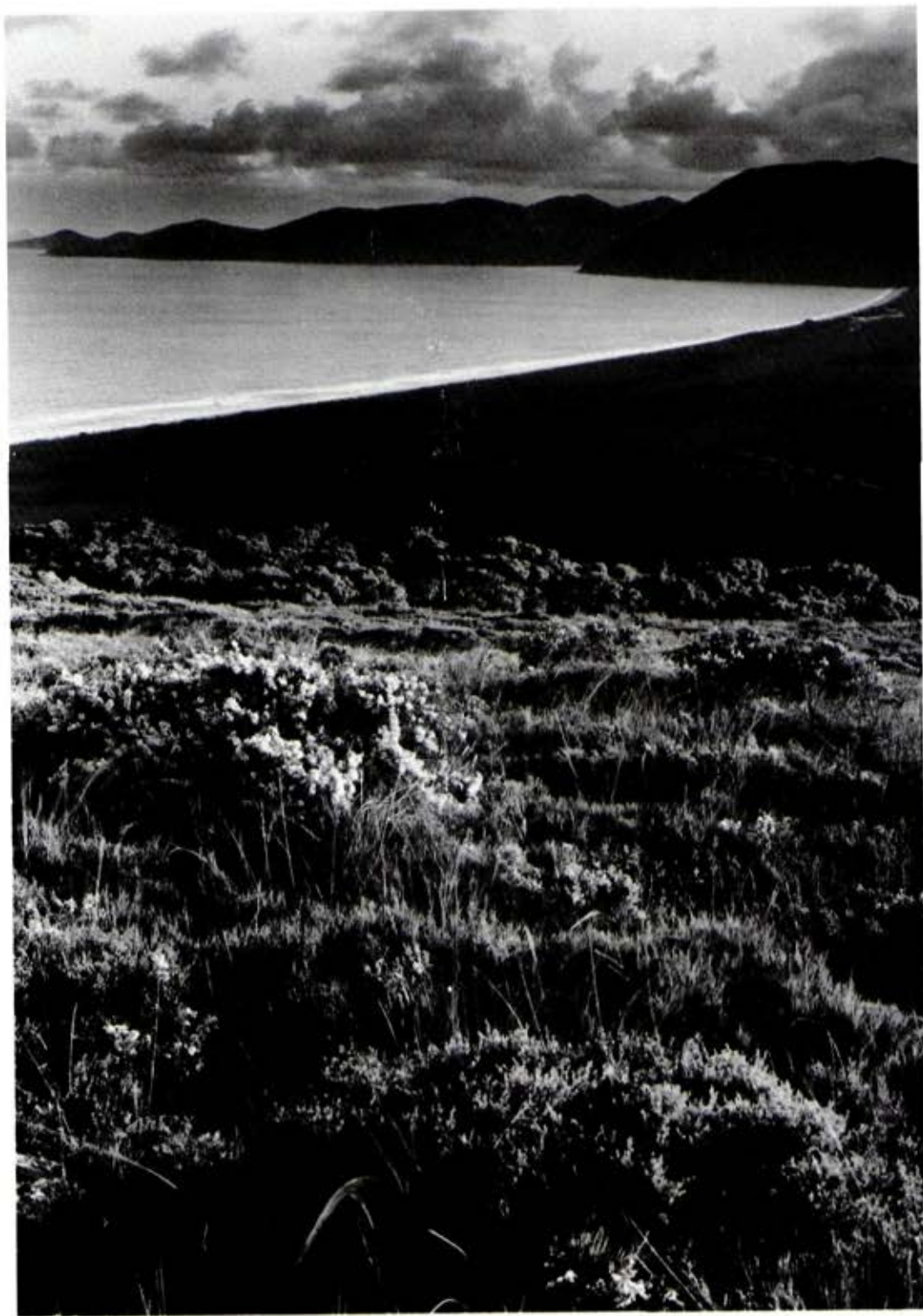


WILDERNESS

SPECIAL INVESTIGATION
DESCRIPTIVE REPORT



LAND CONSERVATION COUNCIL

WILDERNESS

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DESCRIPTIVE REPORT**

FEBRUARY 1990



LAND CONSERVATION COUNCIL

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Cover Photograph:

Wilsons Promontory contains one of the largest areas of higher wilderness quality in eastern Victoria - Five Mile Beach looking towards the Vereker Range.

Photo: David Tatnall

CONTENTS

	Page
Foreword	(v)
Acknowledgements	(vi)
1. Introduction	3
 PART I - THE WILDERNESS CONCEPT	
2. Development of the Concept	11
3. Values of Wilderness	25
 PART II - VICTORIAN CONTEXT	
4. Current Approaches to Wilderness in Victoria	39
5. Development of a Cultural Landscape	43
6. Present Land Use and Future Directions	53
7. Wilderness Attitudes and Public Perceptions	70
 PART III - INFLUENCES AND IMPACTS	
8. Influences and Impacts	85
 PART IV - SURVEY OF WILDERNESS QUALITY	
9. Measuring Wilderness Quality	109
10. Overview of Victoria's Wilderness Quality	118
 PART V - DESCRIPTIVE BLOCKS	
11. Background to the Descriptive Blocks	123
12. Individual Block Descriptions	126
1 Sunset p126	
2 Annuello 137	
3 Big Desert 142	
4 Little Desert 151	
5 O'Shannassy 159	
6 Avon 167	
7 Macalister Headwaters 177	
8 Wonnangatta--Moroka 184	
9 Wongungarra Catchment 192	
10 Catherine 198	
11 Yarrarabulla Creek 205	
12 Mount Bogong 212	
13 Nicholson Headwaters p221	
14 Wabba--Dartmouth 227	
15 Murray Headwaters 234	
16 Tingaringy 245	
17 Buchan Headwaters 254	
18 Rodger River--Bowen 260	
19 Errinundra 270	
20 Upper Genoa 279	
21 Cape Howe 287	
22 Croajingolong Coast 295	
23 Wilsons Promontory 309	
13. Special Areas	319
 PART VI - PROTECTIVE MECHANISMS	
14. Possible Approaches to Wilderness Protection	341

APPENDICES

I	Extract of the <i>Land Conservation Act</i> 1970	351
II	Public Land Use Categories	355
III	Survey Questionnaire	359
IV	Survey Data Break-up	363
V	Definitions of Wilderness	365

FIGURES

1.	The Investigation Process	6
2.	Wilderness and Environmental Continua	26
3.	Public Land Estate of Victoria 1834--1970	50
4.	Recreation Settings on Public Land	65
5.	Public Land Use	68
6.	Category Relationships	344

MAPS

1.	Victoria's Forest Cover in 1869	44
2.	Victoria's Forest Cover in 1987	45
3.	Expansion of the Squatters' Runs 1834-1860	46
4.	Density of Crown Roads	48
5.	Present Land Use	54
6.	Minerals and Fossil Fuels	56
7.	Weed Composition	95
8.	Major Bushfires 1939--1989	99
9.	Wilderness Quality Values of Victoria	opposite page 118
10.	Location of Descriptive Blocks	opposite page 124
11.	Public Land Use	Map envelope
12.	Wilderness Quality - Values and Influences - Blocks 1 and 2	Map envelope
13.	Wilderness Quality - Values and Influences - Blocks 3 and 4	Map envelope
14.	Wilderness Quality - Values and Influences - Blocks 5 to 13, 23	Map envelope
15.	Wilderness Quality - Values and Influences - Blocks 14 to 17	Map envelope
16.	Wilderness Quality - Values and Influences - Blocks 18 to 22	Map envelope
17.	Location of Offshore Islands	opposite page 324

FOREWORD

The Land Conservation Council was established under the *Land Conservation Act 1970*. The function of the Council is to carry out investigations and make recommendations to the Minister with respect to the use of public land in order to provide for the balanced use of land in Victoria. (An extract of the Act is provided in Appendix I).

Council, in meeting the government's request to carry out an investigation of wilderness in the State of Victoria, needs to identify the more remote and least modified lands of the State - those of high wilderness quality - and make recommendations on the reservation and use of such areas. It is important that the decisions made are based on the best information available.

This report provides a factual basis for the preparation of submissions to the Council. It describes the concept of wilderness and its values, wilderness quality and the influences which affect it, the nature of areas of higher wilderness quality in

Victoria, and the current and alternative land uses of such areas. Its purpose is to ensure that everyone who has an interest in wilderness and in the use of areas of public land of high wilderness quality, can obtain and study the basic information that the Council itself will study.

Council is also aware that numerous community and industry groups and individuals possess specific information about the values and uses of such areas, and is therefore seeking their involvement in expanding its information base, prior to formulating any land use recommendations.

Submissions are now invited and should be forwarded to the Secretary of the Land Conservation Council by the closing date for submissions, as notified in the *Victoria Government Gazette*, and advertised in State and regional newspapers. The Council will make its recommendations only after due consideration of all these submissions.



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The work of Rob Lesslie and Kathy Preece in refining the wilderness quality assessment methodology and applying it to Victoria was of particular importance to this project. Council is indebted to them for their willingness to make their data available to Council. Kathy Preece also addressed Council's seminar held at the start of the investigation, along with Judy Lambert of the Wilderness Society, Ed Krumpke of the Wilderness Research Centre, University of Idaho and John Harris of the Alpine Planning Team.

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The report was prepared under the direction of Ian Miles, Director of Land Use Planning, Land Conservation Council.

INTRODUCTION

1. INTRODUCTION

BACKGROUND

Community interest in, and government concern about wilderness has increased. Probably no areas totally unaffected by modern society remain in Australia and almost certainly none in Victoria. Previous surveys (Feller *et al.* 1979) have indicated that less than 3% of Victoria retains its primitive character, and, as noted in the State Conservation Strategy, (Victorian Government 1987) this area is still decreasing. This is the context that makes wilderness an issue of concern in Victoria today.

The government, in its Conservation Strategy for Victoria, 'Protecting the Environment', has stated that one of its objectives is to preserve remaining areas of high wilderness quality.

During parliamentary debate on a bill concerning the establishment of National Parks in East Gippsland the then Minister for Conservation, Forests and Lands, announced in the Legislative Council on 6 May 1988 the government's intention to refer the issue of wilderness to the Land Conservation Council (Parliament of Victoria, 1988). Subsequently an Order-in-Council was made on 16 August 1988, under Section 8 of the *Land Conservation Act* 1970, which required the Land Conservation Council to carry out an investigation of wilderness in the State of Victoria.

The Land Conservation Council has now studied and made recommendations covering all of the State on a regional basis. Recommendations have been made proposing specific wilderness areas: the Big Desert in 1977 (Mallee Study Area) and the Avon Wilderness in 1979 (Alpine Study Area). An addition to the Avon Wilderness was recommended in 1983 (Gippsland Lakes Hinterland Study Area). Additional recommendations have recognised the wilderness value of other areas.

The Council's process of land use reviews is now well established as an effective

mechanism for assessing new information and new issues.

New information, notably the Survey of Wilderness Quality in Victoria by Kathy Preece and Rob Lesslie, which was completed in 1987, is now available (Preece and Lesslie 1987). This investigation, funded and prepared for the Australian Heritage Commission and the Victorian Ministry for Planning and Environment, was unavailable to the Land Conservation Council in all but two of its previous studies of public land use.

The Preece and Lesslie survey, in line with recent approaches to wilderness in Australia and elsewhere, considers wilderness as a specific environmental setting with the inherent distinguishing characteristics of remoteness and naturalness. Wilderness has been considered by Council in its previous studies primarily as a recreational concept; this approach is discussed further in Chapter 4, together with the present Victorian legislative provisions for wilderness protection.

In this report the term wilderness reflects its more recent usage as being a descriptor of a particular environmental setting. More specifically it is considered to encompass one end of a continuum of wilderness quality. Such an approach more closely follows the direction set out in the government's State Conservation Strategy, where wilderness is implied to be an area of high wilderness quality. The use of the term 'wilderness area' is restricted to wilderness, or an area of high wilderness quality, that has been specifically designated for protection of these values.

THE TASK

The purpose of the Land Conservation Council's investigation is to make recommendations on the identification, reservation and use of wilderness areas and other areas of high wilderness quality. The specific terms of reference of the investigation are outlined in Table 1.

Table 1

TERMS OF REFERENCE

The Council's investigation will address the terms of reference below:

1. Identify:
 - * those parts of Victoria that should be protected and managed as wilderness areas
 - * other areas of high wilderness quality that should be protected
 - * areas with potentially high wilderness quality subject to minor changes in management.
2. Specify the uses that would be permitted and identify guidelines for management of these areas as well as adjoining land where this is considered necessary to protect wilderness quality.
3. Recommend any additional requirements (including legislation) for the protection and management of wilderness.
4. Take into account the economic and social implications and the environmental benefits of its recommendations.
5. In making its recommendations, the Council is to have regard to the following attributes of wilderness:
 - * remoteness from settlement
 - * remoteness from access
 - * aesthetic naturalness
 - * biophysical naturalness
 - * size
 - * ecological viability
 - * capability for appropriate recreational activities
6. The Council is also to have regard to the following values of wilderness:
 - * preservation and maintenance of ecological processes and natural gene pools
 - * the opportunity for native species and ecosystems, which have their intrinsic values, to exist without human interference
 - * opportunities for non-mechanised self-reliant forms of recreation, inspiration, and solitude in essentially natural environments
 - * the existence value of wilderness to humans; although many people may never visit such areas, many derive satisfaction simply from knowing that wilderness exists.

The wilderness investigation, unlike most of the Land Conservation Council's previous studies, will not focus on the issues facing a specific region of Victoria. Instead, it will cover the whole of Victoria and focus on only the one issue - wilderness.

The Preece and Lesslie Survey of Wilderness Quality in Victoria provides an important initial basis for the investigation. Much of the additional information required to identify areas of higher wilderness quality, the factors

influencing it, and the nature of other values of such areas, has been derived from previous reports of the Land Conservation Council. This information has been updated and expanded upon by a range of government departments and public authorities, as well as by reference to a range of published and unpublished reports.

Beside considering definitions of wilderness areas, particularly with respect to their role in protecting areas of high wilderness quality, Council and the

community must address the issue of appropriate size and use of such areas.

METHODS

A seminar was conducted at the beginning of the investigation using the theme 'Understanding and Investigating Wilderness'. This provided an opportunity for key groups and individuals to be involved in the early planning and assisted the Council in identifying methods available for determining, describing and protecting areas of high wilderness quality.

The remainder of the investigation will closely follow the usual Land Conservation Council process. This process is shown diagrammatically in Figure 1.

This descriptive report describes the concept of wilderness and its values, wilderness quality and the factors that influence it, the characteristics of areas of higher wilderness quality in Victoria, and the current and alternative land uses of such areas.

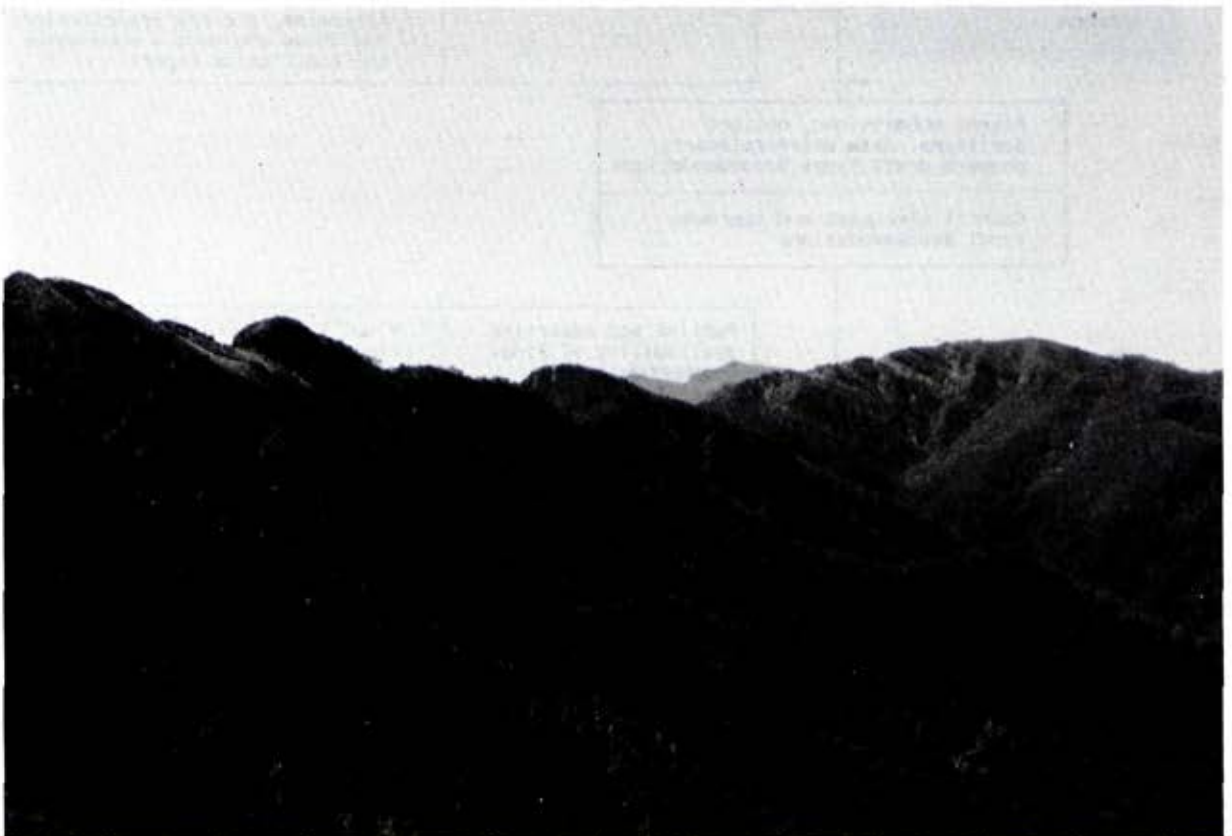
The results of a survey which sought to obtain a representative indication of society's perception, attitudes, and expectations of wilderness are also included in the report. This survey was specifically commissioned as part of the Council's investigation.

The report provides a factual basis upon which members of the community may base their submissions to the Council. Submissions will be sought for a period of 60 days after publication of this report.

REPORT STRUCTURE

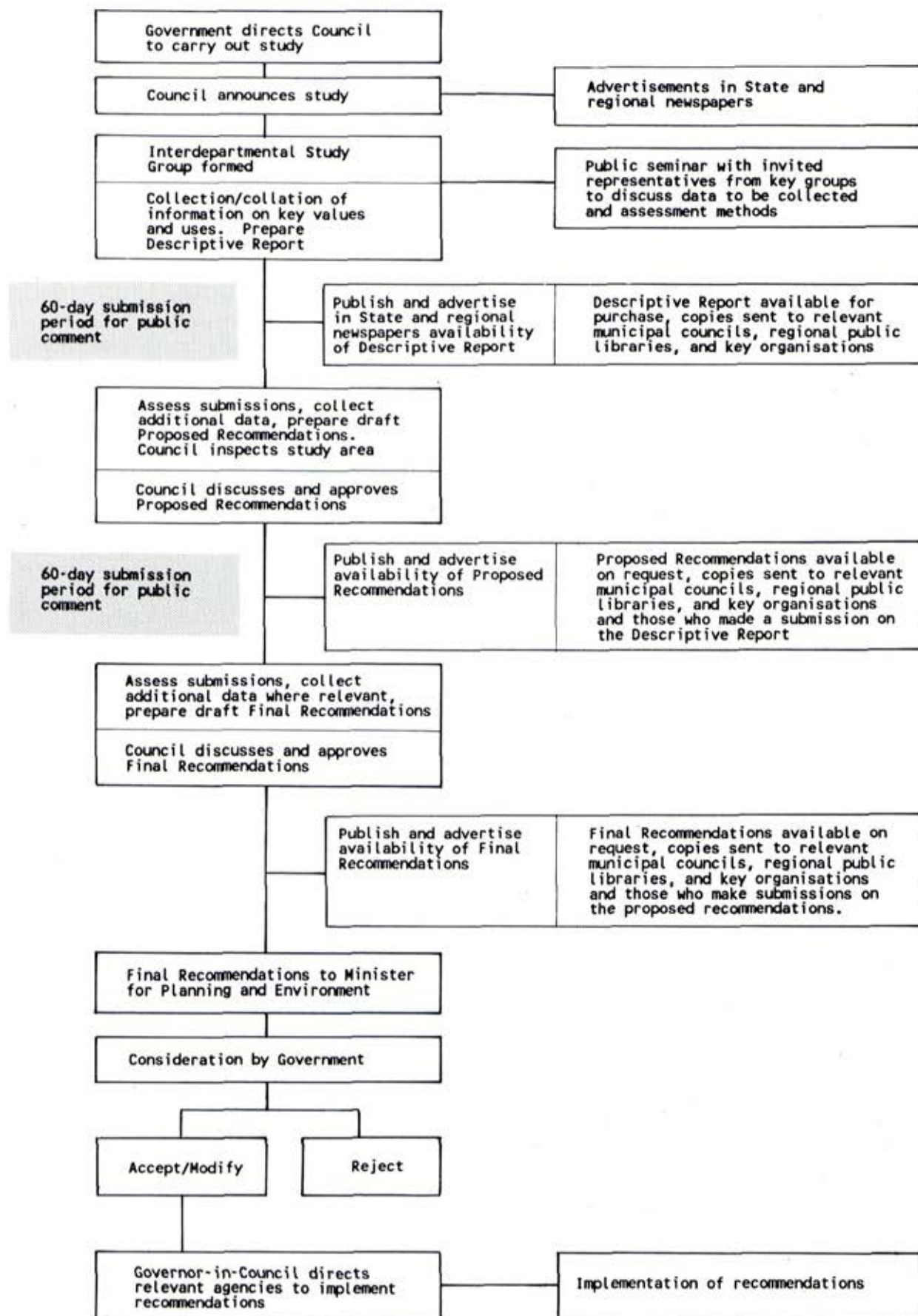
This report is in six parts. The first discusses the concept of wilderness, its delineation and protection in Australia and elsewhere, and describes the values of such areas.

Part II outlines current approaches to wilderness in Victoria, discusses the Victorian context of the remaining areas of high wilderness quality, and reviews the land uses that have and are likely to



This report, in line with recent approaches to wilderness elsewhere in Australia and overseas, considers wilderness as a specific environmental setting with the inherent distinguishing characteristics of remoteness and naturalness - the Crosscut Saw and the headwaters of the Wonnangatta River

FIGURE 1:
INVESTIGATION PROCESS



influence wilderness values in those areas. It also includes the results of a survey of the Victorian community's expectations of wilderness areas. Specific impacts and direct influences on wilderness quality are covered in more detail in Part III.

Part IV includes a chapter on methods of inventory of wilderness, adopting those of Preece and Lesslie. An overview of wilderness quality throughout Victoria, based on the results of the Preece and Lesslie survey, is also provided.

Detailed descriptions of areas including higher quality lands, as identified by Preece and Lesslie are given in Part V. These provide the context of each area, describe their existing uses and capabilities and outline the factors influencing the area's wilderness quality. Also included is a chapter about the wilderness quality of special areas such as offshore islands.

Part VI briefly outlines possible approaches to wilderness protection.

References

Feller, M., Hooley, D., Dreher, T., East, I., and Jung, R. (1979). *Wilderness in Victoria: An Inventory*. (Department of Geography, Monash University: Melbourne.)

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PART I
THE WILDERNESS CONCEPT

2. DEVELOPMENT OF THE CONCEPT

ORIGINS OF THE CONCEPT

Modern humans appear to have evolved at least 50 000 years ago and by 30 000 years ago were found throughout the world. The early humans were hunters and gatherers and had loose tribal groupings and nomadic lifestyles. To these early human societies wilderness was a meaningless concept. Their total environment was dominated by natural processes and systems of which they were only a minor part and over which they generally had little influence. It was only after the development of environments dominated by human modification that the differentiation between a natural environment and a cultural environment emerged.

An over-exploitation of the available fauna due to increasing population and more effective hunting technologies and strategies, together with the effects of climatic changes on both animal and plant communities, may have led to cultivation becoming important for subsistence. The shift from hunter-gatherer based societies to societies based on agricultural systems meant that the pattern of human society changed from one of a nomadic lifestyle, which was closely dependent on understanding and working with the vagaries of natural systems, to one that was sedentary and relied on the modification of natural systems and processes for its survival. Humans, particularly as a result of a rapidly expanding population, began to modify the environment dramatically - not simply live in it.

The difference between the controlled 'settled' areas and those not settled (the wilderness) was not only physically distinct but, perhaps more importantly, mentally distinct (Hendee *et al.* 1978). People became unfamiliar and uncomfortable outside the new settlements. A fear of natural lands developed. The non-culturally dominated environments of the mountains, forests, and rocky or poorly watered country was the home of animals which raided the crops (and

inhabitants) in the new settlements. The word *wilderness* appears to have been derived from 'wild-deor-ness' an early Teutonic and Norse word of the 12th century meaning a place of wild or untamed beasts.

As outlined by Johnson (1974), concepts of wilderness were incorporated into the early Jewish and Christian traditions. Biblical translations in Old English since at least 1400, and in Modern English since early in the 16th century, use the word *wilderness* extensively (Helman *et al.* 1976). Biblical usage applies to vast, uninhabited and desolate areas, in contrast to the earlier northern European derivations which suggest that the concept applied to wild and heavily forested areas.

