Department of Conservation, Forests and Lands.
- The purchase of cleared freehold for road construction purposes should be considered as an alternative to clearing of stands of native vegetation in the road reserve.

Unused roads

When the State was being settled, surveyors provided access to every block by means of a surveyed Crown road. Many of these have never been used as roads, and they are usually held by the occupiers of the adjoining land under an unused-road licence.

Recommendation

K2 That the following guidelines, approved by the government following publication of the final recommendations for the Mallee area in May 1977, continue to apply to unused roads.

- The clearing of native trees and shrubs other than noxious weeds should continue to be clearly prohibited in the conditions of unused-road licences.
- A condition permitting public use of licensed unused roads should be written into unused-road licences where necessary to provide practical access to public land.
- Unused roads or easements should not be alienated if there is any likelihood that they will have value for future traffic, nature or landscape conservation, recreation, or other public use.

Roadside picnic areas

Along some roads, the reserve carries picnic areas and wayside stops. Council considers there is a need for additional areas in attractive locations, adjoining the road reserves, that could be used for relaxation and picnicking. Some picnic facilities should be provided.

Recommendation

K3 That the land management authorities establish picnic areas in suitable locations adjacent to the road reserves.

Roadside sites of habitat and/or botanical significance

Recommendation

K4 That, when activities such as widening or re-alignment of roads, fire-protection works, or grazing are proposed within a

road reserve, sites of geological, habitat, or botanical significance that may be affected be investigated and every effort made to retain and preserve them.

A number of important sites have been identified along road reserves and these are listed below:

- stands of *Acacia melvillei*: at the junction of the Sturt Highway and McCarthys Road—Merbein South; along the Swan Hill—Woorinen road; and along roads around Goschen
- stands of *Acacia melvillei* and *Rhagodia ulicina* beside the Lake Boga—Goschen road
- stands of *Maireana cheelii*, *Swainsona swainsonioides*, and *Brachycome readeri* along the Tresco—Bael Bael road
- a stand of *Swainsona swainsonioides* on the Bael Bael—Korrek Korrek road
- the only stand in Victoria of *Ixiolaena chloroleuca*, on the road between the Riverside golf course and Sandalong Racecourse—Mildura
- the large stand of *Sida ammophila*, south of Colignan on the Red Cliffs road
- a stand of *Sida* sp.C (limestone sida) at the junction of Koorlong Avenue and 20th Street, Cardross

- a stand of *Maireana cheelii* on Bristowe Road; between the Murray Valley Highway and the Lake Charm—Benjeroop Road
- the native plant reserve set aside by the Shire of Kerang at the junction of the Quambatook—Boort and Buchanan Roads, Parish of Quambatook. This contains a number of plant species found only rarely in the Mallee including *Ptilotus erubescens* and *Drosera glanduligera* as well as *Maireana excavata* and *M. humillima*, orchid species, and kangaroo grass.

Note:

The Shire of Mildura is carrying out a program of fostering the regeneration of native flora along Ranfurly Way, Morkalla Road, and Paschendale Avenue.

Sites of historical importance

Recommendation

- K5** That, where items of historical significance are identified on road easements, every effort be made to preserve their historical character consistent with management practices and safety requirements.

L. Recreation

The term recreation includes the multitude of different activities that people undertake during their leisure time. In fact, the distinguishing characteristic of recreation is not the activity itself so much as the attitude with which it is undertaken—activities undertaken with little or no feeling of compulsion are almost certainly recreation.

Outdoor recreation is of particular interest to Council, as the public land of the study area provides important opportunities for it. Throughout, these recommendations refer to the many forms of outdoor recreation in a number of ways.

- Formal recreational activities include all organized sports and other group activities, while activities such as picnicking, fishing, and hiking are grouped as informal.
- Passive recreation covers situations where the individual obtains his recreation through enjoying the sights, sounds, and atmosphere of the surrounding environment while expending little physical effort. Examples are picnicking, nature observation, and strolling.
- Active recreation covers situations where the individual must expend considerable physical effort to obtain some mastery of physical forces in order to satisfy his particular recreational needs. Examples are playing organized sport, bushwalking, and water-skiing.
- Open-space recreation includes all recreational activities that require spacious outdoor surroundings, whether the activities be active or passive, formal or informal.
- Intensive recreation involves large numbers of people per unit area. For example, the River Murray frontage near Mildura, Robinvale, and Swan Hill would be considered to be intensively used.

In view of the predicted increase in demand for outdoor recreation and the high capability of some public land to meet this demand, the Council, in making its recommendations, has suggested that the majority of public land should be available for recreational uses of some sort. Accordingly, it has set aside a variety of reserves that will provide for a wide range of opportunities. Council could not, however,

make recommendations covering in detail all the forms of recreation currently pursued on public land. These include activities such as swimming, bushwalking, orienteering, canoeing, fishing, hunting, picnicking, horse-riding, boating, trail-bike riding and pleasure driving. Council believes that activities such as these can be accommodated, without detriment to other values, somewhere on public land. Consequently, Council points out that outdoor recreation in general is an acceptable primary or secondary use of much public land (except reference areas and some water storages and their buffers) and has left the details of recreational use to the land manager.

The various recreation activities differ in their requirements for types of land, size of area, and site location. They also differ in their impact on the land and on other activities (including other forms of recreation). Generally, any one activity pursued at a low level of intensity poses little threat to the environment and seldom conflicts with other activities. With increasing intensity, conflicts and problems can arise. There is always the problem of recreation damaging the environment it seeks to use.

Council therefore believes that the land manager should aim at controlling the levels and patterns of recreational use according to the capability of the area to sustain such use without irreversible damage or significant conflict with the primary purposes of the area, while at the same time avoiding unnecessary restrictions on usage. Special care will be required in the location and management of areas zoned for intensive recreation, to prevent environmental damage. Thus, more stringent restrictions can be expected in areas where the vegetation and soils are sensitive to damage (such as on the lighter soils of the dune-fields of the Sunset Country and Big Desert) and where the natural environment or special natural features are being preserved.

Particular aspects of recreation that may require consideration by the land manager, whether now or in the future, are further discussed below.

Motorized recreation

Much outdoor recreation depends on motor vehicles. These may be conventional cars, four-wheel-drive vehicles, or motor cycles.

They may be used for touring and sightseeing, as a means of obtaining access to a particular area where other forms of recreation will be undertaken, or—when they are driven in competitive rallies or in adverse but challenging road conditions—as a source of recreation in themselves.

Most visitors to the area use conventional two-wheel-drive vehicles and keep to the major through routes. Others use four-wheel-drive vehicles or motor-cycles to gain access to the more isolated areas via the secondary system of roads and tracks that supplement the major ones. These tracks are frequently rough and have not been designed to cope with increasing use by recreation vehicles.

Consequently, even legal use of roads can pose maintenance problems for the land manager. Authorities responsible for their construction and maintenance on public land may close roads temporarily or permanently when traffic exceeds their physical capacity, for safety reasons, or when use by vehicles is in unacceptable conflict with the area's primary uses. Erosion hazard areas may be proclaimed according to the provisions of the *Land Conservation (Vehicle Control) Act 1972* and regulations, enabling strict control to be enforced.

If the increased recreational use of roads is to be catered for, adequate funding should be provided for road maintenance, otherwise deterioration leading to erosion is inevitable.

A number of four-wheel-drive clubs have acknowledged the need for restrictions on motorized recreation in certain areas and during some periods of the year, and generally support the use of existing legislation to control undesirable activities. Clubs also recognize the need to inform and educate participants in motorized recreation of the environmental consequences of improper use of four-wheel-drive vehicles. Authorities with management responsibilities should continue to promote responsible attitudes to the use of four-wheel-drive vehicles and trail-bikes.

A significant and growing proportion of the population is becoming involved in recreational touring, which depends on the use of roads on public land. It must be appreciated that, in accordance with regulations under the *Land Conservation (Vehicle Control) Act 1972*, motorized vehicles (including motorcycles) may only be used on public land if they are registered and on roads or tracks formed for the passage of vehicles having four or more wheels. (Limited exceptions are given in the Act.) Driving vehicles off such roads is prohibited. This applies to all public land in Victoria, whether it is in parks, State forest, or other reserves.

The demand exists for the provision of some areas of public land to accommodate and relocate the off-road activities of motor vehicles, particularly trail-bikes. Such areas could, for example, take the form of defined trails in some State forests or could include disused quarries or parts of some recreation reserves close to urban centres. Where possible, the alternative use of suitable private land should be considered. Areas chosen, whether public land or freehold, would have to be in situations where damage to soil and vegetation would be minimal, and where noise would not cause undue disturbance to other people using, or living in, nearby areas (see Recommendation L3). Council points out that there is a serious and growing problem of damage to soils and vegetation by spectators attracted to these activities.

The Mallee Rally, an annual motor vehicle event, follows a circuit around Lake Tyrell. The Council considers that this event could continue, subject to controls on vehicular movement on defined tracks and to the implementation of rehabilitation works where necessary (see Recommendation D19).

Hunting

The Kerang wetlands receive heavy use by hunters during the proclaimed Victorian duck-hunting season. The Marshes, Lake Albacutya (when it is holding water), and the many billabongs and streams of the River Murray floodplain are also popular.

Hunters both individually and collectively, through organizations like the Victoria Field and Game Association, have contributed

significantly to the conservation of wildlife habitats in the State by tree-planting and protection programs and erection of nesting boxes, and through their support for the conservation of swamps and wetlands. These activities have benefited not only waterfowl species but also some non-game species.

Rabbit-hunting is common throughout the Mallee and may assist in controlling this pest. Foxes and feral goats in the Sunset Country and feral pigs along the River Murray are also hunted.

Marinas

The increasing recreational use of the River Murray, particularly through the use of houseboats, has seen a corresponding demand for berth sites for watercraft.

Following Council's investigation in 1977, the government approved the development of a marina excised from the northern end of Kings Billabong wildlife reserve (see Recommendation L7 below).

There have been suggestions that another marina may be developed at Cowanna Billabong, near Merbein. The Council cannot make specific provision for such a development as no definite proposal has been forwarded. However, there would be no objection in principle to this project proceeding, provided: it is approved by the Department of Conservation, Forests and Lands and the Rural Water Commission; Aboriginal artefacts are protected; and any such proposal is evaluated under the environmental effects legislation.

Youth camps

Currently the study area contains few permanent youth camp sites. Demand is likely to increase, however, for sites for use by scouts, schools, church groups, and the like. Users have generally preferred sites situated in pleasant bushland, close to a permanent stream, readily accessible by road, and in areas where the safety of the camp and its occupants can be ensured during periods of high fire danger. Such sites are relatively scarce and their use for youth camps is in direct competition with their use for less-restrictive public activities, such as picnicking and general camping.

Camps on public land vary greatly—in the purpose for which they are constructed, in their standards of maintenance, and in the degree to which they are used. Some are designed to provide full accommodation, with campers living in huts that have electricity and hot water provided; others have only minimal facilities, with campers living in tents. Some have considerable amounts of money and volunteers' time and effort put into their construction and maintenance; others have been built and maintained at very low standards. Some are used for much of the year, with the owner organization allowing use by other groups. Others are used only occasionally and exclusively by one group.

User groups have an increasing tendency to acquire freehold land for their actual camp site, while using adjacent public land for their outdoor activities, and Council believes that this trend should be encouraged. While recognizing that a variety of types of camps may be needed, Council believes that any camps permitted on public land should be properly located, constructed, and maintained. For efficient management of camps, it may be necessary for a single organization to be given limited tenure over a minimum area at any individual camp site, under the control of the land manager. Council believes, however, that these camps should still be used as fully as possible consistent with avoiding damage to the environment.

The greater use of existing camps on public land is desirable in order to avoid proliferation of camp sites, and there is a need for co-ordination of information regarding the availability of those camps that could be used by groups who do not have tenure of their own.

Recommendations

- L1** That public land continue to be available for a wide range of recreational uses where these can be accommodated without detriment to other values, and that land managing authorities aim at controlling the types, levels, and patterns of recreational use according to the capability of particular areas to sustain such use without irreversible change or significant conflict with the primary purpose of the area.

L2 That vehicular use of roads within the meaning of the *Land Conservation (Vehicle Control) Regulations 1973* continue to be permitted on public land except where closure is necessary because of erodible soils, seasonal conditions, excessive maintenance, or conflict with the primary use of the area.

L3 That the land management authorities endeavour to provide some areas for off-road vehicular use within land under their control.

Notes:

1. Two potential sites for off-road vehicle use have been brought to Council's notice—one on the old Merbein Common north of Allotment 16D, section B, Parish of Merbein, and the other on Allotments 1, 11, 12, and 13, section 124, Parish of Mildura. Council believes that investigation of the suitability of these sites and any development should be undertaken by the Department of Conservation, Forests and Lands in consultation with local government.

2. No recommendation is listed under L4.

Existing recreation reserves

(recommended by the Council in 1977)

Recommendation

L5 That existing recreation reserves, some of which are indicated on the maps, continue to be used for those purposes approved by government following publication of the final recommendations for the Mallee area in May 1977.

Note:

Minor alterations have been made to some of the recreation reserves mentioned in Council's 1977 final recommendations. These are included with L34 to L50 below.

Existing recreation reserves

(not listed in Council's recommendations in 1977)

Recommendation

L6-L33 That the existing recreation reserves, described in Table 6 below and indicated on the maps, continue to be used for organized sports (football, cricket, golf, etc.) and informal recreation (picnicking, camping etc.) as permitted by the land manager

and that they be reserved under section 4 of the *Crown Land (Reserves) Act 1978*, and managed by the Department of Conservation, Forests and Lands.

Table 6: Existing recreation reserves

Recommendation	Parish (P) or Township (T)	Description	Area (ha)
L6	Merbein (T)	Public Park and Recreation Reserve	15.7
L7	Mildura (P)		34.0
	Note: Kings Billabong Marina—excised from Wildlife Reserve D1 after Council's 1977 Final Recommendations.		
L8	Red Cliffs (T)	Three areas, being CA 35, section 4; CA 6 and 4, section 8; and CA 9, section 10	2.8
L9	Paninya (T)		6.5
L10	Murrayville (T)	Part of Public Purpose Reserve, section 9	0.2
L11	Cowangie (T)	Reserve south of section 1	0.7
L12	Linga (T)	Recreation Reserve, section 2 and CAs 15, 16 and 17, section 1	3.0
L13	Underbool (T)	Playground Reserve west of section 4 and Recreation Reserve north of the Railway Reserve	12.6
L14	Ouyen (T)	4 areas, CAs 2, 3, 4 and 5, section 21; CA 8, section 20; CA 20, section 16	9.0
L15	Patchewollock (P)	Part of CA 27A and 27B	3.8
L16	Goyura (P)	Adjacent to CA 37	35.0
L17	Hopetoun (T)	Recreation Reserve and Racecourse	31.4
L18	Dennyning (P)	CA 11A	22.3
L19	Beulah (T)	Recreation Reserve and Agricultural Showgrounds and Extensions	4.7

Table 6: Existing recreation reserves—continued

Recommendation	Parish (P) or Township (T)	Description	Area (ha)
L20	Robinvale (T)	Recreation Reserve	9.1
L21	Manangatang (P)	Adjacent to CA 27	0.1
L22	Chinkapook (T)	Part of State School Reserve	0.8
L23	Tyntynder North (P)	Golf course adjacent to CAs 11 to 15	37.0
L24	Nyah (T)	Public Park, east of section 7	0.1
L25	Nandaly (T)	Public Recreation and Showground Purpose Reserve and Extensions	22.0
L26	Tyntynder (P)	Recreation Reserve	2.0
L27	Sea Lake (T)	Swimming Pool Reserve, section 1 Recreation Reserve, west of section 1 Reserve for War Memorial and other Public Purposes	6.1
L28	Lake Boga (T)	CAs 27, 27A and 31	5.0
L29	Woomelang (T)	Park and Garden Reserve, section 10; Recreation Reserve and CA 23 of section 9	7.8
L30	Watchupga (P)	CA 33A	0.8
L31	Culgoa (T)	Recreation Reserve and Crown land to the south, Public Park and Playground Reserve, section C	9.7
L32	Dartagook (P)	CA 1B, section C	2.5
L33	Quambatook (T)	Recreation Reserve and Extension	1.7

Note:

The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.

Additional recreation reserves

(including alterations to existing, previously recommended, recreation reserves)

Recommendation

L34- That the areas described in Table 7
-L50 below and indicated on the maps be used

for organized sports (football, cricket, golf, etc.) and informal recreation (picnicking, camping etc.) as permitted by the land manager

and that they be reserved under section 4 of the *Crown Land (Reserves) Act* 1978, and managed by the Department of Conservation, Forests and Lands.

Table 7: Additional recreation reserves

Recommendation	Parish (P) or Township (T)	Description	Area (ha)	Comments
L34	Mildura (P)	Part of block 63	2.1	Mildura Pistol Club: Benetook Ave
L35	Carwarp (T)	Recreation and part of Park Reserve	12.1	Reduction of existing reserve
L36	Murrayville (T)	Part of Public Purpose and Showground Reserve	48.8	Reduction in size
L37	Boinka (T)	CA 17 and Crown land to the south, and CAs 7 and 8, section 6	7.0	Former Boinka State School, and Tennis Courts
L38	Underbool (T)	Racecourse and Public Recreation Reserve and Crown land to the east	30.1	Additional to existing reserve
L39	Torrita (T)	Part of Public Hall and Recreation	2.9	Reduction of existing reserve
L40	Kulwin (T)	Part of Recreation Reserve	2.0	Reduction of existing reserve
L41	Yaapeet (T)	CAs 6 and 7, section 2	0.4	Tennis courts
L42	Rainbow (T)	Public Park and Swimming Pool Reserves, section 9; Part of the Timber and Water Supply Reserve; Agriculture Showground and Recreation Reserve	60.4	Bowls and Tennis Area—Park St and alteration to existing reserve
L43	Manangatang (T)	CAs 17 and 18, section 4	1.5	Bowling Club
L44	Mittyack (T)	Part of CA 22, section 3, and adjacent road reserve to the west	0.55	Reduction of existing reserve
L45	Tyntynder North (P)	Part of Crown land east of CA 16	135.7	Reduction of existing reserve Existing garbage remains separate

Table 7: Additional recreation reserves—*continued*

Recommendation	Parish (P) or Township (T)	Description	Area (ha)	Comments
L46	Woorinen South (T)	CAs 2 and 3, section 1; CAs 23 and 24, section 3; Part of CA 13 and Recreation Reserve and extension, section 4	7.6	Alteration to existing Recreation Reserve and includes Scout Association Hall
L47	Pental Island (P)	Part of Crown land adjacent to CA 1	19.0	Addition to Swan Hill Pioneer Settlement
L48	Goschen (T)	Part of Public Hall and Recreation Reserve	0.90	Reduction of existing reserve
L49	Berriwillock (T)	Adjacent to CAs 15 and 16, section 6	0.7	
L50	Birchip (T)	Crown land in section 5	15.5	

Note:
The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.

M. Scenic reserve

These are set aside to preserve scenic features and look-outs of particular significance.

Aims of management of these areas should be to maintain the character and quality of the landscape and to maintain native vegetation.

Existing scenic reserve

Recommendation

Red Cliffs

- M1 That the area of 21 ha, shown on Map C, continue to be used for those purposes approved by the government following publication of the final

recommendations for the Mallee area in May 1977

except that

management of the reserve should ensure that the significant plant species found here, and their habitat, are protected.

Note:

This reserve contains the following plant species that are threatened in Victoria: *Abutilon fraseri*, *Jasminum lineare*, *Myoporum deserti*, *Rhyncharrhena linearis*, *Sida ammophila* and *S. fibulifera*, and probably *Leichardtia australis*.

N. Mineral and stone production

The continued existence of our technological society will depend on the availability of minerals. The study area contains known deposits of 'minerals' as defined in the *Mines Act* 1958. Nevertheless, knowledge of the location of our mineral resources is far from complete and new deposits of commercial significance will undoubtedly be found. Furthermore, currently uneconomic deposits of important minerals may become economically exploitable, and other minerals that are not used at present may become important.

Exploration for minerals

The government has the responsibility to establish the existence and extent of the State's mineral resources. The government, in the main meets this responsibility through the provisions in the *Mines Act* 1958 that provide the tenure under which private enterprise is encouraged at its own cost to locate new mineral deposits. When a new deposit is discovered in an area where mining is not a currently approved land use, it may be of such importance that a change of the land use is required in the State's interest. The decision on whether such a change is in fact necessary can only be made against a background of the best available knowledge of the location and extent of the particular mineral deposit. It is important therefore that the reservation of conservation areas should not automatically exclude exploration for mineral and fossil fuel resources. Attention should be directed towards ensuring that other values and interests are protected, rather than preventing exploration activities.

The protection of other values—particularly those historical values around old mine sites—should never be enforced to the point that it places human life at risk. In relation to public safety, nothing in the recommendations affects the powers of Inspectors under the *Mines Act* 1958 and the *Extractive Industries Act* 1966.

The government is, at present, reviewing the *Mines Act* 1958. In December 1988 it released for public comment a paper outlining options

for changes to the Act. On the basis of these comments, the government in 1989 will prepare a paper outlining its preferred options and, subsequently, the draft Mines Amendment Bill.

The Parilla Sands—which underlie the Wimmera and much of the southern Mallee, including the Big Desert—have potential for heavy mineral sands, and this is being investigated on the south-eastern edge of the Murray Basin.

The underlying pre-Cainozoic sedimentary rocks have potential for oil and gas and a petroleum exploration permit is current for land extending south from the southern half of the Sunset Country and through much of the Big Desert.

Beneath the Cainozoic deposits in the western side of the Mallee area, extending beneath the Big Desert Wilderness and the western portion of the recommended Murray-Sunset National Park, lies an aeromagnetic feature that is thought to be an extension of the Staveland Greenstone belt. This belt has potential for gold and base-metal mineralization.

The only minerals being produced from the area at present are gypsum and salt.

Gold

Increases in the price of gold have resulted in an upturn in mineral exploration and mining in recent years. This trend has been particularly strong in 1986 which has seen a marked demand for Miner's Rights, Miner's Right Claims, Exploration Licences, Mining Leases, Tailings Removal Licences and Tailing Treatment Licences. Known goldfields have been the focus of most activity and several former mines have been re-opened. Those involved range from the part-time hobby prospector to large mining companies, but in numerical terms, it is the former group which has experienced the most substantial growth. To a large extent, this is due to the ready availability of modern, low-cost, technology in the form of metal detectors and eductor dredges which have enhanced the prospects of small operators.

Fossicking and prospecting

Fossicking and prospecting are often taken to mean one and the same thing. In mining terms a fossicker is a person who casually works over old mine workings and waste rock heaps in the hope of finding small amounts of gold or other minerals. Unlike prospecting, the term 'fossicking' has no basis in legislation under the *Mines Act 1958*. Fossicking is also accepted as a wider term that embraces not only the search for gold and minerals, but also for other items such as bottles or coins.

Prospecting is a systematic activity, defined in the *Mines Act 1958* as 'all operations conducted for the purpose of discovering or establishing the presence or extent of mineralization or of a mineral'. It is necessary to hold an exploration licence, or a Miner's Right, before prospecting may be undertaken. Most individual miners and prospectors operate under a Miner's Right, which does not permit prospecting on private land.

Under current legislation there is a small percentage of public land in the State where prospecting under a Miner's Right is not permitted. This includes areas used for various community purposes such as golf courses, cemeteries, and flora reserves.

Council considers fossicking and prospecting to be legitimate uses of public land and as such should not be unduly restricted or regulated. There are some areas, however, where these activities may not be permitted or may require limitation and these have been specifically nominated in the recommendations (see Chapter C—Reference areas and Chapter O—Water supply and drainage).

In addition to these, there may be other limited areas of land surface that, because of their special public importance or inherent instability, warrant either permanent or temporary exclusion from fossicking and prospecting. These areas may include, for example:

- land that, if disturbed, may detrimentally affect water quality, especially where the water is used for domestic consumption
- important habitats for plant species or fauna
- important historic relics that could be damaged
- sites of high erosion hazard

- community assets such as recreation areas and water or sewerage installations
- important geological formations

These limited areas of land surface have not been specified in the recommendations, but will be determined by the land manager and the Department of Industry, Technology and Resources together. Fossicking and prospecting, where they involve minimal disturbance to soil or vegetation, will be permitted on public land other than these limited areas and those specifically nominated in the recommendations. Areas currently exempted or excepted under existing legislation should remain so, unless otherwise specified in these recommendations or unless the land manager and the Department of Industry, Technology and Resources together determine that such exemptions or exceptions should no longer apply.

Stone

Materials covered by the definition of 'stone' in the *Extractive Industries Act 1966* (including rock, gravel, clay, sand, and soil) are widespread in the State. There is a strong community demand for new and better roads and buildings, and so for the materials necessary for their construction. Most of these materials are provided from private land, but public land is also an important source—particularly for road-making material.

The Council is concerned by the complexity of legislation and procedures governing extraction of 'stone'. (For example, the Roads Corporation and municipal councils are not bound by many provisions of the *Extractive Industries Act 1966*.)

There is need for:

- review of existing legislation and procedures to enable more rational use of the 'stone' resource of the State
- provision of adequate resources for the reclamation of old extraction sites on public land

Poorly planned and located excavations can affect surrounding lands through noise, dust, unsightliness, and erosion and can diminish the value of the land. With care, however, these effects can be avoided or minimized.

Principles and guidelines

The terms 'exploration and extraction', referred to below, do not relate to the activities described above as prospecting under a Miner's Right and fossicking.

The Council believes that the following principles should apply.

1. Some areas of land surface—because of their inherent instability or special public significance (for example, community assets or areas with important scenic, archaeological, historical, recreation, or nature conservation values)—warrant permanent or temporary exclusion from exploration and/or extraction of 'minerals'. The Department of Industry, Technology and Resources and the land manager should together determine these areas. Consultations take place as required between officers of the Department of Industry, Technology and Resources and the Department of Conservation, Forests and Lands to determine those areas that should be excluded and the conditions under which particular areas of public land are used for exploration for, and production of, minerals and stone.
2. When tenure is issued for operations under the *Mines Act* 1958 on public land, the land manager should be consulted regarding the conditions to apply and the supervision should be in accordance with the agreed conditions as specified in the claim, licence, or lease and with the requirements of the Act.
3. Consultation should continue between the land manager, the Department of Industry, Technology and Resources, the Department of Conservation, Forests and Lands, and the other relevant authorities with respect to the procedures to be adopted for the exploration and extraction of 'stone' on public land. Any operations on public land should continue to be subject to the approval of the land manager.

In all cases, the procedures that are established should apply to municipal councils, the Roads Corporation, and other public authorities as well as to commercial operators. To ensure this, the relevant Acts may have to be amended.