These early attitudes reflected a situation in which humans could significantly modify their environment but not control it. They remained in awe of natural processes and features.

By the 18th century conditions had changed. Humans could now largely control their environment. In Europe the wild country increasingly came under the influence of agriculture and the growing new industries of mining and smelting. The wastelands were being tamed. Landscapes were becoming increasingly ordered. The wilderness of the 'Old World' had largely disappeared.

With the rise of physical and natural sciences, the earlier fear of natural phenomena was replaced with understanding or inspiration. The remaining wild areas of Europe, notably the wild and panoramic settings of the Alps, became a source of inspiration to artists, poets and philosophers in the late 1700s and early 1800s - the European Romantics. Such wild areas during this period were viewed by some as 'natural wonderlands' (Helman *et al.* 1976). Such inspiration also led to active use of such areas with the mid-nineteenth century becoming known as the 'golden age' of alpine mountaineering.

The discovery of the 'New World' by European colonists and adventurers excited those seeking new wild lands. Some of the first visitors to America from Europe viewed the vast wilderness of America as 'refreshment from the ordered world in which they lived', and talked with 'delirium' of finding an absence of roads, towns and laws (Johnson 1974).

While it was the Europeans who provided the catalyst for the growth of interest in wilderness, it was the Americans who pursued the idea and brought it to maturity. The present-day usage of wilderness, to describe large natural and unmodified areas, emerged in the United States of America during the 1800s.

NORTH AMERICAN DEVELOPMENTS

The greater majority of European settlers in North America saw wilderness as the country beyond the frontier, wild unknown lands inhabited by fierce natives, and an enemy to progress that had to be conquered.

The naturalist movement, led by the American philosophers Ralph Waldo Emerson and Henry David Thoreau, of the early to mid 1800s saw nature's prime significance as its ability to transport men beyond ordinary rationality into inspired feelings (Johnson 1974). John Muir, in the late 1800s saw that the essence of wilderness was the freedom, solitude and beauty of the mountain. A popular concern developed for the aesthetic and spiritual appreciation of tracts of wilderness. Public interest centred on the Sierras and the 389 000 ha Yosemite National Park was established there in 1890. This was the first National Park to be set aside principally for its wilderness values.

By 1913 industrial and technological forces within America had already caused a vast number of people to move from the land to the cities, but there was growing interest in unspoilt country and the romantic myth of the pioneer took form (Johnson 1974). There was a fascination with the primitive wilderness and the need to regain their lost personal contact with it.

Public interest in the wilderness and backwoods culture increased. Groups like the Sierra Club gained strength, and organisations such as the Boy Scouts flourished. Much forestry and wildlife legislation was introduced by the then President, Teddy Roosevelt.

The interest in maintaining some remote wildlands may also have been motivated in part by the desire to lend a certain distinctive quality to American culture. There was no European counterpart to wilderness.

Leading advocates of wilderness, Aldo Leopold and Bob Marshall, pressed for preservation of areas capable of providing recreational experiences including restoration, refreshment, self-sufficiency and challenge. The ecological significance of unmodified areas was a theme developed by George Perkins Marsh and John Muir. Aldo Leopold also stressed the scientific values of wilderness for seeing how healthy land maintains itself.

The first half of the 20th century saw the development of a national concern for wilderness protection which was reflected in the establishment of wilderness and primitive reserves and areas. In 1924 the U.S. Forest Service designated 232 298 ha of the Gila National Forest as a reserve for wilderness recreation - the first such reserve. Forest Service Regulations of 1929 provided the authority to establish primitive areas. In the 1930s much effort was spent on wilderness inventory and allocation and as a result by 1939 there were 5 746 740 ha of designated wilderness in the national forests. Recognition of wilderness spread across a number of arms of Government and by 1962 there were five federal agencies and two states which controlled wilderness areas (Helman *et al.* 1976).

In the 1950s and 1960s, the Sierra Club and the Wilderness Society (formed in 1935) pushed for a Wilderness Act, and following much debate the Act received Presidential assent in 1964.

The U.S. Wilderness Act was the first document in the world to accord statutory protection specifically to wilderness. It defined a concept of use and management policy for wilderness similar to those

previously used by the U.S. Forest Service, and established a national wilderness preservation system by the immediate inclusion of previously identified areas of national forest as well as through a mechanism of review of other lands for suitability as wilderness preserves. Public use and enjoyment are clearly provided for in the Wilderness Preservation System but recreational use is appropriate only so long as it is consistent with the purpose of maintaining a system of areas where natural processes could operate as freely as possible (Hendee *et al.* 1978).

The development of the wilderness concept in America has been mirrored, at least to some extent, in a number of other countries including Australia.

DEVELOPMENT OF THE WILDERNESS CONCEPT IN AUSTRALIA

For 50 000 or more years prior to European settlement, Aboriginal society was intimately involved with every aspect of the Australian environment. It sustained their life and culture. Through their mythology they understood that their ancestors created the landscape and the life associated with it, including themselves, with each part playing a role in the maintenance of the whole dynamic world (Fox 1984).

The Aborigines had a very highly developed relationship with the land stemming from their daily hunting and gathering of food, with their nomadic movement largely arising from changes in the supply of food, and the seasons, as well as for comfort and ceremonies. Part of their land use practices also involved active manipulation of natural systems - particularly of fire regimes.

Before the arrival of the Europeans, however, all of Australia was essentially unmodified. This 'wilderness' was perhaps seen as quite comfortable and familiar territory by the Aborigines, although as areas were used differentially according to their capability and significance to individuals within clans or to whole clans or tribal groupings, any given area may be a site to be avoided.

The settlement of Australia by the British was in many ways linked to early concepts

of wilderness. When Captain James Cook took possession of Australia in 1770, it was based on the legal doctrine of 'Terra Nullius': an empty land owned by no man could be claimed by a sovereign state and confirmed once effectively occupied. To Cook, and the early colonial governments Australia had no permanent settlement and was uncultivated, and therefore waste land, a wilderness, available to be claimed, occupied and used. They were, however, certainly aware that it was inhabited by Aborigines who were seen as a danger to the new settlers living in the agricultural settlements, and towns and villages.

The early European settlers brought to Australia an interpretation of the biblical connotations of wilderness. Not so much to them an area of spiritual renewal, but rather as waste land. To them wilderness was land to be tamed. It harboured 'savages', dingos and 'thylacines' (Tasmanian Tiger) who ravaged stock and poultry, wallabies and kangaroos which competed with domesticated stock for pastures, and later bushrangers and cattle duffers (Wright 1980).

By the mid 1800s attitudes towards nature began to change. An appreciation for the untamed country emerged as artists and writers developed a national pride for the distinctive Australian landscape.

Most land suitable for settlement was, however, soon developed, leaving only remnants of natural country (the bush) along the Great Dividing Range, in the tropical north and in the arid interior. Even these relatively remote areas were not unaffected by the expansion of pastoral industries, prospecting and road-building. While this period of rapid change created the legend of the Australian bushman, it progressively isolated remaining areas of wilderness into smaller and smaller blocks separated by ever-widening areas of development (Ovington 1980).

The bush remained essentially a place for work: mustering, timber cutting or prospecting, up until the 1900s. Recreation associated with these wild areas was limited to picnics or social meetings on its edges. In the early part of this century, bushwalking began as a popular recreational activity. Members of the

early bushwalking clubs entered the bush for recreation. They wanted to experience the Australian wilderness that was denied them in the growing cities (Helman *et al.* 1976).

While national parks had been established throughout Australia by this time, they did not, however, necessarily provide this experience. The underlying basis of most of the early national parks was for scenic protection or for tourist recreation and they were often small, managed for intensive use and developed, or did not encompass major areas of interest.

One of the early bushwalking clubs, the Mountain Trails Club, had a strong interest in visiting the more primitive parts of the rugged Crown land surrounding Sydney. The club was formed in Sydney in 1914. One of its co-founders, Myles Dunphy, is regarded by many as the 'father of wilderness' in Australia. The objects of this club included 'to associate walkers, mountain tracker and amateur explorers who instinctively reject roads and beaten tourist routes to reach and enjoy the canyons, ranges and tops of the wildest parts of this country' (Johnson 1974).

Between 1920 and 1930 Myles Dunphy, assisted by other members of his and other bushwalking clubs, researched and tentatively designed a number of park projects. In 1932 a proposal for the Greater Blue Mountains National Park was prepared. This included 'primitive areas', a term apparently borrowed from American developments, where the Forest Service had renamed wilderness areas, as 'primitive areas' (Mosley 1978).

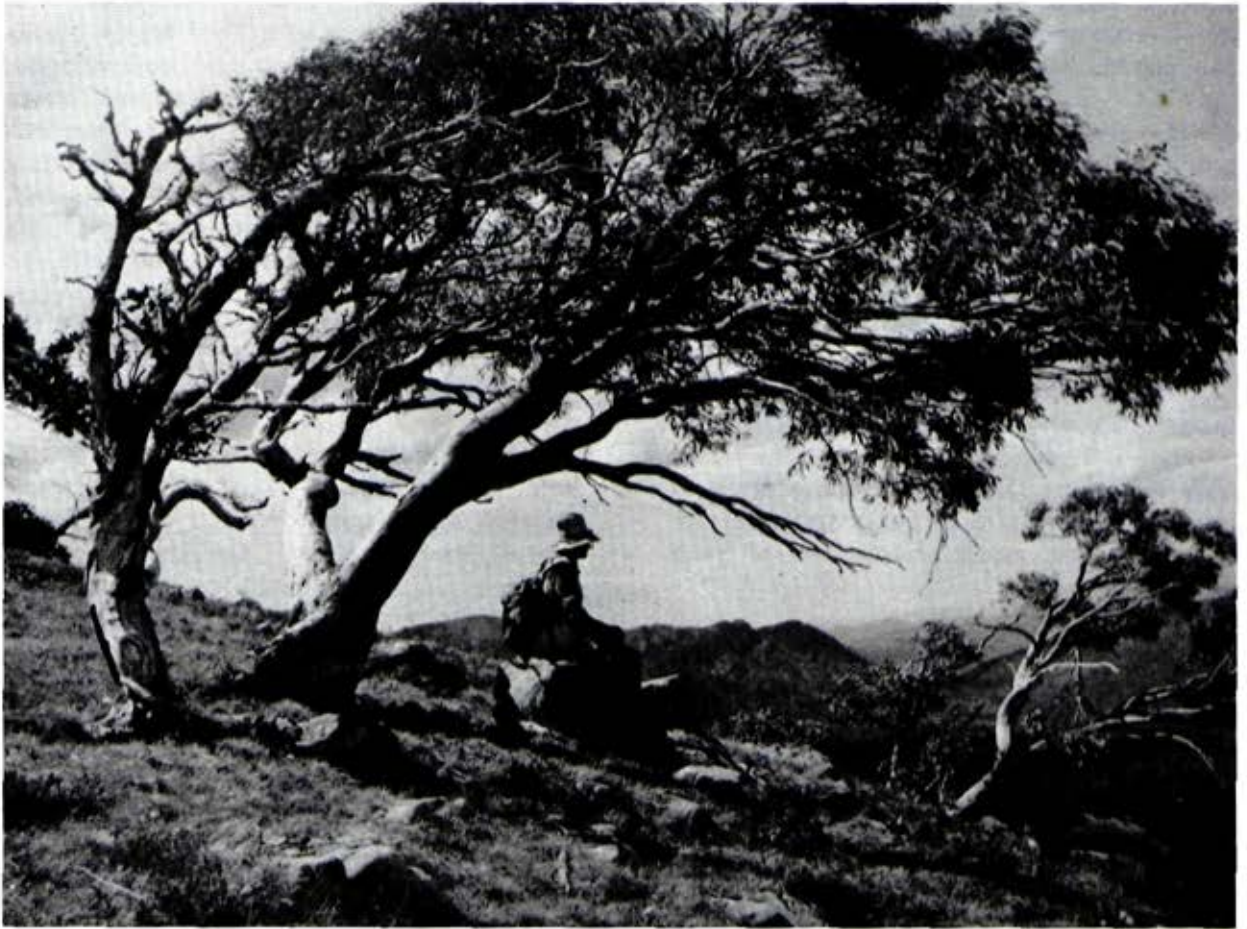
In 1933 Dunphy formed the 'National Park and Primitive Areas Council' (NPPAC). This was dedicated, amongst other things, to the preservation of land in its primitive condition (Johnson 1974). The Council saw that the primitive area concept could be applied in two ways: national parks could be divided into tourist 'open' or developmental areas and into primitive areas, with other primitive areas established as separate reserves. A map was prepared showing a tentative plan for the establishment of a system of major parklands between Sydney and the Victorian border.

As a result of the work of Myles Dunphy and the NPPAC, the New South Wales Lands Department proclaimed, in 1934, the Tallawalla Primitive Reserve in the Southern Highlands. This was just 10 years after the proclamation of the first formal wilderness, the Gila Wilderness, in the U.S.A. It was the first wilderness reserve in Australia and as such, the first official recognition of wilderness as a form of land tenure (Thompson 1984). It was followed by the gazettal of the Morton Primitive Area (1938) and the Heathcote Primitive Area (1943).

One of the National Park and Primitive Area Council's proposals was for a Snowy-Indi Primitive Area. This formed an important factor in the reservation of the Kosciusko State (now National) Park in 1944, and the provision in the enabling Act for its governing body, the Kosciusko State Park Trust, to set aside not more than 10% of the (500 000 ha) park as a 'primitive area'. However, a number of scientists and naturalists saw primitive areas as 'strict scientific reserves', in contrast to the Council view of these areas as essentially (in the sense of the American model) roadless recreational areas (Mosley 1978). It was not until 1962 (when plans were mooted for hydro-electric power works in the area) that a primitive area was set aside 'as wilderness for science and recreation'.

In Victoria, bushwalkers were also one of the earlier groups concerned about wilderness. 'In 1939 ... the Federation of Victorian Walking Clubs approached the Minister for Lands with a plan to reserve all lands over 4000 ft (1219 m) in the eastern highlands as 'primitive and tourist open areas', but the Minister refused and World War 2 put an end to its efforts' (Johnson 1974).

Prior to World War 2 it seemed that there was enough land and resources to meet all needs and desires. After the war, things changed. There were accelerated infill programs for soldier settlement and increasing demands for timber in the post-war building booms. There was also, however, a growing concern about wildlife and a number of wildlife programs were initiated.



Bushwalkers were one of the first groups of people concerned about wilderness - a bushwalker looking towards the Barry Mountains, circa 1938

All forms of outdoor recreation were growing rapidly and the traditional forms of bushwalking spawned other types of wilderness recreation such as rock-climbing, ski-touring, canoeing and caving. Public support and concern for retaining natural areas, however, came from broadly based conservation and planning groups. In 1945, for instance, the Town and Country Planning Association of Victoria appointed a subcommittee to investigate national parks which recommended the establishment of a national park authority and new national parks including a 500 000 ha alpine national park (Johnson 1974).

Ovington (1980) in a paper discussing the development of national parks, considered that the most important characteristics of the first 25 post-war years probably were: the increase in conflict in the allocation of resources, the growth of public involvement and concern and the development of power groups capable of exerting political

pressure, the development of classificatory systems to evaluate nature conservation needs and the involvement of academics in these and associated problems, recognition of the ability of technology to change landscapes, the greater mobility of people and their awareness of nature through media presentations. Other factors included a slow but steady increase in the number of parks and reserves, and a growing awareness by governments that new administrative and professional structures were needed to establish and maintain adequate national park and reserve systems.

The public outcry over the proposed subdivision for agriculture of marginal lands in the Little Desert, and the subsequent halting of the scheme, (and the creation of the Land Conservation Council) was perhaps the first of a number of large conservation issues that arose in the early 1970s. Society in Victoria appeared to be more questioning

of technology and the economic concepts of a continuous growth were being challenged.

By the late 1970s and early 1980s, many groups became active in protecting remaining natural areas or wildlife from utilization or development. National parks became considered to be vitally important as nature conservation reserves, and the desirability of including representative examples of all major ecological communities with national park systems became an objective of both community groups and government agencies. Not only was there demand for more areas to be included in national parks and reserves, but there was much greater use of such areas.

It was perhaps only after the conflict between groups wishing to protect Lake Pedder and those seeking to develop the area, that the concept of wilderness developed as a focus of the basic concerns in such land-use debates. Wilderness became a key issue in land-use conflicts in the Daintree area in Queensland (particularly with regard to the Cape Tribulation road), in the northern Blue Mountains (Colo area) in New South Wales, in the Victorian Alps (between advocates for a major Alpine National Park and timber and grazing interests), and in particular the conflict over the Tasmanian Hydro-electricity Corporation's proposals to develop the Franklin River for the generation of power (Mosley & Messer 1984). Groups such as the Australian Conservation Foundation and more recently the Wilderness Society raised the level of community awareness about wilderness.

Reference to wilderness is now included in statutes of the Commonwealth of Australia, the Australian Capital Territory, New South Wales, Northern Territory, Western Australia, Victoria, and, in the form of primitive areas, Queensland. New South Wales recently enacted Australia's first legislation specifically addressing wilderness - the *Wilderness Act* 1987.

PRESENT APPROACHES TO WILDERNESS

A reconnaissance-level inventory of the wilderness remaining in the world was

undertaken in 1987 (McCloskey & Spalding 1987). It identified major blocks (of at least 400 000 ha) of undeveloped, although not necessarily unoccupied, lands. All areas showing roads, settlements, buildings and the like were excluded. Given the scale of the survey and, consequently, the definitions used, the results are not readily comparable with the results of the more detailed wilderness inventory surveys undertaken in the U.S.A. and Australia. It does, however, provide a useful overall context.

They found five billion hectares of undeveloped land in over a thousand tracts located in 78 countries and Antarctica - about one-third of the earth's land surface. From their definitions, the continents with the most wilderness are Antarctica, Asia, Africa and North America. The countries with the biggest undeveloped areas are (after Antarctica) the Soviet Union, Canada, Australia and Brazil. Further details are shown in Tables 2 and 3.

Not all areas identified as wilderness in the McCloskey and Spalding survey are protected; in fact they considered that less than 20% of the world's remaining wilderness is protected. Even less is specifically designated for wilderness protection.

Wilderness areas, parks or zones have been designated either administratively or legislatively in a number of countries around the world, including Australia.

Within Australia, most States and Territories have made, or foreshadowed, legislative provision for the protection and management of wilderness. Generally, such provision is included within national parks legislation. Only three have actually included land within designated wilderness protection categories, although two others have well-developed proposals.

Of the three States presently without specific wilderness provision, one, Queensland, nevertheless provides for the declaration of a 'primitive areas' under its National Parks and Wildlife Act. These are similar in many ways to the wilderness areas and zones referred to in the legislation of other States.

Table 2
DISTRIBUTION OF WILDERNESS BY CONTINENT

Continent	Area (km ²)	% of total land area	No. of areas
Antarctica	13 209 000	100	1
Asia	11 864 000	27	306
Africa	9 177 700	30	437
North America	9 006 700	36	89
South America	4 222 700	24	91
Oceania & Australia	2 666 300	30	94
Europe	741 000	7	31
	50 887 400	34	1 049

Source : McCloskey & Spalding (1987).

Note: Most areas are not designated or protected.

Table 3
COUNTRIES WITH THE MOST WILDERNESS

Country	Area (km ²)	% of total land area	No. of areas
Antarctica	13 208 983	100	1
Soviet Union	8 753 899	39.1	185
Canada	6 421 790	64.7	66
Australia	2 516 429	32.8	82
Brazil	2 372 972	27.9	24
Greenland	2 155 832	99.1	2
China	1 822 474	19.0	48
Algeria	1 526 405	64.1	42
Sudan	939 659	37.5	74
Mauritania	761 155	73.8	18

Source : McCloskey & Spalding (1987).

Note: Most areas are not designated or protected.

The specific approaches used in each State varies. Notably, the more extensively settled and developed States appear to have the most active programs. A summary of the statutory approaches to wilderness in Australia is given in Table 4. The current approaches to wilderness in Victoria are outlined in greater detail in Chapter 4.

Overseas wilderness programs tend to be nationally based, although some state programs also exist. The designation of wilderness may be solely within national parks such as in Canada, whereas in other countries, notably the U.S.A. and New Zealand, they may be designated, in

addition, in their own right over a range of public land. Again, the specific approaches in each country vary. A summary of current approaches in selected countries is included in Table 5.

NATIONAL AND INTERNATIONAL DEFINITIONS AND CRITERIA

CONCOM Guidelines

Guidelines for reservation and management of wilderness areas in Australia have been prepared by the Council of Nature Conservation Ministers (CONCOM 1986) in an attempt to establish a consistent approach to

Table 4

SUMMARY OF AUSTRALIAN STATUTORY APPROACHED TO WILDERNESS

State or territory	Relevant act/s	Terminology used	Number of designated areas	Designation process	Criteria for establishment	Approval authority	Revocation authority	Uses ³
Victoria	National Parks Act 1975	Wilderness Park or Wilderness Zone	2 (113,500 and 40,000 ha)	Based on independent recommendation by LCC or management plan process, and public submissions to these	An area (of public land) not substantially modified or is capable of being restored, of sufficient size, and capable of providing solitude and self reliant recreation	Parliament	Parliament	No roads, structures (other than pre-existing survey markers), vehicles, or non-indigenous animals. Measures for essential management permitted. Also no mineral exploration or mining
Australian Capital Territory	Nature Conservation Ordinance 1980	Wilderness Zones	Nil (one 30 000 ha zone proposed)	Management plan process (Administrative mechanism only)	Nil, but required to be within a 'reserved' area	Minister	-	No tracks or roads, vehicles (other than on pre-existing formed roads or tracks). Also no structures, firearms, non-indigenous species
New South Wales	National Parks and Wildlife Act 1974	Wilderness Areas	12 (2,400 to 92, 400 ha)	Identified in accordance with Wilderness Act as below	As described below for Wilderness Act but required to be within a designated national park or nature reserve	Chief Administrator	Chief Administrator	No structures (other than for scientific research or essential for management and survival huts). Also non-nature animals, and mining subject to Parliamentary approval
	Wilderness Act 1988	Wilderness Area	Nil	Based on wilderness protection agreement or conservation agreement and public submissions to these	An area not substantially modified or is capable of being restored, of sufficient size, and capable of providing solitude and self-reliant recreation, and subject to a wilderness protection agreement (freehold or or leasehold land)a conservation agreement (statutory agency land)	Minister	Parliament	Subject to wilderness protection agreement or conservation agreement and consistent with management principles (as per criteria for establishment). Access for essential management permitted

Queensland	No specific references to wilderness in legislation. One act, however, provides for the declaration of primitive areas, details of which are:							
	National Parks and Wildlife Act	Primitive Areas	Nil (3 proposed totalling 39,000 ha)	Management plan process (administrative mechanisms only) by the Director of NPHW	An area (within a national park) follow-well-defined natural boundaries and of sufficient size	Governor in Council	-	No roads, or structures. Uses damaging ecology may be limited. scientific study subject to conditions
South Australia	No specific references to wilderness in legislation. (Legislation to establish wilderness reserves, on both private and freehold land, with appropriate protection provisions planned.)							
Tasmania	No specific references to wilderness in legislation. (Legislation for establishment of wilderness and wild and scenic areas has been foreshadowed.)							
Western Australia	Conservation of Land Management Act 1984	Wilderness Area	1 (15,877 ha, other larger areas proposed)	On recommendation of NPNCA and consistency with management plan	Nil, but required to be within a national park	Minister	Minister	-
Commonwealth of Australia	National Parks and Wildlife Act 1984	Wilderness Zone	Nil (two proposed)	Management plan, if any, and public submission	Nil, but required to be in park or reserve	Governor General	Resolution of both houses of Parliament	Authorised scientific research, and specified recreation and other uses permitted, other than mining
CONCOM	N/A	Wilderness Area	N/A		A large area, preferable where >25 000 ha, where visitors may experience remoteness from roads and other facilities, and with minimal evidence and alteration	N/A	N/A	No vehicles or animals for transport (other than for essential management), no structures, only essential research

Notes:

1. This is summary, readers are referred to listed legislation for full details of legislative provisions.
2. Dash means no specific reference in relevant legislation.
3. Essential management generally includes safety, emergency, fire or other protection purposes.

Table 5

SUMMARY OF APPROACHES TO WILDERNESS IN SELECTED COUNTRIES

	Canada	New Zealand	United States of America
Statutory base	National Parks Act (1934); 1988 amendment provides for Order-in-Council designation of wilderness areas.	National Parks Act (1980); Reserves Act (1977); Conservation Act (1987).	Wilderness Act (1964); 'Eastern Wilderness Act' and Alaska National Interest Lands Conservation Act (1980).
Designation process	A government Order-in-Council designates public lands under the 1988 amendment to the National Parks Act as wilderness areas, subject to consistency with wilderness zones in management plans for national parks.	The government Minister responsible for the above Acts can designate or revoke a wilderness area. Wilderness areas are only established after public consultation. A wilderness policy guides management and establishment of wilderness areas.	Congress designates federally-owned lands under the Wilderness Act for permanent wilderness. Act also established a systematic process for identification of additional wilderness areas.
Criteria	Wilderness zones are extensive areas that are a good representation of a natural region and which offer significant opportunities for remoteness and solitude within their boundaries.	* Wild lands capable of being managed to perpetuate their condition as wilderness. * Lands having only been affected by the forces of nature. * Be sufficiently large so as to require at least two days hike to traverse. * Have clearly defined topographic boundaries and be adequately buffered from outside human influence. * Be free of developments such as huts, tracks, and bridges.	* Human activities are substantially unnoticeable in the area. * Land retaining its primeval character and influence, without permanent improvements or human habitation. * An area with outstanding opportunities for solitude or primitive types of recreation. * May contain ecological, geological, scientific, educational, scenic or historical values.
Size of wilderness area	There are no designated wilderness areas (as at February 1989). Most of the 34 national parks however, contain large managed as wilderness zones which cover up to 98% of the park area (largest such area exceeds 4 400 000 ha in Wood Buffalo National Park).	Five areas have been declared, including (as at April 1989) two outside national parks. Most recent (Tasman) is 39 650 ha.	There is a total of 32 760 000 ha in the national wilderness preserve system (as at 1985). The largest single wilderness area is 2 854 000 ha Gates of the Arctic wilderness. The smallest, an island, is 1.2 ha. About half were in National Parks.
Objectives	* To protect wilderness areas from development, other than for park administration, public safety, basic user facilities and traditional renewable harvesting.	* To preserve indigenous natural resources, through the prohibition of buildings, machinery, livestock, vehicles, roads or tracks. * To provide opportunities for wilderness experiences and recreation.	* To secure the enduring benefits of wilderness. * To preserve and protect areas in a natural condition. * To be administered so that use and enjoyment will not diminish wilderness values to protect the areas and preserve their wilderness character. (From the wilderness Act 1964).
Uses	Permitted activities vary between management plans of different national parks, although mining and logging are prohibited. In some wilderness zones, management plans have closed vehicle roads and restricted structures to camping sites and trails, with corresponding restrictions of activities and uses. Recreation activities often include hiking, camping, skiing, horse riding, and canoeing. Visitor numbers range from less than a thousand to many thousands.	Vehicles, boats, aircraft, logging, roading and hydroelectric development are all prohibited. No animals can be taken in or kept in the area. Commercial recreation is restricted. Exceptions (temporary) to these conditions are search and rescue operations, control of pest species, scientific research and mineral exploration under strict licence and conditions.	Some commercial and pre-existing uses allowed, for example, grazing and hunting. A ten-year moratorium on the cessation of mining was introduced. Wilderness can include logged areas. A wide variety of recreation activities are permitted. Recreation demand is increasing by 7% annually. National parks and wilderness areas receive 350 000 000 visits annually, ranging from 500 to 1 000 000 visitor days annually for individual areas.

wilderness areas across all States. CONCOM is composed of all Commonwealth, State and Territory Ministers having responsibility for national parks and wildlife. The guidelines were prepared by a working group of CONCOM and reflect the input of CONCOM members, as well as some government organisations, public interest groups and individuals through a public comment process.

The guidelines define a wilderness area as 'an area designated under legislation and managed to maintain its high wilderness quality', with wilderness quality referring to 'the extent to which land or water is remote from and substantially undisturbed by the influence of modern technological society'. They emphasise that wilderness areas are established to provide opportunities for the visitor to enjoy solitude, inspiration and empathy with his or her natural surroundings, and that they have significant value for nature conservation, as well as for recreation. The guidelines also note that wilderness areas may be declared in their own right or may be large zones within areas reserved as national parks or other reserves.

The guidelines propose the following key criteria for the identification and evaluation of land having wilderness area potential:

- (a) a large area, preferably in excess of 25 000 ha, where visitors may experience remoteness from roads and other facilities; and
- (b) an area with minimal evidence of alteration by modern technological society.

They also note that shape and adjacent land use may be other important elements.

The guidelines state that the primary objective of management should be to protect wilderness quality, both physical and social, and that use should be so regulated as to minimise impact and maintain the quality of the environment and the wilderness experience.

The general management principles include that:

- (i) Access for recreation be by non-mechanical methods and unaided by animals.
- (ii) Access by mechanical means and transport animals be permitted for essential management operations where no practical alternative means of access is available.
- (iii) The impact of self-reliant recreation on the ecological process and the effect of interactions between visitors and the environment be monitored, as should any group or commercial activities.
- (iv) No permanent structures or developments should be retained, except where of historic or archaeological value or where necessary to protect the environment.
- (v) Research should be restricted to essential work which cannot be carried out elsewhere.
- (vi) An awareness of wilderness values be encouraged among visitors.
- (vii) Fire management policies take into account the wilderness management principles, as well as available ecological knowledge and fire histories, recreational values, and the need to protect adjacent communities and property.

The guideline document made a number of specific conclusions about the desirability of consistent approaches to wilderness across Australia. The conclusions also included statements to the effect that:

- (a) all agencies consider an active program of wilderness area identification and reservation;
- (b) inventories based on an assessment of areas both within and external to existing systems of protected areas be compiled, and use consistent survey approaches;
- (c) wilderness areas be given at least the same security of tenure as national parks, whether they be discrete

Wilderness Areas or zones within reserved national parks; and

- (d) where an area is designated as a Wilderness Area, resource exploration and exploitation should not be permitted.

IUCN Classification System

The major international body with a charter for world-wide consistency on the designation and management of protected areas is the United Nations affiliated International Union for Conservation of Nature and Natural Resources (IUCN) through its Commission on National Parks and Protected Areas (CNPPA). The Commission has a global network of 335 members in 126 countries. Prior to 1978 the Commission (then known as the International Commission on National Parks) had a very specific focus on national parks. Since 1978 it has assumed a broader perspective and has developed and is concerned about 10 categories of protected areas. These range from Strict Nature Reserves and National Parks to Anthropological Reserves and Multiple Use Management Areas and are documented in the IUCN's 1978 paper 'Categories, Objectives and Criteria for Protected Areas'. None of these categories specifically referred to or provided for wilderness.

In 1984, at the Madrid General Assembly of IUCN a resolution was passed requesting that the inclusion of 'wilderness areas' in its protected areas category be examined. In part this was in response to many such designated areas not being within the normal protected area network, notably the case in the U.S.A. As a result of this concern and other concerns about the evolving approaches to managing National Parks and other protection issues such as the role of areas totally managed through human intervention, a comprehensive revision of categories was undertaken. A new CNPPA paper 'Protected Areas - A Classification System' was prepared and adopted at the January meeting in Costa Rica and was subsequently adopted at the meeting of the IUCN in June 1988.

The IUCN's new classification system is composed of three groupings: Group 1

areas - Nature Reserves, Group 2 areas - Resource Conservation Areas, and Group 3 areas - Resource Development Areas. A summary of the framework is shown in Table 6.

National Parks are included in Group 2 areas, and one of the major criteria for an area to qualify as a national park is the presence of wilderness zones. Wilderness designations are also considered as an appropriate element within Group 3 areas.

Wilderness Areas were also included as a one of seven, designated categories of Group 2 areas in its own right. The IUCN paper includes specific considerations for Wilderness Areas. These being that:

'In addition to the selection criteria, establishment mechanisms, management objectives and monitoring processes spelled out under the generic objectives for Resource Conservation Areas, wilderness areas will adhere to the following definitions and criteria:

Definition

Wilderness is an enduring natural area legislatively protected and of sufficient size to provide the pristine natural environment which serves physical and spiritual well-being. Wilderness is an area where little or no persistent evidence of human intrusion is permitted, so that natural processes will take place unaffected by human intervention.

Criteria

- (i) Wilderness will encompass the characteristics of remoteness and primitiveness found in undeveloped areas.
- (ii) Wilderness is an area large enough and so situated as to be unaffected, except in transitory ways by what takes place in the non-wilderness around it.
- (iii) Wilderness areas will include only limited primitive facilities essential for the security of the area and its visitors.

Table 6
IUCN PROTECTED AREA FRAMEWORK

Group	Name	Objective	Uses	Characteristics
I Nature Reserves	Ecological Reserves	Maintain	Research	Designation by
	Strict Nature Sanctuary	undisturbed	Education	appropriate authority
	Biogenetic Reserves	natural areas	Monitoring	Access by permit
	Scientific Reserves			Designed research
	Strict Nature Reserves			program
II Resource Conservation Areas	Wilderness Area	Maintain extensive	Outdoor recreation	Legislative protection
	National Park	natural areas	Conservation	Controlled/limited access
	State Park/Provincial Park		Tourism	No resource extraction
	Tribal/Council Park		Research	Comprehensive, management plans
	Private Conservation Area		Education	Long-term conservation objectives
	Natural Monument		Monitoring	
III Resource Development	National Forest	Resource utilization	Sustainable resource	Extensive planning
	Forest Reserve	in an environmentally	use	for: game management,
	Protected Landscape	harmonious and	Protection of	forest management,
	Protected Seascape	sustainable manner	environmental values	rural conservation
	Rural Management Area		Outdoor recreation	
	Natural Park		Education	
	Game Reserve		Research	
	State Forest			
IV Internationally Designated Areas	World Heritage Sites	Enhanced protection	Protection	Designation by international body
	Biosphere Reserves	through international	Tourism	
	Ramsar sites	recognition	Education	

Source : IUCN (1988).

- (iv) *In situ* resource utilisation is incompatible with wilderness when it disturbs the functioning of ecosystems' (IUCN 1988).

Areas which meet all the above criteria but are not legislatively protected or designated, or *de facto* wilderness, are not considered as meeting the requirements of inventory.

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3. VALUES OF WILDERNESS

The approach to defining and considering wilderness has evolved over a long period. As the concept has developed it has variously been considered as that area beyond civilization, the land on the frontier, the wild areas and as areas uninhabited, uncultivated, undisturbed and uninfluenced. The unifying theme of wilderness has been relatively consistent however - a distinct environmental setting characterized by being remote, and more particularly natural and unmodified.

Wilderness is as distinctive as other environmental settings, such as rural farmland, or towns and cities. Some of these environmental settings, or landscape types, may overlap to some degree as they form part of a continuum of modification. Wilderness is a narrow range of conditions at the least modified extremity of such a continuum (see Figure 2.)

Each environmental setting is distinctive and they have distinctive sets of values attached to them. These values are essentially cultural values and are not necessarily constant; they can change over time as society's perception of its environment changes.

Throughout much of the history of European settlement of Australia, and probably across the world, the unsettled areas were, in effect, defined by their perceived lack of value. Their often rugged terrain, extremes of climate, poor soils, dense scrub and forest all thwarted development. They were the unproductive lands with limited access; the remote frontiers. Such areas, which were thought of by many as wilderness, became a recognizable cultural entity as well as a recognizable environmental setting: an idea as well as a place.

The widespread recognition of the positive values of wilderness was a slow process and only gained momentum as technological advances made it more cost effective to expand settlement into such areas and use the available resources. There was a growing awareness that

wilderness was not limitless and that the active avoidance which protected such areas was no longer valid. A conscious effort was now required if a wilderness was to be retained. The advantages to society of utilising these often marginally productive areas, relative to the advantages of maintaining them in a 'non productive' wilderness state, became an issue of debate.

The values of maintained wilderness are essentially restricted to non-consumptive values. These can be categorized, as in this chapter, into values relating to direct use of such areas by individuals and use of such areas by society as a whole, as well as values pertaining to their intrinsic and moral 'worth'. Use by individuals may also be indirect (vicarious). Wilderness values may also be categorised into biological values - those relating to the protection of nature, and cultural values - those relating to benefits directly obtained by people.

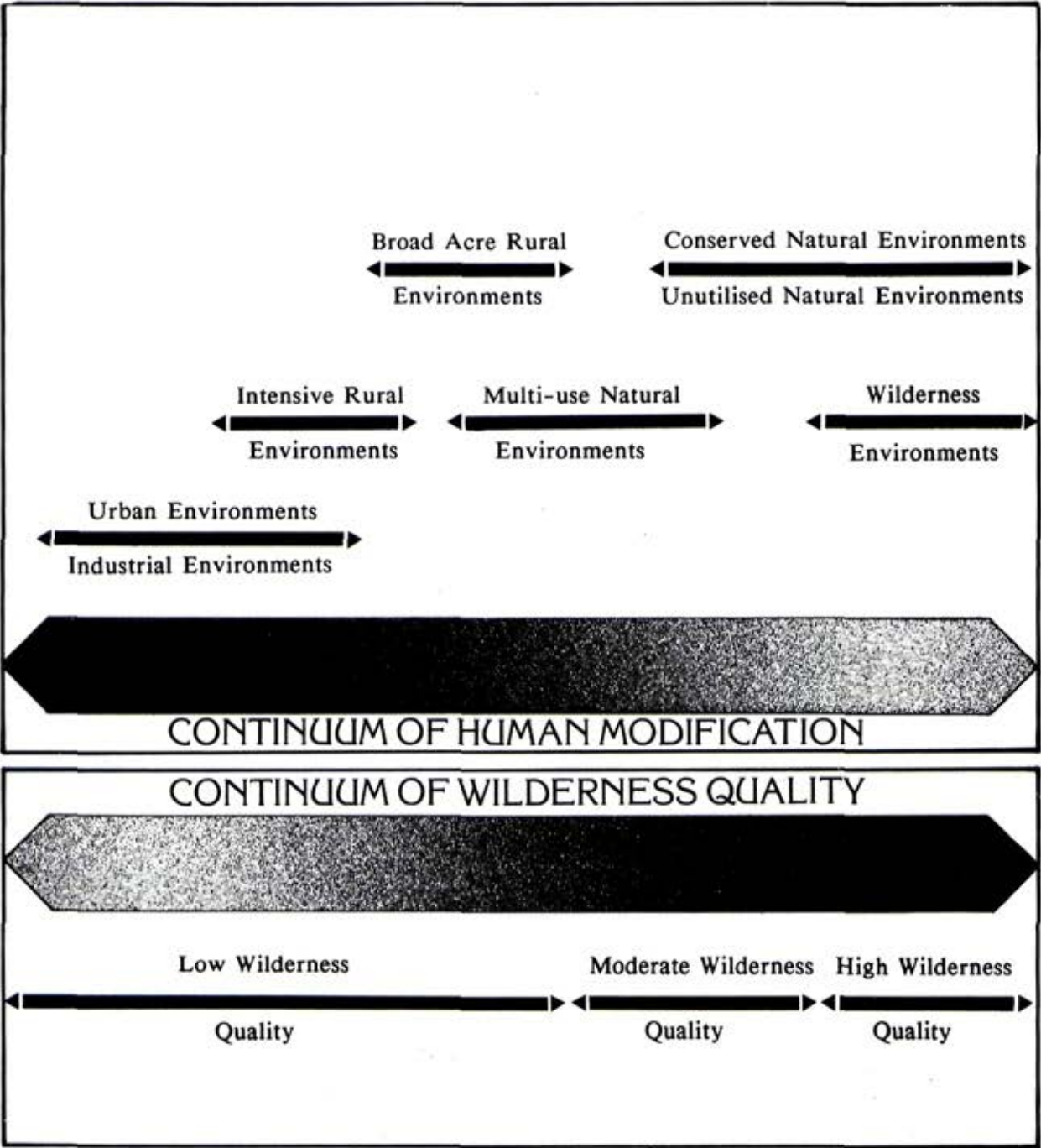
The value of wilderness to individuals who use such areas largely arises from recreational and experiential use. Value to society arises from nature conservation, scientific and educational, and water resource uses.

Use of wilderness may involve direct physical use, with access into such areas being made for recreation, scientific investigation, as well as for military training.

Use is not, however, restricted to direct physical use. The very nature of wilderness also encourages other forms of use (Waterman 1978), these include:

- (i) Edge use, involving people who come to the edge of a wilderness area and look up, into, or over it. Access may be by well-made road, tour boat or climbing to the top of a mountain vantage point - but no journey is actually made into the area.

FIGURE 2:
WILDERNESS AND ENVIRONMENTAL CONTINUA



- (ii) Aerial use, involves use such as recreation, resource reconnaissance, scientific investigation and airforce tactical training. Access is gained by flying over the area.
- (iii) Derived (or vicarious) use. This involves access to the area through mediums such as films, books, photos, or may simply involve an awareness of such areas.

Vicarious appreciation of wilderness is a very significant 'use', often being the main source of public support for wilderness preservation (McKenry 1977). Many people gain pleasure and satisfaction from such areas even though they have never visited them. This pleasure may be based on a concern for posterity with the knowledge that they are able to visit, and others may do so, either now or in the future.

The desire by non-users to retain the option to use the resource is known as 'option demand'. This may reflect a concern to provide for use by future generations or by scientists, rather than any intention to use it themselves. In wilderness, recreational use is relatively light by desire and design, and cannot be used as a direct measure of net social benefit. The Board of Inquiry into the Timber Industry (Ferguson 1985) noted that there is sufficient evidence to show that the value of option demand is real and in some cases may be substantial.

The benefits provided by wilderness may be considered as being one of three categories (Driver *et al.* 1987):

1. Benefits that can be obtained only from wilderness.
2. Benefits that can be obtained from both wilderness and non-wilderness, but for which wilderness is strongly preferred as the source.
3. Benefits that can be obtained from both wilderness and non-wilderness, but for which no strong preferences exist for wilderness as the source.

Complex classifications of wilderness benefits have been compiled (for example by Driver *et al.* 1987). From such work,

the benefits arising from dependent recreation use can be considered to include:

- * Self improvement - such as skill development and self perception, particularly where associated with organised programs such as Outward Bound.
- * Physical health - exercise and physical challenge (not wilderness dependent, but may be strongly preferred).
- * Self sufficiency - testing bushcraft and technical skills.
- * Education - exploring and learning about nature.
- * Social bonds - wilderness provides a setting which enhances the establishment of trust, sharing of ideals and problems, particularly within small groups.
- * Spiritual - just as the Aborigines regarded places as sacred, many people see wilderness as a setting for answering the deepest questions of human existence and providing spiritually uplifting experiences.
- * Aesthetic - scenic enjoyment and enjoyment of nature (enhanced in wilderness whether or not such areas are actually more scenic than other areas).
- * Therapeutic benefits - particularly where related to a reduction in stress - this is often associated with escaping from noise and crowds.

Not all such benefits accrue to all users. Some of these benefits may, however, be of far greater value to the participant than those derived from the recreational activity itself. Thus people may seek out an area of wilderness, not merely to canoe or bushwalk, but to obtain a particular experience dependent on wilderness. The medium of access or activity may be relatively unimportant to them. The experiential value of wilderness may be the key value.

In the following discussion where values are ascribed to wilderness and the derived benefits described, the term wilderness is used for a large area of high wilderness quality. (Areas of lower quality or smaller size may not necessarily have directly proportionate levels of values or benefits.)

VALUES RELATING TO DIRECT USE BY INDIVIDUALS

The value of wilderness to individuals who use such areas largely arise from recreational and experiential use.

Recreation Values

Most direct use of areas of high wilderness quality is by those involved in the more 'primitive' forms of recreation. These are activities that rely on an individual's own resources of physique and skill, without need for constructed facilities and mechanized assistance.

They could include activities such as bushwalking, kayaking, canoeing, cross-country ski touring, rock climbing, abseiling, mountaineering and caving, as well as deer hunting, fishing, photography and nature study.

The value of wilderness for recreation is proportional to the activities level of dependency on high wilderness quality. Bushwalking, ski-touring, canoeing, nature study are forms of recreation that may be more dependent on such areas. Camping, fishing, rock climbing, deer hunting, sight seeing, photography, painting and horse trekking may be less dependent and satisfactorily experienced in other areas.

While few activities are perhaps entirely dependent on wilderness as such, the experience obtained from involvement in many activities undertaken in a wilderness setting adds a dimension to that activity which is an extremely important part of the recreational experience. Some people place these activities and the benefits gained from them, as some of the more important values of wilderness (Davey *et al.* 1984).

Given the evolution of cultural development, those areas of wilderness which remain are often rugged and inaccessible. Accordingly, the basic en-

vironmental prerequisites for many forms of challenging recreation are met in such areas.

The opportunity to meet the natural environment and its weather on its own terms, relying on bushcraft, strength and navigating skill is greatest in areas of highest wilderness quality, and cannot be obtained from more developed areas.

Such wilderness-dependent recreation involves activity by users seeking self-sufficiency challenges. Areas where a bushwalker will not face signposts, defined tracks, or major access routes being of vehicular standard, where a canoeist will find white water that has not been dammed or subject to spillway releases, or where a ski tourer will find skiable snow but no ski poles or refuge huts, are important to such people. For many, such areas are also important as they are less likely to be strictly regulated as to how and when one can undertake the activity. The areas are also unlikely to be crowded or noisy.

Areas of high wilderness quality are particularly important to programs such as those offered by Outward Bound, those associated with Bushcraft and Mountaineering Leadership Certificates, the Scout and Guide Associations, and other survival training and educational programs utilising outdoor, self-sufficient and adventure activities.

The value of wilderness to those involved in the more dependent activities lies partly in the challenge and adventure of moving through large natural areas containing rugged, challenging terrain unaided by motorised forms of transport and partly in the aesthetic and spiritual qualities related to the naturalness and vastness of such areas. (Feller *et al.* 1979).

Experiential Values

The response to wilderness is individual and personal. The experience obtained in wilderness may have a profound impact on individuals. This emotional experience is one of challenge and discovery, aesthetic and spiritual inspiration, and of freedom and solitude.

Wilderness allows for the opportunity of both physical and intellectual challenge. The challenge of self-reliant recreation in areas of high wilderness quality and rugged terrain and environments is a source of great pleasure to many - in terms of the anticipation and reminiscence of the event, as well as the actual participation. This pleasure is heightened by a sense of overcoming the many uncertainties (such as weather or water levels of a stream crossing) of the successful expedition - uncertainties reliant on individual skill (success in navigation), physique and health (muscular power, strength and stamina). Encounters with other people, wildlife, scenery and other aesthetic qualities of the area, may all contribute to the experience.

Certainly these experiences are heightened by personal contact with wilderness. Travel by foot, skiing or canoeing permits more intimate contact with the natural environment. A long, arduous journey to

a rugged mountain peak or beautiful lake also gives periods of anticipation and preparation of appreciation (Smith 1977).

The level of scenic quality, while not a determinant of wilderness quality, may enhance the experiential value obtained. It may also be a particularly important part of the experience for those who admire and enjoy wilderness solely from its edge or from a distance.

The wilderness setting also stimulates aesthetic appreciation in its own right. The aesthetic values arise not only from a perception of the naturalness and absence of change to terrestrial systems but to water quality and air quality as well.

Air quality of wilderness is presently the subject of much research in the United States of America (such as by Rowe and Chestnut 1983). Changes in visual aesthetic resources, such as those arising from the impact of hazes or plumes, are



The response to wilderness is individual and personal. The emotional experience may be one of challenge and discovery, aesthetic and spiritual inspiration, and of freedom and solitude

now known to have a significant effect on the recreational experience obtained within areas of wilderness.

The aesthetic values of a wilderness setting are a source inspiration to many, including writers, painters and photographers, and can provoke in all users a feeling of being part of a greater whole.

For many, from the early advocates of wilderness such as Thoreau, Muir and Emerson, to those experiencing a truly unmodified panorama today, the spiritual and elevating values of wilderness set it aside from all other areas.

Allied to a sense of inspiration is the feeling of independence, spontaneity and freedom which is also a major part of wilderness experience. This freedom may relate to the freedom of life-style choice, the freedom to choose from the widest possible range of experiences and environmental settings and the freedom from regulation.

Within a wilderness such freedom is constrained by the size of the area, the level of use and the capability of such areas to absorb use without damage.

For some the state of solitude heightens appreciation of beauty, awe, and challenge. The benefits of solitude, either as an individual or obtained as part of a small group, include a strong theme of awareness of one's own capabilities and limitations as well as an appreciation of companionship.

Smith (1977) considered solitude as an essential quality of wilderness: 'Its value is complex, but is probably based in the awe of being alone and small in an environment which is vast and indifferent to one's safety and comfort. It is felt most by solo travellers in small groups and is dependent on a lack of encounter with too many other groups especially large parties, horses, cars, aircraft and boats'. Smith also noted that danger is an ingredient of solitude and for people who are physically prepared for it, an element of danger is often considered a precious part of the total experience.

Others have considered that the arduous conditions of wilderness recreation and the

shared activities are ideal for development of lasting friendships amongst like-minded people. Companionship is strengthened when the environment setting focusses dependency in ways ranging from entertainment to survival.

One important experiential opportunity facilitated by a wilderness setting is the pressure to utilise inner strength in the face of difficult situations, rather than the normal behavioural response of escaping by modifying one's behaviours and/or modifying one's environment. Wilderness is one of the few environmental settings that allows people to receive feedback directly about their inner self, and as such can lead to psychological benefits (Scherl 1987).

It has been suggested, and there is some evidence to indicate, that physical pressures of the home and work environments such as crowding, noise and air pollution are related to the seeking of wilderness recreation experiences (Brown 1983).

Perhaps the particular value of wilderness is in the provision of experiences that contrast with people's normal routine. This contrast may relate to lack of noise, natural darkness, clean air, fresh water, lack of people and absence of constructed or mechanised infrastructure. It is perhaps the only area where people cannot be affected by motor vehicles.