4. A system should be established that would ensure, before work commences, the availability of funds for progressive and final reclamation of any excavation or operation. Provision should also be made to enable the acceleration of the rehabilitation of all existing extraction areas on public land.
5. Royalties for materials extracted from public land, including site rental when appropriate, must be more closely related to the market value of the material. This would eliminate any temptation to use public land purely on the grounds of the nominal royalties sometimes levied in the past.
6. The following guidelines should apply to all extraction from public land.
 - (a) The Department of Industry, Technology and Resources should not issue leases for petroleum production or for the mining of 'minerals' unless satisfied with the program submitted by the applicant. In the case of Miner's Right claims, prior assessment is impractical and the Department should ensure the lodgement of a bond as surety is adequate for rehabilitation. Wherever practical, the Department should seek the lodgement of mining plans that show the expected post-mining state of the land and should state operating conditions to achieve an appropriate standard of rehabilitation acceptable to the land manager.
 - (b) No sites for the extraction of 'stone' should be opened in areas that the land manager, in consultation with the Department of Industry, Technology and Resources, considers to be of greater value for other uses including aesthetic or nature conservation values. The advice of the Department should also be sought as to the desirability of proposed excavations, having regard to alternative sources of 'stone'.
 - (c) Extraction of 'stone' should generally be concentrated on the fewest possible sites in an area, and any one site should be substantially worked out and where possible reclamation ensured before a new site is exploited. The type of excavation to be carried out should be that with the lowest environmental impact consistent with the effective use

of the resource. In general, and where the nature of the resource permits, excavations for 'stone' should be deep and limited in area in preference to shallow excavations over a wide area. The extraction of granite sand occurring as shallow deposits in the weathered profile should be discouraged unless it has been established that no suitable alternatives are available. In the special circumstances where approval is given for this form of extraction, particular attention should be given to the prevention of soil erosion.

- (d) Where an application for the removal of 'stone' from a stream-bed is considered, the land manager should take particular care to ensure that the operations will not directly or indirectly cause erosion of the bed or banks, or undue pollution of the stream. In addition to the arrangements outlined above for 'stone', the land manager should also consult with the relevant water supply and conservation authorities, and should consider the scenic and recreation values of the area.

Alternative sources with a lower environmental impact should be used where they are available. The environmental effect of extraction may be reduced if alluvial stone is obtained from properly managed quarries on the river terraces, rather than from the present stream-bed.

- (e) All extraction sites should be fully reclaimed where possible. Reclamation should follow extraction progressively when possible, but otherwise should begin immediately extraction is completed. The requirements for reclamation should continue to be included in the conditions of the lease or licence before any approval to extract is granted. The reclamation may include, for example, replacing topsoil, revegetating the site with plantation forest, allowing a quarry to fill with water and developing the site as a park, using a gravel pit for off-road vehicles, using a quarry for garbage disposal prior to reclamation, or restoring the site as

closely as possible to its original topography and revegetating it with species native to the site.

In addition to the above, approval under the *Soil Conservation and Land Utilization Act 1958* should continue to be sought for the exploration or extraction operations for 'minerals', 'petroleum', or 'stone', where the subject land is within a proclaimed water supply catchment.

Recommendations

- N1** That public land in the study area (other than reference areas and other areas as determined by government) continue to be available for exploration under licence and extraction of 'minerals', 'petroleum', and groundwater, subject to Recommendation N4 and the principles and guidelines set out above.

Note:

This recommendation does not refer to prospecting under a Miner's Right, which is covered by Recommendation N3, but does include claims registered under a Miner's Right.

- N2** That public land in the study area (other than reference areas and other areas as determined by government) continue to be available for exploration for 'stone' subject to the principles and guidelines set out above.

- N3** That prospecting under Miner's Right and fossicking, involving minimal disturbance of soil or vegetation, be permitted on public land other than:

- (i) those areas specifically excluded in the recommendations (see the chapters on reference areas and water supply) and other areas as determined by government
- (ii) those areas that the land manager and the Department of Industry, Technology and Resources together may determine (see the guidelines in the section on fossicking and prospecting)
- (iii) the areas referred to in N4 below.

- N4** That those areas of public land currently exempted or excepted from occupation for mining purposes under a Miner's Right or from being leased under a

mining lease, remain so exempted or excepted unless the land manager and the Department of Industry, Technology and Resources together determine that such exemption or exception should no longer apply.

Note:

Because of their relatively small sizes, it is considered that harvesting of salt or gypseous material should not be permitted from flora and fauna reserves in the Mallee (see Chapter G).

Gypsum

Where highly saline groundwater lies about a metre below the ground surface in the Mallee, usually indicated by salt pans and salt lakes, a layer of crystalline gypsum has formed above the water table. Gypsum also occurs as an efflorescent deposit on the surface of clay pans, where it typically mixes with clay and/or sand and is called 'gypsite' or, locally, 'copi'. Wind action concentrates this material into low dunes called 'copi islands'. Crystalline gypsum is also found in a 'sugar' form beneath mallee in the south-west.

Both crystalline gypsum and copi are mined under the provisions of the *Mines Act* 1958. Although this takes place over extensive areas, no surveys have been undertaken to determine the extent of the resource.

Council is concerned that, in the past, little or no rehabilitation was undertaken to restore areas from which gypsum was mined and this has left the land surface of the sites in a degraded condition.

More recently, however, rehabilitation after mining for copi involves respreading the overburden, ripping the site, and then leaving it to regenerate naturally. Following mining for crystalline gypsum, the mounds of overburden are flattened. Regeneration in these highly saline environments is difficult, especially where the resultant land surface is significantly closer to the water table.

Recommendations

N5, N6 That:

- (i) the existing mining tenements, shown on Maps A and B, continue to be used for the extraction of gypsum
 - (ii) all readily available gypsum be mined from the existing tenements before operations are relocated
 - (iii) progressive rehabilitation, including revegetation, of excavated sites, including those now disused, be undertaken to return the land surface to as near as practicable to its pre-mining condition
 - (iv) mining for powdered and 'sugar' gypsum be concentrated into areas denuded of native woody vegetation, but, should it be necessary to mine vegetated areas, they be replanted with species native to the area
- and that
- (v) government, in association with the industry, undertake investigations to determine appropriate and effective means of rehabilitating and revegetating mined areas.

N5 Crystalline gypsum workings (2090 ha)

N6 Powdered and 'sugar' gypsum workings (333 ha)

Note:

Access should continue to be available through the Towan Plains flora and fauna reserve (G22 and G46) to the 48-ha mining tenement that has been applied for within that reserve. Sites on which stands of the rare grass *Stipa nullanulla* are growing should be excluded from the tenement. Following completion of mining operations, and site rehabilitation, this area should be added to the flora and fauna reserve.

Salt

Recommendations

- N7, N8 That the areas listed below and shown on the maps be used for the extraction of salt and, if not already reserved for this purpose, be temporarily reserved under section 4 of the *Crown Land*

(Reserves) Act 1978, with management plans prepared by the Department of Conservation, Forests and Lands.

Note:

These sites are extensively developed for salt extraction.

N7 Lake Tyrrell (5860 ha)

That

- (i) management ensure that those nature conservation values of islands within the lake and along the shore-line are protected

and that

- (ii) grazing be permitted at the discretion of the managing authority and in accordance with the management goals specified for the adjoining wildlife reserve.

Notes:

1. The balance of Lake Tyrrell is proposed as a wildlife reserve and the nature conservation values of the area are discussed in that Chapter—see Recommendation D19.

2. Only portion of the area indicated on the map for salt extraction is used for that purpose. The land manager should investigate the potential of this area for further salt production with a view to rationalizing the licences there.

N8 Spectacle Lake (34 ha)

Note:

This area was licensed for the establishment of a salt-harvesting and processing enterprise after the Council published its final recommendations for the Mallee area in 1977.

N9 That the extraction of salt from pans and lakes on lake reserves, wildlife reserves, and other parcels of public land, where not otherwise specifically excluded, be permitted at the discretion of the land manager.

Notes:

1. The development of evaporation pans, access tracks, stack sites, and processing facilities has considerable impact on the natural values of the land. Where possible, the development on public land of permanent facilities, such as processing factories, should be discouraged.

2. A number of low-lying sites and salt pans in the Mallee area are used now for the disposal of water as part of salinity-mitigation schemes. Investigation should be conducted into the feasibility of using these areas also for salt extraction (see Chapter O).

3. Should there be a requirement for further areas for salt extraction, sites that have already been modified, such as by severe secondary salting or agriculture, should be investigated before relatively natural sites are utilized.

Stone reserves

Recommendation

N10 That the areas listed on Table 8 below and indicated on the maps continue to be used for the extraction of 'stone' in accordance with the principles and guidelines outlined above and, if not already reserved for this purpose, be temporarily reserved under section 4 of the *Crown land (Reserves) Act 1978*, with management plans prepared by the Department of Conservation, Forests and Lands.

Table 8: Stone reserves

Parish	Description	Area
Dennyning	South of Allotment 5	3.6
Dennyning	South of Allotment 16	1.6
Ginquam	Adjacent to Allotments 50 & 51	31.0
Pigick	South-east of Allotment 46	11.7
Pirro	West of Allotment 42	3.2
Willoby	Within Allotment 11	4.4

Note:

Road-making materials are extracted from many other areas of public land throughout the Mallee; most of these are not indicated on the maps, however, as they are usually short-term surface workings. In a number of cases, rehabilitation of the sites is lagging and a number of old sites also require rehabilitation work—some old gravel-stripped sites near Mildura are still in need of rehabilitation, for example, although recent operations there include replacing the topsoil and replanting with species native to the area. In accordance with the principles and guidelines stated above,

these operations should be a normal feature of gravel-extraction works. Planting of native species on rehabilitated sites should be undertaken, even where vegetation may have been sparse prior to surface-stripping. It may be necessary to exclude grazing for a period from areas undergoing revegetation to ensure its success.

O. Water supply and drainage

Water supply

Most of the settled districts of the study area are supplied with water for stock and domestic purposes by the large network of earthen channels of the Rural Water Commission's Wimmera-Mallee Stock and Domestic Water Supply System that bring water from storages to the south and east. Most towns have an elevated reservoir, into which water is pumped from an earthen storage. Many of the channels and town storages are on public land, but are not shown on the maps because of their small size. The Council proposes no change in the use of these areas.

The Millewa district in the north-west of the study area is supplied from the River Murray, via Lake Cullulleraine and a storage at Bambill South (O1 and O2 respectively on Map A) and then pipelines to individual farms.

The irrigation districts along the River Murray downstream from Swan Hill draw their water directly from the river. Supplies for the irrigation districts in the Kerang region are drawn from the Torrumbarry system. This diverts water from the River Murray at Torrumbarry, east of the study area, to the Loddon River at Kerang, whence it flows through a system of natural lakes, connected by channels. These are the Reedy Lakes, Racecourse Lake, Lake Charm, and Kangaroo Lake. Water for irrigation and domestic use is drawn from these lakes. Other lakes receive fresh water intermittently from the water-supply system. The lakes also play an important role in flood mitigation.

The lakes mentioned above, which would normally be dry for long periods, now receive assured supplies of fresh water and consequently have considerable value for recreation and nature conservation. Around Kerang, many species of water-birds use and breed in them; the Second (Reedy) Lake contains Victoria's largest colony of white and straw-necked ibis. Lake Boga and Lake Cullulleraine are used extensively for boating, swimming, and fishing. Duck-hunting is an important recreational activity on many of the lakes.

The Council recommends that the lakes and watercourse required for water-supply purposes and flood mitigation continue to be so used, and that their importance for nature conservation and recreation be recognized in their management.

Access should be provided for management purposes to all water-supply works on public land, and also for recreational purposes commensurate with public safety and the protection and continued operation of the works.

Recommendations

O1, O2, O4-O8, O10-O12, O14, O15, O17, O19, O20, O22

That these areas, totalling 3354 ha and shown on the maps, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977

except that,
as for O19, O20, and O22, management of O1, O10, O12, O14, O15, and O17 by the Rural Water Commission be in consultation with the Department of Conservation, Forests and Lands.

Notes:

1. O3 is no longer required by the Rural Water Commission for water supply purposes.
2. O9 (Lake Boga), O16 (Lake Meering), and O18 (Tcham Lake north) are now recommended as lake reserves—Recommendations T5, T7, and T6 respectively.
3. Portion of O19 [Scotts channel] is proposed for reservation as a wildlife reserve—Recommendation D26.
4. O21 (Cullens Lake) and O13 are incorporated in the proposed wildlife reserve—Recommendation D25.
5. O22 refers to the Dennyning Channel in the Parishes of Paignie and Wymlet. Public land surrounding this channel is now recommended

as a linear bushland reserve to be managed by the Department of Conservation, Forests and Lands in consultation with the Rural Water Commission (see Recommendation I303).

6. A number of pumping stations and other water-supply facilities were identified in the report by Andrew C. Ward and Associates (Mallee Area Review—Study of Historic Sites) as being of historical importance. Most of these facilities are still in use. Nevertheless Council believes that, where possible, their use should not compromise the historical integrity of the sites and if they are no longer required by the current agency they should be considered for preservation as historic sites. Other water-supply facilities, some of which may not necessarily be now used for that purpose, may also be of local historical importance—such as Harveys Tank at Woorinen South.

Flood mitigation

While flood mitigation in the study area is not the direct responsibility of the Rural Water Commission, the operation of the Commission's water-supply and drainage systems can provide some mitigation. 'Natural' flood mitigation, however, involves the use of many lakes and water courses that are not used for water supply or drainage. It is essential that these areas continue to be available to act as natural flood pondages. Chapter J—Rivers and streams—discusses river management.

Public tanks and bores

The dryland farming districts of the Mallee contain many public tanks (dams) either filled from the channels of the Wimmera-Mallee Stock and Domestic Water Supply System or filled by run-off from the surrounding land.

The Rural Water Commission uses a number of tanks for regulation and flood spill purposes as an integral part of the water distribution system. Shire Councils and the Road Construction Authority use some of the tanks to draw water for road-making. Authorized diverters are supplied by agreement with the Commission, and, after paying a fee, draw water for various purposes other than irrigation. Other tanks are used by individuals who pay water rates on the area occupied by the Crown land reserve in which the tank is located.

Many of these public tanks also have community values. Some are currently used for recreational activities such as picnicking and yabbing, while others have potential for such use. Many provide habitat for wildlife, and public tanks also supply water for use in fire-fighting.

In 1977, and again during the current review, the Council investigated the use of public tanks to assess current requirements and to clarify uncertainty as to the public or private status of a number of them. In assessing which tanks should be retained, the following factors were considered.

- road-making and maintenance
- fire-fighting
- the needs to landholders in fringe areas
- public use as picnic areas
- regulation of the water-supply system
- existing licensed diversions

Most of the tanks are located in water reserves, although some are on road reserves and channel easements. Use of some areas has changed and some tanks have become redundant, and the usefulness and reliability of public tanks that are filled by run-off (catchment tanks) varies considerably. The Council believes that, with the termination of licensed grazing from nature conservation reserves, catchment tanks should be investigated for their potential to provide community uses, principally firefighting. Those not required should be made inoperative by the land manager.

The following list includes a number of public bores and catchment tanks as well as tanks filled from the water-supply systems.

Recommendations

023-068, 070-073, 075-0100, 0102-0107, 0109-0119, 0121-0134, 0136-0161, 0165-0169, 0171-0177, 0179-0194

That these areas, indicated on Maps A and B, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977

except that:

- (i) where a tank is located within an area of public land that is recommended for other uses, the tank and any other water supply works on the land be managed by the manager of the surrounding public land in consultation with the Rural Water Commission (these tanks are shown on the maps by a blue dot adjacent to the public land)
- (ii) where the tank is located on a small discrete piece of public land, it be reserved under section 4 of the *Crown Land (Reserves) Act 1978* and be managed by the Department of Conservation, Forests and Lands, in consultation with the Rural Water Commission, except in cases where it is already vested in the Commission.

Notes:

1. O69 and O74 are located within freehold land and O101 is on land now recommended for alienation.
2. O108 is no longer filled by the Rural Water Commission—it is incorporated into flora and fauna reserve G20.
3. O162 and O163 are incorporated into wildlife reserve D22, and O164 and O170 are incorporated into wildlife reserves D20 and D21 respectively.
4. O120, O135, O164 and O178 are no longer required by the respective shires.

Drainage

High saline water tables are a problem throughout the irrigated lands of the Mallee. The method most commonly used to keep the water table below the plant rooting zone is the installation of sub-surface drains. While these drains prevent waterlogging and salting on the irrigated land, disposal of the saline drainage water presents a further problem.

Current practice is to run the drainage water into lakes and low-lying areas, which act as evaporation basins, although some areas drain directly into the River Murray, or onto its floodplain. Water is released from some basins into the Murray at times of high river flow, when it will be rapidly diluted.

The Salinity and Drainage Strategy of the Murray-Darling Basin Ministerial Council provides for the States to undertake land management programs that discharge salt to the River Murray within agreed limits and enables governments jointly to fund cost-effective salt-interception schemes to achieve a net reduction in River Murray salinity.

Land management schemes for the Campaspe and Shepparton areas, for instance, include on-farm measures and surface and sub-surface drainage to manage land salinization and waterlogging, which would add salt to the River Murray.

Further disposal directly to the River Murray should only be undertaken in the context of the Murray-Darling Salinity and Drainage Strategy and the salinity strategy for Victoria—'Salt Action: Joint Action'.

Depressions and natural lakes in the Mallee used for disposal have considerable nature conservation value because they provide habitat for water-birds and waders. For example, Lake Tutchewop is noted for the migratory waders found there from time to time, while the Cardross Lakes often attract large numbers of water-birds.

As the salt content of these lakes increases over time, their value as habitat will fall until they become lifeless bodies of brine. The salt usually builds up slowly, however, and the lakes can be expected to provide useful habitat for many years.

The Council believes that the provision of wildlife habitat is an important aspect of the management of areas used for disposal of saline drainage water.

Public land currently used for water-drainage purposes is shown on the maps.

The discharge of drainage water from horticultural enterprises directly onto public land is also of concern to the Department of Conservation, Forests and Lands. Rehabilitation is often required on these areas to overcome the effects of erosion and salinity. The Council believes that this should be examined jointly by that Department and the Rural Water Commission, which should then employ measures that either avoid this situation or provide equitable means for rehabilitation works. This may include a levy on those discharging the water.

Elevation of the regional water table and saline-water-disposal schemes have caused the salinization of many low-lying areas and wetlands in the Mallee.

It has been suggested that harvesting of salt is compatible with the disposal of saline water in some areas and that, coupled with the abstraction of water from the water table, or the use of naturally discharging groundwater, commercial salt-harvesting enterprises may be established. Council considers that processes that export salt from the region without compromising natural values should be investigated. Such enterprises would also be evaluated under the environmental effects legislation.

Recommendations

O197-O201, O206-O209, O213-O217

That these drainage areas, indicated on the maps, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Note:

The total area of these reserves is 685 ha.

Drainage basins within larger blocks of public land

Recommendations

O195, O196, O202-O205, O210-O212

That the portions of these areas actually used as evaporation basins and other allotments considered necessary for water management continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977

and that

those areas not considered necessary as evaporation basins or for water management become part of the adjacent public land and be managed by the Department of Conservation, Forests and Lands

except that

for those areas of public land surrounding O195, O196, and O204, and not required for salinity-management purposes and not carrying native vegetation, consideration be given to their alienation (see Note 2 below).

Notes:

1. In 1977, these areas were set aside as relatively large parcels of land of which the drainage basins comprise only a small part. Council considers that the areas not required as drainage basins are integral parts of the surrounding public land and should be managed as such. The total area of these reserves would now be 2074 ha.

2. The areas of largely cleared agricultural land surrounding O195, O196, and O204 are indicated on Maps A and C as U2. These areas may be required for, or affected by, water-drainage works in the future, the extent of which has not yet been fully determined. The small parcels of native vegetation here should be protected.

Management in consultation

Recommendations

O218- That these areas, totalling 1182 ha, -O220 continue to be used:

- (i) primarily for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977
- (ii) for the conservation of native animals and for public education and recreation where this does not conflict with the primary aim

and that

they be managed by the Rural Water Commission in consultation with the Department of Conservation, Forests and Lands.

Note:

Each of these areas—Lakes Tutchewop (O218), William (O219), and Kelly (O220)—are valuable for waterfowl and waders. All three areas are included in the Ramsar listing of

wetlands—principally for their value for waterbirds. These wetlands receive water from Barr Creek. The Barr Creek Salinity Management Plan will reduce the proportion of fresh water entering Barr Creek and thus raise the average salinity of water pumped into these lakes. It is probable that their rate of salinity increase will accelerate as higher tonnages of salt are diverted away from the River Murray. Therefore, as the salinity of Barr Creek is primarily due to regional groundwater discharging into the stream, their wildlife values will gradually diminish.

Additional tanks

0221- That the tanks listed below and
-0223 indicated on Map A be used for water supply purposes

and that

they be reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Department of Conservation, Forests and Lands in consultation with the Rural Water Commission, except where they are already vested in the Commission.

0221 In the north-west corner of Allotment 8, Parish of Wirnbool

0222 In the north-west corner of Allotment 16, Parish of Wirnbool

0223 Adjacent Allotment 18, Parish of Kenmare

Note:

Each of these has been identified by the Shire of Dimboola as being filled by the Rural Water Commission and used regularly for municipal purposes.

Additional drainage basins

0224, That these areas, indicated on the maps,
0225 continue to be used for the disposal of saline drainage water and, as far as is possible, for nature conservation and recreation

and that

they be reserved under section 4 of the *Crown Land (Reserves) Act 1978* and managed by the Rural Water Commission.

0224 Woorinen basin (245 ha)

0225 Lake Iraak (115 ha)

Notes:

1. Several other parcels of public land are salt-affected and have potential for use as evaporation basins, but investigations have not yet been completed. These include land in the Yatpool and Carwarp West basins—mapped as U1. There would be no objection in principle to these areas being used subject to a full investigation of their need and evaluation under the environmental effects legislation.

Future proposals for evaporation basins should also be treated individually on their merits and full investigations into their feasibility and environmental effects undertaken.

2. A number of saline-water-drainage areas and other salinized land may be suitable for the establishment of commercial salt-extraction enterprises, which may include the abstraction of water from the regional groundwater. Investigation of such proposals should include studies into their potential environmental impacts.

Drainage onto the floodplain

In a number of localities, drainage water from irrigated horticultural or agricultural crops is directed into wetlands such as billabongs on the floodplain of the River Murray. Where this currently occurs, frequent flushing of these wetlands must take place to ensure that natural values are not endangered. However, there should be no new schemes that employ this method of disposal and, where it is currently permitted, monitoring should be undertaken to ensure that salinity levels do not cause modification to the natural system. If this does occur, action should be taken to halt the process.

Recommendation

0226 That new schemes for the disposal of saline drainage water not include disposal into natural wetlands or onto river floodplains

and that

those schemes currently disposing saline water onto the floodplain be monitored

for modification of the natural systems and, if this does occur, remedial action be taken.

Salinity

Salinity has been recognized by the government as the single greatest threat facing Victoria's environment. The study area contains some of the worst-affected land in the State.

Salinity, where it causes problems, is linked inextricably to groundwater behaviour. The balance between groundwater and surface water is very finely tuned and even a small increase in the amount of water filtering into the soil from the surface can cause the groundwater level to rise. As it approaches the surface, salt is concentrated by evaporation. This increase in salt levels can damage vegetation by preventing plant germination and growth, or killing it, thereby reducing agricultural production and changing the nature of native vegetation. The loss of plants exposes the soil to wind erosion. Salt can also damage water-using appliances, pipes, and metal tanks and cause the loss of wildlife habitat and the amenity of recreation areas.

Extensive clearing of trees and the introduction of large-scale irrigation are the main factors that have contributed to the rise in groundwater levels. In irrigation areas, dissolved salts in the irrigation water can also gradually accumulate in the soil and shallow groundwaters.

Naturally occurring saline pans occupied about 88 000 ha or 2% of the study area at the time of settlement. Groundwater pressures have risen as a consequence of removal of the perennial vegetation, and groundwater now discharges at the soil surface over approximately 3% of the total landscape. Salt-affected areas are thought to be expanding at an annual rate that averages about 2%, increasing in abnormally wet years.

The Rural Water Commission is establishing a network of groundwater observation bores throughout the Mallee to obtain an understanding of groundwater flows and to eventually monitor the effect of salinity-control works. It is possible that future bore sites may be required within existing and new park areas and the Big Desert Wilderness. Investigations in these areas should only be undertaken if this

is necessary in the salinity program, as agreed to by the Groundwater Advisory Committee, and that they be undertaken according to guidelines established by the Department of Conservation, Forests and Lands.

The dominant vegetation over most of the area before clearing comprised mallee eucalypts, which are deep-rooted and perennial. Very little natural rainfall would have reached the groundwater, as transpiration by the eucalypts transferred water direct from the subsoil to the atmosphere and thereby kept water tables down. Since clearing and the introduction of shallower-rooted annuals such as wheat and medic pasture, significant amounts of rain-water have entered the groundwater system. Long fallows accentuate this accession because of the absence of transpiring vegetation. Papers presented to the National Mallee Conference in 1989 indicate that recharge to the groundwater can be expected to increase up to a hundredfold as a result of clearing and present cropping practices.

About 90% of the secondary (human-induced) salinization in the Mallee has been brought about by a general increase in the height of the regional water table.

Particularly where sand dunes have been cleared for agriculture, local groundwater systems associated with clay sub soils that have low permeability produce salinity at the foot of some of the dunes. While the immediate effects are observed at or near the recharge area or water source, it may also be contributing to the regional groundwater.

Based on 1984 estimates, dryland salting within the study area has to date caused the capital value of land to decline by more than \$2 million. The annual loss in productivity is estimated to be \$0.4 million.

The decline in water quality on freehold and public land is an additional cost. Salinization of the River Murray is of particular concern, not only for the study area but for the States of New South Wales and South Australia.

Parts of the Big Desert and the Sunset Country, and of the naturally saline evaporative basin plains, would be susceptible to further salinization if clearing of the native vegetation took place.

Control must be tackled on a regional basis and it is unlikely that the farmers actually affected by salinity can achieve anything of significance on their own properties.

Preventative work—such as fencing and the planting of deep-rooted perennial and salt-tolerant species—has proved effective in controlling dune and channel seepage.

Establishment of a continuous vegetative cover to reduce surface run-off and erosion is an important factor in reclaiming bare saline soils. The mulching effect of the plant cover reduces surface evaporation and hence salt accumulation at the soil surface.

In May 1988, the government released its strategy for managing land and water salinity. As its principal long-term goal, the strategy—'Salt Action: Joint Action'—seeks to manage the salinity of land and water resources throughout Victoria in order to maintain and, where feasible, to improve the social well-being of communities and the environmental quality and productivity capacity of the regions. Where possible, the spread of salinity will be controlled. Where an increase is unavoidable, the strategy is to help communities to adapt to more saline conditions.