This contrast is perhaps greatest for urban dwellers and the value of contrast is illustrated by much of the interest in maintaining and using wilderness coming from such people. It provides a venue for escape from urban stress, pollution and the complexity of modern life. The desire to 'go bush' for a few days is also often strong amongst people of rural communities. It is perhaps the nature of the activities undertaken, rather than the experience sought, that differs.

SOCIETAL VALUES

Areas of high wilderness quality are not only of value to individual users, but are also of value to our society as a whole. Value to society arises largely from nature conservation, scientific and educational use and water resource uses.

It should be noted, however, that individual benefits can also contribute to the benefits gained by society from their sum benefit, and spin-off benefits, such as those related to the influence of the improvement of an individual's quality of life and health obtained from wilderness settings, on their work and home environments.

Large natural areas maintained through natural processes and virtually unaffected by humans, are of particular value for nature conservation.

Prineas and Gold (1983) consider that wilderness 'is likely to form the backbone of any system of ecological reserves that represent an enormously valuable resource of genetic material, they are places in which ecological processes continue mainly unaltered and where natural selection and evolution still have a prospect of continuing. Few things are likely to be more important or less illusory than these values of wilderness'.

Nature Conservation

Wilderness has high value for nature conservation. Every ecosystem has differing levels of inherent environmental stability and resilience, though a wilderness setting, being substantially unaltered, provides the best opportunity for preserving ecosystems. Given the level of modification of much of Victoria, many communities or ecosystems no longer have examples that are substantially unmodified and it is no longer possible to aim to have representative areas of all of Victoria's communities or ecosystems in such a condition.

Nevertheless, where large areas of high quality wilderness do remain these have a special nature conservation value. Where such areas are predominantly or entirely natural, and large enough, they perhaps provide the best possible circumstances for natural processes to continue, to cause the evolution of individual species and entire biotic communities, and affect soil development. Dynamism of the biotic communities can only be natural in large areas protected from exotic species and modifying processes.

Wilderness provides an ideal opportunity for maintaining species diversity,

especially where species are dependent on minimal modification for their survival. Maintaining species diversity is important as it allows the interactions between the components of an ecosystem, to continue. Genetic diversity is also important for the maintenance of evolutionary processes and ecological stability.

In some cases, the last remaining habitats of individual species of flora and fauna occur in areas that have high wilderness values. Such species may be rare outside such areas (and even within them). The presence of species that are notably sensitive to modification of their habitat could also be considered indicative of the biophysical quality of that area.

Large, remote, unmodified areas are of high value for many species that are vulnerable to predation or competition by introduced species or for native species which do not readily adapt to modified conditions. Vulnerable species include ground-dwelling marsupials and birds such as the tiger quoll, the long-footed potoroo, the lyrebird and the mallee fowl. The lack of alteration to dense understorey vegetation is also important for successful nesting as well as protection from natural predators for many species.

Areas of mature vegetation, especially those within large unmodified areas, are particularly important to many species of fauna. Mature trees within such areas are particularly important to arboreal mammals, such as the greater glider and many forest bats, only mature trees form hollows which are required for nesting. Access to tree hollows are also important for a number of bird species.

Large, unmodified settings of wilderness are necessary for species which require large natural foraging areas. For instance, it has been estimated that the yellow-bellied glider requires a foraging area of 30 to 60 ha over a diverse range of eucalypt species; sooty owls have a home range of at 200 to 800 ha, and the powerful owl 800 to 1000 ha. Other species, (for example the masked owl) need dense forest for roosting but open areas in which to hunt.

Natural water flows, sedimentation and turbidity levels tend to remain undisturbed

in areas of high wilderness quality. Nor do such areas have significantly increased pesticide and nutrient inputs. Consequently, such areas are likely to provide better habitat for invertebrates as well as for higher order species, such as the platypus. Such areas also have high value for native fish species, many of which are less tolerant than introduced species of degraded aquatic environments, especially in those areas not subject to stocking of introduced species or where self-sustaining populations of introduced species are absent.

Scientific and Educational Values

Research into natural systems and ecological processes, as well as comparative research into modified environments, calibrated against natural baselines, are, of course, dependent on areas with a high degree of wilderness quality. Such areas provide information for reference and research into ecological processes, evolutionary development, long-term climatic trends, and geomorphic processes.

Knowledge of much of Australia's biota is far from complete. Many species are still undescribed, and the importance and role of species within communities and ecosystems often poorly understood. Much of this information can only be obtained where natural systems prevail.

Large areas of high wilderness quality, may provide a bench mark environment against which some changes in pollution levels and other environmental impacts and variables of settled areas can be compared. Such baseline data is of immense value for all types of land management and planning, especially land-use planning, environmental impact assessment, forestry, agriculture and wildlife management (Helman *et al.* 1976).

For instance, Davey *et al.* (1984) noted that in timber management an understanding of the accumulation of forest fuels, growth rates of trees, erosion rates, water quality, water production, fire regeneration, habitat classification and species densities under natural influences, can all be studied best in large undisturbed areas.

The value of wilderness for science and education is dependent on other concurrent uses and management practices. Thus where recreational use is high, the value of such an area as a reference standard would diminish. Areas where management objectives are to maintain high wilderness quality will also have a high value for long-term monitoring.

Areas of high wilderness quality are also of particular value as a bench mark area as they have generally withstood invasion by exotic animals and plants to a greater extent than have the modified environments throughout the rest of the State.

Virtually no areas in Victoria can be said to contain ecological communities that are the result of entirely natural fire regimes. Deliberate burning of vegetation has been used by Aborigines to flush kangaroos from scrub areas, by graziers to encourage the growth of palatable grass species and foresters promoting the regeneration of preferred tree species in logged areas. More recently, protective burning regimes have been established to reduce fire hazard adjacent to areas of settlement or high timber value. While no single wildfire is known to have eliminated an entire natural community, it is perhaps possible now where remnants are relatively small in area.

Wilderness when characterised by high remoteness values and large size, have particular value in that they provide perhaps the only, if any, area where the natural processes of fire could be permitted to operate to their fullest without intervention by humans. Active manipulation of fire regimes and, in particular, fire protection measures may only be required adjacent to such areas. Where resources or property outside the wilderness require protection or, where the wilderness or surrounding areas have been predominantly subject to active manipulation, this potential is much reduced.

Water Resources

The value of areas of high wilderness quality for the production of water is variable. Where such areas encompass water catchments with reliable rainfall, their value is generally high.

The water quality of streams and rivers in areas of high wilderness quality is generally higher than in those draining disturbed areas. Sediment and nutrient inputs in such areas are not notably influenced by intensive and extensive agriculture, intensive township development, road construction, or timber harvesting operations. Erosion is minimal and contamination from fertilizers, weedicides and pesticides are likely to be low.

Water yields in undisturbed catchments are also generally higher. Old growth ash forests, as well as mature mixed species forests, have been shown to have significantly higher water yields than regrowth forests.

High water quality in undisturbed areas ensures the viability of existing in-stream flora and fauna. It also enhances recreational experience by providing an immediate source of drinking water, besides reducing the level of treatment required for potable water supplies to downstream cities and towns.

Closed water catchments, where water production and nature conservation are the only uses, generally result in high water quality. However bacteriological pathogens from wildlife sources may mean water could still require disinfection in order to meet guidelines for safe drinking water.

OTHER VALUES

Aboriginal Cultural Associations

Traditional Aboriginal societies had a strong affinity to the land. The time of dreaming, associated with their creation is intrinsically connected with animate and inanimate features of their environment - their sacred sites. Many aspects of their day-to-day life reflected the significance of these features.

Areas of high wilderness quality, given their scattered distribution across the generally least-productive lands of the State, appear unlikely to be coincident with the total territory (domain) of traditional clans or tribes. Where coincident with areas of significance as identified from oral traditions and archaeological evidence, however, they

may have high value for the protection of evidence of aboriginal occupation and the protection of other sites of significance to Aboriginals.

No aboriginal communities in Victoria now maintain a lifestyle totally dependent on natural systems.

Historical Cultural Benefits

Wilderness can play a part in the development of a national identity. It has been argued that one of the major reasons that the United States of America has been so concerned about wilderness is that such areas were seen as a distinctive part of the American culture that distinguished it from the 'Old World'. This was reflected in American writing, painting, the national character and the deep historical relationship between wilderness and freedom (Driver *et al.* 1987).

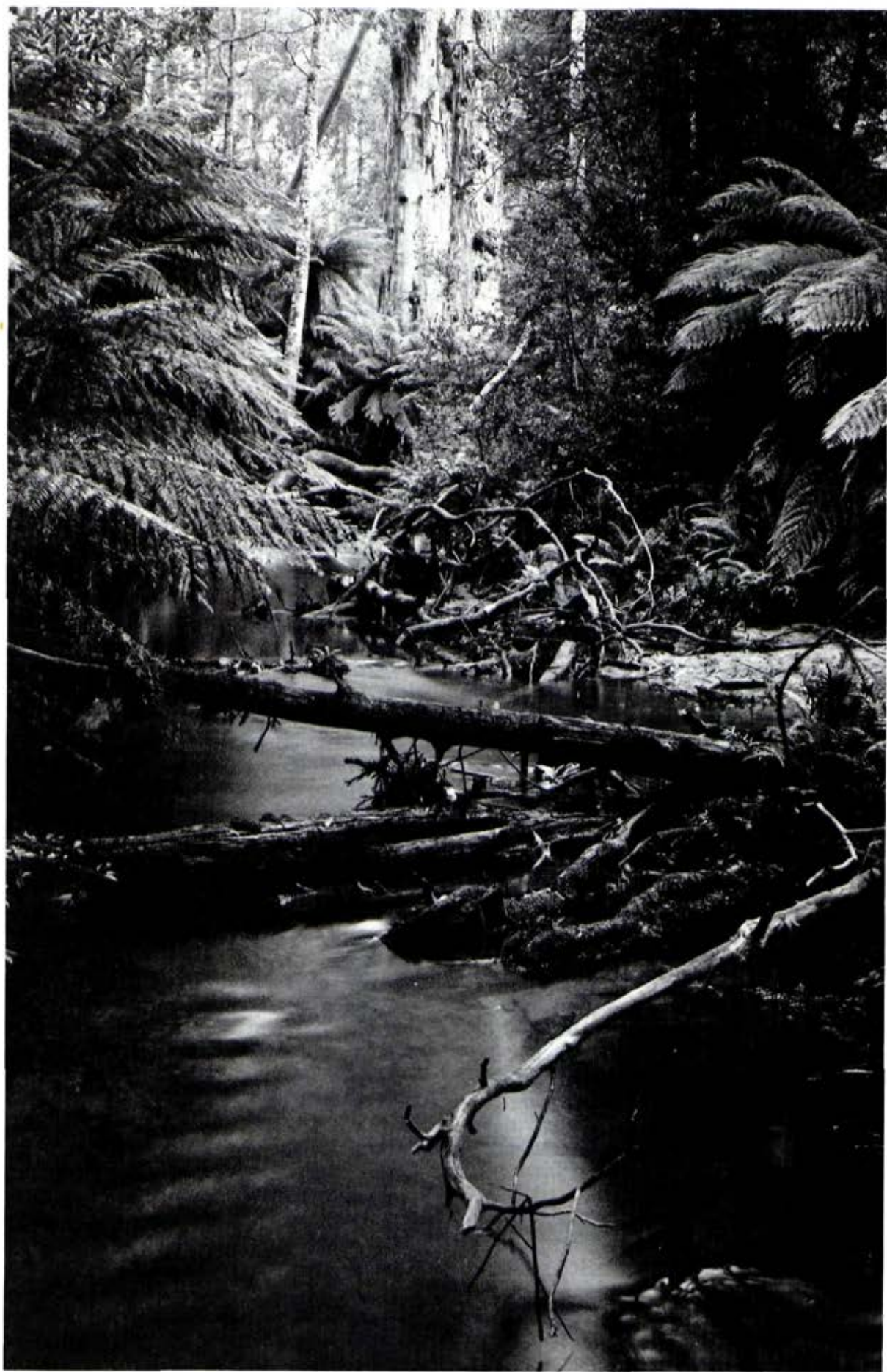
Likewise in Australia the bush has many distinctive characteristics and the essence of this distinctiveness is found in the wilderness. 'Cities have become the same the world around, what is really different about Australia is its unspoiled places, and these can continue to provide inspiration for Australian artists and writers ...' (ACF 1975).

The retention of those few large tracts of land that have not been greatly disturbed has also been considered important in its own right to retain something uniquely 'Australian'.

Much of Australia's popular culture is affected by the pioneering spirit typified by the qualities of self-reliance, adaptability and bush skills. These experiences of the bush contributed to the emergence of a sense of nationalism and pride in Australia. While these qualities were not specifically concerned with the protection of wilderness they were related to intimate interactions with wild remote natural areas.

Unforeseen Utility

A wilderness would usually have a more diverse range of indigenous species and genetic stock than areas where similar ecosystems have been modified or replaced by relatively simple agricultural systems.



The knowledge that areas of high wilderness quality exist, and continue to exist, is seen as important by many - the Rodger River

Genetic diversity within such areas can provide a useful gene pool to replenish genetic stock of particular species and strains and for cross breeding.

Certain species in such areas, particularly those rare or sensitive to modification, while presently considered to be of no value, or which are perhaps unknown, may prove to be valuable in order to understand particular physiological conditions, or even be of unforeseen utility value for medical, pharmaceutical or industrial purposes.

The retention of complex ecosystems, high diversity of species and a wide genetic stock may also be of critical importance for the maintenance of biological systems in the event of long-term disturbance from large scale modification to natural systems as rapid climatic change would bring.

Ethical and Intrinsic Values

Some believe (see ACF 1975), that there are strong ethical arguments that the species living within a wilderness have their own intrinsic values and a right to exist, regardless of any benefit they may or may not provide to people. This moral value is perhaps greatest where the modification of wilderness may lead to the local or total extinction of a species.

The World Conservation Strategy (IUCN 1980), for instance, argues that because humans have become a major evolutionary force with the power to cause radical change in ecosystems and the extinction of species, we are morally obliged to act prudently in the interests of other species. This principle has been supported in the Victorian Government's State Conservation Strategy (Victorian Government 1987).

Others (for example Feller *et al.* 1979) see an intrinsic merit in maintaining areas of wilderness to retain a full range of environmental conditions and maintain an option for future generations to benefit from them, regardless of any present benefit available from them. Retention of such environmental diversity provides the maximum degree of freedom for future choice of ways of life. With the contraction of natural environmental conditions over time, the value of

remaining areas at the most natural end of the spectrum increases.

The mere knowledge that areas of high wilderness quality exist and continue to exist is seen as important by many regardless of whether they, or perhaps anyone else, actually experiences such areas first hand. The spirited public support for preservation of threatened areas of wilderness in the last 10 to 15 years by large numbers of people who have never, and are perhaps unlikely, to visit such areas, stands as evidence of the existence and importance of such intrinsic values.

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PART II
VICTORIAN CONTEXT

4. CURRENT APPROACHES TO WILDERNESS IN VICTORIA

PRESENT LAND CONSERVATION COUNCIL POLICY

The allocation of public land in Victoria has, since 1971, been based on the recommendations of the Land Conservation Council, under the *Land Conservation Act 1970*. Its policies and recommendations have had a profound effect on the use of public land in Victoria.

The Land Conservation Council has made a number of recommendations about wilderness and wilderness areas and these are largely based on those attributes of the land that make it valuable for the wilderness experience from a human point of view. Such areas are recommended to be used to:

'Provide opportunities for solitude, and unconfined forms of recreation in substantially unmodified natural environments.'

Council's present policy statement of wilderness areas is as set out below:

'Wilderness Areas

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.*

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.'

Following government acceptance of Council's recommendations, two wilderness areas have been proclaimed. These

are the 114 000 ha Big Desert Wilderness Park and the 40 000 ha Avon Wilderness Park.

Council has not recommended that a specific area in a national park be included in a wilderness zone, although recent recommendations for two national parks in the Mallee (LCC 1989) recommend that, amongst other things, they be used to protect areas of high wilderness quality. The protection of areas of relatively high wilderness quality is also a scheduled significant value of some areas of State forest in the Mallee.

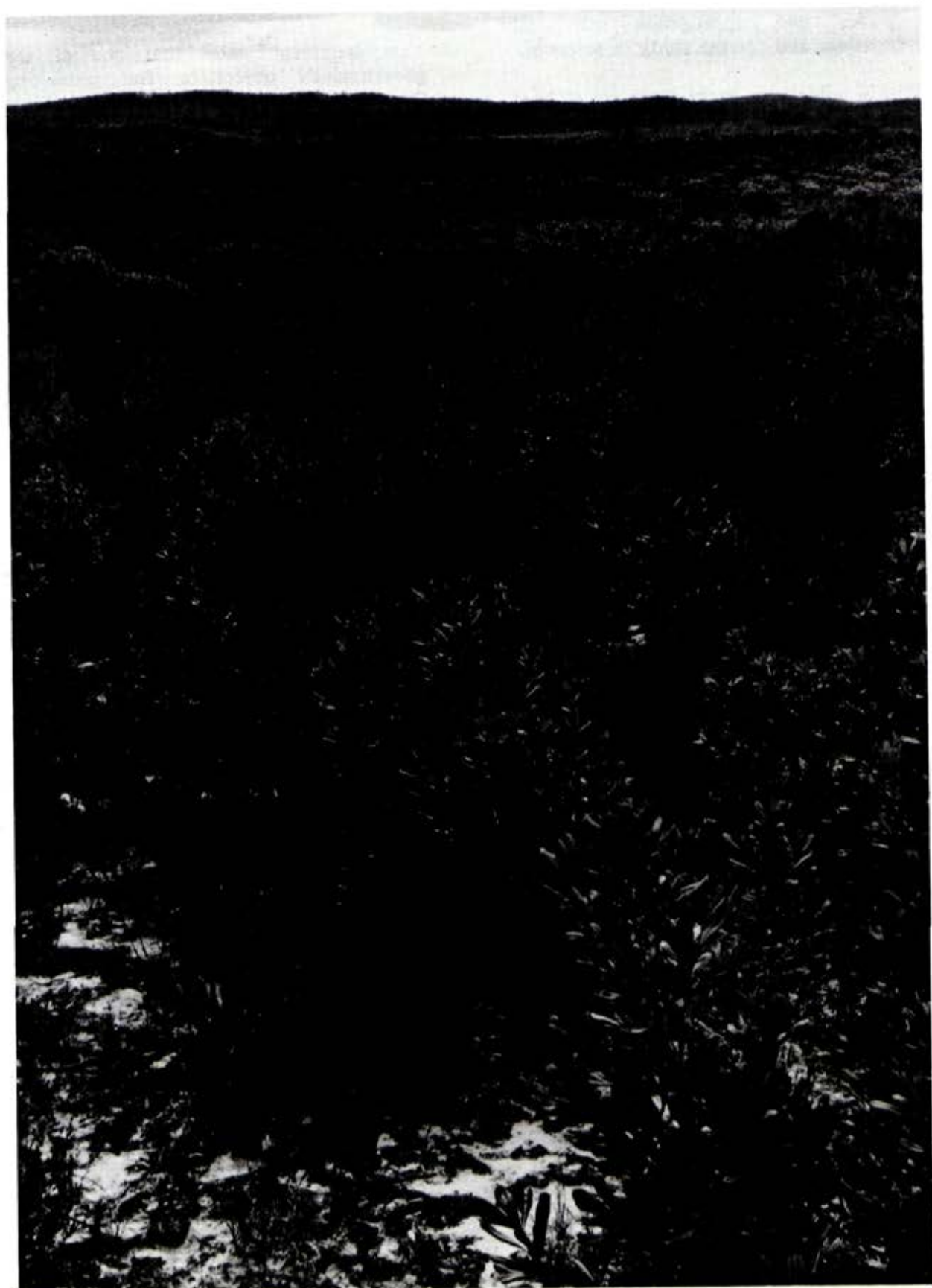
In its final recommendations for the East Gippsland area, the Council also recommended that the Tingaringy National park be managed in such a way as to maintain its wilderness values (LCC 1986).

VICTORIAN LEGISLATION

Victoria's two proclaimed wilderness areas are both reserved under the *National Parks Act 1975*, and like all reserves under that Act, can only be revoked by an Act of Parliament. They are, however, of separate status to national parks.

Until recently there were no specific legislative provisions relating to such areas. Amendments [made under the *National Parks (Amendment) Act 1989*] in the *National Park Act* now provide specific principles for the management of scheduled wilderness parks, prohibit development in them (other than for limited but necessary exceptions for management purposes), and provide for proclaimed wilderness zones within other parks which are to be managed as if they were a wilderness park. The amendments also require that management plans must be prepared for each wilderness park and that authorities for mineral exploration or mining not be granted over a wilderness park.

The Act requires such areas to be controlled and managed to ensure the protection and enhancement of these parks (or zones) as wilderness so as to maximise the extent to which they are undisturbed by the influences of the European settlement of Australia, as well as for the protection, preservation and evolution of the natural environment and features of



The Big Desert Wilderness Park is one of only two proclaimed wilderness areas in Victoria

scientific interest, and for the use and enjoyment by the public for inspiration, solitude, and appropriate self-reliant recreation, and for the study of sciences.

Within wilderness parks there are to be no roads, structures or installations (other than pre-existing survey markers or those essential for park management), no activity or development (other than authorised tours or activities not involving vehicles or use of animals), no use of vehicles or non-indigenous animals or hunting. Measures considered necessary to provide for the health and safety of persons within the area, the prevention and control of fire, or emergencies relating to the control of diseases are, however, permitted.

These provisions apply to the two existing wilderness parks. No wilderness zones have been proclaimed to date. A number of large existing national parks, such as the Croajingolong National Park (87 500 ha), Snowy River National Park (95 400 ha), Wyperfeld National Park (100 000 ha) and the Alpine National Park (626 700 ha), do however contain areas that are essentially unmodified and proposed management plans for some areas of these parks include wilderness zones. These are discussed further in the descriptive blocks (see Chapter 12).

The *Forests Act* 1958 provides for a wilderness reserve (temporary) to be declared over the whole or any portion of a reserved forest. No areas are presently designated under this Act.

GOVERNMENT POLICY STATEMENTS

'Protecting the Environment - A Conservation Strategy for Victoria' (Victorian Government 1987) includes a

number of specific references to wilderness.

This document states that one of the government's objectives for protecting flora and fauna is to 'preserve remaining areas of high wilderness quality'. It further states that 'the few remaining tracts of wilderness will be identified with a view to ensuring their protection in reserves'.

The Victorian Government, in its State Government Strategy, has also stated that management of wilderness areas will be guided by the principles and guidelines adopted by the Australian Council of Nature Conservation Ministers but that these will be further refined. A summary of the existing (CONCOM) guidelines has been included in Chapter 2.

The strategy also notes the concern to limit the effect of fire, logging, grazing and road construction on, among other things, forest wilderness, and that 'non-consumptive uses such as wilderness protection ... will be given greater priority than ever before'.

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5. DEVELOPMENT OF THE PRESENT CULTURAL LANDSCAPE

Victoria's landscape is the result of an *interplay* between its basic physical characteristics - the climate, landforms, soils, and associated biological communities, and the land-use patterns of past and present generations of humans.

Cultural influences are not restricted to those of the past 155 years of European settlement. Cultural associations and influences of aboriginal society date back over 20 000 years, with much evidence of their presence dating from 1000 to 2000 years ago. The cultural values, technology and social organisation of traditional aboriginal society was, however, markedly different from the society of the European colonists, and accordingly their imprint on the landscape markedly different.

In particular, the level of technology available to European society was very different to that used by Aborigines. While both societies appear to have modified the environment by, for example, regular burning of areas to maintain grasslands (a non-climax community) and the hunting of game, the technology of European society enabled major and rapid changes to the natural systems through the physical clearing of extensive areas of land, alterations to hydrological systems, and massive earthworks. The use of metals was a key technology not available to Aborigines. These changes were largely to support agricultural development of the land and they permitted a massive increase in human population, often in urban settlements which, in turn, led to further environmental impact.

The dominant cultural landscapes observable today arise from the influences of the predominantly European immigrant settlers and their modern technological society.

The most obvious change to the landscape is the decline of the area of naturally vegetated lands. A comparison of Victoria's forest area in 1869 compiled from contemporary field survey notes,

with mapping of the forest area in 1972 and 1987 from the analysis of Landsat satellite imagery (Woodgate and Black 1988) provides a dramatic indication of this decline (not withstanding that the analysis does not differentiate between modified or unmodified forest cover, or between natural or modified non-forest areas). Some 88% of the State was estimated as being covered by forests and woodlands in 1869, but by 1972 had been reduced to 36%, and to 35% by 1987. This change is shown on Maps 1 and 2.

This chapter briefly explores some of the factors that have contributed to the creation of Victoria's cultural landscape as we know it today. A more detailed account of the development of Victoria and the history of the public land estate can be found in the Council's Statewide Assessment of Public Land Use (LCC 1988).