Its principal 10-year targets include:

- identification of all major groundwater-recharge zones of relevance
- development and widespread application of optimum farm management systems in recharge and discharge zones
- implementation of a sustainable and environmentally acceptable drainage and salt-disposal system in northern Victorian irrigation regions
- application of improved water-use practices throughout irrigation regions
- identification, assessment, and appropriate protection of sensitive environmental features, such as wetlands, in salt-affected areas

The strategy suggests that evaporative basins are viable options—where appropriate, and subject to careful evaluation of environmental effects. Under the State Conservation Strategy, published in 1987 (Protecting the Environment) evaporation basins will only be considered as a method of disposal when they represent the most cost-effective solution and

after social and environmental implications have been properly evaluated. They will not be located in existing wetlands or lakes unless a compelling public interest is demonstrated. Long-term solutions include reducing recharge and accession to the groundwater by planting trees, and other plants that require large volumes of water, in the recharge zones and adopting more efficient means of watering irrigation areas.

In 1989, the Murray-Darling Basin Commission called for tenders to conduct a feasibility study on the construction of a pipeline to carry water from within the Basin to the sea. The pipeline and its collector system, if developed, could stretch from Shepparton to the mouth of the River Murray. The aim of the project would be to keep the saline groundwater table at least 2 metres below ground level.

In formulating these recommendations, the Council intends that its recommendations for public land complement government and community initiatives on freehold land with respect to the salinity problem. This is reflected in the recommendations for agriculture, State forest, and wildlife as well as in the recommendations below.

Recommendations

0227 That the government continue to encourage and expand the development of tree-growing assistance schemes, agroforestry, cropping and grazing techniques, and the use of deep-rooting plants to reduce the accession of rainfall to groundwater, thus alleviating the effects of dryland salting and improving the condition of public land.

0228 That, where possible, native vegetation be replanted, including on road reserves and isolated blocks on public land, especially in recharge areas and catchments where dryland salting is occurring.

0229 That the techniques developed to control salting be applied to salt-affected public land, where appropriate.

Water and environmental flows

Regulation of natural water supplies for irrigation and stock and domestic use, combined with the establishment of extensive agricultural areas, has changed the nature of many of the Mallee's streams and wetlands. While some of these changes might have benefited some native plants and animals, others have made the wetland areas of the Mallee less suitable as habitat for native species.

Although water regulation and distribution works have altered wetland conditions in a number of circumstances, the Rural Water Commission, in co-operation with the Department of Conservation, Forests and Lands, has attempted to preserve and enhance wildlife habitat wherever practicable.

Environmental flows

Water is supplied to a number of wetlands from the Rural Water Commission's distribution system according to a set of operating rules, and at a nominal price compared with normal irrigation supplies.

The question of permanent allocations of water for environmental purposes has in recent years been addressed in two major inquiries—by the Parliamentary Public Works Committee, which reported on water allocations in northern Victoria in 1982, and by the Salinity Committee, which completed that first inquiry and reported its findings to Parliament in 1984. Proposed changes to water legislation by the Department of Water Resources also address this issue.

Among other things, the Salinity Committee recommended that the annual allocation for the conservation of flora and fauna should be 25 000 ML from regulated resources and that the Department of Conservation, Forests and Lands should develop management strategies for each wetland in northern Victoria. To date, the particular wetlands involved and the volumes, charges, and conditions under which water would be supplied have not been determined.

Following a suggestion from the Rural Water Commission that, in many years, large volumes of surplus water flows would be available in excess of the 25 000 ML, the Salinity

Committee also recommended that water for nature conservation should receive high priority for the use of these flows. Such surplus water for the Mallee area would be available in the River Murray.

In its final recommendations for the Wimmera Area (November 1986), the Land Conservation Council expressed its belief that a significant proportion of any water saved through the proposed pipelining of the Wimmera-Mallee water-supply system should be designated for environmental use in the Wimmera River.

An interdepartmental team is currently investigating the aquatic environment of the Wimmera River with a view to determining the benefits of increased flows for environmental and recreational purposes (see Chapter J—Rivers and streams).

The Council believes that improvement in river values would follow the allocation of a significant proportion of the water saved by pipelining to environmental flows in this important inland river. However, there is some concern that increased volumes of water in the Wimmera River system may increase accession of water to the regional water table. Investigations will be required to develop procedures for scheduling flows.

Rather than depend on the allocation of environmental flows from irrigation or other water-supply systems, certain wetlands in the Mallee would benefit if provisions were made to modify existing flood-mitigation works. Haywoods Lake (D18 on Map B), for instance, no longer receives flood-waters from the River Murray because of levee banks and a dam built for adjoining farmland, and the black box stands here are deteriorating.

Recreational use of water-supply areas

Depending on the availability of supplies, surplus flows from the Wimmera-Mallee Stock and Domestic Water Supply System provide water to a total of 13 lakes approved for recreational use. Six of these—Green Lake (now recommended as a regional park), Lake Lascelles, Walpeup Lake, Underbool Lake, Tchum Lake South, and the Yarriambiack Creek at Beulah—lie within the Mallee area.

In some cases the local community has established facilities to service the recreational use of the lakes, and there is now an expectation that water supplies would continue to be made available.

The Rural Water Commission charges for water delivered to these lakes at a rate equivalent to the irrigation rate within the Wimmera region and cannot guarantee regular supplies.

River Murray

The construction of water storages in the upper reaches and tributaries of the River Murray has reduced the frequency and duration of floods during the winter and spring months. In addition, flows during summer and autumn are now greater than under natural conditions. There has been concern for many years that these alterations to river flow may be having an adverse effect on the regeneration and growth of river red gum and box species within forests along the river, such as the Nyah and Vinifera forests, Belsar Island, the Hattah-Kulkyne and Murray-Kulkyne Parks, Kings Billabong, and Lindsay and Wallpolla Islands.

The impoundments in the River Murray and its tributaries and the consequent changes in both flow and thermal regimes have had a marked effect on native fish, many of which require specific minimum water temperatures and floods as triggering mechanisms for spawning and the subsequent survival of eggs and young. The gradual elimination of the great anabranch or backwater systems of the river and its tributaries by water-control schemes, including the construction of levee banks that effectively reduce the floodplain area, has reduced the extent of waters that previously provided the necessary space and food for the young of many fish species.

Fish such as Murray cod and golden perch have only reproduced in large numbers when extensive floods have occurred at spawning time.

The Rural Water Commission and the Department of Conservation, Forests and Lands are co-operating in an inter-departmental State Working Group that, since 1979, has been examining measures that may overcome the problems of reduced winter-spring flooding.

The River Murray Commission in 1986 published the results of a comprehensive survey of wetlands along the River Murray floodplain, and is currently conducting a study of riparian vegetation along the river.

Kerang Wetlands

Many of the lakes here form part of the water distribution system and now hold water for longer periods than under natural conditions. These wetlands are important as wildlife habitat, and contain some of the largest water-bird breeding areas in Victoria, especially for migratory waders and ibis. Many smaller lakes receive water only infrequently.

Lake Albacutya-Outlet Creek

The Wimmera River flows from the highlands of central Victoria into Lake Hindmarsh on the edge of the study area. In wet years, Lake Hindmarsh overflows into Outlet Creek, which then carries water to Lake Albacutya. Records show that, since the turn of the century, Lake Hindmarsh has overflowed on at least 12 separate occasions. Lake Albacutya last filled in 1975.

The course of Outlet Creek continues north from Lake Albacutya, and the river red gum and black box woodlands associated with the creek are an important feature of Wyperfeld National Park. The creek last flowed into the park between 1975 and 1977, but did not fill the whole wetland system here. Wirrengren Plain, the terminal lake in the Wimmera system, historically received water from Outlet Creek about every 20 years, but this has not occurred since about 1918.

Over the years there have been a number of proposals to increase water flow to the downstream end of the Wimmera River system. A feasibility study carried out by the Rural Water Commission in 1980 indicated that proposals to augment supplies to Lake Albacutya were impracticable, due mainly to the large volumes of water required, the high capital cost, and the limited agricultural benefits obtainable.

Presently, water to supply parts of the Wimmera and Mallee is transferred from storages in the Grampians via the Wimmera River and open

channels to farms and urban areas. The Wimmera-Mallee water-supply system involves diversion of some waters from the Wimmera River system into the channels used to supply stock and domestic water. As a result the flow patterns of the lower Wimmera River have altered since construction of the channel system. Of the water leaving the storages, up to 75% is lost through seepage and evaporation while approximately 50% of the water reaching farm and town storages is also lost through subsequent seepage and evaporation. The current channel system is inefficient and, in addition, supplies poor-quality water with high turbidity. Seepage has also resulted in some areas of dryland salting.

To overcome these problems the Rural Water Commission proposed programs to replace parts of the open-channel supply system with pipes. The Eureka section of pipeline in the Lake Tyrell area of the Mallee was opened on 25 May 1988. This project involved replacement of the Eureka relift pumping station and piping of supply over an area of about 200 sq.km. It could be incorporated into a larger scheme to pipe water supplies the system at a later date.

If the entire Wimmera-Mallee system is changed over to pipelines, it will result in a considerable saving in water (initially estimated to be approximately 70 000 ML per annum, although the Commission feels that this figure may now be an over-estimate), which could be used to restore security of supply, to supply additional demand, or for environmental purposes.

Council believes that a significant proportion of any water saved should be designated for environmental use. It is evident that the

vegetation communities associated with the Outlet Creek system are under considerable pressure and will continue to degrade unless alternative water management arrangements are put in place.

Recommendations

- O230** That the interdepartmental team, currently comprising officers of the Department of Water Resources, Rural Water Commission, and the Department of Conservation, Forests and Lands, determine and implement a management strategy that would favour environmental flows into the downstream areas of the Wimmera River system, particularly Wirrengren Plain.
- O231** That a high priority be given to allocating water for environmental flows in the Wimmera system should any savings in water be made as a result of pipelining a portion or the whole of the Wimmera-Mallee Stock and Domestic Water Supply System or changes in the operation of the headworks.
- O232** That steps be taken to provide for adequate winter-spring watering of the River Murray forests and associated wetlands and various engineering and management solutions be pursued in order to achieve this.
- O233** That water from Victoria's share of the River Murray resource be allocated specifically for winter-spring forest-watering, including portion of the currently unallocated water from the Dartmouth Reservoir.

P. Utilities and survey

Many utilities occupy public land. They include roads, pipelines, power lines, hospitals, churches, cemeteries, public halls, shire offices and depots, garbage depots, sanitary depots, and sewage-treatment works. These recommendations do not specifically refer to many of the small areas used for the purposes listed above, as no change of use is proposed. It is intended that for such areas existing legal uses and tenure should continue.

In the absence of firm planning proposals, accompanied by the necessary detailed information, it is not possible for the Council to provide for future requirements of land for survey and utilities. The use of land for these purposes will be considered when the need arises. Government agencies concerned with provision and installation of communications equipment, transmission lines, pumped storage sites, power stations, port facilities, pipelines, roads, etc. are requested to submit proposals involving occupation agreements or the setting aside of sites on public land to the appropriate land managers at an early planning stage. This would assist in achieving co-ordinated planning, and perhaps avoid the necessity for costly resurveys.

Existing utilities

Recommendation

- P1 That the areas, some of which are indicated on the maps, currently used for public utilities, continue to be used for those purposes approved by the government following publication of the final recommendations for the Mallee area in May 1977.

Note:

Some utility sites contain artefacts of historical importance, or are in themselves historically important. Several of these sites are listed below. The current use, where possible, should not compromise the historical integrity of the site and, if it is no longer required by the current agency, it should be considered for preservation as an historic site.

- Kenmare School No. 3221, Kenmare
- Tanks and Stands, Meringur Town Water Supply
- Nyah Pumping Station, Nyah

Garbage depots

Council considers that sites on public land used for the disposal of garbage should be located so as to cause minimal conflict with conservation values and with particular care to avoid contamination of water resources.

Disposal of waste should be confined to small sections of a site at any one time and supervised to ensure that garbage is dumped in the designated areas. The sites should be adequately fenced and screened from public roads.

New garbage depots

Recommendations

- P2 That the area of 60 ha, being part of Allotment 21, Parish of Tokol, and shown on Map B, be available for municipal purposes, including the establishment of a garbage depot.
- P3 That the area of 0.6 ha, being the eastern part of the former school reserve, Township of Linga, be available for the establishment of a garbage depot.
- P4 That the existing garbage depot in the western part of flora reserve G13, adjacent to the Township of Torrita, continue to be available for waste-disposal purposes until such time as the presently cleared area has been fully utilized, or until December 1999, whichever is the sooner

and that

following rehabilitation, it be included in the flora reserve.

Cemeteries

Some infrequently used cemetery reserves contain areas of relatively undisturbed native vegetation. Such an area is located in the

eastern half of the Kenmare Cemetery Reserve. Where possible this vegetation should be protected.

New cemeteries

- P5** 4 ha, being the existing lawn cemetery, west of Allotment 490D, section B, Parish of Mildura.

Note:

This area was reserved for cemetery purposes by government after the Council published its final recommendations for the Mallee area in 1977.

- P6** 16 ha, being Allotments 11 to 14, section 78, Parish of Mildura (Nineteenth Street).

Note:

Allotment 12 contains a plantation of native pine; this and other areas of native vegetation should be protected.

Railway land

Over recent years about 1700 km of railway line have been closed in Victoria. All sections have been assessed by the Department of Conservation, Forests and Lands in regard to nature conservation, historical, and recreational values.

In the Mallee, the Council has proposed the establishment of linear bushland reserves to retain in public ownership extant native vegetation along the section of the now-disused railway between Morkalla and Meringur (Recommendation I302) and portions of the disused Piangil-Yungera line (I304).

Other portions of disused railway lines could be useful for tree-growing schemes, particularly in these areas where salinity is a problem, or to develop biological corridors. They may also be useful for some forms of recreation.

An expression-of-interest procedure, managed jointly by the Department of Conservation, Forests and Lands and V/Line, is soon to be introduced. Responses will be sought from individuals and groups in local communities (including municipal councils) who would be willing to manage sections of rail reserves in ways that would help to improve the environmental values of the rail reserves.

Recommendations

- P7** That, where isolated remnants of the original vegetation remain on land associated with railways, every effort be made to protect that vegetation consistent with management practices.
- P8** That disused railway land be retained as public land where it may have historical, recreational, environmental, or educational values or be used for other government or local government needs.

A number of railway facilities were identified in the report by Andrew C. Ward and Associates (Mallee Area Review—Study of Historic Sites) as being of historical importance. Most of these are still in use. Management of these facilities should not compromise their historical integrity.

Recommendation

- P9** That railway facilities of historical importance, listed below, continue to be used for railway purposes such that the current use, where possible, does not compromise the historical integrity.
- and that
- if the site is no longer required for railway purposes, it be considered for preservation as an historic site.

Note:

The following were noted as important in the study undertaken for the Council; others may subsequently be identified as also being of importance.

Yelta Railway Station
Woomelang Railway Station
Murrayville Railway Station
Irymple Railway Station
Hattah Railway Station
Water Tank and crane, Hattah Railway Station
Patchewollock Railway Station
Former Railway depot complex, Robinvale Railway Station
Storage Shed, Lake Boga Railway Station
Former Refreshment Room, Underbool Railway Station
Manangatang Railway Station

Survey, navigation, and communication

P10 That the minimum area necessary for survey purposes around trigonometrical stations and for access to and maintenance of navigation aids and

communications installations be temporarily reserved on public land where it would otherwise remain as unreserved Crown land; and, where other forms of public land tenure apply, that the government utility involved have the right to occupy a minimum area and provide lines of sight.

Q. Township land

Public land in townships is currently used for a wide range of purposes. The Council has not generally proposed any change in use for such areas where the present use is for schools, public halls, sports grounds, and so on. In some cases, however, Council has made specific recommendations for township land to be used for bushland reserves, recreation, utilities, or water supply. These recommendations are included in the appropriate sections. In general, the Council considers that other areas of public land within townships should remain as unreserved Crown land to meet future requirements, although it has recommended that some areas be released now for urban purposes.

Recommendations

- Q1** That public land in townships, other than those areas that have been specifically reserved or which are listed under Recommendation Q2 below, remain as unreserved Crown land to meet future township requirements.
- Q2** That the areas totalling 94.4 ha, listed in Table 9 below, be used for urban purposes and that they be made available for alienation, on application, with the issue of the title being conditional on development for urban purposes within 2 years or such time as local government may determine.

Inappropriate townships

Some townships, although gazetted, either have never been settled or have been largely abandoned. Council considers that these townships are no longer appropriate and, following discussion with the relevant Shire Councils, has recommended their revocation.

Much of the Crown land in these townships supports native vegetation in either an undisturbed condition or, in the case of partially developed and subsequently abandoned townships, as regrowth.

Table 9: Land for urban purposes

Parish (P) or Township (T)	Description (see note 1 below)	Area (ha)
Berriwillock (T)	CA 4D, section 4 and CA 20, section 1	0.5
Birchip (T)	CA 10, section 4	0.4
Bumbang (P)	Crown land east of CAs 5, 6 and 7, section C and to the south of Bushland Reserve I261	54.0
Carwarp (T)	CA 2, section 1; Crown land in sections 2 and 3	2.0
Cowangie (T)	CAs 11-15, section 2 and Crown land to the east; CAs 3, 10, 11, section 3; and CA 19, section 1	
Hattah (T)	CA 2, section 1	1.8
Lake Boga (T)	CAs 25A and 25B	0.2
Manangatang (T)	Eastern part of CAs 19 and 20, section 4	0.4
Meringur (T)	CA 2, section E	0.2
Murrayville (T)	CAs 10 and 11 and Crown land to the south, section 11; CA 16, section 7	1.5
Nyah (T)	CAs 4 and 11, section 7 and the Stone Reserve	2.2
Ouyen (P)	Northern part of the former Racecourse Reserve	7.2
Ouyen (T)	CAs 24, and 26-29, section 16	0.5
Piangil (T)	CAs 9 and 10, section 4; and CAs 9 and 12, section 5	0.4
Robinvale (T)	Crown land south of CAs 62, 63, 71 and 72	5.9
Sea Lake (T)	CA 27B, section 5; part of CA 20D	3.7
Underbool (T)	CAs 11, 16, 18 and 19, section 5, and Crown land south of CA 9, section 6	1.0
Walpeup (T)	CAs 9-16, section 5; CAs 13 and 14, section 1; CA 2, section 3	2.1
Wood Wood (T)	Public Hall Reserve, section 2	0.2
Woomelang (T)	CA 18, section 9; CAs 10, 13 and 15-18, section 3; all of section 4; parts of CAs 1-8, section 5; parts of CAs 11-14, section 2; parts of CAs 1-8, section 6; parts of CAs 10-13, section 1; CAs 1-8, section 10	7.5
Woorinen South (T)	CAs 10 and 11, section 4	0.2
Yelta (T)	CA 5 and the adjacent Crown land	2.5

Notes:

- The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.
- At the mapping scale used (1:250 000), it is seldom possible to define the boundaries of public land in townships accurately. Reference should be made to the appropriate township plan to determine the accurate boundaries and form of reservation for those townships where public land is not shown on the map or referred to in these recommendations. Details are held by the Council.

Many such areas have important nature conservation values because they support remnant native vegetation in predominantly agricultural areas. They also have important landscape values. Where appropriate, the Council has recommended that these areas be set aside as flora and fauna or bushland reserves.

Recommendation

Q3 That the townships listed in Table 10 below be revoked.

Table 10: Townships for revocation

Township	Parish	County
Albacutya	Albacutya	Weeah
Annuello	Geera	Karkaroc
Bambill	Werrimull	Millewa
Bannerton	Toltol	Karkaroc
Barrapoori	Gredgwin	Tatchera
Benetook	Benetook/Gingnam	Millewa/Karkaroc
Boigbeat	Boigbeat	Karkaroc
Boinka	Boinka	Weeah
Bolton	Myall	Karkaroc
Boonoonar	Nurnurnemal	Karkaroc
Cocamba	Cocamba/Eureka	Karkaroc
Curyo	Curyo	Karkaroc
Danyo	Danyo	Weeah
Galah	Tiega	Karkaroc
Goschen	Koem	Tatchera
Goyura	Goyura	Karkaroc
Karawinna	Karawinna/ Murnroong	Millewa
Karween	Karween	Millewa
Kiamil	Kia	Karkaroc
Kooloonong	Mirkoo	Tatchera
Kulwin	Kulwin	Karkaroc
Merrinee	Merrinee	Millewa
Miralie	Piangil	Tatchera
Mittyack	Mittyack	Karkaroc
Morkalla	Morkalla	Millewa
Natya	Coonimur	Tatchera
Nowingi	Nurnurnemal	Karkaroc
Panitya	Carina	Weeah
Pier-Millan	Pier-Millan	Karkaroc
Pirlta	Benetook/Merrinee	Millewa
Pira	Tyntynder West	Tatchera
Torrta	Nyang	Weeah
Tutye	Tutye	Weeah
Yarrara	Yarrara	Millewa
Yarto	Yallum	Karkaroc
Yatpool	Yatpool	Karkaroc
Yungera	Koorkab	Tatchera

Notes:

1. Where parcels of public land within the townships to be revoked support native vegetation, the Council has recommended their reservation where appropriate as flora or bushland reserves. Where the land carries no extant native vegetation and is not required for other government purposes, Council has recommended its alienation (see Recommendation F1). It is intended that the township allotments should be amalgamated to form additions to present farms and not sold as individual lots.
2. Notwithstanding the recommendation to revoke these townships, they represent, along with those townships that are still occupied, the incentives and aspirations for the development of the Mallee. Their historical context is important and their design may reflect variations to then-existing town planning concepts to accommodate the Mallee environment. In most cases it may be appropriate to merely retain the township name for any reserved public land in the area. For some, however, the land manager, in consultation with local government and an appropriate historian, may designate a township site as a historic area.

R. Military training

Council believes that military training is a legitimate use of public land, but is aware of the possibility of conflict arising with some forms of recreation and the protection of natural values. It is Council's view that military training should not occur in reference areas or wilderness areas, and only under special circumstances in parks and other areas of recreation and conservation significance.

The Minister for Defence may declare an area of public land to be a military training area, under the regulations to the *Defence Act 1903*, but only with the consent of the State authority responsible for the management of the land. The managing authority may also impose conditions of use on particular areas and these must be observed. Provisions for compensation for damage to assets or land also exist. No public land in Victoria is currently designated for military training purposes, however.

Extensive areas in the Mallee have been used in recent years for exercises involving large numbers of both personnel and heavy vehicles in off-road conditions. However, under the provisions of the *Land Conservation (Vehicle Control) Act 1972*, the off-road use of vehicles is prohibited; although limited exceptions are given in that Act.

Although mallee vegetation resprouts rapidly after being rolled by heavy vehicles, some exercises have taken place on sensitive soil types and the evidence of the passage of vehicles remain.

A conflict in land management objectives therefore exists wherein the recreational use of vehicles off-road is severely restricted because of the damage that may be inflicted on the land surface, and yet military training activities, which can cause considerable modification to certain areas, are permitted to take place.

Exercises involving navigation and training with conventionally tyred vehicles and on foot

conflict little with land management objectives and may even be permitted in some parks and other reserves. However, strict controls **must** be imposed on the use of heavy vehicles. Such controls may be in the area used and/or the nature of the use.

Recommendation

- R1 That, where military training is conducted on public land:
- (i) the types of activities, and their timing and location, be subject to agreement between the Department of Defence and the Department of Conservation, Forests and Lands and rehabilitation of areas damaged by military exercises be undertaken at the expense of the Department of Defence to the satisfaction of the Department of Conservation, Forests and Lands
 - (ii) the Department of Conservation, Forests and Lands be consulted (for fire-protection purposes) with respect to training activities in protected public land
 - (iii) it be excluded from reference areas, wilderness areas, and, except where it does not conflict with the purposes of the reserve, from parks and other areas of recreation and conservation significance. Discussions should be held with the Department of Defence concerning alternatives to the proposed Murray-Sunset National Park and the proposed extensions to the Wyperfeld National Park for military training involving use of heavy vehicles and/or pyrotechnics as this is considered an inappropriate use within the parks.

S. State forest

The larger areas of forested public land in the State that were not incorporated into parks, or set aside in various reserves or for softwood production, were in the past designated by the Council as either areas for hardwood timber production, or as uncommitted land. In the Council's final recommendations for the Alpine Area-Special Investigation, published in November 1983, it was proposed that such forested land be managed as a single unit.

The Council decided to refer to this land as 'State forest', as it believes that term best describes public land in timber production areas and uncommitted land, even though this may contain a range of vegetation types from tall mountain forests through to woodlands, mallee scrub, heathlands and swamplands. The name is used only in a descriptive sense rather than as a term defined in the *Forests Act* 1958.

State forest comprises a mosaic of forests of varying productivity, and the separation of land into timber production areas and uncommitted land has tended to reinforce the belief that the State's commercially productive hardwood forest is entirely located within hardwood production areas and that timber production is the sole object of management there. In fact, a significant volume of timber is harvested, in conformity with Council's recommendations, from uncommitted land; at the same time, hardwood production areas are managed for a range of uses as well as for wood production.

Although many of the outstanding natural features and values occurring on public land are included in parks and reserves, the hardwood production areas and uncommitted land contain significant water production, landscape, historical and conservation values. Many rare plants are found in State forest and, considering it occupies about two-thirds of all public land, it is of major significance as faunal habitat. The term 'hardwood production' implies quite erroneously that such areas have few values other than for timber production, while the term 'uncommitted land' belies the significance of this land for many different uses including timber production.

The Council has defined the area of State forest within the study area and, in line with the concept of unified and co-ordinated management, believes it would be appropriate for all State forest to be administered under one Act and be securely reserved under a single land tenure incorporating provisions similar to those currently applying to land administered under the *Forests Act*.

The areas of State forest in the Mallee include the Murray and Loddon River floodplains, which contain river red gum forests and black box woodlands. As well, considerable areas away from the floodplain carry mallee vegetation but also chenopod shrublands, woodlands, and a range of other communities where mallee eucalypts do not dominate.

Although many of the vegetation types in the dryland areas of the Mallee do not fit the general public perception of 'forest', they are still areas of high conservation and recreation value and require special attention.

Regional significance

Given that two-thirds of the mallee vegetation in Victoria has been cleared, the remaining one-third on public land is crucial to the maintenance of ecosystems. It also has special significance with respect to the conservation of semi-arid vegetation and faunal habitats in south-eastern Australia.

Wind erosion and salinity

Public land in the Mallee plays an important role in reducing the hazards of wind erosion and salinity.

Many woodlands and land adjacent to saline shrublands and boinkas in the Mallee have suffered a dramatic decline in vegetative cover. Overstorey trees are senescent and regeneration is virtually non-existent. Perennial native understorey shrubs and grasses are being replaced by annual exotic species. These changes need to be reversed to ensure that the contribution of public land to the salinity problem in the Mallee is reduced. This requires restoration of both the perennial overstorey and understorey species on these disturbed areas.

Wind erosion has long been of concern in the Mallee. Semi-arid lands, such as those comprising much of the region, tend to erode when the soils are exposed to strong winds. The main reason for this is that the soil surface is only weakly bound by humus and is frequently dry.

The more susceptible lands are those with east-west or irregular sand dunes in the drier north and the Big Desert, much of which still occur on public land. These usually comprise deep infertile sands. Soils in the south-east of the study area are more stable due to their higher clay fraction, but they can be badly affected when poorly managed, particularly during droughts. Erosion becomes significant where the projected ground cover of standing vegetation is less than about 25 per cent.

Given the high risk of wind erosion associated with the larger blocks of public land, it is important to protect and, where possible, enhance the existing vegetation cover on these areas and ensure that activities that disturb such cover are minimized. Dangers include the impact of fires which can also expose large areas to the risk of wind erosion.

Biological corridors

Some areas of State forest form important biological corridors between major blocks of public land.

These are important in facilitating the interchange of faunal populations and reducing the likelihood of extinctions of species. Several such corridors have been identified in the Mallee area. Alienation of the link between the large parcel of land at Annuello (now recommended as a flora and fauna reserve) and the south-eastern extent of the now recommended Murray-Sunset National Park was prevented immediately prior to the commencement of this review—revegetation of portions of this link is progressing.

The public land corridors linking the new Bronzewing and Wathe flora and fauna reserves (G35 and G36 respectively on Map A) with the eastern edge of the Big Desert include land previously designated for limited cultivation leases. Revegetation of some of these areas will be necessary.

Land uses

Grazing

As indicated in Chapter F—Agriculture, stock grazing would be permitted to continue in State forest subject to the recommendations and conditions outlined in that chapter.

The Council has taken into account the concerns raised in submissions to the proposed recommendations regarding grazing and is recommending that this can continue, provided it is consistent with the broad aim, which is 'to maintain and improve the native perennial overstorey and understorey vegetation to reduce wind erosion, local and regional salinity problems, and other forms of land degradation—such as weed invasion, and to establish a sustainable (though not entirely natural) ecosystem based on the key elements of the original vegetation communities'.

Timber production

Although currently deriving its sawlog supplies from New South Wales and private land, one sawmill has an annual licence to extract up to 2750 cu.m from the river red gum forests on public land in the Mallee area, subject to the availability of this material. Sawn products include railway sleepers and timbers for housing, landscaping, furniture, and fenceposts.

River red gum forests in the Mallee area are restricted to bends and islands dispersed along the floodplain of the River Murray and cover more than 13 000 ha. Some 7000 ha of this would be excluded from timber harvesting by prescriptions aimed at protecting sites of recreational, historical and archaeological importance and frontages to the River Murray, major rivers (anabranches), and billabongs, leaving about 6000 ha to be managed for timber production. The Department of Conservation, Forests and Lands is undertaking a resource assessment which will determine the sustainable level of timber-harvesting that these forests could support.

The impact of the Council's proposed recommendations on sustainable yield cannot be determined until the resource assessment is completed. Timber-harvesting will only be permitted in areas designated as State forest and in certain parts of the River Murray Reserve.

A number of small parcels of public land in the Mallee, particularly in those areas where natural vegetation may be severely depleted in extent, could be suitable for the establishment of woodlots. Such sites may include disused school sites or stone-production areas (see Recommendation S4).

Broombush harvesting

Mallee broombush (*Melaleuca uncinata*) is harvested from extensive areas of public land—primarily in the Big Desert—to produce broombrush panels used for fencing, feature panels, and shadehouses. Six commercial licensees operate in the Mallee, supplying markets principally in Adelaide and, to some extent, Melbourne.

Following the publication of its proposed recommendations, the Council engaged a firm of consultants to prepare an 'Economic Evaluation of the Broombush Industry'. A summary of the findings of that evaluation is provided below.

The total licensed annual cut from the Mallee is now 68 000 bundles (about 1360 tonnes). However, it would appear possible that about 50% more is harvested illegally from public lands in Victoria.

Most of the broombush being harvested now is regeneration following the 1959 wildfire. Some cutters believe that, after about 20 years of age, the broombush has both the size and maturity to produce stable panels (younger stems may acquire sufficient size, but they are reported to split on drying and produce untidy and unstable bundles). Younger broombush—in some cases about 7 years old—may be suitable for machine-packed panels, however.

The paucity of information about the broombush resource in Victoria makes the planning and management of the industry an extremely difficult task. Similarly, the effects of a change in management cannot be judged well without knowledge of the true size of the industry—both its legal and illegal components. The latter information, by definition, is difficult to obtain.

Since the illegal component is large, the size of the harvesting industry, its costs, and its employment value must remain less than

certain. However, several conclusions on some of the important issues can be drawn.

The consultants estimated that harvesting provides about 1.4 to 2.0 full-time jobs per 10 000 bundles and erecting the fences from 10 000 bundles means another 3 to 4 full-time jobs. The total number of persons whose livelihood is directly dependent on the legal broombush industry on public lands in the Mallee was estimated as 28–40, as shown in Table 11 below.

Table 11: Employment in the broombush industry

Activity	Approximate equivalent full-time employees
Harvesters in the Mallee	9 to 19
Fencing contractors in Melbourne	4 to 6
Fencing contractors in Adelaide	14 to 19
Processing workers in Murrumbidgee	1 to 2
Total:	28 to 40

The total Australian market seems to be about 350 000 to 400 000 bundles per year. While exact market shares are not certain, it is likely that the legal cut of 68 000 bundles per year from public lands in the Mallee represents no more than 20% of the Australian market for broombush.

Broombush comprises only about 20% of the total retail cost of both hand-packed and processed-panel fences. The harvesters' bases have legal brush production with a gross value of about \$400 000 per year, which yields about \$1.8 million worth of fencing at retail prices.

Although there is some concern as to the biological impacts of broombush-harvesting, its major impact is the proliferation of tracks intruding progressively into previously untracked parts of the Mallee, compromising nature conservation and wilderness values.

In South Australia, the government has prohibited the harvesting of broombush from public land, and planning controls there severely limit this activity on freehold.

Council recognizes that considerable areas of broombush are included in the proposed extension to the Wyperfeld National Park, and that this has reduced the resource that was potentially available for harvesting. However,

until now, the industry has been operating without any information about the available resource and without adequate supervision; cutting areas have been worked through rather haphazardly. Reorganization and restructuring of the industry has been necessary and inevitable and the Department of Conservation, Forests and Lands has commenced this task.

The Department has also made a preliminary assessment of the broombush resource in part of the Big Desert, but further refinement of the data is required. The land assessed included those stands of broombush that were identified on the map of the Floristic Vegetation (published with the Council's report on the Mallee in 1987), but outside the wilderness area and the existing and proposed additions to the conservation reserves in the Big Desert. It also included the land in the eastern portion of the Big Desert (moratorium area) that the Council indicated, in its proposed recommendations, should be unavailable for broombush harvesting pending a review of its conservation values and potential contribution to the sustainable output of broombrush.

The assessment of the resource included a proportional allowance for the possibility of some stands being inaccessible and for some of poor site quality. It was based on a rotation age of 20 years and an average productivity of 2.5 tonnes (125 bundles) per hectare. Its results indicated that the areas described above (including the moratorium area) contain almost 16 500 ha of broombush stands suitable for harvesting. About 12 000 ha of this lies within the parcels, indicated on the map, where harvesting may take place.

It is estimated that these areas should be able to support a sustainable output at or close to the current legal harvest from public land in the Mallee.

The Council believes that any future harvesting should be conducted on a sustainable basis. The Council also believes that the royalty for this product should reflect both the market value of broombrush and the cost of administration and that there should be adequate planning and supervision of the operations. Should adequate supervision be beyond the resources of the Department, the industry should not be permitted to continue.

The areas from which harvesting may take place (indicated by diagonal stripes on Map A) are now largely accessed or lie close to tracks and most have been cut over in the past thus eliminating future problems associated with new tracking in previously undisturbed areas. In a number of cases, the primary routes follow tracks previously established by the Army during its exercises. Council is concerned that future tracking within the broombush-harvesting areas should be kept to a minimum, and location of stands using the floristic vegetation maps now available from the Department should help reduce the number of exploratory tracks that are made. These recommendations limit the industry to 5 defined areas, mainly to minimize the future impact of harvesting operations on environmental values. The moratorium area, mentioned above, is to be included with the western addition to the Wyperfeld National Park and will not be available for further broombush production.

The Council considers that mechanical harvesting of broombush has a far greater impact on the environment and should not be permitted.

Although recommending that broombush-harvesting could continue, Council considers that further research into its impact on floral and faunal values is necessary. The Council has also ensured that a substantial area of broombush containing a range of age classes has been included in the conservation reserve system.

The Council also endorses the recommendations of the Board of Inquiry into the Timber Industry (June 1985) that 'research be conducted into the economic and technical feasibility of cultivating broombush on private land'. A project for a Masters' Degree at the University of Melbourne is under way at present, investigating the feasibility of growing broombush from seed with a view to its cultivation on private land. If successful, this may lead to a valuable source of income from some marginal farmlands and could be employed to revegetate some areas of public land where past activities have removed much of the overstorey vegetation. The Council is recommending that, if it is economically and technically feasible to grow broombush from

seed, there should be more widespread production from private land as an alternative to public land.

The Council has referred below to a number of guidelines related to broombush-harvesting that it believes should be incorporated into management plans prepared for the industry by the Department of Conservation, Forests and Lands.

- The degree of tracking into and throughout the cutting areas should be minimized by planning access routes. This planning should particularly seek to avoid the establishment of tracks over high dunes.
- All tracks, other than the main trunk routes, should be closed and rehabilitated after completion of work. Mechanical harvesting should not be permitted.
- Planning of cutting areas should recognize that wildfire could destroy at least part of the presently available resource. Alternative cutting areas should not be made available outside those indicated on the map.

Land use goals for State forest

State forest in the Mallee area has a multiplicity of uses. It is important for the protection of water resources, conservation of plants and animals, and timber production and provides many opportunities for outdoor recreation. The forests also provide honey, forage, road-making materials, and other forest products to satisfy various community needs.

Management of State forest should take into account these various values and should ensure that they can be maintained and that the range of forest products can continue to be supplied in the future. The government has prepared a Draft 'Code of Forest Practice', which seeks to:

- protect forests and their associated vegetation and fauna from damage by wildfire and from injury by biological or other agents
- conserve landscape values, wildlife habitats, and floral, historical, and other natural values
- provide a continuing supply of hardwood timber on a regional sustained-yield basis
- provide opportunities and facilities for public recreation and education
- protect water supply catchments and stream environments in general
- protect adjacent plantations from fire

- provide for apiculture, forest grazing, extraction of road-making materials, defense training, and mineral exploration and mining etc. where appropriate

In relation to these goals, a number of principles are referred to below. These are based on harvesting prescriptions used by the Department of Conservation, Forests and Lands. In addition, certain values are listed and these should be protected by the implementation of management prescriptions.

Protection of water bodies

Adequate buffer strips—generally 40 metres wide on either side along major streams and 20 m along ephemeral watercourses and hydrologically sensitive areas—should not be logged, and where possible other operations that cause soil disturbance should not take place in them. Buffer strips should, as far as practicable, be protected from fire. The width of the buffer should be determined after consideration of the sensitivity of the particular stream environment. (The public land water frontage reserve along the River Murray extends to 60 m.)

State forest along the River Murray is particularly important in mitigating the effects of flooding and regulating the flow of water in the Murray system. Some damage to these forests has already occurred due to river regulation, particularly upstream in the Barmah Forest, and this will increase unless preventative measures continue to be taken in the near future. The maintenance and protection of the river red gum forest ecosystem depend in turn on an effective winter-spring flooding regime and the absence of summer flooding. A more detailed discussion of River Murray regulation and associated forest management problems is included in Chapter O—Water supply and drainage.

Recreation and landscape

In planning for recreation and protection of landscape, special consideration should be given to road location and other activities carried out in the forest in areas of high landscape value.

All refuse associated with logging, mining, or quarrying operations (such as tyres, drums, and disused huts) should be removed at the end of the operations.

Activities involving disturbance to the natural environment should not occur in buffer zones around popular recreation sites and beauty spots.

Nature conservation

The Council is aware that a number of uncommon or rare plants and animals occur within State forest. Where known, these are specifically referred to in the recommendations below, along with broad guidelines for management to protect them. As new information becomes available on the specific habitat requirements of other native plants and animals, it should be incorporated into management plans for State forest.

Some species or communities may require long-term monitoring in order to assess their habitat requirements and the most appropriate methods of management to ensure their survival. The managing authority may, in some cases, need to:

- create and manage buffer zones of adequate size
- erect protective fencing
- provide additional weed and vermin control
- manipulate fire regimes to maintain or enhance the viability of certain species
- collect and store seed for use in planting and re-establishment programs

It may be appropriate for the managing authority to involve local field naturalist groups or other interested parties in some of these management operations.

Sufficient mature and veteran trees in logging areas should be retained for fauna habitat.

It may also be necessary to exclude grazing from some areas along the floodplain, at least temporarily, in order to protect particular species or habitats. These areas of State forest contain a mosaic of wetlands and billabongs that are particularly important feeding and breeding localities for waterfowl and these should be protected to ensure their continued viability as wildlife habitat.

Archaeological and historical sites

Sites of archaeological and historical significance or interest should be identified, and the sites and their environs protected.

State forest

Recommendations

S1, S2 That the areas indicated on the maps be used in accordance with the principles outlined above to:

- (i) conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques
- (ii) provide opportunities for open-space recreation (including hunting) and education
- (iii) protect the values in the areas described in the schedule below by the implementation of management prescriptions
- (iv) produce honey, gravel, sand, and other forest produce where this is compatible with (i) and (iii) above

that

- (v) grazing be permitted in accordance with the recommendations and conditions outlined in Chapter F—Agriculture

and that they become State forest and be managed by the Department of Conservation, Forests and Lands.

S1 State forest in the dryland regions of the Mallee

That the areas indicated on the maps be used in accordance with the general recommendations outlined above and to:

- (i) maintain and, where necessary, rehabilitate native vegetation to provide improved protection from the hazards of wind erosion and salinity

and that

- (ii) mineral exploration and mining be permitted subject to the principles and guidelines outlined in Chapter N—Mineral and stone production.

S2 State forest in the riverine regions of the Mallee

That the areas indicated on the maps be used in accordance with the general recommendations outlined above and to:

- (i) supply water and protect catchments and streams
- (ii) produce hardwood timber.

Broombush-harvesting

S3 That, for those areas of State forest indicated on Map A, broombush-harvesting be permitted

that:

- (i) harvesting be confined to those areas indicated
- (ii) harvesting be undertaken at a sustainable level
- (iii) royalties reflect the market value of the product, the cost of supervision, and the contribution towards the research referred to in (vi) below
- (iv) adequate supervision of the operations be undertaken and if this cannot be achieved, harvesting not be permitted to continue
- (v) harvesting be in accordance with the guidelines listed above

and that

- (vi) research be conducted into the economic and technical feasibility of cultivating broombush on private land and, if this is shown to be possible, private land be used as an alternative to public land.

Revegetation of areas

The deterioration of tree cover in some of the rural areas of the State is causing increasing and widespread concern. Clearing—to establish pasture and croplands—has been the initial cause of this deterioration and continues in some areas. However, the gradual decline, and ultimate death, of the remaining trees is emerging as the major problem.

Soil compaction by stock, utilization of timber, attacks by insects, parasites, and other pathogens, exposure to winds, salting of the soil, erosion, and natural senescence among aging trees are all possible causes of the decline. The prevention of natural regeneration by grazing or other practices is exacerbating the problem.

Increasing soil salinity resulting in the degradation of grazing and crop country, loss of shelter for stock and for wildlife, and diminished aesthetic value are all consequences of this decline, which, although difficult to express in monetary terms, results in economic loss.

In addition to the large areas of State forest on which the native vegetation has become depleted, and for which specific recommendations concerning the management of grazing apply (see Chapter F—Agriculture), a large number of small parcels of public land throughout the Mallee carry little or no natural vegetation. In many cases they have been reserved for specific purposes, although not used for them, and have been continuously licensed to the adjoining landholders; once a period of time they have been cleared and integrated with the surrounding farmlands. In other cases the reserves can still be recognized by the native vegetation, but, for a number of reasons, the tree cover has declined.

A number of tree-growing assistance schemes exist to encourage tree-planting and tree-fostering projects—where these are in the community interest.

To complement such schemes in areas where tree decline and salting are becoming a problem and in areas where native trees are greatly reduced in number, Council recommends that some of the small areas of public land be used as pilot schemes or nuclei for the re-establishment of tree species native to the area or for the establishment of woodlots. Similar uses may be made of small parcels of public land near townships set aside for township purposes.

Following successful vegetation, some of these areas could serve as examples to the rural community of the effectiveness of such revegetation schemes, and consideration could be given to reserving them for various public uses.

Some public-land corridors between major parcels of public land have been or are at present being used for dryland agriculture. These are to be retained in public ownership and will also require revegetation.

Recommendation

S4 That the areas indicated on the maps and described on Table 12, below, be rehabilitated where applicable and that they be used to foster the re-establishment of vegetation native to the area or for woodlot schemes

that:
when revegetation is completed, they become State forest or consideration be given to reserving them for various other public uses including their use as woodlots

and that
they be managed by the Department of Conservation, Forests and Lands.

Table 12: Areas for revegetation

Parish	Crown description (see note below)	Area	Comment
Mullroo	CAs 18, 18A and the Aviation Reserve	292.0	
Ginquam	Adjacent to CA 41	38.0	
Wathe	Within CA 9	1.5	
Tyamoonya	Adjacent to CA 1 (Water Reserve)	57.0	
Wortongie	Within CAs 38A and 39A (two areas)	1.0	
Werrap	Within CA 44	77.0	The local community is already involved in revegetation works here
Kallery	Within CA 31	3.0	
Curyo	Within CA 15 (Stone Reserve)	3.7	
Ballapur	Within CA 19	1.0	
Wallowa	Within CA 9	8.0	Excavation to be rehabilitated
Willoby	Within CA 14	4.2	Excavation to be rehabilitated
Ultima	Adjacent to CA 38A and CA 40	9.0	Rubbish to be removed
Dartagook	CA 12A	25.0	
Chinangin	Adjacent to CA 22	51.0	
Murnungin	Within CA 49	33.0	
Murningin	Within CA 48	45.0	
Tungie	Water Res adjacent to CA 53	41.0	
Towaninny	Adjacent to CA 13A	12.0	

Note:

The cadastral descriptions of land employ the following abbreviation: CA—Crown Allotment.

Rack sites

Many small areas (1–2 ha) of public land in irrigation areas are used as sites for the drying racks associated with dried vine-fruits industry.

The Council believes that, where they do not obstruct access to public land and do not have other community values, the rack sites should

be consolidated with the adjoining freehold allotments rather than become new allotments or, if separated from freehold land by, for instance, a road reserve, they may be alienated with conditions applied to the title such that they are recognized as being inextricably associated with the agricultural land.

There should be no new sites for fruit-drying racks permitted on public land.

Recommendation

S5 That where existing rack sites have no public land values they be made available for alienation under the provisions of the *Land Act 1958* and consolidated with the adjoining Crown allotments

and that
no new sites be made available on public land.

Schedule of values to be protected in State forest

Nature conservation

- All plant species, not otherwise protected, that are included in the species list in the back of the report—*Mallee Area—Review*, November 1987. This report includes data from the 'List of Rare or Threatened Plants in Victoria' prepared by the Department of Conservation, Forests and Lands, and the report by A.C. Beauglehole ('The Distribution and Conservation of Native Vascular Plants in the Victorian Mallee'—1979).
- Stands of river red gum, black mallee box, black box, yellow gum, and *Callitris* along the spring-line on the northern fringe of the Big Desert. These are important in themselves and provide valuable habitat for a wide range of faunal species; they are the potential habitat of the western whipbird and the night parrot.

The area north of the Big Desert Wilderness, in particular, is significant in that all species of small mammal recorded in the Big Desert occur here, as are all species of snake. The heathlands with brown stringybark in this area support a wide range of honeyeaters and other birds; some of the best examples of long-unburnt Mallee plant communities occur here also.

- The habitat of the cyprotus blue butterfly (*Candalides cyprotus*) in the south of the Big Desert. Studies are continuing on the insect fauna of the Mallee and new areas for protection will inevitably be identified.
- Corridors of native vegetation that provide continuity between larger parcels of public land. These are important in facilitating the interchange of populations and reducing the likelihood of extinctions of species. Four such corridors have been identified in the Mallee area. Alienation of the link between the new Annuello flora and fauna reserve and the south-eastern extent of the now-recommended Murray-Sunset National Park was prevented immediately prior to the commencement of this review—revegetation of portions of this link is progressing. The public land corridors linking the new Bronzewing and Wathe flora and fauna reserves (G35 and G36 respectively on Map A) with the eastern edge of the Big Desert and between the Wyperfeld National park and the 1440-ha parcel of land in the Parishes of Baring and Patchewollock include land previously designated for limited cultivation leases. Revegetation of some of these areas will be necessary. Activities within them should be compatible with the retention of their capacities to act as biological corridors.
- Public land bordering the Big Desert Wilderness provides an important buffer to activities that would conflict with the use of the Wilderness. Its depth from the Murrayville track, for instance, reduces the intrusiveness of vehicular movement and noise. Other conflicting activities would similarly be buffered—the depth depending on the activity. The smaller areas of relatively high wilderness quality outside the Big Desert Wilderness and national parks should also be protected.
- The habitat of the Kori bustard in the south-west of the Big Desert as well as the habitat of the western whipbird, believed to also occur here.
- The large parcel of public land at Cullulleraine, in which the paucident planigale was first recorded for Victoria and in which the grey falcon is known to be breeding. The tessellated gecko has also been found here.

- The habitats of the paucident planigale, long-thumbed frog, tessellated gecko, and eastern water skink on Wallatoo Island.
- Public land lying between the Hattah-Kulkyne and recommended Murray-Sunset national parks requires particular management that recognizes its special scenic and recreational values.

This area, comprising some 29 000 ha, consists primarily of the Raak Plains—a zone of groundwater discharge and an important area for hydrogeological studies. The shallow salt lakes and salt pans dotted across the broad plain and interspersed with dunes provide an outstanding scenic feature, whether viewed from vantage points on the ground or from the air.

Although high grazing pressure in the past has considerably modified the vegetation communities here, the diversity of plant species—from saline shrublands, grasslands, and open woodlands to mallee scrub—enhances its scenic attractiveness.

Control of grazing pressures and specific measures to ensure revegetation (described in Chapter F—Agriculture) will mean that the native vegetation and therefore faunal habitat will improve over time.

Apart from a resident population of red kangaroos, the old trees provide hollows for a range of birds, including cockatoos and parrots.

Readily accessible from the Calder Highway at Hattah, the area is suited for touring and dispersed camping and would complement the recreational values of the adjoining parks. Its management plans must ensure that the public can continue to use the area for recreation, consistent with the protection and improvement of the its native vegetation, and that interpretative facilities are provided.

Historical sites

- Sites of significance associated with Aboriginal culture or occupation throughout State forest need to be identified and protected (their management should involve the local Aboriginal community). Among these are the sites associated with the spring line along the northern fringe of the Big Desert and mounds and scarred trees along the riverine plain, in particular Nyah forest.

- Sites of interest referred to in a report by Andrew C. Ward and Associates, titled 'Mallee Area Review—Study of Historic Sites', include a large number of water-supply facilities—tanks, bores, and pumps—as well as mine sites, cemeteries and burial sites, schools and other buildings, and salt-works.

Several of the more important sites of historical interest are now recommended for historic reserves (see Chapter V) and others lie within conservation reserves. A number of sites listed in the report are located on freehold land—their historical context is nonetheless important.

T. Lake Reserves

Some of the public land lakes in the Mallee are reserved for water supply or drainage (see Chapter O), but others are simply unreserved Crown land. The Council considers that, while 'public purposes' reservations have in the past served to protect particular lakes, the value of the system as a whole has not been recognized.

Both capability and current use of the individual lakes vary widely. Scenic quality varies from picturesque to barren and unattractive, and the extent to which the lakes provide opportunities for other uses—such as recreation (mainly boating and angling), wildlife conservation (particularly waterfowl), water supply, and drainage—also varies. Most of the lakes are popular for duck-hunting during the declared hunting period, but the extent of this varies according to the season. The ephemeral nature of many lakes also leads to a variation of uses and values with time on individual lakes. In some cases, a lake may dry up completely and remain as either a bare saltpan or a fertile plain that can be used for agriculture until the next wet season. The natural water levels in some lakes are manipulated—by deliberate drainage, by pumping for irrigation, or to hold surplus flood flows.

Form of reservation

In preparing its recommendations, Council has considered the various competing uses for and the capabilities of each lake separately as well as considering the system as a whole. Those lakes with high wildlife values and where wildlife conservation is the prime use have been recommended as wildlife reserves (see Chapter D); those integral to water supply and drainage are recommended accordingly (Chapter O).

Some of the lakes are recommended as lake reserves; this establishes a secure form of tenure and gives the managing authority flexibility to introduce those controls necessary to protect the values both of specific lakes (where no one value may predominate) and of the system as a whole, while providing for existing legal uses to continue. The land manager can frame and enforce regulations that are specific to a

particular lake. This will ensure that proposals for use can be evaluated in relation to the capabilities of the particular lake and to the impact on the system as a whole.

Existing lake reserve

In its final recommendations for the Wimmera Area in 1986, Council proposed the delineation of a lake reserve for Lake Hindmarsh and surrounds, which included the northern section of lake frontage located in the Mallee Area. This was approved by government.

Lake Hindmarsh

Recommendation

- T1** That the area of 295 ha, shown on Map A, continue to be used for those purposes approved by the government following publication of the final recommendations for the Wimmera Area in November 1986
- and that
sites of archaeological importance be protected.

Additional lake reserves

Recommendations

- T2-
-T7** That the lakes described below and shown on the maps be used, according to their particular capabilities, for:
- (i) recreation, including hunting
 - (ii) nature conservation
 - (iii) scientific study
 - (iv) water supply
 - (v) drainage
 - (vi) salt harvesting (where appropriate)
- that
- (vii) sites of archaeological importance be protected
 - (viii) current legal use for low-intensity grazing be permitted under the control of the managing authority

(such control may involve exclusion of grazing, at least temporarily, from some reserves)

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act* 1978 and be managed by the Department of Conservation, Forests and Lands, in consultation with the Rural Water Commission where appropriate.

- T2** Lakes Coorong and Lascelles (760 ha), Parish of Wiall.

Note:

Occasionally, excess water from the Wimmera-Mallee Stock and Domestic Water Supply System is channelled into this lake during heavy rain or difficulties in the operation of the system. This arrangement should continue.