RESOURCE UTILISATION AND SETTLEMENT PATTERNS

The natural resources of Victoria were not only the basis for settlement by Europeans but also critical to its ongoing success. The utilisation of natural resources provided exportable commodities providing economic growth and the raw materials for the growth of a new community.

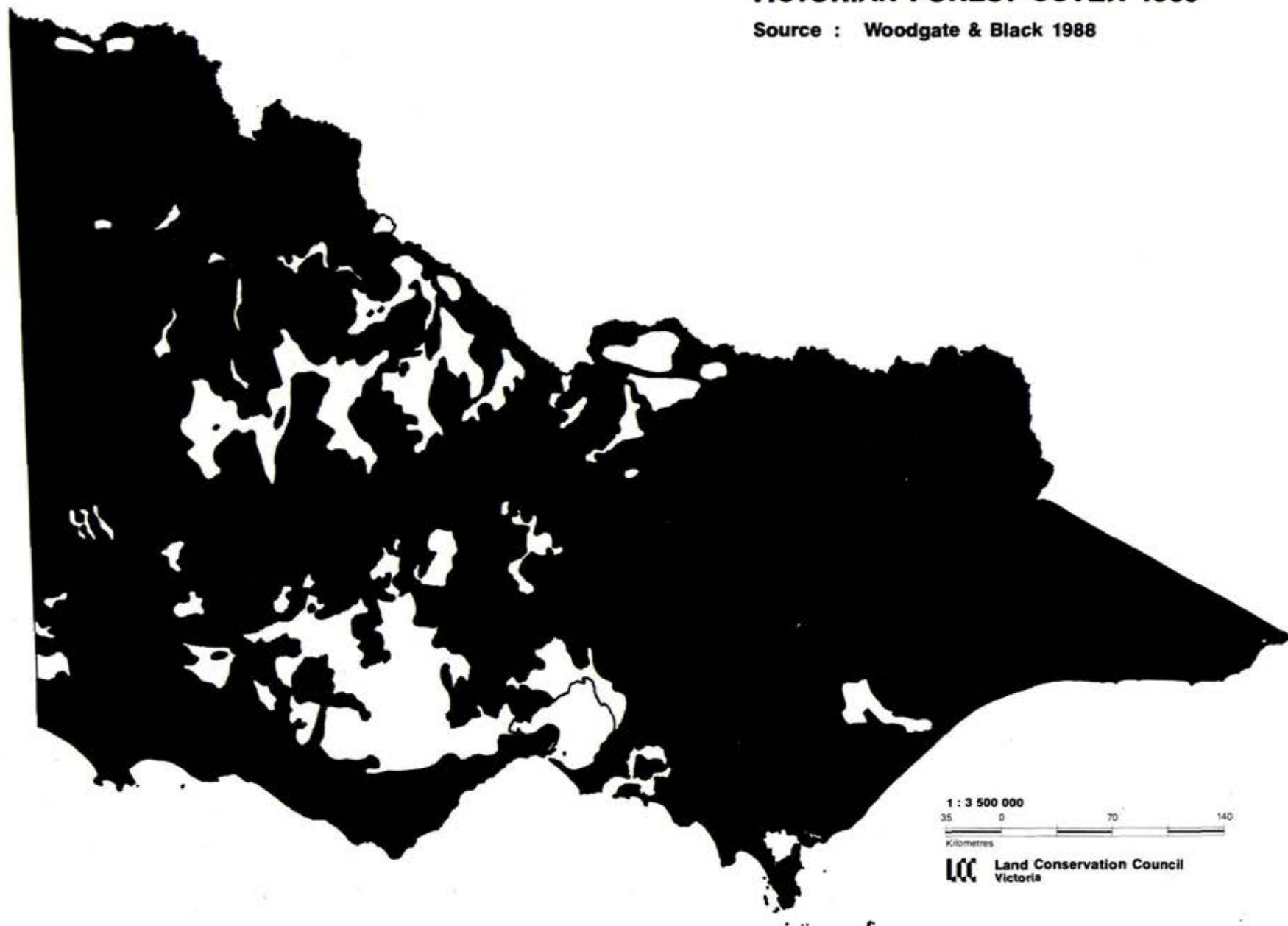
The land-use practices of the European settlers significantly altered the landscape and made major impacts on the natural environment. Agricultural development caused most of the changes but gold mining and timber production also contributed.

The speed at which the landscape changed following the arrival of Europeans in Australia is indicated by the expansion of squatting runs in Victoria (see Map 3). While the squatters generally cleared little timber, once secure tenure was obtained, in the 1860s and 1870s, much of the former pastoral land was selected for agriculture and cleared. More marginal

VICTORIAN FOREST COVER 1869

Source : Woodgate & Black 1988

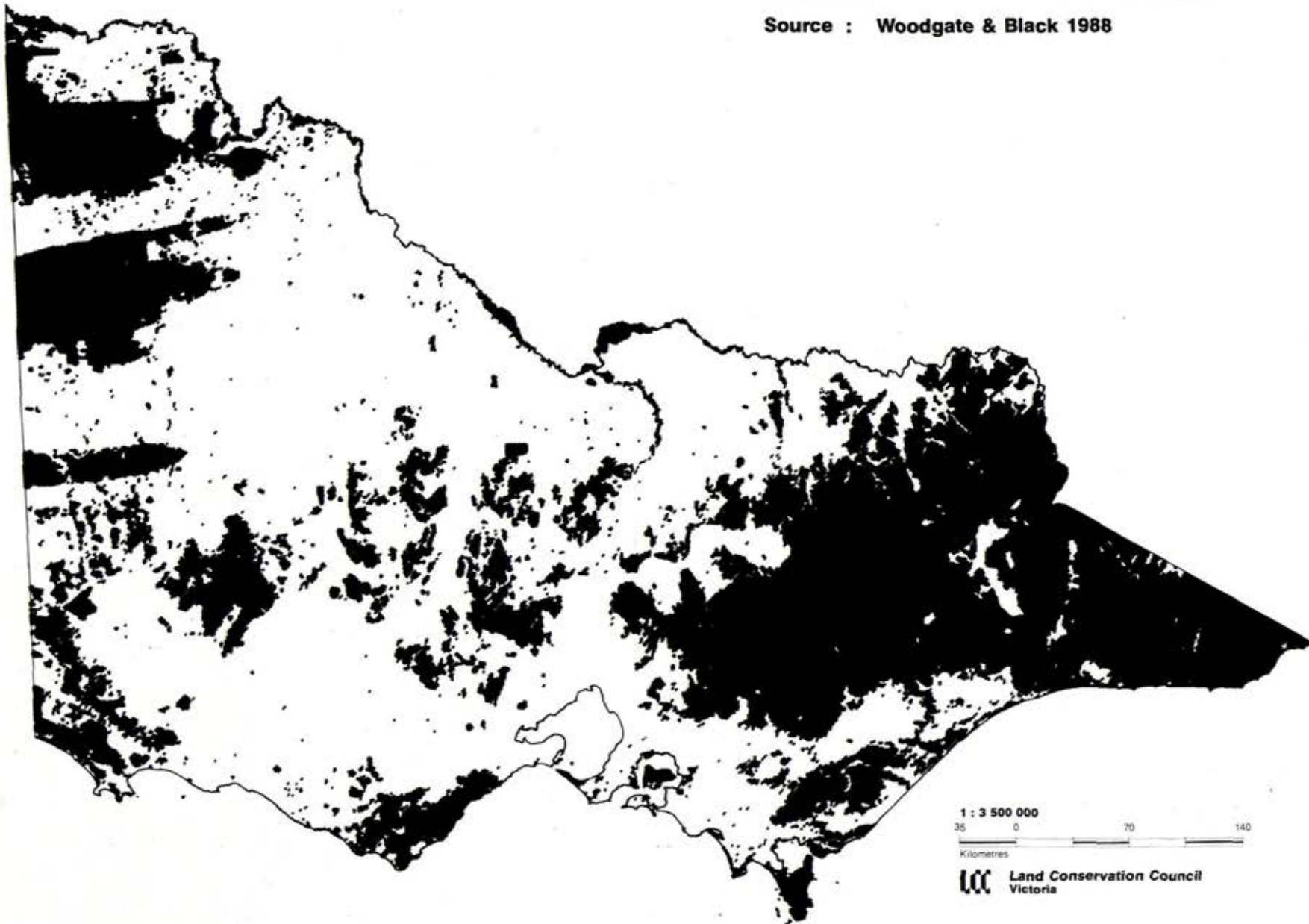
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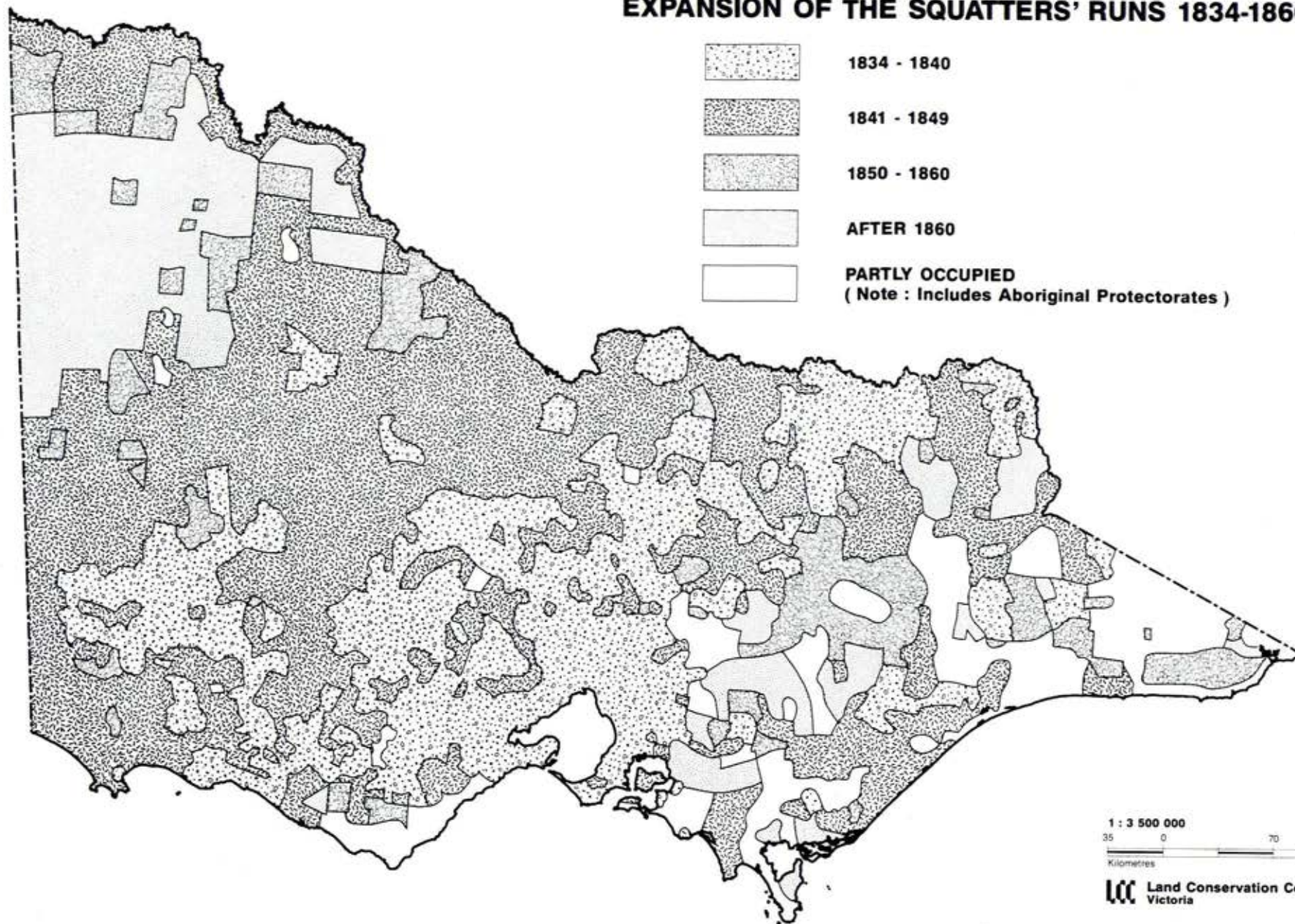
VICTORIAN FOREST COVER 1987

Source : Woodgate & Black 1988



EXPANSION OF THE SQUATTERS' RUNS 1834-1860

46



areas such as the Dandenongs, the Strzelecki Ranges and the Mallee were cleared in the 1880s. By the end of World War I, the agricultural pattern of today was essentially in place, with most agricultural activity in the 20th century focussing on improving productivity by technology, rather than increasing the size of the land resource.

The first gold rushes occurred in the 1850s and involved mainly alluvial mining. As these prospects decreased, attention turned to the original source of the alluvial gold - primarily the quartz reefs of the Palaeozoic sedimentary rock which is widespread through central Victoria. Reef mining soon spread from the major gold mining centres, with small isolated areas prospected virtually throughout the State. As well as the direct localised impacts of mining, the industry led to the establishment of mining tracks through hitherto untrafficked areas and the occupation of places remote from the pastoral and shipping centres where settlement had previously been confined. The industry also led to a massive influx of migrants and the resultant need for food stimulated intensive agricultural development. The gold rushes also made the first heavy demands on public forests, with the immense requirements of wood for building and mining. As gold production declined there was increased pressure for closer settlement.

Early sawmills were generally located in forests adjacent to the mining areas. Other heavy users of timber were the steamer trade on the Murray River and the developing railway system, apart from general construction. Indiscriminate cutting was rife and there were few forest reserves until the establishment of the Forestry Commission of Victoria in 1918. Changes in technology also had major impacts. Horse-drawn teams which brought logs to winch lines were progressively replaced by crawler tractors in the 1940s and the axe and cross-cut saw were replaced by chainsaws in about 1950. The post-war housing boom placed unprecedented demands on Victoria's forest resources and the mountain forests of north-eastern Victoria and north-central Gippsland, became the main source of high quality timber. In the 1960s East

Gippsland became another major source of hardwood sawlogs.

In the 1880s tourism began to become a major influence on land use in its own right. Interest in experiencing the alpine areas increased and by the end of the 1920s Mount Buffalo, Mount Buller, Mount Feathertop, the Bogong High Plains, Mount Bernard and Mount Hotham were all skied, and accommodation houses constructed and access tracks cut. Interest in the more remote areas of the State increased with the availability of motor cars. Specific funding was allocated for the construction and maintenance of tourist roads such as the Great Ocean Road and the Mount Baw Baw Road. Tourist walking tracks were also cut, for example in the Grampians and notably the Baw Baw track between Warburton and Walhalla, which was established in 1906.

By the turn of the century only the eastern highlands, other than for gold prospectors in the valleys, the Mallee, the Little Desert, and the Grampians remained unsettled and undeveloped.

Most urban settlement was in areas with a reliable water supply and transport linkages to productive lands or major mining centres. The railways especially had a major influence on settlement throughout Victoria, with the future prosperity or even existence of many towns determined by the location of lines. By 1891, 43% of the population lived in Melbourne alone.

Major land-use patterns changed little during the 20th century. Today's major regional urban settlements and the essential transport and agricultural patterns had been established before the First World War.

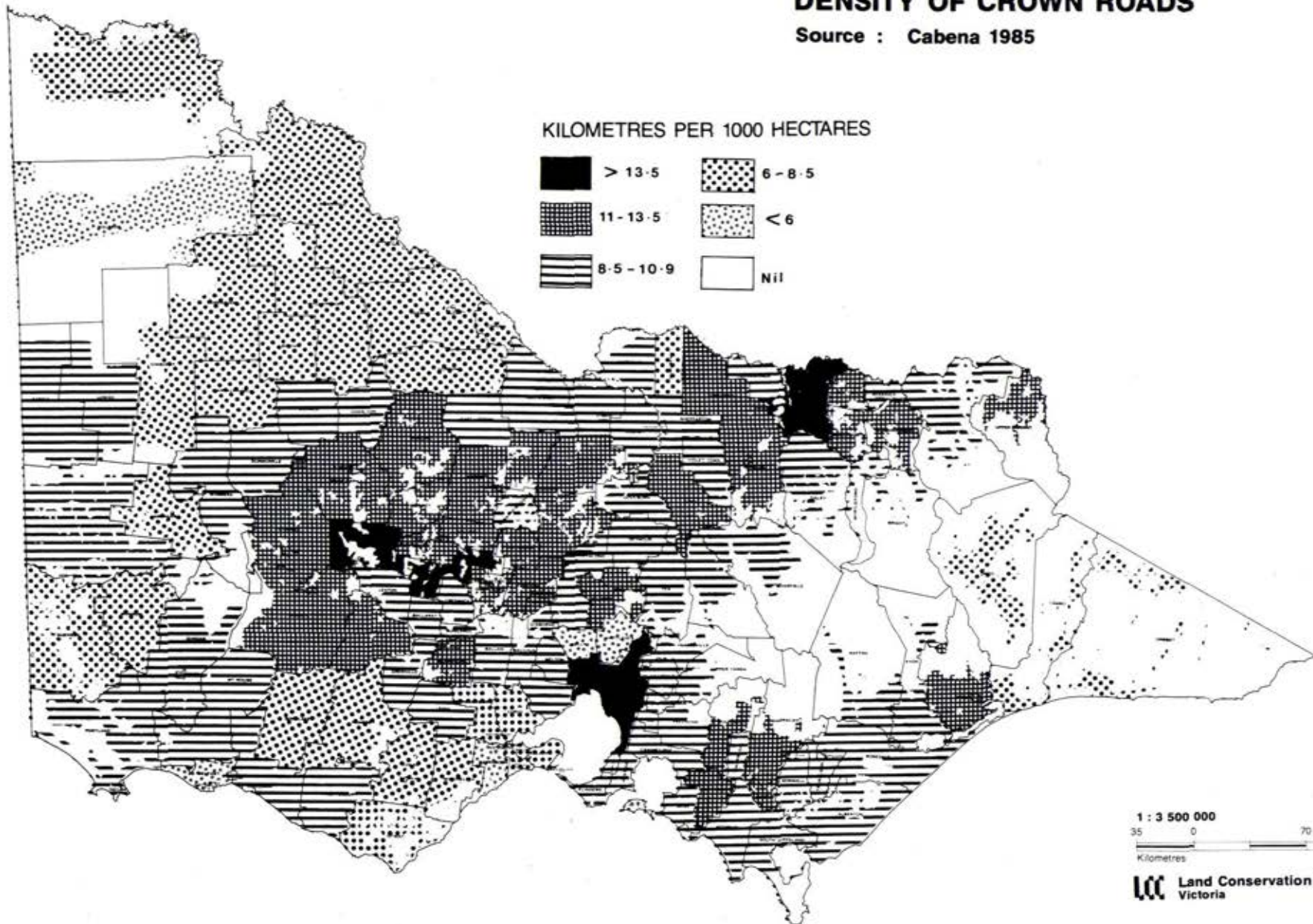
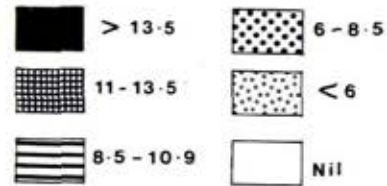
The State's public road network was also largely in place by the turn of the century. The main public roads were constructed and maintained by central government; other public roads were generally the responsibility of local government. Roads were reserved in association with Crown subdivisions, particularly after 1841 when legal access was required to be provided to every Crown allotment and the density of roads became related to the average size of

DENSITY OF CROWN ROADS

Source : Cabena 1985

48

KILOMETRES PER 1000 HECTARES



1 : 3 500 000

35 0 70 140

Kilometres

 Land Conservation Council
Victoria

allotments (Cabena 1985). The density of the Crown roads is thus an indicator of the density of settlement. The density of Crown roads throughout Victoria is shown on Map 4.

Following World War II, extensive track networks were established for fire control purposes or to truck timber from the forests to mills. These rarely followed road reserves; nor were they proclaimed as public roads. Nonetheless they have been generally available for public use.

THE REDUCTION OF PUBLIC LAND

Throughout the period when Victoria's public land was being alienated the prevailing attitude of both government and the public was that land not utilised was wasteland (as was its official designation). It became a common objective to put this wasteland into productive use. To this end public lands were sold for agriculture and settlement (as well as for revenue raising). What was not sold was generally made available for use under licensing or royalty arrangements.

The reduction of public land is closely associated with closer settlement policy and has been closely correlated with the reduction of land retaining its natural vegetative cover. Recent assessments of forest cover in Victoria (Woodgate & Black 1988), for instance, indicate that only 6% of the area covered by forest in 1987 was on freehold, and that 84% of forested land cleared between 1972 and 1988 was on freehold land.

Eight phases of change in the public land estate are described in Table 7, which also lists the associated impacts contributing to the diminution of the condition of public land and its values. The diminution of extent of public land associated with these phases is shown in Figure 3.

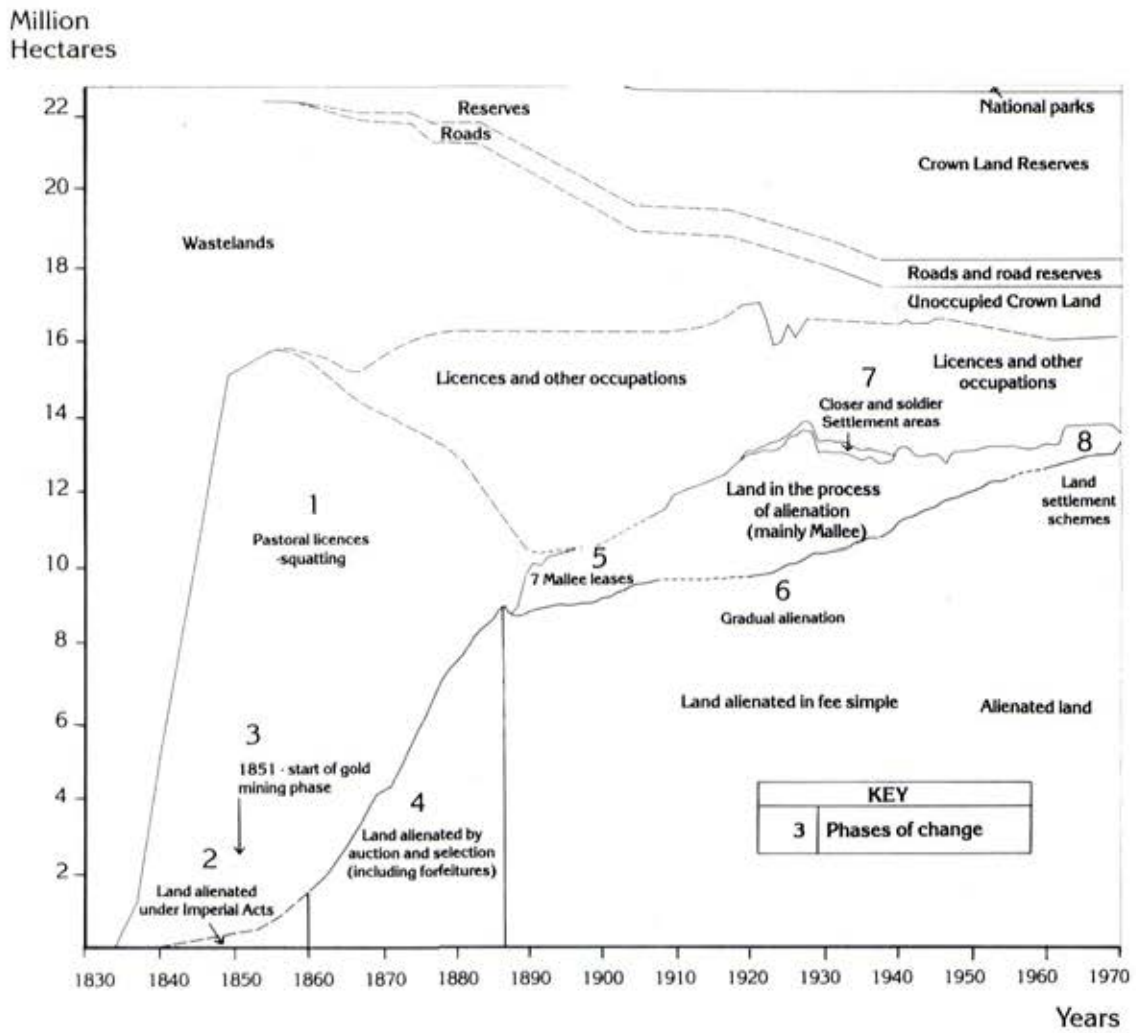
These changes were rapid. In 1860, 7% of the State had been alienated, and by 1881, 35% alienated, with much of the remainder held by under some form of licence. Following major phases of alienation via several Land Acts, the boundaries of the public land estate had been effectively reduced to their present position by 1925.

Table 7

PHASES OF CHANGE IN THE PUBLIC LAND ESTATE

Date	Phase	Effects on public land estate
1820s to 1890	1 Pastoral settlement (squatting)	Damage to ground flora; competition with grazing fauna; weed spread; erosion
1837 to 1860	2 Alienation under Imperial Acts	Loss of public land; clearing, cultivation, and destruction of flora and fauna
1851 to 1860	3 Gold-mining and associated settlements	Clearing, timber extraction; mining-sludge deposition; erosion; water pollution; flooding
1860 to 1887	4 Alienation under Victorian Land Acts	Extensive loss of public land; widespread clearing, cultivation, and destruction of flora and fauna
1888 to 1928	5 Mallee settlement and other leasehold	Leasing and later alienation of the Mallee country; other new areas opened for selection effects as above
1888 to 1970	6 Gradual alienation of public land	Loss of public land and its values as for 2 and 4 above
1919 to 1970	7 Closer, soldier, and rural settlement schemes	Some areas of public land developed by the State and alienated for farming; effects as above
1960s	8 Little Desert and other land	Limited areas settled; proposals stimulate changes in attitude to public land

FIGURE 3:
PUBLIC LAND ESTATE OF VICTORIA 1834 TO 1970



MANAGEMENT EMPHASIS OF PUBLIC LAND

Victoria has a long tradition of maintaining significant parts of its land resource as public lands for public use and benefit. This contrasts with some of the other Australian States and notably with much of the rest of the world. Nonetheless, management practices have changed considerably over the years in response to changed community expectations.

Minimal Management

In 1836, when Port Phillip was declared a district of New South Wales, management was focussed on the eviction of unlicensed squatters and the settlement of boundary disputes. The squatting was conducted under an annual licence, and after 1847 the squatters were granted 15-year leases.

After the colony of Victoria was established by separation from New South Wales in 1851, the Department of Public Lands was established (in 1855), incorporating the Board of Land and Works, to administer such licensing. Much effort was also spent on identifying auriferous areas and regulating the ensuing mining activity. The extraction of gold had priority over all other land uses.

As mining activity declined, emphasis turned to settling the massive influx of immigrants on the land. After a series of selection Acts were passed in the 1860s, the emphasis changed from pastoral-area licensing to land survey and sale. Policies were introduced to encourage selection, retain Crown land in reserves and develop the first rudimentary town plans.

The Crown land reserves were set aside for purposes complementary to agricultural or other uses, that is for roads, water supply and timber, but increasingly for recreation and public purposes. Some were reserved on account of their natural beauty and in 1879, land was reserved from sale along all of the remaining coastline and, in 1883, along the remaining water frontages. These reserves were generally managed by local communities.

While some areas had been protected by these reserves, there was growing popular concern towards the end of the century about the condition of public resources also managed by the Department, namely the wildlife, the forests, the soil, and the water.

Protection of Individual Resources

Acclimatization societies pressed for a game law, which, when passed in 1862, specified year-round protection or no-hunting periods for various imported species. Subsequently, several native species were added to the protected list. As part of a wider movement seeking to establish major nature reserves, pressure for native wildlife protection resulted in a *Game Act* amendment in 1896, which allowed the reservation of sanctuaries. In 1902, 35 species of native birds and all native fauna, except snakes, were added to the protected game list. By the end of 1916 at least 100 reserves had been established, with 205 sanctuaries by 1945. Most, however, were small and were managed primarily to provide habitat for game species, notably water birds. Early fisheries and wildlife work concentrated on stocking streams with fish and enforcement of the game laws. Fisheries and Game, and later Fisheries and Wildlife organisations have actively administered fishing, hunting, researching and stocking fish, and (since 1948) researching native mammals and birds.

Local forest boards were set up in the early 1870s and in 1874 a Central Forest Board was established which managed forests through the allocation of licences. Subsequent to a Royal Commission on forestry in 1887 a State Forests Department was set up under the *Forests Act* 1907, which also made provision for the control of forest produce from public land, for the dedication of areas of reserved forest and for the collection of royalties. Under the *Forests Act* 1918 the Forests Commission was established and forest management was aimed at enhancing the timber resource.

Following the major bushfires of 1939, fire protection became a much greater part of public land management. Fire protection strategies have been based on

progressive improvement to detection measures, suppression techniques, and fuel management programs, as well as the development and enforcement of fire protection laws.

In response to rabbits and weed infestations, in the decades after settlement, specific legislation was proclaimed. The earliest was the *Thistles Act* in 1856 and the *Rabbit Suppression Act* of 1880 which gave responsibility of control to owners and occupiers of land, shire councils and the Department of Crown Lands and Survey. The *Vermin and Noxious Weeds Act* of 1922 established a separate division within the Lands Department, with 92 vermin and weed control districts throughout the State. The Vermin and Noxious Weeds Destruction Board was formed in 1959. It had extensive powers, a large staffpower and financial resources to combat weed and vermin problems.

Various national parks were established under the Land Act in the first half of this century, generally being controlled by local Committees of Management. By 1956 they totalled 126 670 ha and were revoked as Land Act reserves, being included instead in a schedule to the *National Parks Act* 1956, with responsibility vested in the National Parks Authority that was established in 1957.

Into the Present

As at June 1970 over 50% of the remaining public lands was unreserved Crown land under the responsibility of the Department of Crown Lands and Survey. Nearly half of this was occupied under various licences and leases (mainly used for grazing). No one agency had overall management responsibility for the remaining area of 3 million hectares.

Such public land was used to supplement personal incomes, particularly during times of economic hardship. Grazing of stock, shooting of rabbits and extraction of gravel and timber were all pursued. Such temporary uses often led to the effective

privatisation of the public land - by default rather than by purchase under tender or auction. In the post-war period, the general affluence of society increased and quality of life issues began to be considered over and above subsistence requirements. The public land was seen as having special conservation values.

Until the advent of the Land Conservation Council (in 1970) such land was utilised for productive purposes largely at the discretion of local officers of the Department of Crown Lands and Survey, with the removal of timber produce permitted at the discretion of Forests Commission officers. The Forests Commission was also responsible for the fire protection of such areas.

The process of establishing specialised agencies with land management arms was abruptly reversed in 1984 with a major re-organisation of responsibilities for natural resources. Thus the bulk of public land in Victoria became the management responsibility of a single government agency - the Department of Conservation, Forests and Lands.

Present land use of public lands is described in the following chapter.

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- Cabena, P.B. (1985). Unused Roads in Victoria: An Historical and Geographical Assessment and Management Critique: Discussion Paper. (State Forests and Lands Service, Department of Conservation, Forests and Lands, East Melbourne, Victoria.)
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6. PRESENT LAND USE AND FUTURE DIRECTIONS

This chapter provides an overview of present day land use in Victoria and indicates future directions. It thus describes the context within which the approach to wilderness needs to be considered. Map 5 locates the major land uses across Victoria.

SETTLEMENT

Victoria comprises 3% of the Australian continent, but contains more than one-quarter of Australia's population. Victoria is also the most densely populated State with an average (as at 1987) of over 18 persons per square kilometre. This compares with the national average of just over 2 persons per square kilometre and is nearly three times that of N.S.W. (Australian Bureau of Statistics 1989).

Victoria's population is also highly concentrated with 2.6 million persons (or 70%) living in Melbourne. Outside Melbourne there is also a high concentration of people in urban centres. Two hundred and fifty thousand people live in the three largest regional cities of Geelong, Bendigo and Ballarat. A further 500 000 live in the smaller cities and towns throughout the State, with the largest (major regional centres) being Warrnambool, Mildura, Shepparton, Albury--Wodonga and the cluster of towns in the La Trobe valley. The population living in non-urban areas (urban areas being considered by the Australian Bureau of Statistics as towns and cities with over 200 persons) is less than 500 000, or about 12.5% of the population (Australian Bureau of Statistics 1989).

Population and settlement density in rural areas is closely linked to the nature of the farming activity with higher densities in areas of intensive agriculture such as irrigation or dairying regions. Elsewhere settlements may be widely dispersed. Substantial areas in the east and north-west of the State are almost unpopulated. The present trend towards urban dwelling is likely to continue.

Regional centres with significant spheres of influence are Ballarat, Bendigo, Mildura, Shepparton, Wangaratta, Warrnambool, Portland, the Geelong area, Albury--Wodonga area, and La Trobe valley area. These have been targeted (Victorian Government 1984) for regional industry assistance, with other centres with specific problems, and are likely to remain the major regional centres.

Population densities in rural areas are likely to decrease as labour intensive farming wanes, farm size increases and the smaller townships decline under competition from the larger towns. Areas adjacent to major urban centres or those attractive to the tourist, holiday retreat and retirement sectors such as along the coastline, the Gippsland Lakes, the Murray Valley and the north-east, are likely to persist as the only sectors of rural population expansion.

The transport networks of the State have remained essentially stable. In 1986--87 there were 159 376 km of roads and streets open for general traffic, a length which has not increased significantly for some years. The length of railway line open for traffic decreased 10% between 1981--82 and 1986--87. The number of motor vehicles has continued to rise, climbing 16% between 1982 and 1987 (with the greatest increase in the truck and bus sector). As at 1987, 2 527 400 motor vehicles were registered (Australian Bureau of Statistics 1989).

Declared Tourist and Forest Roads (that is excluding most public land tracks and minor roads) make up 1.2% of the total length of declared roads and streets open for general traffic (a total of 1848 km), and 6.8% of the maintenance cost (a total of \$7 429 000). Construction of roads is the major component of the Road Corporation's expenditure on roads, being \$299 513 000 or over 70% of total expenditure in 1986--87 (Australian Bureau of Statistics 1989). Upgrading of roads is likely to continue, particularly of those between the major urban centres.

PRESENT LAND USE

54



Major Conservation Reserves



Broad Acre Agriculture



Other Public Land Uses

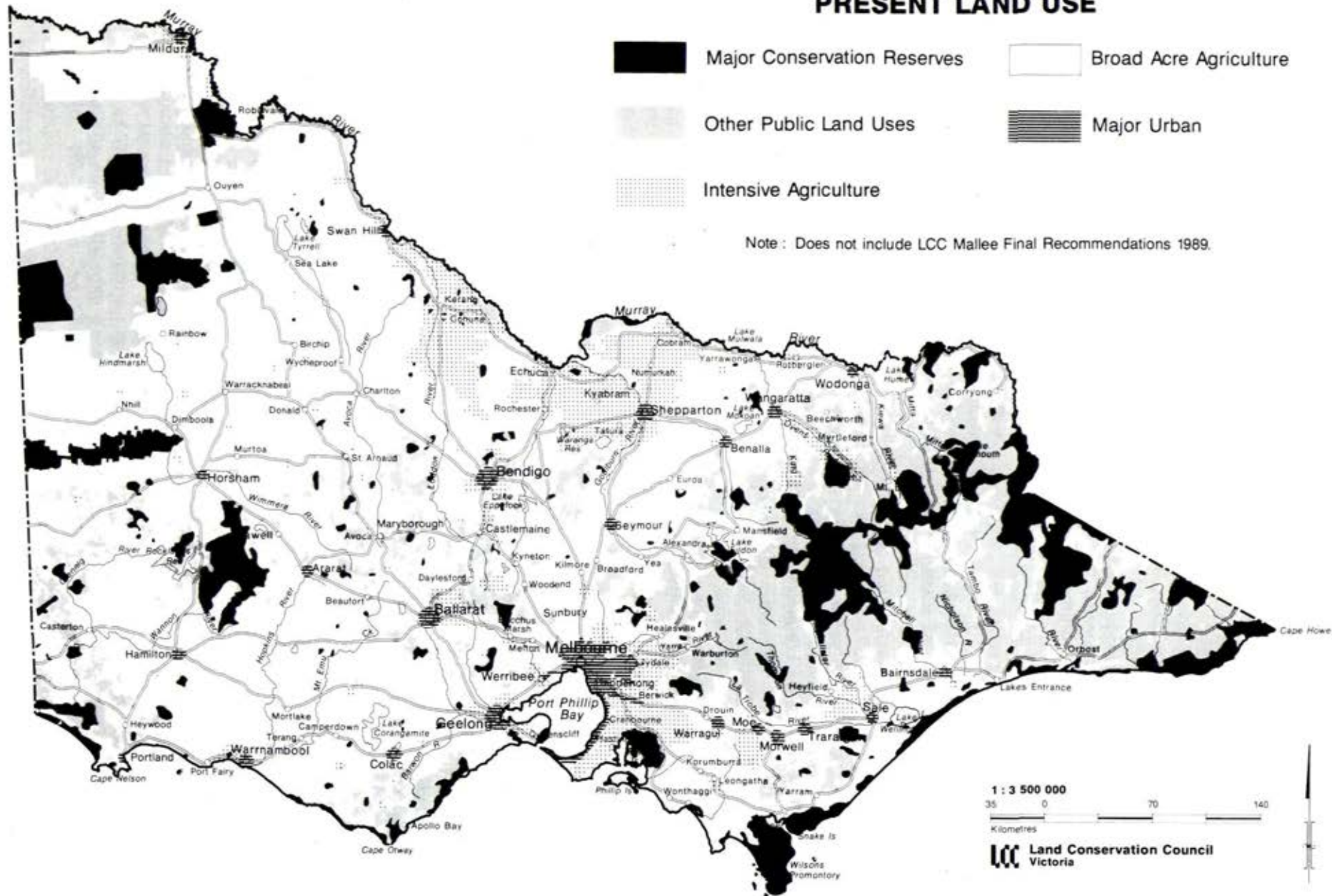


Major Urban



Intensive Agriculture

Note : Does not include LCC Mallee Final Recommendations 1989.



Most urban growth centres are already on major transport routes, and are notably closely allied with the major interstate transport routes.

A breakdown of the amount spent on the construction and maintenance of forest tracks across the public lands of the State is not available. However, as an indication, the road and track maintenance allocation for the Central Gippsland Region of the Department of Conservation, Forests and Lands was \$686 306 in 1989--90. This region is responsible for a road and track network of approximately 6000 km in length. About 60% of this region's funding was for works associated with native forest utilization activities and 19% associated with fire protection requirements.

While the present trends of rationalisation of train lines and the reinforcement of settlement and transport networks along existing corridors are both likely to continue, recent proposals for a 'Very Fast Train' link between Melbourne and Sydney could induce major change in the existing patterns (see also Chapter 8.)

MINING AND QUARRYING

Minerals, fossil fuels and 'stone' products are extracted in Victoria and the State is a major producer of oil and gas, brown coal, and 'stone'.

The industry provides a small but relatively stable contribution to the State's employment (averaging about 0.3% since 1981), and since 1981 has contributed between 3.6 (1987) and 5.3% of the State's Gross Domestic Product. Currently there is strong growth in the mineral sector. Advances in technologies of exploration and extractive metallurgy, together with the depreciation of the Australian dollar and high gold prices, have led to increased exploration effort and higher production levels, with gold output increasing 30% during 1986 and 1987 (DITR n.d.).

The viability of any mining project depends on many inter-related factors including geographical location, size, and quality of the deposit, as well as overburden thickness and characteristics. Markets must also be established prior to the initiation of large projects.

Exploration undergoes constant and often rapid evolution and change as new ideas and concepts, backed by changing technologies, lead to constant re-evaluation of prospective areas. Allied to this is the basic tenet of mineral economics - that mineral deposits currently regarded as uneconomic may become economically viable in the future, and some minerals not used at present may one day become important.

Minerals

The mineral sector of the mining industry in Victoria is dominated by gold mining, which accounts for more than three-quarters of total sector employment and more than half of the total capital turnover. Other minerals currently produced include gypsum, kaolin and salt, while a major copper mine is being developed at Benambra.

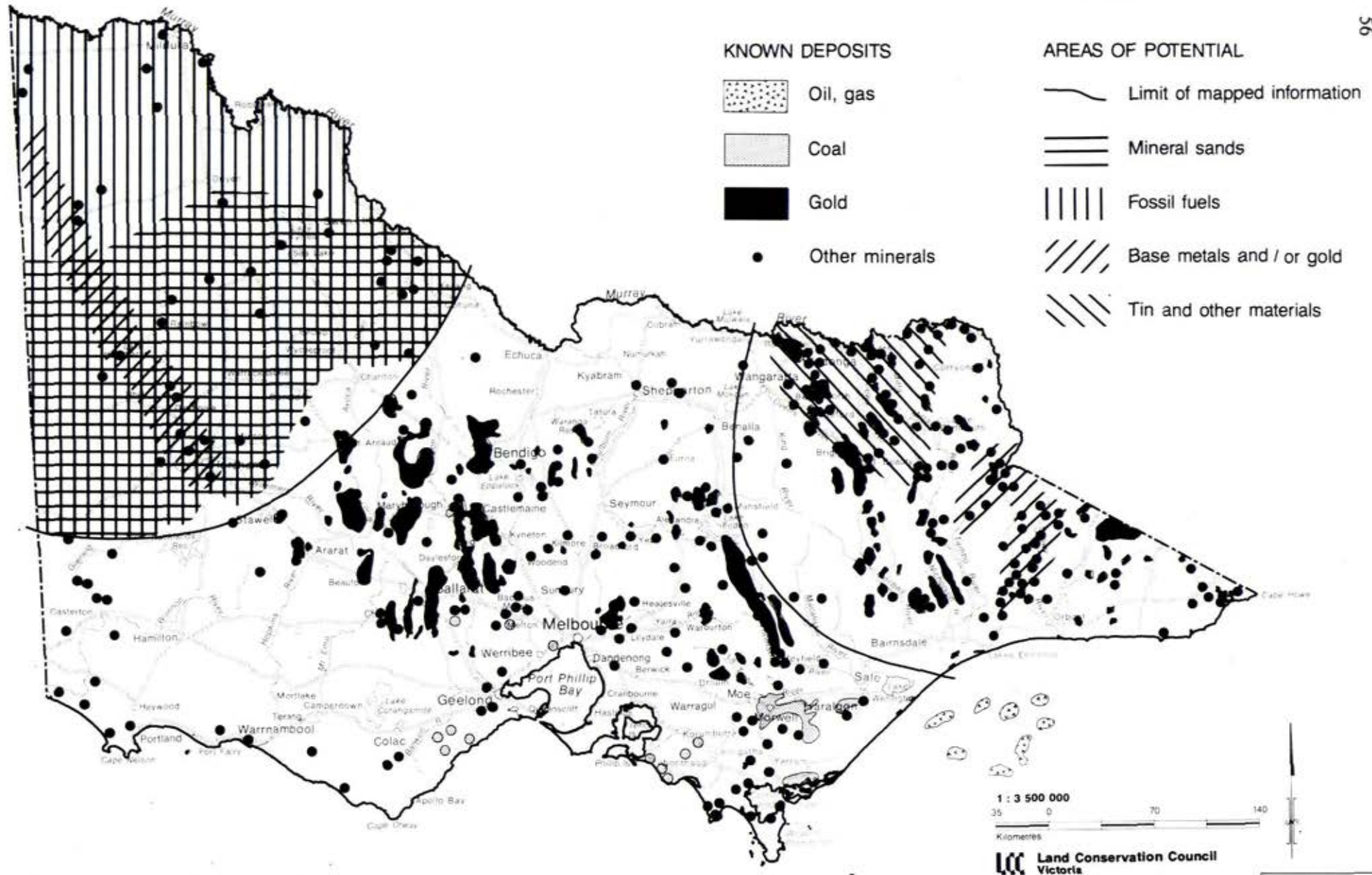
A number of large mining companies are putting much effort into exploration and development. Until recently most mineral exploration has been carried out in areas of known mineralization, with the emphasis on gold. Drilling and geological mapping were the main techniques used. More recent mineral exploration programs use new concepts of ore genesis, different interpretations of an area's geology, and new techniques such as geochemical and geophysical (including gravity and aeromagnetic investigations) survey. A wider range of minerals are now also sought including copper, zinc, lead, silver and the heavy mineral sands, zircon, rutile, ilmenite and monazite.

In addition to previously identified mineralization zones associated with former goldfields, exploration has been concentrated at Limestone Creek in the east of the State, where base metal deposits and other prospects occur, and in the Mallee and the Wimmera where deposits of mineral sands have been proved. These and other areas of potential are shown on Map 6. Future mining activity is expected to occur in all these areas as well as in the large former goldfields. New goldfields, such as that at Nagambie, may also be found and worked.

Non-metallic minerals mined include gypsum, salt, kaolin and diatomite. Gypsum is extracted by surface mining

MINERALS AND FOSSIL FUELS

56



from thin but widespread deposits in the west and north-west of the State. Future production is likely to continue in the Mallee and Wimmera. Salt is extracted from seawater at Geelong and Avalon, and from salinas in the north-west of Victoria - Lake Tyrrell being the major source. Kaolin and diatomite is mined in central Victoria.

Government policy excludes exploration and mining in reference areas, national, state or wilderness parks, and this is now reflected in recent amendments to the *National Parks Act 1975*. They may also be excluded from other lands at the Minister's discretion.

Fossil Fuels

The main fossil fuels produced in Victoria are oil and gas, and brown coal. These are essential commodities in Victoria's economy.

Victoria's major reserves of oil and gas are in the Gippsland Basin, and smaller gas fields are likely to be found in the Otway Basin. The Gippsland Basin contains much of Australia's declared commercial natural gas reserve and accommodates a large part of Australia's requirement. In 1987--88 petroleum products were produced from 12 offshore fields, all of which were in the Gippsland Basin (see Map 6). The only area where onshore natural gas is currently being produced is the Otway Basin near Port Campbell. Its gas is used for domestic purposes in Warrnambool.

The off-shore areas of the Gippsland and Otway Basins, which underlie much of the coastline of Victoria, are substantially covered by petroleum exploration permits. All of the onshore area of the Otway Basin, and 85% of the Gippsland Basin are at present under onshore exploration titles. Exploration titles also exist in the Murray Basin, which extends into New South Wales and South Australia. The area with potential for fossil fuels in the north-west of the state is shown on Map 6.

The Gippsland Basin is likely to remain the focus of oil and gas production in Victoria for the immediate future, although their reserves are finite. Several marginal fields are now being developed.

If oil and gas are located in basins other than the Gippsland Basin, changes in the landscape, local population densities, and distribution systems would occur.

Victoria has very major brown coal resources, most of which are concentrated in Tertiary sediments in the La Trobe valley. Smaller coalfields include those at Anglesea, Deans Marsh, Wesleydale and Benwerrin, Ballarat, and in the Gippsland basin at Won Wron and Gelliondale. Resources have also been identified in the Murray Basin in the Kerang area. Resources in the La Trobe Valley will dominate Victoria's energy requirements for base-load electricity for the foreseeable future. Use of renewable energy sources may become more widespread, if carbon dioxide emissions are to be reduced.

Stone

Recorded production of stone in Victoria has fluctuated between 30 and 40 Mt per annum since 1971 (approximately 1.25 Mt of stone products were produced from public land in 1987--88). Crushed and broken stone, sand, and limestone are the major stone products, representing by weight 51%, 20% and 19% respectively of 1986/87 production (DITR 1988). Most materials are used in road-making and maintenance, the construction industry, and in brick and ceramic manufacture.

Most stone resources in Victoria are well distributed and stone is usually extracted at locations close to point of use in order to minimise transport costs. Because stone is a low price but high volume commodity, given current consumption, it should continue to be locally available, except for some high quality materials. Due to continuing high demand, supplies of readily available concrete sand in the Melbourne area declining.

Cost minimisation and budget restraints encourage agencies and municipalities to seek the closest practicable source of materials. This has often meant the nearest source on public land.

TIMBER HARVESTING

The State's forests supply a broad and expanding range of products and services,

one of which is timber - a most important and extremely versatile raw material. Because of its strength, durability, easy working characteristics, and relatively low cost, it is used for a variety of purposes such as the construction of buildings, bridges, and wharves apart from furniture and internal fittings. Timber and wood fibre can be reconstituted to provide the raw material for the manufacture of paper and paperboard products, panel products such as particleboard, hardboard, and plywood and can serve as a fuel for domestic and industrial purposes. Other forest products include charcoal, posts and poles, railway sleepers, props and mining timbers, garden mulch, broombrush, and eucalyptus oil. Timber is also a renewable resource, when managed appropriately.

Victoria produced about 56% of its sawn timber requirements (in 1984/85), with the shortfall overcome by imports from interstate and overseas. Hardwood saw log and veneer log production in Victoria in 1987/88 amounted to 949 404 cu.m, with softwood sawlog and veneer log production being 455 406 cu.m. Pulpwood production was 416 891 cu.m and 361 244 cu.m for hardwoods and softwoods respectively (DCFL 1988).

The timber industry generated more than \$42 million in royalties for the State of Victoria in 1987--88, an increase of \$1.3 million on the previous year's revenue. This included \$19 million for hardwood, \$11.8 million for softwood, and \$8.9 million for pulpwood. The funds allocated for native State Forests management was \$20 million in 1987--88 (DCFL 1988).

Forestry, logging, and the primary processing industries of sawn timber, panel products, and pulp products have a significant impact on the Victorian economy. They employ about 6500 rural workers and provide from one-fifth to one-half of all manufacturing employment in many rural communities, although employment is gradually declining owing to mechanisation. These industries therefore comprise a relatively large component of the rural economy.

The demand for timber is expected to continue to grow slowly, despite new products, such as the extrusive plastic materials like 'Timbrene'. The volume of

hardwood timber available will become relatively constant under sustainable yield policies, but as the large areas of privately and publicly owned pine plantations established since the early 1960s reach maturity, the available softwood resource will increase significantly. The annual availability of softwood sawlogs is estimated to double from 692 000 cu.m in 1990--94, to 1 405 000 cu.m estimated to be available per year by 2015 (Victorian Government 1986).