- T3** Lake Daytrap (106 ha); the salt lake adjacent to Allotments 30, 31, 36, and 37, Parish of Gerhamin.
- T4** Lake Wahpool (2460 ha), Parishes of Lianiduck and Moortworra.
- T5** Lake Boga (950 ha), Parish of Boga.

Notes:

1. During World War II, Lake Boga was used as a flying-boat repair depot and a number of intact artefacts remain. The local community has undertaken restoration of a flying boat. Most of the items of historical significance here are on Commonwealth land and therefore not included in Council's study. Nevertheless these items should be preserved.

2. The principal source of water for this lake is flood flows from the Avoca River. It can also be filled from the irrigation system or via the Little Murray River.

- T6** Tcham lakes (92 ha), Parish of Karyrie.

- T7** Lake Meering (220 ha), Parish of Meering.

Notes:

1. Recreational use of this lake and its foreshore should not be restricted by exclusive occupancies.

2. Management of this lake, and particularly of its southern shore, should complement the management of the adjoining Leaghur State Park (A7).

U. Other reserves and public land

Some areas of public land in the study area that are used for various purposes, such as water production, flood mitigation, grazing, camping, public utilities, and so on, have not been specifically mentioned in these recommendations. Others (both reserved and unreserved) receive little active use at present, even though they might once have been reserved for some specific purpose.

The Council intends that existing legal uses and tenure of these small areas of public land should continue, and that those not currently used for any particular purposes be used in a way that will not preclude their commitment in the future to some specific public use.

Recommendation

- U1 That, for areas of public land not specifically mentioned in these recommendations, existing legal use and tenure continue

and that

where the land is not reserved for a specific purpose at present, such areas be used in a way that will not preclude their reservation in the future for as-yet-unknown public purposes.

Note:

Some of these have potential for incorporation into salinity-mitigation works. There would be no objection in principle to these areas being used subject to the full investigation of their need and an evaluation of the proposals under the *environmental effects legislation*.

Parishes of Olney, Merbein and Wargan

Recommendation

- U2 That the areas shown on Maps A and C, totalling 3435 ha, and held under title by the Rural Water Commission, continue to be managed by the Commission and, should they be no longer required, they be made available for alienation.

V. Historic Reserves

Sites of historical importance associated with pre-European occupation—and with European exploration, agricultural and irrigation activities, settlement, and the utilization of salt and gypsum—are found on both private and public land throughout the Mallee area.

There is considerable interest in the community about the State's history. This interest is likely to increase, particularly as more becomes known about historical relics located on public land. Council considers that sites of historical interest should be managed to promote public awareness of the history of the area and that they should be protected as far as possible from progressive deterioration due to exposure to the weather and from damage by the public.

Historic reserves are small areas that contain important relics, but generally have only one historical theme represented. Their size will generally preclude the development of recreational facilities, although some aids to interpretation could be provided.

In 1986, the Council commissioned a study of such sites in the Mallee. The resultant report, 'Mallee Area Review—Study of Historic Sites' by Andrew C. Ward and Associates, detailed 166 sites, of which the consultant considered 34 to be significant at the State level and a further 22 of regional significance.

Although most are on public land, some are on the banks of the River Murray and therefore not in Victorian public land, some are utilities that are still in use, and others are located on freehold land.

In addition, the Victoria Archaeological Survey provided information about areas containing sites of cultural significance to the Aboriginal community and other sites of archaeological importance.

Several sites of historical and archaeological importance have been included in parks or other reserves. One site associated with the pre-European history of the area and several with post-European history have been included in the historic reserves described below.

Recommendations

- V1-V4** That the areas listed below be used to:
- (i) protect buildings, equipment, and artefacts associated with the history of the locality
 - (ii) provide opportunities for recreation and education associated with the history of the locality

and that they be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and, unless otherwise stated, be managed by the Department of Conservation, Forests and Lands.

- V1** 0.5 ha (Map C), being the old Red Cliffs Urban Pump, adjacent to Allotment 229, Section B, Parish of Mildura—to be managed by the Rural Water Commission.

The pumping station was built in 1929 to provide a reticulated water supply to the township of Red Cliffs, and still contains the original pump, manufactured by Thompsons Engineering of Castlemaine, and the residual-oil engine (number 7799) manufactured by Ronaldson and Tippet Pty Ltd of Ballarat. This site is currently managed by a local historical society.

- V2** 1 ha, being Nowingi Ironclad Catchment and Concrete Tank, Allotment 2, section 3, Township of Nowingi.

Built about 1928 as a public water supply associated with the Nowingi railway settlement, this catchment and tank were used until the late 1960s. The catchment is constructed from sheet iron, crimp-locked together and sloping toward the concrete tank, which has sloping sides and is roofed over with corrugated iron.

Note:

This area is already reserved for historical purposes.

- V3 2 ha, being the former Hopetoun School, Hopetoun, corner of Austin and Garrard Streets, Hopetoun.
This former school is one of the largest limestone buildings in the Mallee, and was constructed in 1894 with limestone donated by E.H. Lascalles. The school was closed in 1979, and is now used by the Hopetoun Historical Society and as an education centre.
- V4 14.5 ha, being Major Mitchell Lagoon. Centred on the billabong beside the River Murray, immediately upstream of the Wakool Junction, this was a campsite of the explorer Major Sir Thomas Mitchell. A member of Mitchell's party made a sketch of the lagoon, the original of which is held at the Mitchell Library in Sydney, New South Wales. An examination of the sketch indicates that the area has remained virtually unchanged since that time. The area is also of botanical importance, containing as it does high densities of *Danthonia* species in the understorey of black box.

Recommendation

- V5 Bumbang Island (566 ha)
That the area shown on the map be used to:
- (i) protect specific sites that carry or contain evidence of past Aboriginal occupation
 - (ii) provide opportunities for recreation and education associated with the history of the locality (development of recreational facilities would be minimal)
- and that it be permanently reserved under section 4 of the *Crown Land (Reserves) Act 1978* and be managed by the Department of Conservation, Forests and Lands.

Note:

This area is of considerable interest to the Aboriginal community, and has much evidence of Aboriginal use and occupation, including over 600 scarred trees. Council is aware of proposals for its development for the interpretation of previous Aboriginal use and other cultural aspects. Management should be in close consultation with the Aboriginal community.

Appendix I

LIST OF SUBMISSIONS

Key to abbreviations in Appendix I:

Assoc.	Association
Cons.	Conservation
Ctee.	Committee
FNCV	Field Naturalists' Club of Victoria
GFB	Group of Fire Brigades
Grp.	Group
RFB	Rural Fire Brigade
Soc.	Society
SSAA	Sporting Shooters' Association of Australia
UFB	Urban Fire Brigade
VAA	Victorian Apiarists' Association
VFF	Victorian Farmers' Federation
VFGA	Victorian Field and Game Association
VNPA	Victorian National Parks Association
Wild.	Wilderness
(DCFL)	Department of Conservation, Forests and Lands
(RWC)	Rural Water Commission

Note:

Of the submissions received by the Council, 414 comprise form letters issued by the Sporting Shooters' Association on which the signatures are illegible. They have been registered as authorship 'unknown'.

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Abela	SSAA	0	1287
Ablitt	Black Rock & Sandringham Cons. Assoc.	0	129
Abriane	SSAA	0	940
Acklom		0	466
Adamidis	SSAA	0	986
Adams		0	88
Adams		0	278
Adams	SSAA	0	1040
Adamson		0	783
Adamson		0	794
Adamson	SSAA	0	1003
Adamson	SSAA	0	1998
Adorna	SSAA	0	1338
Aguilar	SSAA	0	866
Ahern		101	401
Aisbett	SSAA	0	1072
Albaton	SSAA	0	1518
Albert	SSAA	0	1092
Albert	SSAA	0	2015
Albrecht	SSAA	0	1962
Alcazar	SSAA	0	1152
Alderton		0	75
Alderton		0	79
Alexander		0	681
Alexander		0	689
Alipanopolous	SSAA	0	1953
Alla		0	249
Allen		0	138
Allen		0	163
Allen		0	432
Allen		0	586
Allen	SSAA	0	846
Allen	SSAA	0	1170
Allen	SSAA	0	1504
Allen	SSAA	0	2066
Allerry	SSAA	0	892
Alley		0	652
Amery	SSAA	0	1251
Anbar	SSAA	0	1205
Anchett	SSAA	0	990
Anders		0	558
Anderson		56	23
Anderson		0	385
Anderson	SSAA	0	872
Anderson	SSAA	0	1241
Anderson	SSAA	0	1322
Anderson	SSAA	0	1576
Andrews	SSAA	0	845
Andrews	SSAA	0	1431
Andricciola	SSAA	0	898
Angelico	SSAA	0	1175
Anonymous	Maroondah Wild. Soc.	0	405
Anonymous	Calder Primary School	0	724
Anonymous	Ballarat Bush-walking & Outdoors Club	0	742
Anonymous	FNCV—National Herbarium	118	0
Ansell		3	0
Arcaro		0	472
Arditto	SSAA	0	1101
Arkman		0	526
Armitage	SSAA	0	1532

Name	Department or association	First subm. no.	Second subm. no.
Armstrong	SSAA	0	1413
Armstrong	SSAA	0	1534
Armstrong	SSAA	0	1536
Arnold		0	511
Arnott	SSAA	0	1524
Arstall	SSAA	0	1288
Ashman	SSAA	0	1306
Ashton	School of Botany—Melbourne University	0	229
Atkins	SSAA	0	1621
Atkinson		0	639
Atkinson	SSAA	0	1115
Austin		0	565
Austwick	SSAA	0	1292
Baarda		0	365
Bail		195	0
Bailey	Fencing Industry of S.A. Inc.	0	324
Baker		0	74
Baker		0	149
Baker	SSAA	0	939
Baldwin	SSAA	0	1162
Bales		0	474
Ball	Vic. Apiarists' Assoc.	0	436
Ball	SSAA	0	965
Ball	SSAA	0	970
Ball	SSAA	0	1584
Balossa	SSAA	0	1348
Banfield	SSAA	0	1369
Barakas	SSAA	0	1314
Barbarino	SSAA	0	1361
Barbetti		0	802
Barbetti	SSAA	0	891
Barclay	FNCV—Creswick	0	245
Bardell	SSAA	0	1257
Barmi	SSAA	0	1302
Barnett	VNPA	66	539
Barrow	SSAA	0	1214
Bartlett	SSAA	0	1397
Barwise	SSAA	0	950
Bate		0	274
Bates	SSAA	0	1334
Batsis	SSAA	0	1262
Baulch Bros		0	177
Bawden		0	481
Baxter		0	751
Bcesckeis	SSAA	0	1988
Beales		0	602
Bear		0	220
Bear		0	226
Beaton	SSAA	0	1421
Beaton	SSAA	0	2041
Beattie		0	566
Beattie	SSAA	0	1123
Beaughtole		40	12
Beaumont	SSAA	0	1506
Beckmann		0	259
Beech	SSAA	0	1554
Beer		0	678
Beere	SSAA	0	992
Beere	SSAA	0	1184
Bell		0	197
Bell	Mildura Chamber of Commerce	0	625
Bell	Swan Hill School Support Centre	0	2094

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Beitrame	SSAA	0	1228
Benaim	SSAA	0	1224
Bendrops		0	734
Bennet		0	450
Bennett		1680	
Bennett	Aust. Petroleum Exploration Assoc. Ltd	0	176
Bennett	Women Ladies Social Club	0	719
Bennett	SSAA	0	1622
Bennetto		0	17
Benshmesh		0	750
Benton	SSAA	0	1186
Berry	Sunraysia A.P. Horse-riding Assoc.	0	255
Berry	SSAA	0	1309
Best	SSAA	0	876
Beudel		0	10
Bewley	SSAA	0	1188
Bildstein		0	35
Binns	FNCV—Ballarat	0	400
Birkett		0	662
Bishop		0	106
Bishop		0	452
Black	SSAA	0	1447
Blackman		0	404
Blackmore		0	428
Blackmore	SSAA	0	2090
Blake		196	0
Blake	Pioneer Settlement—Swan Hill	0	115
Blandthorn		0	573
Bleechmore		0	737
Bock	SSAA	0	1968
Bodinnar		0	420
Boere		0	791
Bohn	SSAA	0	2006
Bolton	SSAA	0	1400
Bond		0	699
Booth	SSAA	0	1171
Borchers	Continental Resources N.L.	0	188
Bortoli	SSAA	0	1407
Bertoli	SSAA	0	1408
Boscarrist	SSAA	0	2014
Boseley		0	531
Boseley	SSAA	0	1076
Bother	SSAA	0	863
Bottegaro	SSAA	0	1493
Bourke		0	65
Bourke & Associates	SSAA	0	893
Bowen		0	345
Bowen & Wilson	Dept. Industry, Technology & Resources	132	505
Bowitz & Tech		0	632
Bowler	Museum of Victoria	161	650
Boyd	Shire of Karkaree	38	0
Boyhan	SSAA	0	1107
Boyl	SSAA	0	932
Boyle	SSAA	0	1117
Braden's Plumbing	SSAA	0	848
Bradley		0	392
Bradley		0	1122

Name	Department or association	First subm. no.	Second subm. no.
Bradley	SSAA	0	1151
Bradley	SSAA	0	2034
Branekki	SSAA	0	1131
Braun		135	737
Braybon	SSAA	0	1411
Breaden		0	238
Brennan	SSAA	0	1136
Brenton	SSAA	0	1355
Brewin	SSAA	0	1230
Bride	SSAA	0	1321
Bridley		0	159
Bridley		0	184
Briggs	Murray Valley Aboriginal Co-op Ltd	0	796
Briggs	SSAA	0	985
Briggs	SSAA	0	991
Briller	SSAA	0	1298
Briscoe		92	0
Briscoe	SSAA	0	1947
Brittan	SSAA	0	1193
Brown		0	131
Brown	Hopetoun West RFB	0	162
Brown		0	660
Brown		0	692
Brown	SSAA	0	1066
Brown	SSAA	0	1197
Brown	SSAA	0	1383
Brown	SSAA	0	1560
Bruce	SSAA	0	1514
Buckley	SSAA	0	861
Bulington	SSAA	0	1991
Bull		0	72
Burge	SSAA	0	1398
Burke		0	407
Burns	SSAA	0	1028
Burns	SSAA	0	2039
Burstall		69	0
Burstall		0	397
Butcher	SSAA	0	828
Butler	SSAA	0	2042
Bygrave	SSAA	0	812
Byrnes	1st Mildura Irrig. Trust	0	615
Byron		0	583
CONFIDEN-		0	70
TIAL			
CONFIDEN-		0	294
TIAL			
Cachia	SSAA	0	1005
Cafarellei	SSAA	0	1547
Cafarellei	SSAA	0	1548
Cafarello	SSAA	0	1194
Caffin	Aust. Conservation Foundation	0	191
Callahan		24	327
Calleja	SSAA	0	2061
Cambiel	SSAA	0	960
Cameron		93	503
Cameron		0	799
Cameron	SSAA	0	914
Cameron & Forbes	Royal Aust. Ornithologists Union	0	372
Campbell		68	91
Campbell Central VAA		0	272

Appendix I (continued)

<i>Name</i>	<i>Department or association</i>	<i>First subm. no.</i>	<i>Second subm. no.</i>
Cann	SSAA	0	1454
Canning	SSAA	0	1591
Cant	Impi Highland	0	744
Care	SSAA	0	818
Carey	SSAA	0	1538
Carmichael	Strathdownie RFB	0	624
Carrail	VFF	0	21
Carruthers		0	280
Carser	SSAA	0	1542
Carter	Shire of Karkaroc	0	124
Cartledge	SSAA	0	1393
Cassera	SSAA	0	1006
Cassidy	SSAA	0	1323
Castellan	SSAA	0	1957
Catchlove	3rd Military Dist. Australian Army	0	379
Cavallaro		0	136
Cayless	SSAA	0	1080
Chan	SSAA	0	1337
Chaplin		33	100
Chapman	SSAA	0	1181
Chapman	SSAA	0	1401
Chappell		0	712
Charbel	SSAA	0	1975
Charles	S.A. Assoc. of 4WD Clubs	0	370
Charleson		0	658
Che	SSAA	0	1444
Cheers		0	343
Chicktong	SSAA	0	1111
Child		0	47
Chisholm		14	0
Chivell	Rosebery RFB	0	218
Chivers	SSAA	0	1276
Christie		0	787
Churchyard		0	48
Ciccone	SSAA	0	983
Cinerari	SSAA	0	1528
Clark	FNCV—Hamilton	0	192
Clark		0	337
Clark & McIntyre	Victorian Archaeological Survey	0	543
Clarke	SSAA	0	1016
Cleeland	SSAA	0	1428
Cleverly	Shire of Kaniva	0	58
Clinigan		0	373
Clugston		73	308
Cobbe	SSAA	0	1296
Cockroft	SSAA	0	943
Cockroft	SSAA	0	944
Coffrey	SSAA	0	1637
Cohir	SSAA	0	1340
Cohrs	SSAA	0	2001
Coldicutt		2	0
Coles	SSAA	0	1126
Collins	Beaufort—VFF	0	178
Collins	Range Rover Club of Australia	0	453
Collins	Daylesford—VFGA	0	617
Collins	SSAA	0	829
Collins	SSAA	0	957
Collins	SSAA	0	1128
Coma	SSAA	0	601
Condely		0	1273
Congdon	SSAA	0	196
Connelly		41	200
Cook		0	200

<i>Name</i>	<i>Department or association</i>	<i>First subm. no.</i>	<i>Second subm. no.</i>
Cook	SSAA	0	1620
Cooke	SSAA	0	1065
Cooke	SSAA	0	1458
Coonan		0	683
Cooper		0	628
Cooper	SSAA	0	1246
Cooper	SSAA	0	1353
Cooper	SSAA	0	1505
Corbett		15	538
Corbett		0	7
Corner	SSAA	0	1030
Coster	Region 18, CFA	0	381
Coto		0	339
Courtney	SSAA	0	977
Cox		183	0
Cox	SSAA	0	862
Cox	SSAA	0	1531
Cracknell	SSAA	0	1357
Craig	NW Municipalities Assoc, Shire of Kowree	0	733
Crimmins	SSAA	0	1024
Cristensen	SSAA	0	1959
Croft	SSAA	0	1466
Croft	SSAA	0	1467
Crosby		0	165
Cross	Shire of Walpeup	158	55
Crouch		0	399
Cruise	Sunraysia College of TAFE	31	395
Culph		0	456
Cummings	Patchewollock RFB	0	241
Curley	Health Department Victoria	0	504
Curran		120	758
Curran		123	490
Curran		0	311
Curran		0	499
Curran <i>et al</i>		0	41
Curtis		0	761
Curtis	SSAA	0	1429
Curtis	SSAA	0	1985
Cutbush		0	376
D'Abrera	SSAA	0	1566
Dale	SSAA	0	1173
Dandoerend	SSAA	0	1034
Danschke		0	707
Darch	SSAA	0	967
Davey	SSAA	0	1260
Davidson		0	254
Davidson	SSAA	0	1063
Davies	FNCV—Portland	0	123
Davies		0	137
Davies		0	205
Davis		22	63
Davis		76	113
Davis	Red Cliffs UFB	0	132
Davis		0	168
Davis	SSAA	0	971
Davis	SSAA	0	1310
Dawes		0	137
Dawson		0	121
Dawson	SSAA	0	1046
De Bruyne		0	445
De Vincentiis	SSAA	0	1185
Dean	SSAA	0	1996
Deane		0	734

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Deane	SSAA	0	1484
Dehao		0	90
	Fosterville & Wellsford Land Protection Assoc	0	551
Deliso		81	319
Dempsey		198	59
Dempsey	SSAA	0	1176
Dempsey	SSAA	0	1178
Dempsey	SSAA	0	1179
Deszez	SSAA	0	1061
Deszez	SSAA	0	1084
Deszez	Darwin Ranges GFB	0	645
Deubler		0	57
Dew		0	275
Dewhurst	SSAA	0	1385
Diamond	SSAA	0	1587
Dichtera		0	50
Dickens	SSAA	0	1198
Dillon	SSAA	0	997
Dillon	SSAA	0	1990
Dimasi		-	0
Dimasi		21	0
Discher	SSAA	0	1495
Dowell	SSAA	0	945
Dupa	SSAA	0	2093
Dadds		0	477
Dery	Friends of Wyperfeld—VNPA	106	371
Doherty	SSAA	0	1211
Donald	SSAA	0	1502
Dogan	SSAA	0	1417
Douglas		67	626
Douglas		0	7
Douglas		0	310
Douglas	SSAA	0	1414
Dow		0	348
Dowling	SSAA	0	849
Draften	Mortlake—VFF	0	622
Drendel	Pigick RFB	0	206
Dressler	SSAA	0	1486
Drew	Kidman Holdings P/L	113	309
Drummond	SSAA	0	1439
Drury	SSAA	0	1983
Dryden	Shire of Wychebrook	37	22
Dudley	Sunraysia Water Board	96	16
Duffield		169	150
Duffus	SSAA	0	1056
Duke	SSAA	0	1574
Dunbar		0	335
Dunn		0	460
Dunne	SSAA	0	1009
Dunstan	SSAA	0	1599
Dunstone		0	654
Durham		0	187
Dvail	SSAA	0	2024
Dyer	Shire of Kerang	32	224
Dyson	SSAA	0	1202
Dyson	SSAA	0	1457
Eager		184	0
		153	434
		0	1324

Name	Department or association	First subm. no.	Second subm. no.
East	SSAA	0	1325
East	SSAA	0	2020
Eastwood	SSAA	0	1366
Eckermann		39	0
Edgar		0	493
Edkins		0	141
Edkins		0	154
Edward	SSAA	0	1535
Edwards	SSAA	0	1545
Edwards	Melbourne Trail Horse Riders Club	0	1955
Egan	SSAA	0	1229
Eichler		77	441
Elatz	SSAA	0	1240
Eldridge	SSAA	0	2046
Eldudge	SSAA	0	1512
Elize	SSAA	0	1157
Elliot		0	181
Elliot	SSAA	0	1192
Elliot		0	363
Ellis		0	353
Ellis	SSAA	0	1375
Ellis	SSAA	0	1482
Elolbin	SSAA	0	1242
Emmins		0	318
Englefield		0	219
Esmore	SSAA	0	1190
Esmore	SSAA	0	1237
Esmore	SSAA	0	1238
Esmore	SSAA	0	1239
Etherton		0	528
Etulain	SSAA	0	1007
Etulain	SSAA	0	1008
Etulain	SSAA	0	1177
Evans		0	338
Evans, MP	Member for Gippsland East	0	766
Everard	SSAA	0	1054
Everett <i>et al</i>		0	760
Faffis	SSAA	0	2012
Fairweather	SSAA	0	1625
Falconer	SSAA	0	850
Falhenberg	SSAA	0	1445
Falkenberg		0	299
Falkingham		0	39
Falkingham		0	612
Falla		137	0
Fanoy		0	449
Farago	SSAA	0	1359
Farmilo		89	0
Farnsworth	SSAA	0	1306
Farnsworth	SSAA	0	1617
Farris & Mitchell	Conservation Council of Victoria	154	785
Fazio	SSAA	0	878
Fazio	SSAA	0	1217
Fegen		0	161
Feinlang	SSAA	0	1553
Fenton		0	494
Ferguson	Land Protection Council (DCFL)	0	501
Ferguson	SSAA	0	1213
Ferrell	SSAA	0	1038
Ferris	SSAA	0	1619
Finch	SSAA	0	1507
Finch	SSAA	0	1508
Fiorenzo	SSAA	0	1979

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Fisher		0	56
Fisher	Rainbow—VFF	0	298
Fisher	Yaapeet RFB	0	302
Fisher		0	303
Fisk		0	696
Fisker	SSAA	0	1404
Fitts & Patterson	Road Construction Authority	117	592
Fitzgerald		112	0
Fitzgerald	Kerang—VFF	0	142
Flanders		0	388
Fletcher	SSAA	0	1245
Flower	SSAA	0	1099
Foggiano	SSAA	0	1271
Forbes		4	0
Forbes	Shire of Gordon	0	34
Forbes	SSAA	0	815
Ford		0	232
Ford	FNCV—Horsham	0	305
Ford	SSAA	0	928
Fordham	SSAA	0	1182
Formosa		186	0
Forrest		0	563
Foster	Dept of Conservation, Forests & Lands	141	500
Foster		0	663
Foster		0	763
Foster	SSAA	0	1168
Foster	SSAA	0	1612
Foster	SSAA	0	1638
Foulds	SSAA	0	961
Foxall		0	605
Fragale		0	1293
Fragoy	SSAA	0	1169
Frank		0	468
Fraser		201	0
Fraser		0	256
Fraser		0	489
Fraser		0	512
Fraser	SSAA	0	2038
Free	SSAA	0	880
Freeman		0	28
Freeman	Lions International	0	352
Freeman	FNCV—Kowree	0	469
Freeman		0	657
Freeston	SSAA	0	1153
French		0	747
Friswell	SSAA	0	1362
Froling	SSAA	0	1631
Frost	SSAA	0	837
Fry	SSAA	0	1430
Fuller & McFarlane	Mildura Region, Land Protection Regional Advisory Committee	84	222
Gadsden		0	509
Gairns		0	492
Galbraith		100	0
Gale	SSAA	0	1480
Gallagher	SSAA	0	840
Gallasch		130	0
Galliera		0	277
Gallivan		0	697
Galtieri	SSAA	0	1231
Galvin		0	522
Gammilonghi	SSAA	0	1022
Gange		0	1

Name	Department or association	First subm. no.	Second subm. no.
Gardiner	SSAA	0	1001
Gardiner	SSAA	0	1098
Gardner		0	631
Gardner	SSAA	0	1274
Garlick	SSAA	0	1380
Garlick	SSAA	0	1381
Garsed		0	281
Gash	SSAA	0	1496
Gayland	SSAA	0	1295
Gebbie		0	690
Gellie	SSAA	0	976
Gerakitis		23	0
Gerggine	SSAA	0	1141
Gibbins		0	555
Gibson		0	711
Giles		0	598
Giles		0	599
Gillard	Mildura Cemetery Trust	0	731
Gillingham	Lake Meran Camping Committee	0	263
Committee			
Gillson	SSAA	0	1093
Gilroy	SSAA	0	1191
Girl	SSAA	0	1048
Gisborne	SSAA	0	1526
Gleadall		0	779
Gleeson		0	616
Gleeson		0	670
Gleeson	SSAA	0	899
Godfrey	SSAA	0	1436
Goegan		0	128
Goff	SSAA	0	1083
Golding	SSAA	0	882
Goldstein	SSAA	0	904
Goldstein	SSAA	0	916
Goldstein	SSAA	0	1461
Good	SSAA	0	1316
Goodchip	SSAA	0	2057
Goodrem		0	582
Goolan	SSAA	0	1114
Gosling		0	105
Gotch	Mallee Heritage Inc	0	442
Gottschutze		0	73
Gould		5	0
Gowers	Carwarp—VFF	0	234
Grace		8	484
Graham		0	425
Graham		0	435
Graham	Victorian Field and Game Association	0	470
Graham		0	648
Graham	SSAA	0	1455
Grant		0	611
Grant	SSAA	0	1219
Grant	SSAA	0	1498
Gray		148	0
Gray		0	478
Gray	SSAA	0	1346
Gray	SSAA	0	1624
Green		0	451
Greenhalgh	SSAA	0	1527
Greig	Defender Farms P/L	59	0
Greschke	SSAA	0	814
Gretton-Watson	SSAA	0	1077
Grey		0	613
Griffin		0	406

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.	Name	Department or association	First subm. no.	Second subm. no.
Griffiths	SSAA	0	1946	Hart	SSAA	0	1305
Grigg		1160		Hartley	SSAA	0	1601
Grigg		0	287	Harvey		0	158
Grigg		0	288	Harvey		0	471
Grigg		0	536	Harvey		0	788
Grigg		0	768	Harvey	SSAA	0	1129
Grigg	SSAA	0	1563	Hasler		0	322
Grist	Sunraysia & Dist Aboriginal Co-op	0	431	Hatton	Doncaster & Templestowe Cons. Society	0	607
Grossgut	SSAA	0	1463	Haud	SSAA	0	1557
Ground		0	5	Hawke		0	688
Gruddas	SSAA	0	2048	Hawson		0	279
Grusovin	FNCV—Fauna Survey Group	0	340	Hawthorn	Northern Gypsum	74	46
Guard	SSAA	0	1052	Hayes		191	0
Gudgin	SSAA	0	1488	Hayes		0	300
Guest		0	587	Hayes	SSAA	0	841
Gustafsson	SSAA	0	817	Hayes	SSAA	0	1606
Cutch		0	740	Hayes	SSAA	0	1609
Guthrie	SSAA	0	1075	Hayes	SSAA	0	1972
Hacusler		160	398	Hayter		54	134
Haggblom		0	641	Hayter	Hayter Bros.	149	94
Haggblom	SSAA	0	1146	Hayward		0	525
Hahnel		25	600	Hazendonk	SSAA	0	864
Hahnel		0	600	Hazlett		57	292
Haines	SSAA	0	912	Healy		0	653
Halasa		0	728	Heaslip		95	0
Halasa		0	729	Heaslip	Mallee Tourism Assoc.	0	485
Haley		0	418	Heathcote	SSAA	0	1045
Halker	SSAA	0	2032	Hector	SSAA	0	1478
Hall		0	422	Hein	SSAA	0	1386
Hall		0	722	Heinze	SSAA	0	923
Hall		0	792	Henderson		0	621
Hall	SSAA	0	852	Henke	SSAA	0	1395
Hall	SSAA	0	2023	Henschke		0	479
Hall	SSAA	0	2089	Henschke		0	223
Hailam		52	0	Henshilwood	Mildura District, Dried Fruits Assoc.	0	119
Hallam		0	386	Hepburn		0	83
Halley		0	743	Hepworth		0	790
Hamilton	SSAA	0	842	Herberte		18	0
Hamilton	SSAA	0	1541	Hermiston	SSAA	0	823
Hampshire	SSAA	0	1356	Herns	SSAA	0	1427
Hancock		0	584	Hibbet		0	674
Hand	SSAA	0	1448	Hickey	SSAA	0	1341
Hands		0	533	Higgins		125	0
Hanley	SSAA	0	909	Higgins		0	770
Hanlyopoulos		0	730	Hill	National Trust of Australia (Vic)	0	775
Hannig	Walpeup—VFF	0	443	Hill	SSAA	0	1592
Hards	Millewa Sub-District Council—VFF	86	0	Hill		104	24
Hards		0	316	Hill		0	273
Hards		0	765	Hill	Robinvale—VFF	140	296
Harker		0	564	Hill		0	581
Harker		0	594	Hill		11	0
Harrigan	Beryl Nominees Pty Ltd	0	521	Hillman	SAA	0	1223
Harris	SSAA	0	865	Hinkley		0	336
Harris	SSAA	0	881	Hinks		0	458
Harris	SSAA	0	1200	Hippisley		46	6
Harris	SSAA	0	1573	Hirskine	SSAA	0	858
Harris	SSAA	0	2047	Hirst	SSAA	0	1208
Harrison	SSAA	0	1303	Hoarse		0	680
Harrison	SSAA	0	1384	Hobbs <i>et al</i>		0	760
Harrison	SSAA	0	1577	Hocking	SSAA	0	973
Harrison	SSAA	0	1616	Hocking	SSAA	0	1166
Harrison	SSAA	0	1997	Hodgen	SSAA	0	996
Harrison	SSAA	0	2021				

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Hodges	SSAA	0	1372
Hoffman	Sunset Pastoral Co.	62	224
Holden	SSAA	0	1069
Holdsworth	SSAA	0	1580
Holland		0	702
Hollis		0	591
Holmes		0	76
Holmes		0	77
Holmes	SSAA	0	1189
Holmes	SSAA	0	2011
Holt	SSAA	0	1015
Homan	Diamond Valley— Wilderness Society	55	423
Homan		0	152
Honeychurch	SSAA	0	2017
Hooper		0	195
Hopper	SSAA	0	867
Hore	Dpt of Property and Services	0	290
Horgan	State Electricity Commission of Vic	152	0
Horn	SSAA	0	1209
Horn		0	1294
Horne		103	0
Horstman	SSAA	0	853
Hosphol		193	0
Hossack	SSAA	0	1432
Houenbitzer	SSAA	0	1590
House		0	704
Howard	SSAA	0	1483
Howat	SSAA	0	1418
Howe	SSAA	0	2062
Howell	SSAA	0	1343
Howlett	SSAA	0	2025
Hudson		0	325
Hudson		0	326
Hudson		0	331
Huebner	Western Vic Cons. Ctee	78	0
Huebner		70	42
Hughes	SSAA	0	2081
Hulme		0	725
Humphries	FNCV—Stawell and District	0	413
Hunt		170	0
Hunt		0	248
Hunt & Sons		0	330
Hunter	SSAA	0	1511
Hunter	SSAA	0	1558
Hunter	Dept of Premier & Cabinet	0	1954
Hurry	SSAA	0	949
Hvmann		0	718
Isley		0	577
Imes	SSAA	0	1344
Inglis		0	61
Inkler		0	579
Irving	SSAA	0	1425
Iudica		0	8
Iva	SSAA	0	1207
Jackson		111	394
Jackson	Catchment Education Trust	0	25
Jackson		0	455
Jackson	SSAA	0	1150
Jackson	SSAA	0	1443
Jacobs	SGAP Victoria	192	0

Name	Department or association	First subm. no.	Second subm. no.
Jacobs		0	133
Jacobs	SSAA	0	1023
Jaeger-Davis		0	164
Jagger	SSAA	0	888
Jago		0	618
James		280	
James	SSAA	0	889
Jamieson		0	630
Janetzki		1	0
Janiszkiewicz	SSAA	0	1479
Jappie	SSAA	0	993
Jarrett	SSAA	0	1610
Jatti		0	360
Jenkins		0	282
Jenkins		0	283
Jenkins		0	676
Jenkins		0	772
Jennings	Upper Yarra—GFB	0	208
Jennings	Bellarine 4 x 4 Club	0	374
Jennings		0	759
Jensen	SSAA	0	1187
Jenson		175	0
Jeoff	SSAA	0	1210
Jetndusen	SSAA	0	1203
Joekel	SSAA	0	1326
Johanson		0	344
Johnson		0	157
Johnson		0	242
Johnson		0	703
Johnson	SSAA	0	1462
Johnston	SSAA	0	1473
Johnston	SSAA	0	1474
Johnstone		0	233
Johnstone		0	347
Jolli	SSAA	0	2083
Jones		0	135
Jones	SSAA	0	1090
Jones	SSAA	0	1605
Jones		0	286
Jones	SSAA	0	2087
Jones		0	606
Jones	SSAA	0	918
Jones	SSAA	0	934
Jones		0	203
Jones		0	304
Jones		0	801
Jorgensen	SSAA	0	1250
Jowk		0	438
Joyce	SSAA	0	994
Judkins		0	603
Junor	Aussie Outback Escorted Tours	0	552
Jupp	SSAA	0	811
Kane	Hattah-Kulkyne Advisory Committee	147	0
Kannard	SSAA	0	1376
Karanges		0	210
Keable		0	227
Keating		0	339
Keel		0	569
Keel		0	575
Keely		0	26
Keir	Sunraysia District Council, Australian Dried Fruits Assoc.	0	117

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Kellas	SSAA	0	1438
Kelly		51	0
Kelly-Jacka		0	212
Kemp		0	646
Kemp		0	771
Kemp	SSAA	0	1164
Kenna	Mid-Murray GFB	0	483
Kennedy, MP	Member for Bendigo West	0	665
Kenny	SSAA	0	2027
Kenny	SSAA	0	2028
Kent	SSAA	0	1370
Kent	SSAA	0	1593
Kent	SSAA	0	1970
Keon	SSAA	0	1588
Keresztesi	SSAA	0	826
Kerr		0	240
Kerr	SSAA	0	1067
Kerr	SSAA	0	1068
Kidman	SSAA	0	1944
Kiely		0	62
Kiely		0	378
Kiernan		0	86
Kiernan		0	672
Kilpatrick	SSAA	0	1984
Kimberley	SSAA	0	1167
Kimmel		174	0
Kimpton		0	342
King	SSAA	0	906
King	SSAA	0	1281
King	SSAA	0	1491
Kinleyside	SSAA	0	1216
Kiric	SSAA	0	981
Kirkpatrick		0	44
Klat	SSAA	0	807
Klat	SSAA	0	808
Klat	SSAA	0	809
Klupal	SSAA	0	1014
Knappert		0	348
Knights		0	677
Koch	SSAA	0	1124
Kocsis	SSAA	0	1221
Koliba	SSAA	0	1112
Kontrec		0	84
Kontrec		0	87
Koudrat	SSAA	0	1011
Kraguljac	SSAA	0	886
Krake		0	693
Kravs	SSAA	0	1311
Krelle		0	2
Krelle		0	664
Kress		0	430
Krueger		0	686
Kruger		0	517
Krumtunger	SSAA	0	954
L.Loyd		0	237
Lacey	SSAA	0	1517
Ladd	SSAA	0	947
Laizans		0	66
Lancaster	SSAA	0	952
Lane		0	127
Lane		0	636
Lane		0	637
Lanes	Jeparit GFB	0	217
Lanfranchi		0	221
Lange		0	49
Langenhoff	SSAA	0	868

Name	Department or association	First subm. no.	Second subm. no.
Lansdone	SSAA	0	953
Larson	SSAA	0	1630
Lathan	SSAA	0	1220
Laughan		0	179
Law		0	211
Lawrence	SSAA	0	1041
Lawson	SSAA	0	1140
Lawton		0	491
Lawyer	SSAA	0	1510
Layton		172	362
Lazic	SSAA	0	1978
Le Duc <i>et al.</i>		0	560
Le Page-Haines	SSAA	0	1029
Leach	NW Dist. Cncl. Land Settlement Ctee.—VFF	0	529
Lead	SSAA	0	1391
Lead	SSAA	0	1392
Learmonth		0	447
Lee	Westernport—VFGA	0	727
Lee	Reference Areas Advisory Ctee. (DCFL)	0	239
Leen	SSAA	0	1546
Leen	SSAA	0	1555
Leev	SSAA	0	1013
Legg	SSAA	0	1148
Lehmann		0	19
Lehmann		0	640
Lemmon	SSAA	0	1552
Lendaro	SSAA	0	999
Leorke		0	721
Leslie		26	0
Lester	Vic. Assoc. of 4WD Clubs	0	293
Levy	Animal Liberation	0	554
Lewis		0	53
Lewis	Highland Grp Soc. for Growing Aust. Plants	0	215
Lewis	SSAA	0	1102
Lewis	SSAA	0	1172
Lewis	SSAA	0	1226
Lianas	SSAA	0	1252
Libergo	SSAA	0	1460
Lidden		0	720
Lillan		0	198
Lindsay	SSAA	0	1520
Lindsay	SSAA	0	1521
Lindsay	SSAA	0	1523
Lindsey	SSAA	0	1270
Littlejohn	SSAA	0	1485
Llewelyn		0	242
Lloyd	SSAA	0	1382
Robert	SSAA	0	1064
Lock		0	185
Locket		110	323
Lockett		60	323
Lockett		61	0
Lockett		110	323
Lockett		0	749
Lockhart		0	567
Loftus-Hills		0	368
Logan	Underbool—VFF	0	409
Logg		0	695
Lomas	SSAA	0	1315
Lomas	SSAA	0	1561

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Long	SSAA	0	1109
Lonkin	SSAA	0	2029
Lord	SSAA	0	835
Lord	SSAA	0	1118
Love	SSAA	0	821
Luby		0	798
Lucas	SSAA	0	979
Lucas	SSAA	0	1963
Luenbull	SSAA	0	2058
Luxford	Cranbourne RFB	0	644
Lyell	Merbein Witchesy Club	0	497
Lyell	Mildura Carry-on-Club	0	498
Lyon	SSAA	0	1019
Lysch	SSAA	0	1017
MacArthur	SSAA	0	1244
MacDonald		0	264
MacDonald & Stringer	Rural Water Commission of Victoria	145	550
MacFady	SSAA	0	1379
MacFarlane		157	0
MacMahon		187	174
MacMahon		0	175
MacRae		0	694
Madden	Boort Advisory Ctee. (RWC)	0	738
Madge	Sunraysia Bushwalkers Club	0	291
Madge	North West Tree Group	0	301
Maggs		0	448
Mahoney	SSAA	0	1412
Makroglow	SSAA	0	1233
Malcolm		0	306
Mall	SSAA	0	839
Mallia	SSAA	0	1993
Mallia	SSAA	0	1994
Mallia	SSAA	0	1995
Mammone		0	112
Mandelst	SSAA	0	956
Manefield	SSAA	0	875
Manley		13	289
Manley		0	524
Manley	SSAA	0	1002
Mann		0	629
Manning		0	687
Manonella	SSAA	0	1487
Marcheffi	SSAA	0	2026
Marcheffi	SSAA	0	2026
Marchetti	SSAA	0	1025
Marcu	SSAA	0	1094
Marianni		0	723
Maroske	Wyperfeld NP & Albacutya Park Advisory Committee	138	643
Marr	SSAA	0	2030
Marriott	Stawell & District Conservation Group	0	651
Marsh	Land-Rover Owners' Club of Victoria	0	549
Marshall	SSAA	0	1297
Marshall	SSAA	0	1371
Marshall	SSAA	0	1540

Name	Department or association	First subm. no.	Second subm. no.
Marshall	SSAA	0	2085
Martin		0	213
Martin		0	604
Martin	Shepparton GBF	0	777
Martin	SSAA	0	922
Martin	SSAA	0	1070
Martin	SSAA	0	1472
Martin-Davies		0	635
Marwood		0	228
Marx	SSAA	0	1097
Marx	SSAA	0	1144
Mason	SSAA	0	1533
Mason	SSAA	0	2044
Mason	SSAA	0	2045
Masters		0	333
Matheson		0	535
Mathews	Meringur RFB	0	214
Matthews	Central VAA	0	268
Matthews		0	269
Matthews	Central VAA	0	270
Matthews		0	271
Matthews		0	332
Matthews		0	561
Matthews	SSAA	0	830
Matthews	SSAA	0	1085
Matthews et al		0	421
Maurel	SSAA	0	1451
May		0	99
May		0	253
May		0	390
Mayne	SSAA	0	1304
Mazis	SSAA	0	1119
Mazur	SSAA	0	1470
McAlicie	V/Line	34	0
McAnderson	SSAA	0	1982
McArthur		83	557
McArthur		0	295
McBain		0	520
McCallum		0	156
McCallum		0	217
McCallum		0	596
McCann		0	414
McCarthy		0	85
McCarthy		0	183
McCarthy		0	424
McClellan	SSAA	0	833
McClellan	SSAA	0	833
McClure		0	514
McCulloch		0	189
McDonald		12	0
McDonald		57	292
McDonald		0	444
McDonald	SSAA	0	1308
McDonald	SSAA	0	1318
McEwan	Victorian Assoc. of 4WD Clubs	0	293
McGrath		0	27
McGregor	SSAA	0	1100
McGuinness	SSAA	0	1010
McInnes		0	412
McIntosh		176	0
McIntosh		0	144
McIntyre	SSAA	0	1452
McKee		0	518
McKee		0	610
McKenna	SSAA	0	2022
McKenzie		0	649

Appendix I (continued)

<i>Name</i>	<i>Department or association</i>	<i>First subm. no.</i>	<i>Second subm. no.</i>
McLaren	SSAA	0	1104
McLean		9	0
McLean		0	647
McLean	SSAA	0	1481
McLean <i>et al</i>		0	764
McLeish	SSAA	0	2080
McLelland		162	0
McLennan		0	389
McLeod	SSAA	0	1377
McLeod	SSAA	0	1378
McMahon	SSAA	0	1999
McMillan & Kirby	Shire of Mildura	126	43
McMonnies		134	182
McNair	SSAA	0	1636
McNaughton	SSAA	0	1364
McPhail	S.A. Dept of Environment and Planning	0	13
McPhee		0	346
McRoberts	SSAA	0	1989
McSwain		16	262
McSweeney	SSAA	0	1351
McWilliam		0	78
Meagher		0	260
Medleman	SSAA	0	870
Medson	SSAA	0	2035
Medson	SSAA	0	2036
Medson	SSAA	0	2037
Meehan		0	619
Mellmann		0	93
Mellmann		0	103
Mellmann		0	104
Menkhorst		0	410
Mentiplay <i>et al</i>		0	393
Meredith	Aust. Biological Research Group	159	732
Michener		0	67
Middleton		0	685
Mikelsons	SSAA	0	838
Milano	SSAA	0	1415
Miller		0	701
Miller	SSAA	0	1259
Miller	SSAA	0	1319
Mills		0	92
Mills		0	97
Mills	Ouyen RFB	0	540
Milis	SSAA	0	951
Milne	SSAA	0	1018
Milne	SSAA	0	1044
Milner	SSAA	0	2018
Mitchell		85	0
Mitchell		97	153
Mitchell		108	153
Mitchell	Bird Observers Club of Australia	142	354
Mitchell		197	0
Mitchell		0	153
Mitchell	Peninsula Wild. Soc.	0	209
Mitchell		0	778
Mitchell	SSAA	0	2059
Mocking	SSAA	0	1543
Muddaleng	SSAA	0	1525
Moder	SSAA	0	1139
Moloney		43	108
Moloney	Shire of Dimboola	49	114
Monaghan		0	109

<i>Name</i>	<i>Department or association</i>	<i>First subm. no.</i>	<i>Second subm. no.</i>
Monaghan		0	714
Moncrieff	SSAA	0	1249
Monnissey	SSAA	0	877
Monon	SSAA	0	1492
Monson	Vic. Apiarists' Assoc.	72	391
Monson	SSAA	0	1004
Montague	SSAA	0	1215
Monterosso	SSAA	0	1155
Moody & Assoc.	SSAA	0	917
Moon		0	140
Moon	4 x 4 Australia	0	467
Moore		180	464
Moore		0	666
Moore	SSAA	0	1154
Moore	SSAA	0	1477
Moore	SSAA	0	1583
Moore	SSAA	0	2053
Moorfield	SSAA	0	1945
Moran		0	776
Morcom		30	54
Morey		0	51
Morris		0	746
Morris	SSAA	0	1329
Morris	SSAA	0	1330
Moser		0	454
Moss	SSAA	0	1459
Mosseson	SSAA	0	942
Moulding		0	387
Moyle		42	0
Moyle		124	0
Moyne	SSAA	0	816
Muller		0	597
Mullins	Maroondah GFB	0	748
Munro		29	0
Murphy	Dalgety Farmers Ltd	0	171
Murphy		0	366
Murphy		0	767
Murray		0	284
Murray		0	285
Murray	Victoria Land Council, Aborigines Advancement League	0	369
Murray	SSAA	0	834
Murray	SSAA	0	1199
Murray	SSAA	0	1268
Musscke	SSAA	0	1096
Myers	Vic. Recreational Fishermen's Advisory Council	0	769
Nagl		0	116
Nasewelle	SSAA	0	2007
Nation	SSAA	0	900
Nazkias	SSAA	0	1497
Neil		0	1286
Nest	SSAA	0	1611
Neville		200	0
Newland	SSAA	0	1453
Newton	SSAA	0	2088
Nicholls	Swan Hill and Dist Aboriginal Co-Op	0	655
Nicholls	SSAA	0	1161
Nicohazzo	SSAA	0	1623
Nicol	SSAA	0	1059
Nielsen	SSAA	0	1594
Nielsen	SSAA	0	1595

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Noble		0	752
Nocolouhoushi	SSAA	0	1248
Noelker	Shire of Swan Hill	109	0
Noelker		47	0
Noelker		99	0
Nolan	SSAA	0	2050
Nolan	SSAA	0	2051
Noonan	Shire of Birchip	0	5
Normington	SSAA	0	1130
Norris		0	307
Northe	SSAA	0	1137
Norton	SSAA	0	2086
Nulty		150	151
Nunan		0	89
Nunn		20	419
Nuske	Yaapeet Football Club	0	9
O'Brien		44	38
O'Brien		128	71
O'Callaghan		0	487
O'Callaghan		0	544
O'Connor		0	143
O'Donnell		6	426
O'Donnell		0	614
O'Dwyer	Borough of Kerang	0	708
O'Neil	FNCV—Geelong	0	736
O'Neill		0	126
O'Neill	SSAA	0	820
O'Shannessy		0	204
O'Sullivan		0	60
O'Sullivan		0	556
O'Sullivan		0	595
O'Sullivan		0	147
O'Sullivan		94	180
O'Sullivan		0	519
O'Sullivan		0	527
O'Sullivan		0	537
O'Sullivan		0	107
O'Sullivan		0	169
Oatey		0	634
Ogilvie		0	706
Olden	Mammal Survey Group of Victoria Inc	136	623
Oliver		0	190
Oliver	SSAA	0	1026
Oliver	SSAA	0	1027
Oliver	SSAA	0	1354
Orchard	Kerang RFB	0	350
Ordinans		0	684
Orsoanski	S.A. Wild. Soc.	80	0
Osborn	FNCV—Maryborough	0	110
Oswin		0	118
Oustabasidis		0	446
Outrata	SSAA	0	871
Overington	SSAA	0	1426
Overton	SSAA	0	1328
Owen		163	0
Owen		165	0
Owen		166	0
Owen		0	235
Oxley	Shire of Swan Hill	109	45
Pace	SSAA	0	982
Page		0	700
Page	SSAA	0	1537
Pallot	SSAA	0	1347

Name	Department or association	First subm. no.	Second subm. no.
Panagiotopoulos	SSAA	0	908
Panter		0	155
Paraskukis	SSAA	0	1390
Parma	SSAA	0	1435
Parsons		63	52
		0	32
	Sunset 4-W-D Tours		
Passante	SSAA	0	844
Paterson	Dpt of Water Resources	0	757
Paterson	SSAA	0	1180
Patterson		0	160
Patterson	SSAA	0	1071
Patti	SSAA	0	1133
Pattinson		121	297
Paul	SSAA	0	822
Payne	SSAA	0	1597
Paynter	SSAA	0	1247
Pearce		0	667
Pearce		0	668
Pearce		0	669
Pearce		0	673
Pearse		0	276
Pefke	SSAA	0	1389
Pellaa		0	216
Pendleton	SSAA	0	1551
Petri	SSAA	0	1160
Perry		173	0
Perry	Wildlife Protection Agency	0	122
Perry	SSAA	0	894
Peter-Budge	SSAA	0	1544
Petrie	Kara Kara GFB	0	193
Pettenhofes	SSAA	0	1127
Pettingill	SSAA	0	1020
Petzke	SSAA	0	1980
Phalters	SSAA	0	1499
Phillips		48	130
Phillips		105	0
Phillips		0	111
Phillips		0	173
Phillips		0	613
Phillips		0	698
Pickering		0	568
Pickworth	SSAA	0	1433
Piez		199	0
Pinny	SSAA	0	1255
Pipkorn	SSAA	0	2000
Pippin		35	315
Pitman	SSAA	0	1572
Pizzoni	SSAA	0	936
Plalten	SSAA	0	1575
Plowright	SSAA	0	1278
Plush	SSAA	0	1258
Pohlner		0	716
Poland		179	357
Pole		0	773
Pond		0	341
Poon	SSAA	0	1424
Porteous		0	307
Porter	SSAA	0	1082
Potter	Country Fire Authority	98	1952
Poulovic	SSAA	0	1976
Powell		0	265
Pratt	SSAA	0	925
Prentice	SSAA	0	930

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Prepel	SSAA	0	1556
Preuss	Aust Wildlife Protection Council	0	408
Price	SSAA	0	948
Prisley		127	0
Prouse	SSAA	0	937
Prytherch		0	247
Pulla	SSAA	0	958
Purdue & Sons		0	516
Purvis Aust.	Deer Assoc.	0	782
Pymr	SSAA	0	962
Quinlan		122	0
Quinn		0	593
Quinn	SSAA	0	836
Quinney	SSAA	0	1285
Radeliffe		0	661
Rae	SSAA	0	813
Rae	SSAA	0	1350
Ramagi	SSAA	0	1374
Ramsey	SSAA	0	2008
Rand	SSAA	0	1055
Randall	SSAA	0	1476
Rando		0	199
Ranken		0	0
Rarkin		0	507
Rath		0	250
Read		143	0
Read		0	786
Reddick	SSAA	0	1598
Redman	SSAA	0	1142
Reece	SSAA	0	1263
Reedie	SSAA	0	1562
Reedy	SSAA	0	1519
Reeves	SSAA	0	1301
Reeves	SSAA	0	1600
Reichert	SSAA	0	1961
Reid	SSAA	0	1327
Reinbold	SSAA	0	890
Reinwald	SSAA	0	1183
Ricci	SSAA	0	825
Rich		0	267
Rich		0	562
Richardson		0	15
Ridgway	SSAA	0	1363
Rintoule	SSAA	0	919
Risomen	SSAA	0	1604
Roach		0	411
Road	SSAA	0	1571
Robbins	SSAA	0	1570
Roberts		0	710
Roberts	SSAA	0	1021
Roberts		0	1283
Roberts	SSAA	0	1410
Robertson		0	488
Robertson	SSAA	0	1589
Robinett	SSAA	0	2002
Robinett	SSAA	0	2003
Robinett	SSAA	0	2004
Robinett	SSAA	0	2005
Robinson	Sunraysia—VFGA	0	475
Robinson	Mergate GFB	0	125
Robinson	FN—Sunraysia	0	361
Robinson		0	590
Robinson	SSAA	0	1089
Rogers		0	314
Rogers	SSAA	0	1232
Rogers	SSAA	0	1602