In addition, depending on the results of the Value-Adding Utilisation System (VAUS) Trial in Central and East Gippsland, timber in native forests which are presently uneconomic, may become available and increase hardwood chip production suitable for processing as pulpwood for domestic use or export.

Seed harvesting, especially of Shining Gum, may become an important product.

Hardwoods

When discussing their uses, Victoria's commercial hardwood timber species are generally put into three groups: durable, ash and mixed species.

Durable species utilised for timber production are drawn principally from forests along the Murray River, in the central highlands and in the south-west of the State. The main species are red gum, box, and ironbark.

Timbers in the ash group come from mountain forests that grow in the upper reaches of major streams in the Central Highlands, Alps, Eastern Highlands and the Strzelecki and Otway Ranges. These forests usually consist of alpine ash, mountain ash and shining gum. This group provides the bulk of high-quality seasoned timber and has the best potential at present for further processing, i.e. adding value beyond the green sawn-timber stage.

The mixed-species group comprises eucalypts from foothill and coastal forests - mixtures of various stringybark eucalypts with gum, peppermint, or silvertop, or of gums and peppermint. Mixed-species forests occur extensively throughout Victoria. Mixed-species



Hardwood sawlog production is a major land use in the more remote and natural areas of the Alps and East Gippsland - log dump in the headwaters of Mount Wills Creek

timbers are generally used in an unseasoned condition in applications such as house-framing because of variable quality, difficulty in seasoning, and greater ease of use when unseasoned. However, high-quality mixed-species logs can be, and have been, seasoned to produce a variety of value-added products.

In Victoria sawlog production forests are generally considered to be those with a current or potential stand top tree height greater than 28 m, with hardwood timber production presently dependent on forests on public land. Timber harvesting of these forests will in the future continue to be sawlog driven with an emphasis on value adding to achieve the best use of wood withdrawn from the forest.

Extraction of hardwood logs is permitted by licence. Under the government's Timber Industry Strategy these licences (generally 15-year licences) specify a volume of timber in accordance with

long-term sustainable yields. The sustainable yield calculations have been based on the timber available and suitable for hardwood sawlog production for each hardwood management area, and on the basis of minimum harvesting rotations of 80 to 100 years, depending on forest type.

Of the total area of State forest (4.4 million ha) only 1.3 million ha is actually suitable and available for timber production. These areas are now all essentially committed to sawlog production. It is estimated that for the State as a whole, the sustainable level of sawlog production for the next 15 years will be 0.86 million cu.m per year. The estimated yield of residual roundwood over the next 30 years is in excess of 2 million cu.m per year. Under the Timber Industry Strategy the sustainable yield for a particular product is not necessarily the yield sustained, as forests are to be managed on a sustainable basis for all values including non-wood products.

All timber is required to be extracted in accordance with the Code of Forest Practice. This lays down specific principles and standards for timber harvesting, timber extraction, roading, regeneration reforestation that are compatible with the environmental values of the forests. Provisions of forest management plans (covering all forest uses and values and subject to 10-year review), wood utilisation plans and forest coupe plans (covering operation details of logging such as volumes and locations) are also to be followed. An administrative body, the Cutting Area Review Committee, will continue to review areas proposed for logging, until all forest management plans are in place.

Hardwood sawlog production is presently the major form of timber harvesting in the more remote and natural areas of the Alps and East Gippsland. Large-scale harvesting of sawlogs has taken place in these areas mainly since the 1950s. Hardwood production will be phased down in the Benalla--Mansfield and East Gippsland regions to reach sustainable levels of supply, with regrowth forests in the Central Gippsland, Dandenong and Central regions, which are presently being cut below sustainable level, will be of increasing importance for hardwood production. Most hardwood timber is processed in small mills located in small rural communities near their sources of supply.

Softwoods

Radiata pine (*Pinus radiata*) is the principal (commercially significant) softwood species grown in Victoria. It is an exotic species and is produced in plantations from seedlings produced in nurseries. Substantial quantities have been planted in the south-west of the State, the Ballarat area, the Otways, to the north of Melbourne, and, in particular, South Gippsland and the north-east.

In accordance with government policy, softwood plantations are no longer being planted on areas supporting native forest, and additional land for softwood plantings is being purchased mainly in the north-east of the State and in central Gippsland. The government is however conducting a Pine Plantation Impact Study because of

concerns raised about government purchase of agricultural land for pine plantation.

Other Forest Produce

The other main forms of forest produce in Victoria, excluding grazing, gravel extraction and apiculture, are roundwood, eucalyptus oil and broombush. Of these only broombush harvesting is likely to occur, or have major impact, in areas of higher wilderness quality.

Broombush is used for domestic fencing, shade-house construction, and feature panels. The main markets are in Adelaide and Melbourne. It is cut from broombush (*Melaleuca uncinata*) plants in and around the Big Desert and Sunset Country (south-west sectors) in the Mallee area, and formerly in the Little Desert in the Wimmera (and in South Australia) on both public and private land.

Most broombush presently being harvested is from plants in the Big Desert which have regenerated following a large bushfire in 1959. Volumes taken out have fluctuated, with the total licensed annual cut from public land now about 1360 tonnes (68 000 bundles). Possibly half this amount again is thought to be cut illegally from Victorian public lands. The gross value of the legal brush collection from public lands is about \$0.4 million per annum.

The Land Conservation Council's recent review of the Mallee area (LCC 1989), has recommended that broombush harvesting in the Mallee be confined to specified areas in future, with harvesting undertaken at a sustainable level and subject to guidelines aimed at reducing the degree of new tracking, ensuring the rehabilitation of tracks after completion of work, and not permitting mechanical harvesting. A recent assessment of the resource has indicated that broombush stands in the specified areas (which cover about 12 000 ha) should support a sustainable output at about the same level as the present legal harvest on public land in the long term, but that the short term yield, until 2005, is about 49 500 bundles per year.

AGRICULTURE

Agriculture is the major form of land use in Victoria. In 1987--88 there were over 32 600 establishments undertaking agricultural activity (and whose value of operation was worth \$20 000 or more).

The industry in Victoria is quite diverse, ranging from small establishments engaged in dairying or horticulture to large properties mainly devoted to sheep, cattle or cereal production. The total value of agricultural commodities produced in Victoria in 1987--88 was \$4608 million, with cereals, beef cattle and calves, wool and dairy products (all exceeding \$500 million) being the largest contributors. In terms of gross value, Victoria (1987--88 figures) produces 14.7% of Australia's crops, 22.4% of livestock slaughtered, and 27.2% of livestock products (wool, milk, eggs and honey). There were 3.5 million cattle in Victoria in 1988.

Most farming enterprises are operated on private land holdings. The main exceptions are some beef (and sheep) enterprises in Alpine areas and in the north-west of the State, and apiculture. This contrasts with most other States which have retained large areas of agricultural land (mainly used for pastoral purposes) in public ownership and which are occupied under long-term agricultural leases.

Public land grazing is usually carried out under a lease or licence or agistment permit issued by the Department of Conservation, Forests and Lands. These are issued subject to specific stocking rates and compliance with certain conditions. Most grazing over the large and more remote parts of the State are presently under annual licences, which permit the licensee to utilise an area for grazing. It does not give exclusive occupancy or the right to utilise other values of the area or preclude others utilising other values.

The grazing of native forage on public land, is of declining importance, with most grazing now being on improved pastures on freehold. It remains, however, important to the livelihood of some individual graziers, and has been used in

times of emergency when feed is scarce on the farms.

The main areas where public land is still grazed are in alpine areas and in the Mallee.

Alpine Grazing

In the alpine areas cattle are grazed on the high plains on public land in summer and early autumn each year for periods up to 12 weeks. They are then moved to generally lower country to be sold as stores, i.e. they fattened elsewhere. (Outside the alpine area, cattle are able to graze on public land pasture throughout the year).

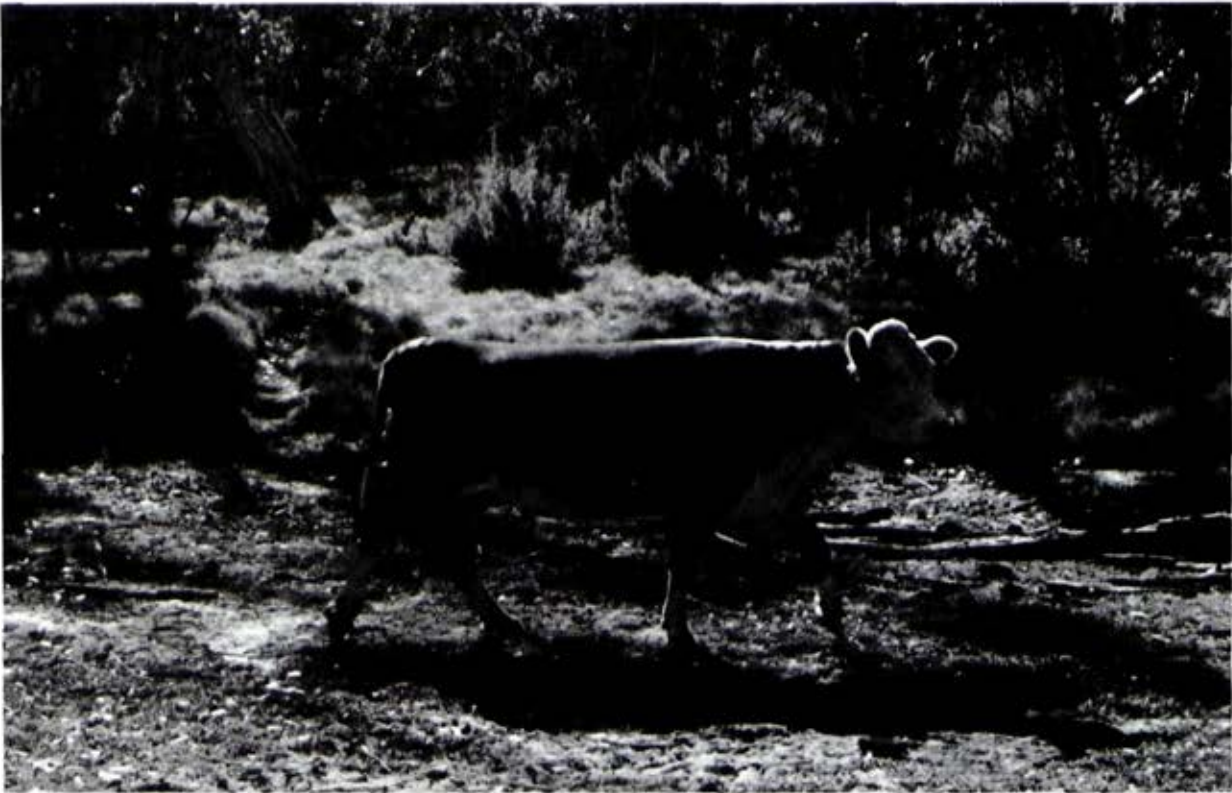
Presently, about 100 cattlemen's families graze some 17 000 head of stock on about 200 grazing blocks across much of the public land of the Alpine area. Nearly half of these are grazed on land above 1220 m. All grazing is on unimproved pastures. These grazing blocks are used to supplement the capacity of the cattleman's home property to carry stock.

Most of this grazing is presently undertaken under annual licences, although the Minister for Conservation, Forests and Lands has recently indicated the government's intention to issue 7-year cattle-grazing licences to existing licensees in the Alps in line with recent legislation for the Alpine National Park and a Ministerial agreement with the graziers.

In an amendment to Council's Alpine Area Special Investigation Final Recommendations (LCC 1983) the government stated that future decisions about grazing in parks and reserves will be made in the light of government policies, taking into account its economic significance for individual graziers, information arising from research, environmental and recreational factors, and the traditional associations of families with the high country.

Grazing in the Mallee

About 519 000 ha of public land is licenced to more than 70 licence holders. Much of this area is not, however, grazed or is of limited grazing potential, with licensees using less than 50% of the total. The vegetation types in some parts are



In the Alpine area, cattle are grazed on the high plains on public land in summer and early autumn - Hereford on Davies Plain

unsuitable for stock grazing and it appears that, in some cases, land is held under licence in the hope that it may be alienated in the future.

Those areas utilised carry both cattle and sheep. Most of the grazing is on unimproved pastures and, in other than a few notable exceptions, is used to supplement the stock-holding capacity of nearby home (freehold) properties.

The recently completed Land Conservation Council's Mallee area review (LCC 1989) has recommended that licences over areas rarely or not used for grazing be terminated and 153 000 ha that are presently grazed and included in national parks be subject to phase out. The remaining areas outside nature conservation reserves that are presently grazed in both dry land and flood plain forests and

woodlands may continue to be used for this purpose under long-term licences (up to 10 years) but subject to management plans which ensure that native vegetation is maintained and improved and land degradation processes reduced.

Dependence on public land for pastoral purposes will thus remain low, and be further reduced. Productivity of enterprises will become increasingly dependent on pasture improvement rather than expansion of land area. Under the Land Conservation Council recommendations, however, where future public land grazing is permitted, it is likely to be under more secure tenure. Licence areas will also more accurately reflect actual areas grazed and be subject to conditions reflecting ecological as well as physical carrying capacities.

Apiculture

The apiculture industry depends on the introduced honey bee (*Apis mellifera*). The pollination activity of honey bees, especially in relation to agricultural and horticultural crops, is probably more important than their commercial value as producers of honey.

There are 2600 registered beekeepers, most of whom have only a few hives. Most honey is however produced by a small number of beekeepers who have large numbers of hives. In 1987 there were 111 bee-keeping operations each of whoms estimated value was \$20 000 or more. Commercial production in 1987 was produced from a total of 58 948 hives (Australian Bureau of Statistics 1989). The bulk of this honey is sold to large processors who clarify and pack the honey. About 58% is exported, principally to the United Kingdom.

The Department of Agriculture and Rural Affairs has estimated that the direct contribution of the honey industry to the State's economy is \$8 million. It has also estimated that crops requiring pollination would decline in value by about \$70 million in the total absence of honey bees.

On forested lands most of the honey is produced from eucalypts. The best producers are considered to be the box and ironbark species, especially yellow box and red ironbark, and river red-gum. During winter, areas of mild climate, which also have pollen-bearing species, such as the Mallee, are used by apiarists for overwintering of hives.

Commercial beekeeping is a migratory industry. Most commercial beekeepers operate between 80 and 400 hives which they move several times a year, particularly during the honey-producing season. An individual apiarist occupies on an occasional basis about 20 individual bee sites and about 16 000 ha of foraging area per annum. Areas sought are those known to have one or more plant species in flower that have high yield, and predictable honey flows. They also travel to overwintering sites where the bees can build up their stocks of pollen. Most commercial beekeepers are based in central and north-eastern Victoria.

As well as requiring access to species of good honey flow, sites require good vehicular access, and water nearby. Apiarists seeking to utilise public land may apply for use of defined permanent and temporary bee sites. Public land is also used by unlicensed beekeepers who locate the apiary on adjacent private property. The more remote and natural areas of the State are relatively little used due to limitations of access, even though they may contain melliferous (honey-bearing) flora.

It is current policy not to permit apiculture in reference areas, or through the exclusion of vehicular access, in wilderness areas. It is permitted in parks or conservation reserves only where it is a traditional use. About half of an apiarist's sites are likely to be located on public land.

Public land is likely to increase in importance to the apiculture industry as weed species important to the industry are brought under more effective control (such as the biological control of *Echium*). Given that the licensing of commercial operators by the Department of Agriculture and Rural Affairs is not matched with the availability of sites, pressure to make additional areas of public land available for apiculture may increase. The honey industry also has potential to expand in the area of queen bee and pollen exports, both activities requiring access to public lands.

RECREATION

Recreation, or any activity, or planned inactivity, undertaken for pleasure during a person's leisure time, encompasses an extremely diverse range of both indoor and outdoor pursuits.

With respect to outdoor recreation on public land, people seek a variety of recreational experiences. For some, this may involve readily accessible areas with well-developed facilities where large numbers of people could be expected and management presence is regular and obvious. Others seek locations where they can avoid the intrusion of vehicles and other people and where the emphasis is on self-sufficiency. Between these extremes,

recreation settings with a variety of facilities, access and levels of use are sought.

Participation in recreation activity is a complex interaction of individual attitudes, knowledge and desire, socio-economic factors, and the availability of opportunity. All of these variables are constantly changing.

The bulk of public land is available for recreational uses of some sort and the variety of reserves recommended by the Land Conservation Council provide for a range of recreational opportunities. While specific reserves have not been set aside for each form of recreation, most activities can be accommodated somewhere on public land.

To assist planning and management of public land, the Department of Conservation, Forests and Lands has identified five classes of recreational settings within the total spectrum based on access, facilities, the level of use, and management criteria. The classes are:

- * remote (unmodified environments, little evidence of other users, restrictions and controls, and no vehicular use);
- * semi-remote (predominantly natural, low interaction between users, some on-site controls, restrictions, and limited vehicular access);
- * roaded natural (natural-looking environments, low to moderate interaction between users, motorised and non-motorised access, some modifications and facilities);
- * semi-developed (substantially modified natural environments, interaction between users moderate to high, facilities designed for use by large numbers or special uses); and
- * developed (substantially urbanised environment, high numbers of users, intensive developments).

Small, developed, settings can accommodate large numbers of people and are often in high demand; remote-

recreation settings, in contrast, involve few people and require much larger areas. Most of Victoria's public land provides semi-remote or roaded, natural recreation settings (see Figure 4). Given the nature of the land and population of a region, not all settings can be provided in all areas and few areas contain remote-recreation settings. Similarly, smaller populations may be unable to finance a developed setting. Nevertheless, each portion of the recreation spectrum is important because of the opportunity it provides for a particular recreational experience.

Many people undertaking outdoor recreation activities may require different settings at different times, depending on the particular activity being undertaken, or at different times of their life. Specific activities may also have physical (including seasonal) environmental requirements that need to be met (such as swimming, caving or skiing) in addition to the experiential setting sought.

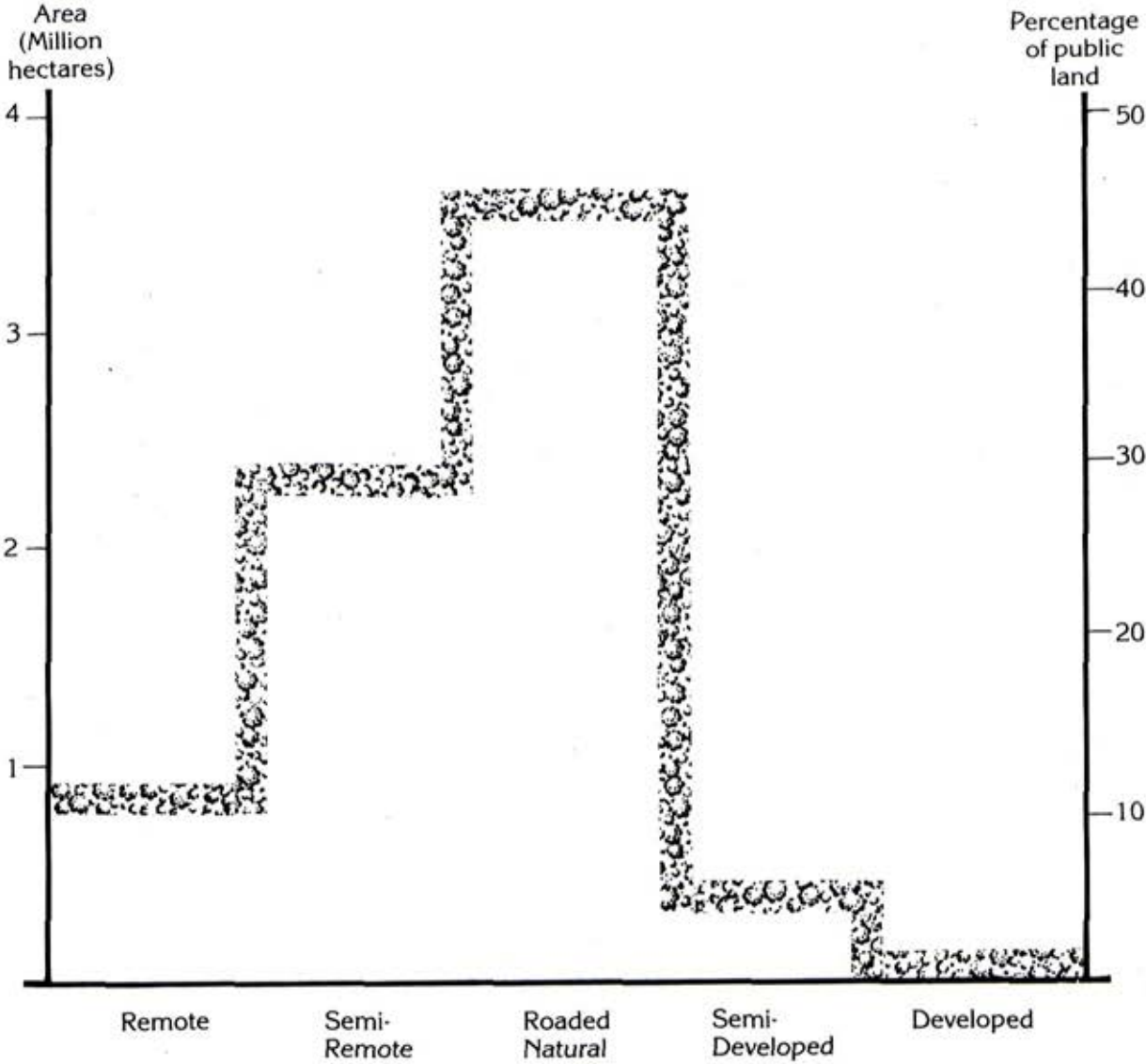
The different forms of recreational activity also have varying levels of dependency on areas of high wilderness quality. Few could be described as totally dependent, although many are considerably enhanced by such environmental settings.

A wide variety of outdoor recreational activities are pursued on public land in Victoria. They may be vehicle based, such as four-wheel-drive touring or car-based camping, or dependent on foot access, skis, canoes or horses. Some may be facility dependent, such as downhill skiing or power-boating.

Many forms of recreational activity appear relatively unregulated, but are in fact subject to a range of control. These vary according to the activity and the area. Some recreation activities may be undertaken under the auspices of a club or organisation or as part of a commercial operation. While some prefer going 'solo', most use is in small groups for reasons of safety and social contact.

Competitive events in remote natural areas may include activities such as cross-country running, cycling, skiing and canoeing or combinations of all of these. Some have become major annual events

FIGURE 4:
RECREATION SETTINGS ON PUBLIC LAND



and may involve large numbers of competitors as well as spectators.

Public land recreation is a major contributor to the State's tourism. Every year tourists in Victoria make 9.2 million overnight trips and 20.6 million day trips. Visitor use statistics, where collected, of Victoria's national parks, indicate that this public land-use category alone (as at 1987) catered for 900 000 camper nights and over 7 million day visitors a year. On a national basis, tourist activity has been rapidly growing and now contributes as much to gross domestic product as the mining sector and substantially more than the agricultural sector. The average expenditure per trip for an overnight stay per person is \$155, nearly eight times that for a day trip (Industries Assistance Commission 1989).

A number of governmental tourist development programs give emphasis to the importance of nature-based recreation for tourism, such as the Southern Coast-line Tourist Development Strategy (VTC 1987). The Far East Gippsland Tourism Strategy (Victorian Government 1988) notes that recognised high value wilderness areas can contribute to tourism by confirming and enhancing a sense of remoteness and naturalness, and that without protected wilderness areas tourism opportunities will be significantly reduced.

As the population and its discretionary income and leisure time increase, the

demand for recreation resources on public land can also be expected to increase.

Recreational activities include bushwalking, camping, four-wheel driving, car touring, fishing, canoeing and rafting, touring and mountain-bike riding, boating, skiing, trail-bike riding, horse riding, hunting, picnicking, sightseeing, nature study, swimming, hang gliding, orienteering, fishing, rock climbing, caving, scuba and skin diving, and fossicking.

Natural environment-based recreation and tourism are rapidly growing industries, and the State Conservation Strategy (Victorian Government 1987), noted that participation in bushwalking has grown by approximately 15% a year, while the number of snow skiers has been increasing at 10 to 12% each year. About one quarter of skiers are involved in cross-country skiing. Outstation camping in Wilsons Promontory National Park has shown a 31% increase between 1979/80 and 1984/85 with camp sites approaching saturation during the summer months (DCFL 1987). Fishing is one of Victoria's largest outdoor participant forms of recreation. A Morgan poll in 1987 found that more than 910 000 persons 14 years of age and over fish Victoria's waters each year. Of these 42% fish mostly in freshwater rivers and lakes.

An indication of the trends of participation for other outdoor recreation activities is included in Table 8.

Table 8

TRENDS FOR SELECTED OUTDOOR RECREATION ACTIVITIES

Activity	Selected index of participation	Approx average growth 1979--1985 (% year)	Forecast growth 1985--1990 (% year)
Caravanning	Production	- 8.1	- 2.0
Four-wheel driving	Club membership	14.3	3.0
Hang gliding	Club membership	- 2.4	1.0
Motor boating	Registrations	3.2	3.0
Orienteering	Club membership	- 3.5	5.0
Pleasure driving/ picnicking	Visits to parks	1.2	2.0
Sailing	Club membership	6.2	1.0
Skiing	Visits to resorts	3.3	3.0
Trail-bike riding	Club membership	1.9	1.5

Source: Chalmers (1986).