Name	Department or association	First subm. no.	Second subm. no.
Romand	SSAA	0	1091
Rose	SSAA	0	1618
Rosie	SSAA	0	915
Ross		0	463
Ross		0	741
Ross	SSAA	0	1394
Ross	SSAA	0	1516
Rostoks	SSAA	0	1522
Rothwell	SSAA	0	831
Rowe		115	0
Rowley	Victorian Mountain Tramping Club	0	638
Rowley	SSAA	0	887
Roy-Chowdaury	SSAA	0	1036
Ruchel		0	312
Rudd	SSAA	0	1501
Ruddick	Ouyen UFB	0	541
Ruddick	Ouyen & District GFB	0	542
Ruddick	SSAA	0	1639
Ruff		0	236
Russell	Mildura Plaster Mills	144	0
Russell		0	102
Russell	SSAA	0	1113
Russell	SSAA	0	1440
Ryan		139	0
Ryan		181	0
Ryan	SSAA	0	1948
Sabo	SSAA	0	984
Said	SSAA	0	2040
Sajiba	SSAA	0	832
Sanders		188	530
Sanders		0	367
Sanger	SSAA	0	968
Santor	SSAA	0	911
Sargent	SSAA	0	1607
Saunders	SSAA	0	974
Sawyer	SSAA	0	1368
Sayers	SSAA	0	1132
Sayome	SSAA	0	1388
Sbalchiero		0	440
Scammell		0	251
Scantlebury	SSAA	0	959
Scarlet	SSAA	0	2054
Scarlett	SSAA	0	1456
Schache		0	572
Schache		0	576
Schaer		0	358
Schinkel		0	167
Schippers	SSAA	0	1969
Schlunke		65	0
Schmidt	SSAA	0	938
Schmidt	SSAA	0	1546
Schofield	Birchip Harness Racing Club	0	756
Schofield	SSAA	0	955
Schwab		0	225
Scott		182	0
Scott		0	261
Scott	SSAA	0	1165
Scott	SSAA	0	1581
Scown		87	0
Scown		88	498
Scurrah	SSAA	0	1116
Selkrig		0	534
Semmens	SSAA	0	1043
Semmens		0	545

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Semmens	SSAA	0	1406
Semmler		0	804
Sennart	Boort—VFF	0	506
Shanahan	SSAA	0	1966
Shanahan	SSAA	0	1967
Shannon		0	571
Sharples	SSAA	0	1582
Shaw		0	781
Shaw	SSAA	0	908
Sheahan	SSAA	0	1331
Shearer		156	402
Sheeton	SSAA	0	1434
Sheil	SSAA	0	1156
Sheren	SSAA	0	857
Sherwood		167	207
Shields	SSAA	0	1047
Shivalanka		0	713
Shore	SSAA	0	1471
Siltow	SSAA	0	1012
Silve	SSAA	0	1402
Simmons		0	252
Simmons		0	257
Simmons		0	258
Simms		0	754
Simpson		0	202
Skinns		0	559
Slater	SSAA	0	1149
Sleep		102	375
Slocombe	SSAA	0	1633
Slubbey	SSAA	0	1264
Smeaton		0	800
Smith		10	548
Smith		133	0
Smith		164	0
Smith		178	18
Smith		0	11
Smith	SSAA	0	1490
Smith	SSAA	0	1614
Smith		0	194
Smith		0	356
Smith	SSAA	0	819
Smith	Region 18 Council—RMB	0	382
Smith	SSAA	0	860
Smith	Beulah RFB	0	461
Smith	North-Eastern Deer Stalkers' Assoc.	0	780
Smith		0	384
Smith	Mildura UFB	0	502
Smith	SSAA	0	941
Smith	SSAA	0	1464
Smith		0	146
Smith	Blackburn & District Tree Preservation Soc.	0	334
Smith	Southern Mallee GFB	0	377
Smith		0	665
Smyth		0	705
Snelgrove	SSAA	0	1000
Softly	SSAA	0	1503
Soldiston	SSAA	0	1603
Sommers	SSAA	0	810
Sorlie	SSAA	0	1284
Spedding	SSAA	0	1212
Spencer	SSAA	0	1569
Spencer	SSAA	0	2043

Name	Department or association	First subm. no.	Second subm. no.
Spitalen	SSAA	0	2063
Spitaleri	SSAA	0	1159
Spooner	SSAA	0	1974
Srb		0	633
Stabb		58	416
Stacey	SSAA	0	1608
Stanton		0	351
Stasiewicz		0	793
Stead	SSAA	0	1559
Steggall, MP	Member for Swan Hill	0	37
Stehn	SSAA	0	1422
Steinhardt		0	588
Stephen	SSAA	0	856
Stephenson	SSAA	0	1053
Stevens	SSAA	0	1949
Stevens	SSAA	0	2077
Stewart	SSAA	0	1342
Stewart	SSAA	0	1530
Stockdale	SSAA	0	1033
Stoeckel		91	427
Stone		0	98
Stone		0	476
Stone		0	480
Stone		0	532
Stone & Sons	SSAA	0	1088
Stoneman	SSAA	0	998
Stony	SSAA	0	1336
Story	SSAA	0	988
Streeter	SSAA	0	924
Stringer		0	246
Stringer	SSAA	0	921
Stringer	Leaghur Forest Park Cree. of Management	0	246
Stuart		0	349
Stuart	SSAA	0	1352
Stuart	SSAA	0	1585
Stulhbery	SSAA	0	1073
Sullivan		75	0
Sully		151	0
Sunnett		0	778
Sutherland		90	508
Sutton	SSAA	0	1373
Sutton	SSAA	0	1500
Svensson	SSAA	0	2056
Swain		0	148
Swayn		0	96
Swebb	SSAA	0	1971
Swinden	SSAA	0	2060
Sykes	SSAA	0	913
Sykes	SSAA	0	1494
Sylvia		0	14
Symes		114	0
Symonds	SSAA	0	907
Syoibosci	SSAA	0	1529
Taggart		0	547
Tait		0	462
Tait	SSAA	0	1513
Tanner		0	726
Taugge	SSAA	0	843
Taylor		0	101
Taylor		0	172
Taylor		0	201
Taylor		0	620
Taylor		0	691
Taylor	SSAA	0	1125

Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.	Name	Department or association	First subm. no.	Second subm. no.
Taylor	SSAA	0	1465	Underwood		0	682
Taylor	SSAA	0	1468	Utishe	SSAA	0	1282
Taylor	SSAA	0	1578	Vallance		0	486
Taylor	SSAA	0	1579	Van Brummelen	SSAA	0	975
Teazis	SSAA	0	1634	Van De Vreede		185	29
Teazis	SSAA	0	1635	Van Der Bronk	SSAA	0	1335
Templeton	SSAA	0	931	Van Der Heydey	SSAA	0	1121
Tesenic	SSAA	0	1266	Van Meure	SSAA	0	1086
Testi		190	0	Vary		0	31
Thomas		0	383	Vear		0	230
Thomas		0	457	Vearing	SSAA	0	1078
Thomas		0	523	Vella	SSAA	0	895
Thomas		0	546	Vella	SSAA	0	1049
Thomas		0	806	Vella	SSAA	0	1050
Thomas	SSAA	0	1265	Vella	SSAA	0	1051
Thomas	SSAA	0	1332	Venn	Returned Services League	0	437
Thomas	SSAA	0	1333	Vereker	SSAA	0	1103
Thomas	SSAA	0	1564	Vernon		0	659
Thompson	FNCV—Latrobe Valley	45	166	Verson	SSAA	0	1105
Thompson	SSAA	0	1992	Vielar	SSAA	0	2049
Thompson	SSAA	0	2052	Villeda	SSAA	0	851
Thomson	Hattah Salt—Larmon Pty Ltd	119	69	Vine	Nangiloc Colignan Salinity Working Grp	36	36
Thomson		0	313	Vipond	SSAA	0	1628
Thomson		0	403	Vipond	SSAA	0	1629
Thongvilu	SSAA	0	1120	Vivian-Smith		0	345
Thorpe	SSAA	0	1469	Vlaeminek	SSAA	0	1365
Thorpe	SSAA	0	1475	Voigt		0	570
Tillson	SSAA	0	987	Vondra	SSAA	0	1218
Timmins		189	0	Vos		0	715
Timms	SSAA	0	2082	Waghorn	SSAA	0	1163
Tomas	SSAA	0	847	Walch		0	513
Tompson	SSAA	0	1289	Walker	SSAA	0	859
Tomsett	Kerang Lakes Area Working Group	0	609	Walker		0	495
Tonkin		0	266	Walker		0	642
Tonkin	SSAA	0	1143	Walker		0	755
Torney		0	515	Walker		0	329
Toskovski	SSAA	0	1446	Walker	SSAA	0	1031
Toumbourou	SSAA	0	1615	Walker	SSAA	0	1253
Townsend	SSAA	0	920	Walker	SSAA	0	1423
Toyne	Australian Cons. & Sher Foundation	79	496	Walker	SSAA	0	1960
Trappel	SSAA	0	1549	Wall		19	317
Treloar	Carwarp RFB	0	3	Walli		0	328
Trempyme	SSAA	0	1081	Wall		0	396
Tribuiani	SSAA	0	1950	Wallace	SSAA	0	1279
Trower	SSAA	0	1626	Waller	Project Local Earth Awareness	0	739
Truscott	SSAA	0	1420	Wallis	SSAA	0	1565
Tsiolkas		177	429	Walls	SSAA	0	1349
Tucker		0	40	Walls	SSAA	0	1450
Tucker		0	578	Walscott	SSAA	0	905
Tucker	SSAA	0	1138	Walsh		107	0
Tucker	SSAA	0	2055	Walsh		0	80
Tuit		0	120	Walsh		0	439
Turner	Solomit Strawboard	146	380	Walsh	SSAA	0	824
Turner	SSAA	0	827	Walsh	SSAA	0	1261
Turner	SSAA	0	1106	Walsh	SSAA	0	1567
Turner	SSAA	0	1986	Walters	SSAA	0	1387
Turne	SSAA	0	2079	Walton	Kerang—VFGA	0	321
Tyler	Gipps and 4-W-D Club	0	784	Ward		53	0
Tyler	SSAA	0	1405	Ward	SSAA	0	910
Tyson		171	20	Ward	SSAA	0	935
Tychman		0	589	Ward	SSAA	0	1058
Ulrich		0	510	Ward	SSAA	0	1403
				Ward	SSAA	0	1981

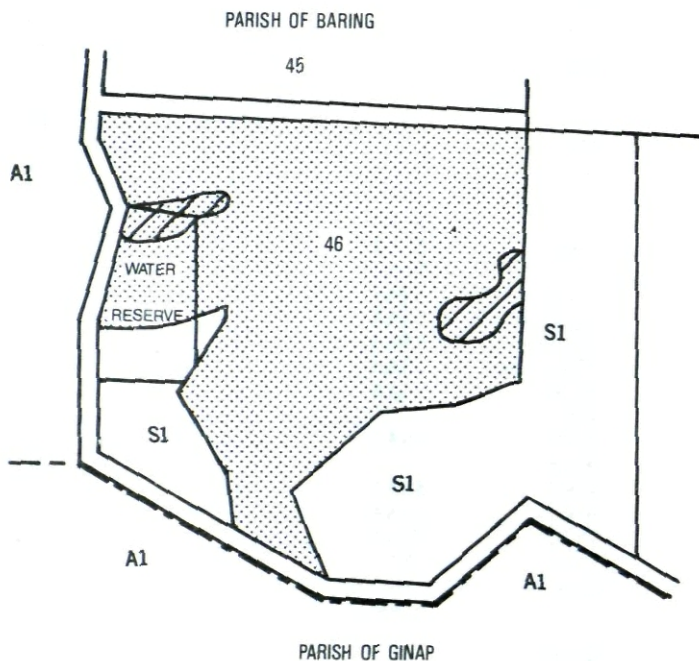
Appendix I (continued)

Name	Department or association	First subm. no.	Second subm. no.
Wardlaw	SSAA	0	1442
Wardle		0	803
Warfe		0	145
Wate	SSAA	0	1317
Waterman	Melbourne Wild. Soc.	82	320
Waterson	Swan Hill High School	0	476
Watkin	SSAA	0	1135
Watson	SSAA	0	1509
Watson	SSAA	0	1515
Watts	SSAA	0	1613
Webster	SSAA	0	1277
Weidemann	SSAA	0	1419
Wells	SSAA	0	1087
Wescott		0	608
West	SSAA	0	1345
West	SSAA	0	1367
Westbrooke		64	417
Westcott		0	797
Westcott	SSAA	0	1225
Weste		0	139
Westhead	SSAA	0	929
Weston	SSAA	0	1320
Whalley	SSAA	0	2013
Whatley	SSAA	0	1300
Wheeler		17	4
Whelan	SSAA	0	1358
Whiddon	SSAA	0	1360
Whitaker		0	717
White	SSAA	0	1409
White	SSAA	0	2019
Whiting, MP	Member for Mildura	19	0
Whiting		0	679
Wickham	SSAA	0	1586
Widdicombe	Shire of Dunmunkle	0	355
Wiffen		27	0
Wilcock	SSAA	0	1313
Wilcock	SSAA	0	2031
Wild		0	574
Wilde	SSAA	0	2016
Wilkenson	SSAA	0	1222
Wilkinson		0	359
Wilkinson		0	656
Wilkinson	SSAA	0	1032
Williams		0	81
Williams		0	82
Williams		0	415
Williams		0	459
Williams	Mildura Motorcycle Club	0	482
Williams		0	580
Williams	SSAA	0	879
Williams	SSAA	0	1256
Williams	SSAA	0	1596

Name	Department or association	First subm. no.	Second subm. no.
Williams	SSAA	0	2075
Williamson		0	805
Willingham	SSAA	0	1201
Willingham	SSAA	0	2009
Willis	SSAA	0	1042
Willoughby	FNCV—Mid Murray	71	627
Wilson		0	68
Wilson		0	231
Wilson	SSAA	0	933
Wilson	SSAA	0	1299
Wilson	SSAA	0	1396
Wilson	SSAA	0	1416
Wilson	SSAA	0	1555
Wiltshire	SSAA	0	963
Wiltshire	SSAA	0	1951
Winning	SSAA	0	903
Withington	SSAA	0	1399
Withy	SSAA	0	1134
Witt		0	433
Wolfh	SSAA	0	1312
Wood		194	0
Wood	SSAA	0	1339
Wood	SSAA	0	1632
Wood	SSAA	0	1987
Wooden	SSAA	0	2033
Woolford	Geelong Environment Council	0	364
Woollard		129	64
Woolough	SSAA	0	1539
Woonton	SSAA	0	995
Wooster	SSAA	0	1489
Worthy		0	170
Woulfe		0	671
Wright	Dept of Agriculture & Rural Affairs	50	473
Wright		0	33
Wright	SSAA	0	1437
Wright	SSAA	0	1441
Wright	SSAA	0	1550
Wust	SSAA	0	1035
Yen	SSAA	0	902
Yetman		155	0
Young	SSAA	0	1254
Young	SSAA	0	1449
Young	SSAA	0	1568
Zaffiris	SSAA	0	2010
Zapponie	SSAA	0	1627
Ziakowski	SSAA	0	1060
Zimmermann	SSAA	0	1275
Zingg	SSAA	0	1079
Zinich		0	585
Zivkovic		0	95
Zonneveldt		0	795

AGRICULTURE F1
PARISH OF BARING

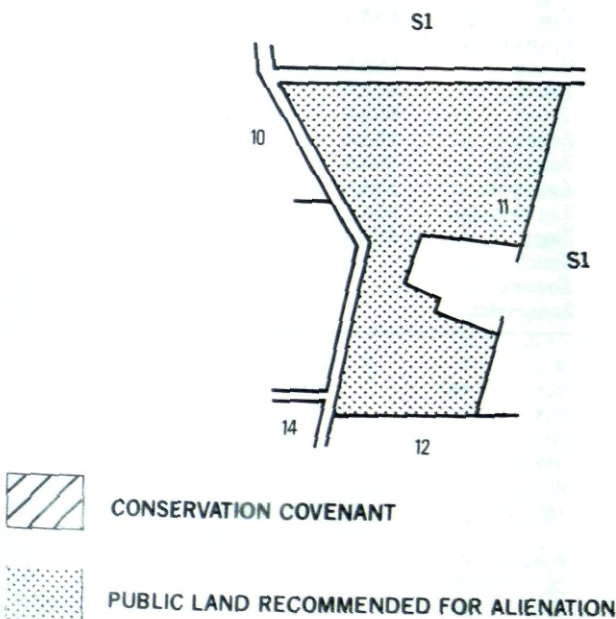
MAP 1



SCALE 1 : 30 000

PARISH OF BARING NORTH

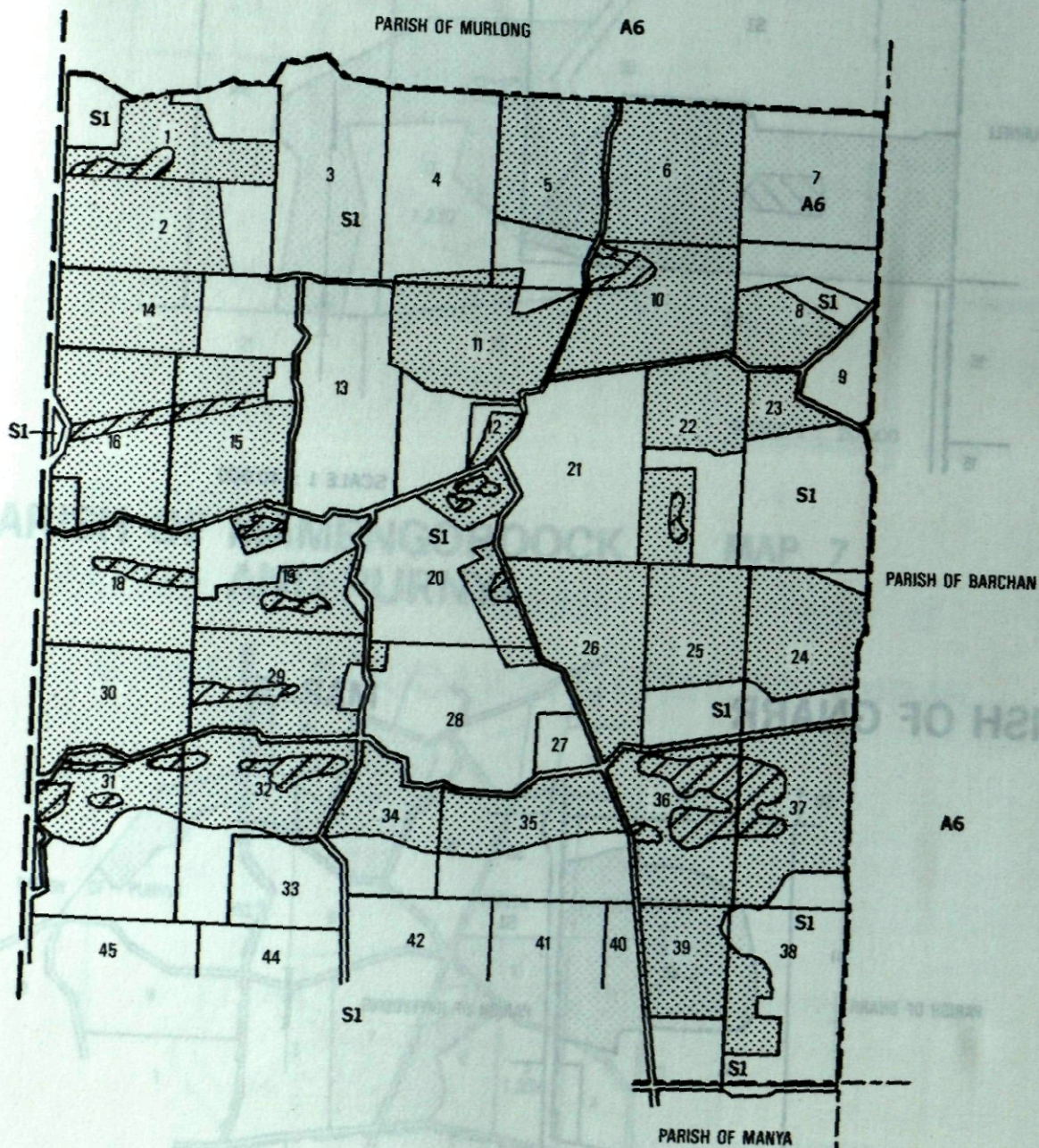
MAP 2



SCALE 1 : 40 000

AGRICULTURE F1 PARISH OF BERROOK

MAP 3



CONSERVATION COVENANT

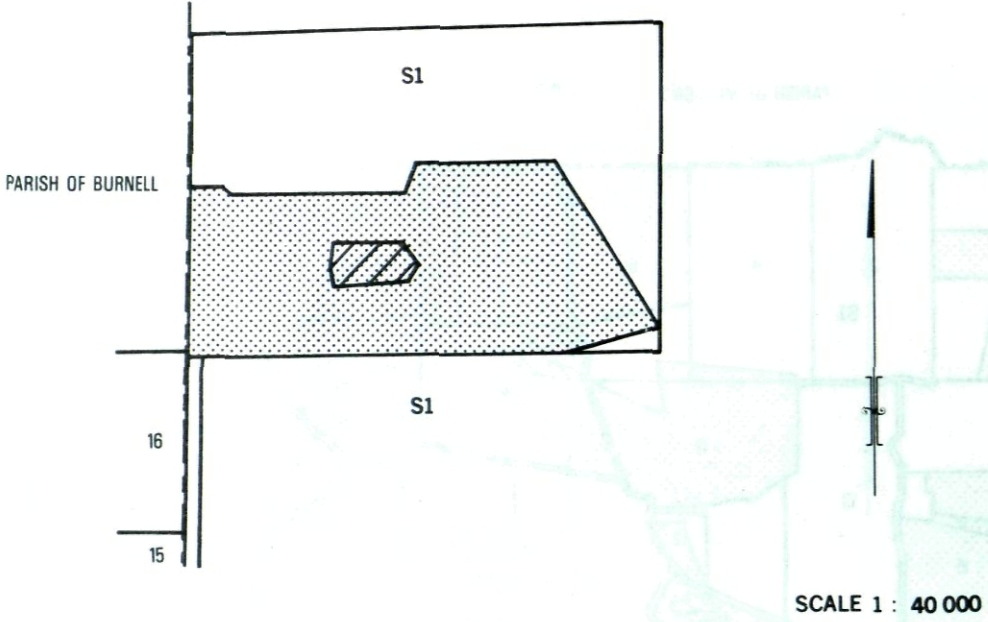


PUBLIC LAND RECOMMENDED FOR ALIENATION

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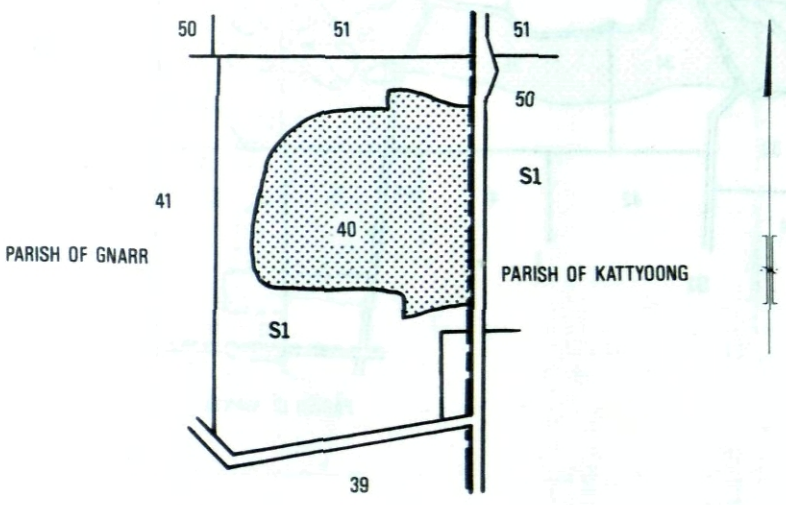
AGRICULTURE F1
PARISH OF BOOLUNGAL

MAP 4



PARISH OF GNARR

MAP 5



CONSERVATION COVENANT

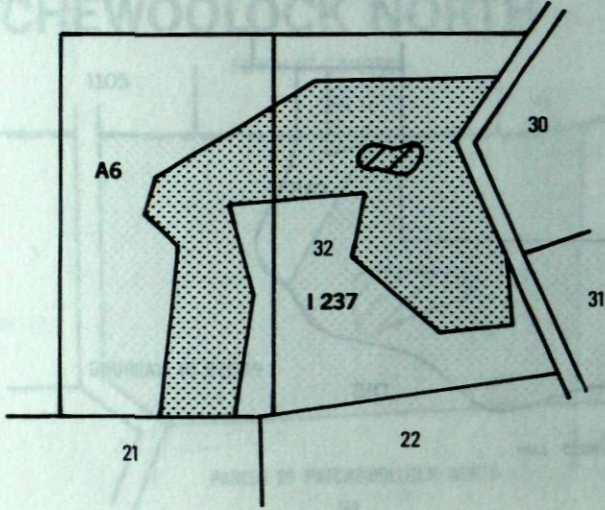


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AGRICULTURE F1
PARISH OF GNARR

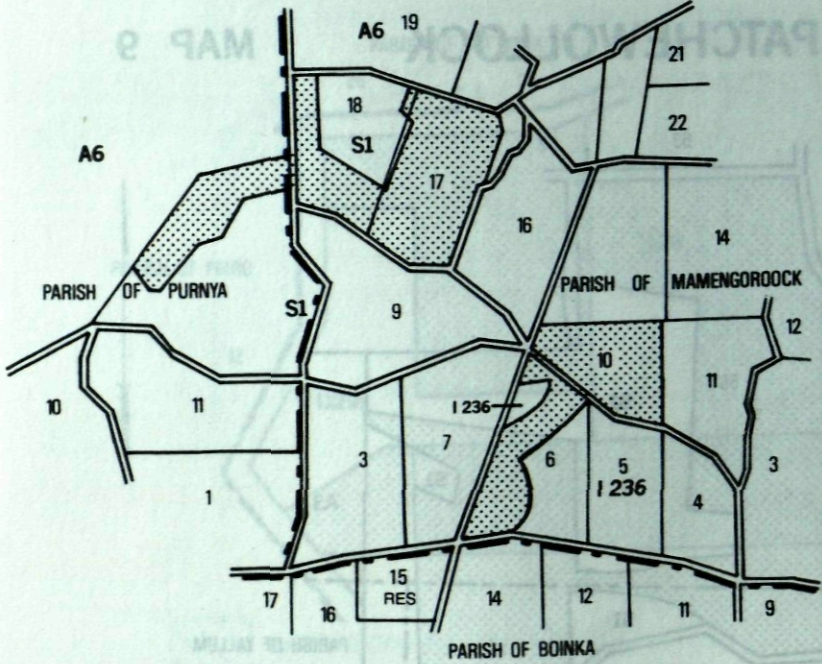
MAP 6



SCALE 1 : 20 000

PARISH OF MAMENGOROCK
AND PURNYA

MAP 7



CONSERVATION COVENANT

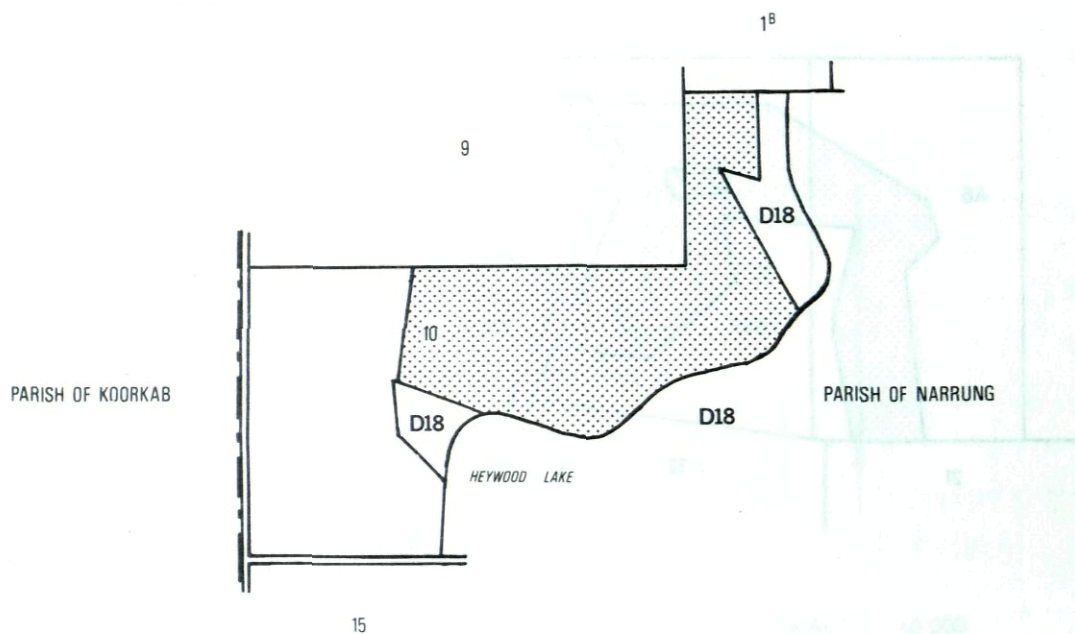


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SCALE 1 : 1 000 000

AGRICULTURE F1 PARISH OF NARRUNG

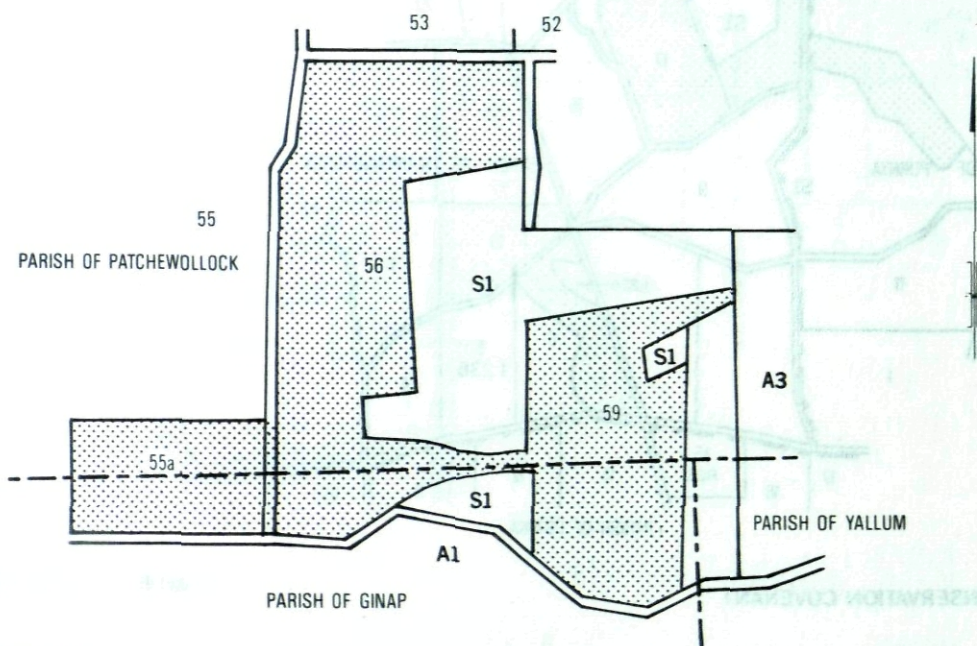
MAP 8



SCALE 1 : 40 000

PARISH OF PATCHEWOLLOCK

MAP 9

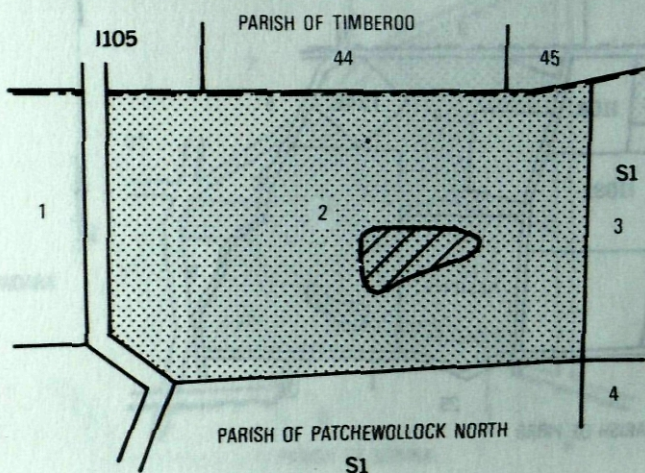


PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 50 000

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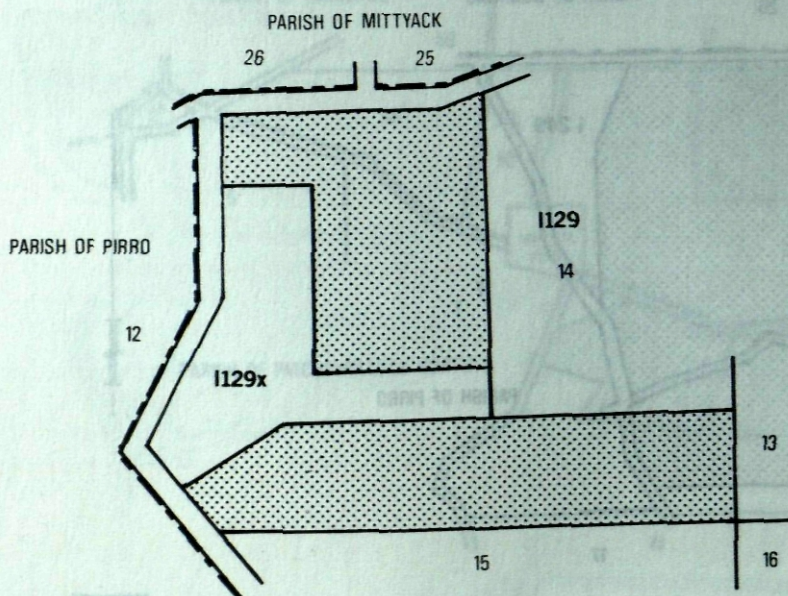
MAP 10



SCALE 1 : 20 000

PARISH OF PIER - MILLAN

MAP 11



CONSERVATION COVENANT

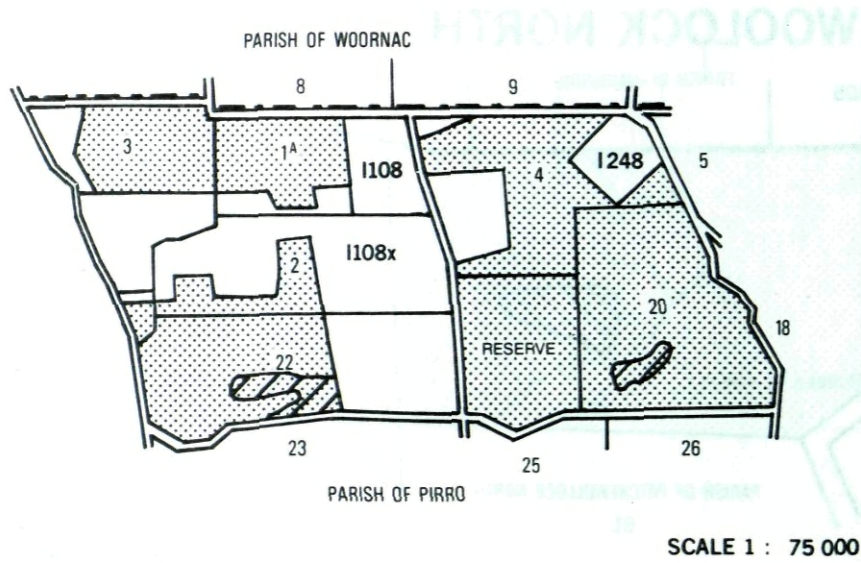


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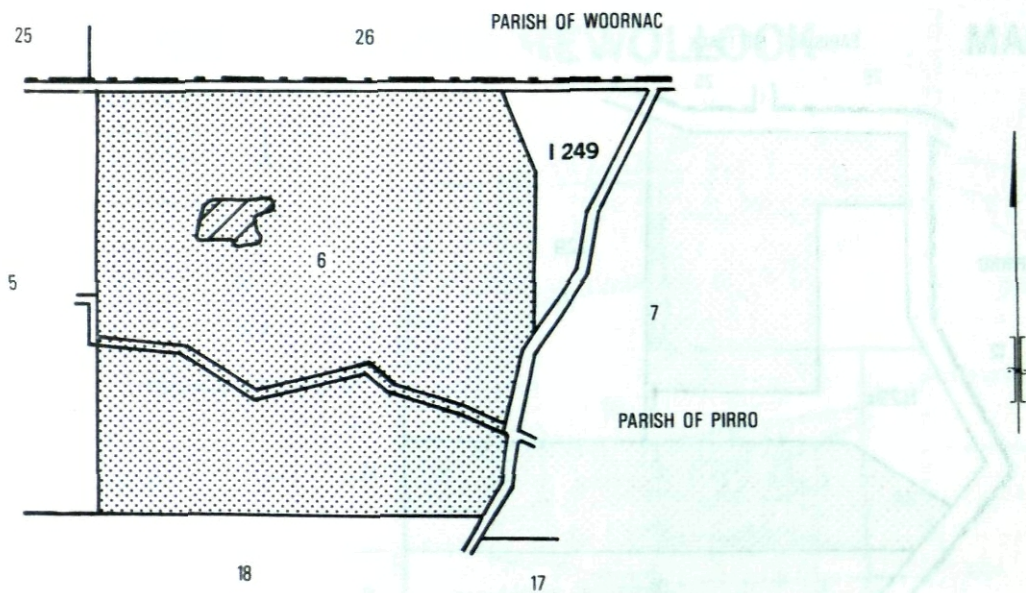
AGRICULTURE F1
PARISH OF PIRRO

MAP 12



PARISH OF PIRRO

MAP 13



CONSERVATION COVENANT

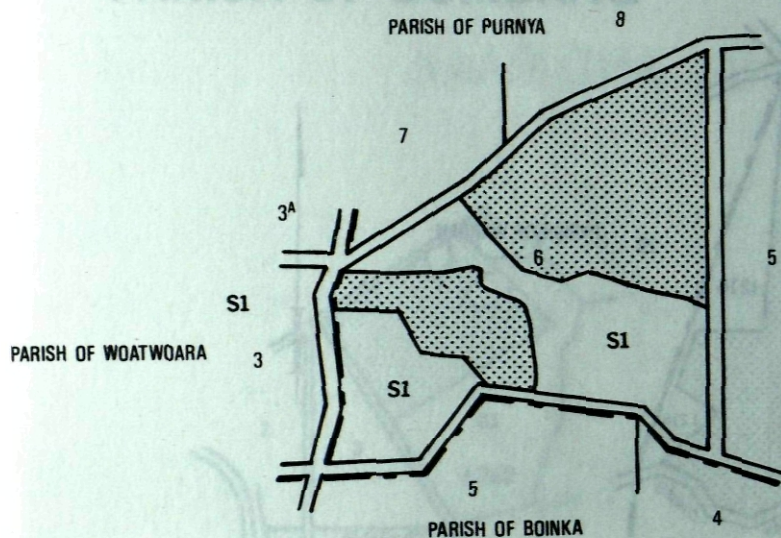


PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 30 000

AGRICULTURE F1 PARISH OF PURNYA

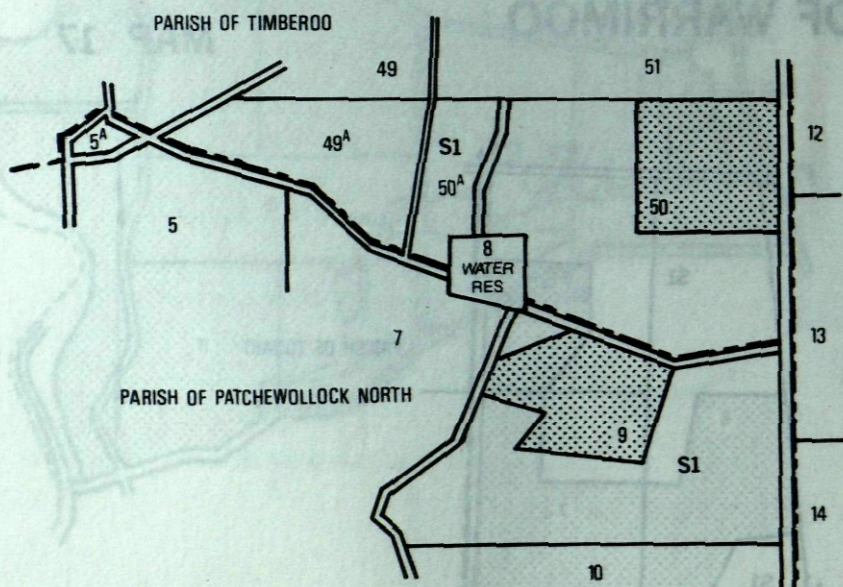
MAP 14



SCALE 1 : 40 000

PARISH OF TIMBEROO AND PATCHEWOLLOCK NORTH

MAP 15



PARISH OF MITTYAH

G35



LAND PROPOSED FOR EXCHANGE



CONSERVATION COVENANT



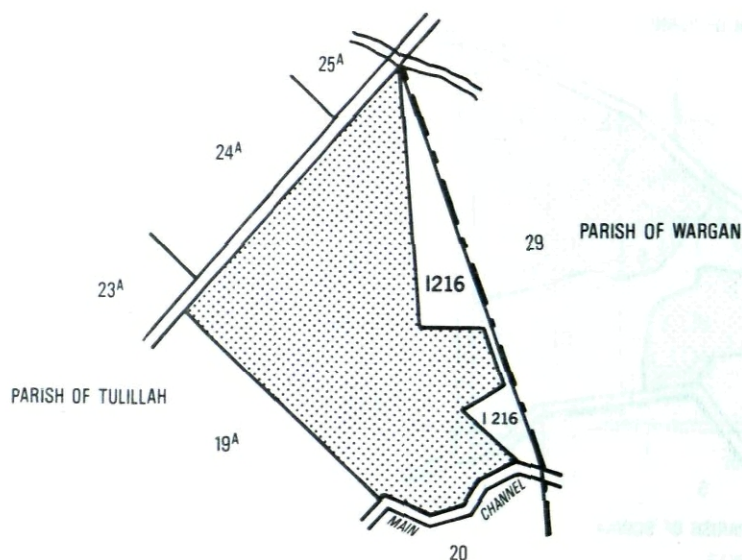
PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 50 000

AGRICULTURE F1

MAP 16

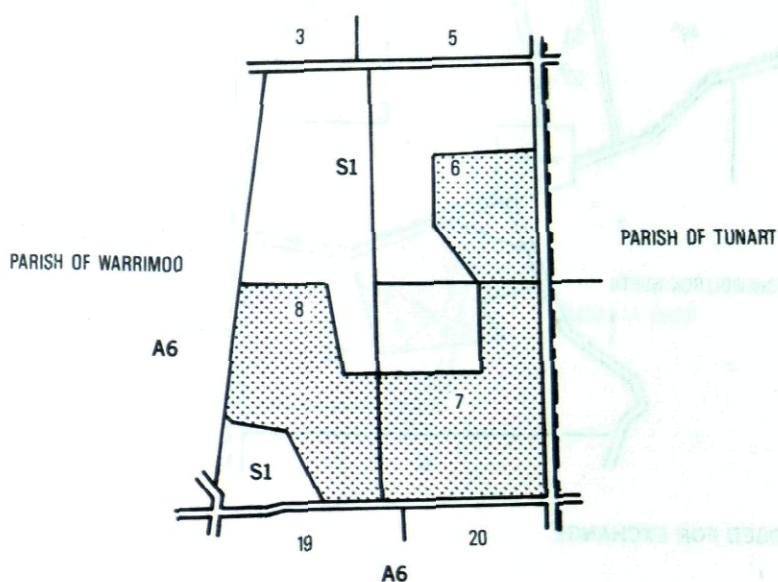
PARISH OF TULILLAH



SCALE 1 : 40 000

PARISH OF WARRIMOO

MAP 17

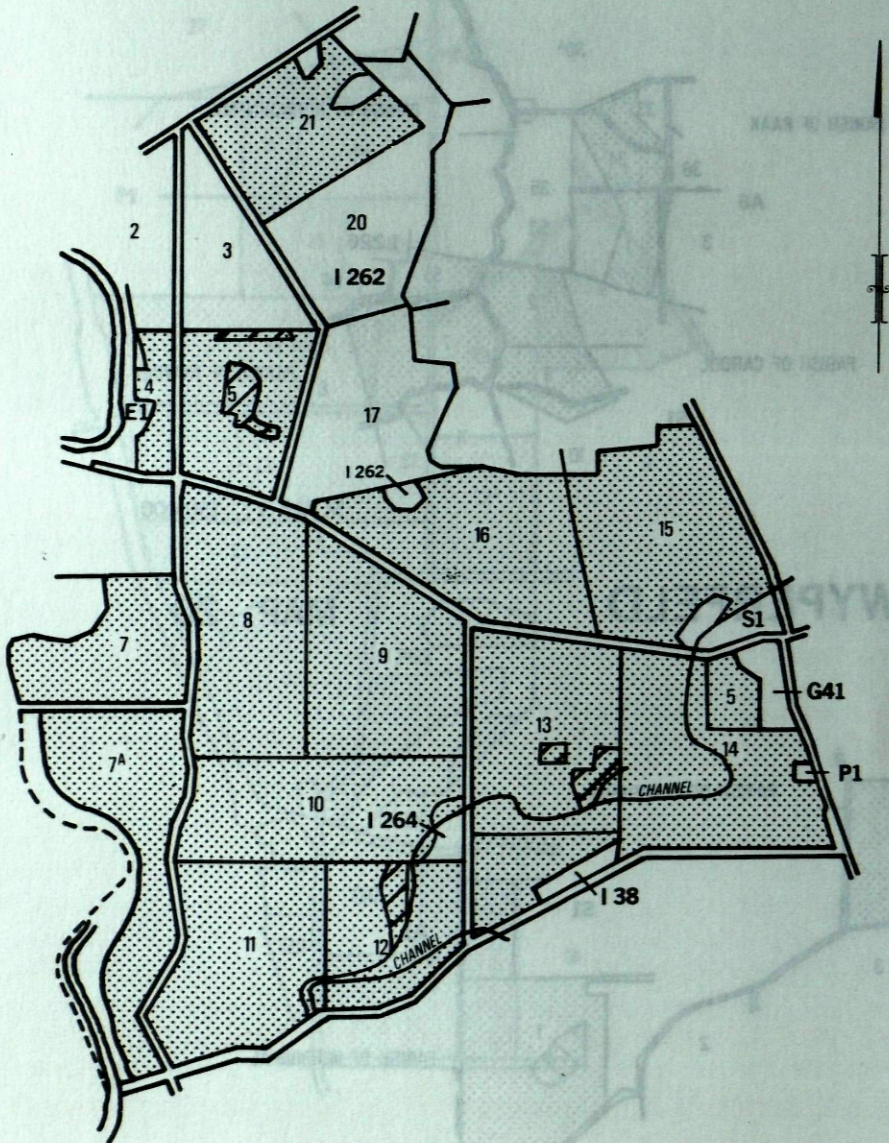


PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 55 000

AGRICULTURE F1
PARISH OF BUMBANG

MAP 18



CONSERVATION COVENANT



PUBLIC LAND RECOMMENDED FOR ALIENATION

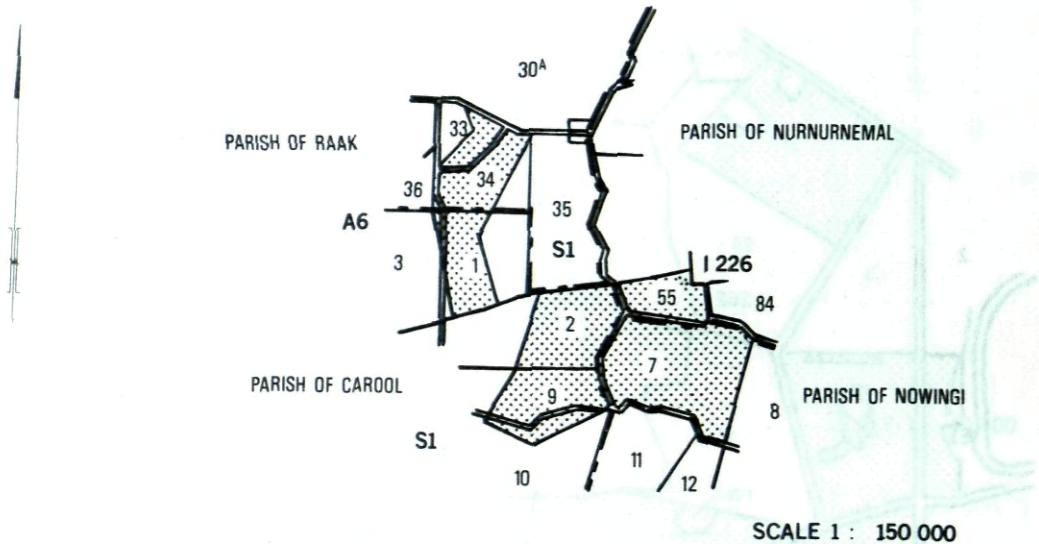
SCALE 1 : 80 000

AGRICULTURE F1

MAP 19

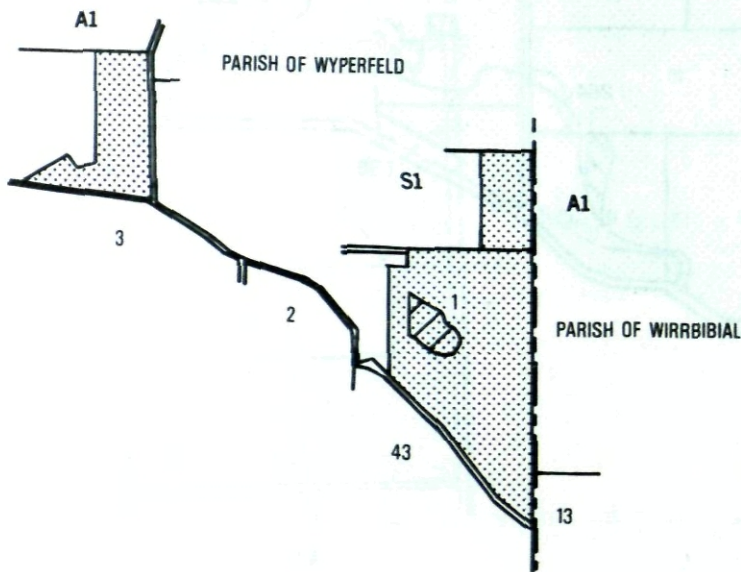
PARISHES OF CAROOL

NOWINGI, NURNURNEMAL AND RAAK



PARISH OF WYPERFELD

MAP 20



CONSERVATION COVENANT

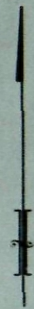
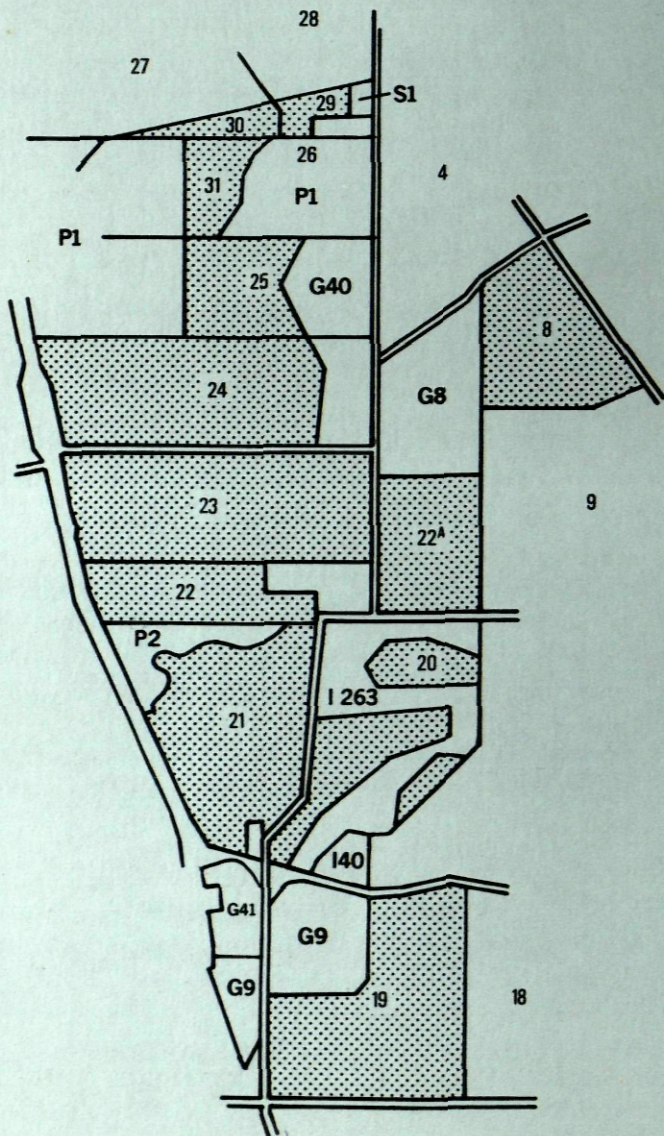


PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 75 000

AGRICULTURE F1
PARISH OF TOLTOL

MAP 21



PUBLIC LAND RECOMMENDED FOR ALIENATION

SCALE 1 : 75 000