Cross country skiing near Kellys Hut

Many recreational programs are run as part of commercial operations. As most are, at least to some extent, vehicle based, an indication of the number and type of such operations can be obtained through the records of the Road Traffic Authority since all vehicle-based commercial tour operations need to be licensed by this Authority.

As at May 1989 there were 17 tour operators within Victoria, with 25 different ('bush' tour) touring omnibus licences. Tours offered include four-wheel drive safaris, nordic skiing tours, rafting expeditions, bushwalks, vehicle-based sightseeing tours, fishing tours, horse riding, snow shoeing, nature study, bike riding, history, photography, and hot-air ballooning. Some operators also offer drop-off and pick-up services for bushwalking.

Within proclaimed national and other parks over 80 operators have been granted permits for commercial adventure tours (with or without vehicles.)

Tours involve day, weekend and extended tours up to a week long. Tours are offered predominantly in alpine areas,

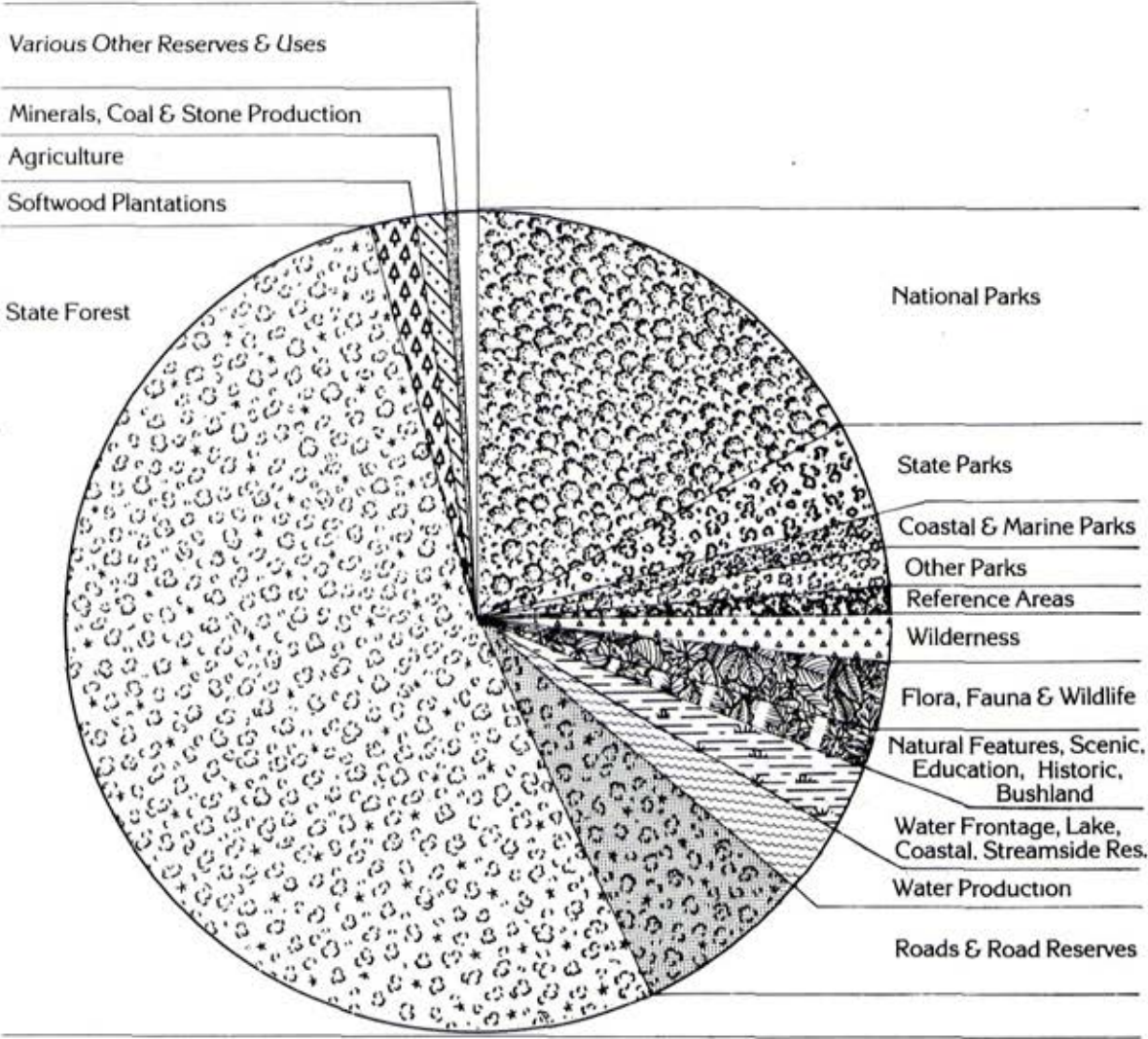
although tours also operate in the Sunset Country in the Mallee, the Little Desert, in East Gippsland, and elsewhere.

PUBLIC LAND POLICIES AND STRATEGIES

About 38% of Victoria is public land. This is a significantly lower proportion than in most other States and Territories of Australia, as within Victoria, most Crown land suitable for agriculture has been alienated, whereas similar land in other States has been retained in public ownership but occupied under long-term agricultural leases.

Victoria's public land has been allocated, through the processes of the Land Conservation Council, into a wide range of land-use categories. The main land-use categories recommended by the Land Conservation Council and approved by the government, and the areas of public land in each (as at May 1988) are shown in Figure 5. Note that this figure excludes the Land Conservation Council's Mallee Review final recommendations, which are still being considered by government. The objectives of the main land-use categories are summarised in Appendix II.

FIGURE 5:
PUBLIC LAND USE
RECOMMENDATIONS OF LAND CONSERVATION COUNCIL APPROVED BY GOVERNMENT
Note: This diagram does not include the Final Recommendations of the LCC Mallee Area Review, 1989



The largest category of Victoria's public land is State forest, which is a multi-objective category and includes areas previously recommended by Council as hardwood production and uncommitted. This covers 52.8% of the public land or 19.5% of the State. The major conservation reserves (National and State Parks) collectively cover 21.0% of public land or 7.7% of the State.

The distribution of public land and the major conservation reserves are shown in Map 5 (see page 54). Council has also recommended, in its final recommendations for the Mallee Area Review, a major new national park in the Sunset Country and large extensions to Wyperfeld National Park in the Big Desert. As noted above these recommendations are still being considered by government.

A large range of government strategies and policies has relevance to the use of public land, including the present government's three major strategies: the economic strategy, the conservation strategy and the social justice strategy, together with their ancillary documents.

Such ancillary strategies of particular reference to processes affecting remote and natural lands include the Timber Industry Strategy, the Flora and Fauna Guarantee Strategy (currently in preparation) and, to a lesser extent, the Agricultural Economic Strategy. The wide range of more detailed relevant policies include State Environment Protection Policies, a Rainforest Policy, a Coastal Policy, and operational policies such as the code of forest practice and fire-protection policy.

Many of these recent government strategies address issues that are interdisciplinary, cross traditional areas of departmental responsibility, and reflect growing recognition that Victoria's long-term survival and prosperity depends on sustainable development; i.e. social and environmental needs are recognised as equally as important as economic goals.

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7. WILDERNESS ATTITUDES AND PUBLIC PERCEPTIONS

The basic concept of wilderness as a distinct environmental setting characterised by remoteness and, more particularly, being unmodified is now generally accepted world wide.

Approaches to wilderness are still very much culturally influenced however. For example, in many South American countries, wilderness is still considered as something to be tamed and its protection is a lower priority than more immediate economic needs. In contrast, in the United States of America the protection of wilderness is believed to be essential to the national psyche. In some countries such areas are regarded as being scientific reserves (for example, the Union of Soviet Socialist Republics), whereas in others (for example, New Zealand and the United States of America), they are primarily seen as recreational resources.

In Australia there has been academic and community debate about the nature and need for wilderness areas and appropriate managerial philosophy. This discussion has not generated much objective research into wilderness, wilderness users and wilderness management. Comparatively the Americans have an extensive research literature but much of it is not directly relevant to the Australian context.

The results of inventories, such as that used in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987), provide a quantitative basis for the comparison of the physical attributes of wilderness across the State - as is discussed and utilised elsewhere in this report. It is also important, however, to have a clear understanding of the wider community's perception of wilderness and its expectations of such areas. The only available Victoria-wide research into the perceptions and attitudes of Victorians with respect to wilderness is a survey carried out in 1974 (McKenry 1975).

With this in mind, the Land Conservation Council commissioned another survey to obtain an indication of society's perception

of wilderness, its attitudes towards wilderness, including the value placed on such areas, and an indication of the expectations (of management) for such areas. The survey also aimed to obtain some idea of the level of visitation to areas of identified higher wilderness quality.

In addition, a number of the survey questions correspond with those used in the 1974 survey by McKenry. This earlier survey embraced a similar Victoria-wide sample and so comparison between the two surveys provides an indication of trends in attitudes and perceptions.

The results of the commissioned survey are one of many inputs into Council's investigation of wilderness and as such must be viewed in the light of this other information. The results could assist in the formulation of recommendations, and in particular assist in the assessment of some of the social implications of those recommendations.

SURVEY METHODOLOGY

A number of questions about wilderness were included in an omnibus survey carried out by the Roy Morgan Research Centre. It sampled some 615 people throughout Victoria. The full questionnaire is reproduced in Appendix III.

The results provided to the Council (and available for inspection) include the raw scores of the sampled population as well as percentages based on weighting to reflect characteristics like gender, age and locality composition (88 groups in all) of the total Victorian population (aged over 14 years). The data presented in this chapter are rounded percentages of the weighted base. As such they are representative of the opinions of the whole Victorian population.

In addition to scores of the total response to each question, a demographic breakup of results was obtained. A range of cross

tabulations were also obtained. These permit comparison between various response groupings with respect to responses in other questions. A list of the cross tabulations and the demographic and socio-economic breakup is included in Appendix IV.

The following discussion is based on a preliminary analysis of the results of the survey. It has been grouped into four parts covering attitudes, perceptions, visitation and trends (from a comparison of the 1975 McKenry survey).

Note that the survey questionnaire has used the phrase 'wilderness areas' as synonymous with the phrases 'wilderness' or 'area of high wilderness quality' in contrast to the meanings used elsewhere in this report. This was done, to help reinforce the concept as one of a physical entity, but avoid providing definitions which could prejudice perception responses.

COMMUNITY ATTITUDES TO WILDERNESS

Relevance of Wilderness Protection

Several questions in the survey provide an insight into whether Victorians consider the protection of wilderness to be important (Table 9).

The response to these questions indicates that there is a high level of support for the protection of wilderness. Some of the questions are in two parts and it is notable that one of these has the highest level (93%) of agreement. The strong agreement with this statement 'we have a duty to our grandchildren to preserve some areas as nature created' is confirmed in that over half of virtually all socio-economic groups strongly agreed with this statement.

It is interesting to note that groups born in Europe (excluding the United Kingdom) and Asia had one of the highest levels of disagreement with the statement 'we should keep some undeveloped areas free from roads at all costs'.

All demographic and socio-economic groups had significantly more people who considered that there was at least one block (the descriptive blocks used in this investigation) important for the preservation of wilderness. In fact, over a quarter of most groupings considered all such blocks important for protection.

Such questions do not, however, force people to rate the protection of wilderness relative to other uses. In many areas of high wilderness quality in Victoria, there are often conflicting aspirations for such areas. An indication of the relative

Table 9

IMPORTANCE OF WILDERNESS PRESERVATION

Statement	Percentage who agree	Percentage who disagree	Percentage undecided
We should keep some areas free from roads at all costs	74	14	12
There is no shortage of wilderness areas in Australia, so we need not worry about their preservation	13	77	11
We have a duty to our grandchildren to preserve some areas as nature created	93	2	5
Valuable is a word generally applying to wilderness areas	46	-	-
Are there any areas most important to protect as wilderness in Victoria? ²	71	2	27

Notes:

1. Due to the manner in which this question was framed it is not possible to determine the level of disagreement to this statement.
2. Areas correspond to the descriptive blocks used in this report (see also Chapter 12) but also include (a few) other areas specifically referred to by respondents.

importance of wilderness to Victorians can be gained from the response to one of the questions which was specifically framed to require people to make a 'trade off' decision. The response to this question is shown in Table 10.

The replies indicate that, while a high percentage (44%) of Victorians consider that there is nothing (or more specifically none of the listed things) more important than preserving a wilderness, half considered that at least one of the listed

things was more important. Response to this question clearly differed (after allowance for sampling variance) between those living in Melbourne or elsewhere in the State. Melbournians were more likely to say that none of the listed things were more important than preserving a wilderness area (48%) than other Victorians (33%). Men were also less likely than women (40% and 48% respectively) to state that none were more important than wilderness.

Table 10

RELATIVE IMPORTANCE OF WILDERNESS PRESERVATION

Activity thought more important than preserving a wilderness area	Percentage ¹
No activity more important	44
Jobs in timber, grazing or mining industries	18
Keeping all existing vehicle tracks open	17
Grazing	15
New tourist facilities	14
New powerlines and water storages	10
Timber harvesting	9
Prospecting for minerals	7
New roads and vehicle tracks	7
New ski resorts	4
New mining operations	4
Hunting	3
Availability of brush-fencing materials	2
All listed things	< 1

Note:

1. Respondents may have listed more than one activity.

In interpreting the results of this question it should be noted that the preservation of any specific area of wilderness does not necessarily involve a choice between all or even some of the listed activities.

The response to one of the other questions also provides an indication of the relative importance of the preservation of wilderness. This question sought a response to the statement: 'Economic development is essential to Australia; wilderness areas are not.' Many (71%) disagreed (44% strongly disagreed), while only 13% agreed, with 15% undecided. Because the question was in two parts, a disagreement response may indicate disagreement with one or both statements. No statistical difference was discerned between Melbourne or non-Melbourne

residents, nor by gender. Older age groups disagreed with the statement less strongly than younger groups.

Importance of Non-recreational Values

A number of questions included in the survey provide an indication of the importance of non-recreation values of wilderness. Table 11 includes a summary of the results of such questions. The responses to these questions indicate that non-recreational values are important to many Victorians.

Spiritual values (undefined) of wilderness are clearly thought to be a very important part of the experience of wilderness, (although the word 'sacred' was not commonly applied, to a wilderness area

Table 11

NON-RECREATIONAL VALUES

Statement	Percentage who agree	Percentage who disagree	Percentage undecided
We need occasionally to be alone with nature	82	6	12
There is a spiritual quality in true wilderness which cannot be experienced elsewhere	70	11	19
There is no point in spending public money to preserve the wilderness character of an area which is rarely visited	20	67	14
I enjoy watching films set in wilderness areas, or looking at magazines or books about wilderness areas ¹	55	-	-
You can appreciate wilderness from the side of the road ¹	19	-	-
Wilderness areas should be for the benefit of animals and plants rather than for the benefit of people	43	-	-
Large numbers of people intrude upon or spoil people's enjoyment of wilderness areas ¹	44	-	-

Note:

1. Due to the manner in which this question was framed it is not possible to determine the level of disagreement to this statement.

see Table 13). The level of agreement with the statement that 'there is a spiritual quality in true wilderness which cannot be experienced elsewhere' was consistently high across all socio-economic groups.

It would also appear that opportunities for solitude in wilderness are also important to many, as indicated by the response to the statement: 'We need occasionally to be alone with nature'. More than half agreed strongly.

The nature of the responses included in Tables 13 and 14 indicate that experiential values are also considered important values of wilderness by many.

Wilderness is also valued by those who do not make direct use of it - vicarious users. Of those who stated that they had visited none of the descriptive blocks, many (44%) agreed with the statement: 'I enjoy watching films set in wilderness areas, or looking at magazines or books about wilderness.' The very high level of agreement (93%) with the statement that: 'We have a duty to our grandchildren to preserve some areas as nature created'

(and given that nearly half of those who had never visited one of the descriptive blocks also agreed with this statement) is another indication of the importance of non-experiential values.

Moreover, the survey appears to indicate that many people consider ethical values to be an important value of wilderness areas since 42% of the respondents agreed with the statement that wilderness areas should be for the benefit of animals and plants rather than people. There was no statistically valid variation in the response to this question between those living in Melbourne and those living elsewhere.

No questions in the survey specifically sought information on the value of wilderness for recreational use (although the word 'challenging' was used by 19% to describe wilderness areas - see Table 13).

Extent of Wilderness

How much wilderness is enough? A number of questions in the survey (see Table 12) offer some insight into the community's perceived 'need' for

wilderness both now and in the future. Clearly it considers that wilderness areas are limited. There was, however, wide diversity of response across the various demographic and socio-economic groupings used in the survey for some of these questions.

For instance, a higher percentage of people living in Melbourne believe that wilderness areas will become more valuable (69%) than those living elsewhere (58%). A higher percentage of people living in Melbourne also agreed with the suggestion that the area of land in a wilderness condition be extended (40% versus 27%).

THE PERCEPTION OF WILDERNESS
HELD BY VICTORIANS

Descriptions of Wilderness

The first question in the survey asked respondents to view a list of descriptive

words and choose those which they felt generally applied to wilderness areas. The response, as weighted to reflect the composition of the total Victorian population, is shown in Table 13.

The response to this question was notable for the low number of respondents who could not say whether any of the listed words applied to wilderness areas (3% or 18 of the 615 interviewed). In short, most people have some idea of the wilderness concept.

The descriptive words cover experiential values of wilderness areas, as well as words which could apply to their physical characteristics. Descriptors which apply to physical features used most often are natural, unspoiled, wild and remote. Roadlessness, a characteristic feature often used to define wilderness in wilderness literature, was not a word chosen by most (although in response to another question 74% thought that some areas should be

Table 12
EXTENT OF WILDERNESS

Statement	Percentage who agree	Percentage who disagree	Percentage undecided
There is no shortage of wilderness areas in Australia, so we needn't worry about their preservation	13	77	11
Wilderness areas will become more valuable to society over the next 50 years ¹	66	-	-
In Victoria, we should try to extend the area of land in a wilderness condition ¹	36	-	-
All descriptive blocks are considered most important to preserve wilderness ¹	27	-	-
Some of the descriptive blocks are considered most important to preserve wilderness ¹	71	-	-
None of the descriptive blocks are considered most important to preserve wilderness ¹	2	-	-

Note:
1. Due to the manner in which this question was framed, it is not possible to determine the level of disagreement to these statements.

Table 13
PERCEPTIONS OF WILDERNESS

Descriptive word	Percentage who consider that this word applies to wilderness areas*
Beautiful	67
Natural	59
Valuable	46
Unspoiled	37
Wild	37
Free	34
Unique	33
Inspiring	33
Restful	32
Alive	32
Exciting	29
Remote	27
Fragile	24
Good	21
Challenging	19
Friendly	17
Pure	15
Sacred	15
Huge	12
Roadless	11
Happy	10
Dangerous	8
Wasteful	4
Bleak	3
Uninviting	3
Dirty	2
Boring	2
Dead	2
Dull	2
Depressing	2
Useless	1
Repulsive	1
Noisy	1
Ugly	1
Bad	< 1
Evil	< 1

Note:

1. Respondents could choose more than one word.

kept free from roads at all costs, and 23% thought that vehicle tracks intruded upon or spoilt wilderness areas). Descriptors most often chosen which apply more to experiential values were beautiful, free, inspiring, restful and exciting.

While there were a number of differences in the responses of the various demographic and socio-economic groupings, 'beautiful' and 'natural' were almost without exception the two words most commonly applied to wilderness. Likewise, the highest five scoring words from the total population results received

consistently high scores across all groupings.

A more detailed understanding of people's perception of what a wilderness is, or ought to be, can be gained by looking at expectations of use and management of such areas. These are indicated by response to listed items (see Table 14) which people thought intrude upon or spoil wilderness areas, or people's enjoyment of them.

As the question did not permit a neutral or negative reply Table 14 does not

Table 14

THINGS CONSIDERED TO SPOIL WILDERNESS OR THEIR ENJOYMENT

Listed 'thing'	Percentage who consider that item spoils wilderness or its enjoyment
Smog or air pollution	62
People with firearms	61
Motor vehicles or trail bikes	54
People hunting deer with bows and arrows	48
Large numbers of people	44
Powerlines, pipelines, communication towers	42
Undrinkable water in streams	35
Vehicle tracks	23
Having to book a visit	19
Sight or sound of aeroplanes	17
Cattle or sheep	16
Views of farmland or logged areas	16
Bush toilets	10
No scenic views	10
Water storages	9
Restricted access to sensitive areas	8
People horse riding	7
Direction or information signs	6
Constructed walking tracks	5
Old huts or mining relics	4
None of these listed items	1

Note:

1. Respondents may have listed more than one item.

indicate whether such 'things' are considered compatible or whether they would enhance a wilderness area or the enjoyment of such an area.

With respect to things which are physical modifications, smog or air pollution was the item considered by most to be intrusive, with water quality also scoring highly (although the presence of cattle, which may be a causal agent of the reduction of water quality in the more remote natural areas, had a lower score). Structures, such as powerlines and towers, were also considered by many to be intrusive, although only a very small percentage believed structures such as built walking tracks or old huts or mining relics intrusive.

The three highest scoring intrusions (smog or air pollution, people with firearms, and motor vehicles or trail bikes) were consistently the highest three or four scoring intrusions across all socio-economic and demographic groupings (with one minor exception).

Interestingly while the survey indicates that only about a quarter of people

consider vehicle tracks to be intrusive, over half regard motor vehicles or trail bikes to be intrusive. Also of interest is that while the word 'beautiful' was the one chosen most often to describe wilderness (see Table 11) few (10%) felt that a lack of scenic views diminished wilderness values.

The survey results also indicate that many (61%) consider people with firearms intrusive. Nearly half felt that hunting of deer (an introduced species) without the use of firearms intrusive.

To a separate question, nearly 60% agreed with the statement 'bushfires should be controlled in all areas including wilderness areas'. The difference between those living in Melbourne and those living elsewhere was not significant.

VISITATION

To obtain an idea of the actual level of usage of some of the areas of higher wilderness quality in Victoria, respondents were asked if they had been to any areas marked on a map. These areas corresponded with the descriptive blocks

used in this report. Response to this question is included in Table 15.

The number of respondents who stated that they had visited a descriptive block was very high, with nearly 80%, as weighted to reflect the composition of the total Victorian population, saying that they had visited at least one block. The response indicated that four of the blocks (those based on Wilsons Promontory, Mount Bogong, the Snowy River and the Little Desert) had been visited by over 25% of the population, with each block listed visited by at least 5%.

Groups more likely to have visited such areas were of professional occupational groupings, and those with higher incomes. Groups less likely to have visited such

areas were those born in Europe or Asia, and some groupings with low family income.

While all the blocks include areas of high wilderness quality, they also encompass areas which have been modified and are easily accessible. People may thus have visited the blocks on the basis of non-wilderness values.

Words such as natural, unspoiled, remote or roadless closely reflect the physical characteristics of an area of high wilderness quality as defined and used elsewhere in this report. People who stated that they had visited blocks (other than visitors to Blocks 1, 6, 13, 15 and 21) used these words more often than the total

Table 15

VISITATION TO DESCRIPTIVE BLOCKS

Block number	Percentage of who have been to area ¹
23 (Wilsons Promontory)	44
12 (Mount Bogong)	31
18 (Snowy River)	28
4 (Little Desert)	26
5 (O'Shannassy)	21
11 (Yarrarabula Creek)	19
7 (The Governors)	17
3 (Wyperfeld/Big Desert)	16
1 (Sunset Country)	15
8 (Mount Howitt)	15
16 (Mount Tingaringy)	15
20 (Genoa River)	14
22 (Croajingolong)	12
10 (Catherine River)	12
6 (Avon)	12
17 (Reedy Creek)	11
21 (Cape Howe)	10
19 (Errinundra)	9
14 (Wabba--Dartmouth)	8
13 (Upper Nicholson)	8
9 (Wongungarra River)	7
2 (Annuello)	7
15 (Murray Headwaters)	5
All	< 1
Any	79
None	17
Couldn't say	4

Note:

1. Includes those who have been to all areas.

Table 16

PERCEPTIONS OF DESCRIPTIVE BLOCK VISITORS

Block number ¹	Percentage of all who have been to area ²	Percentage of those who have been to area who also thought the area most important to preserve as wilderness ⁴	Percentage of all who thought the area most important to preserve as wilderness ⁵	Percentage of those who have been to an area who used the words natural, unspoiled, remote or roadless to describe a wilderness area			
				Natural	Unspoiled	Remote	Roadless
23 (Wilsons Promontory)	44	70	47	67	46	36	14
12 (Mount Bogong)	31	64	38	68	52	35	15
18 (Snowy R)	28	70	42	65	44	32	15
4 (Little Desert)	26	53	36	65	43	32	12
5 (O'Shannassy)	21	64	31	63	44	42	14
11 (Yarrarabulla Ck)	19	62	34	60	43	38	14
7 (The Governors)	17	54	34	68	45	36	16
3 (Wyperfeld/Big Desert)	16	55	35	67	44	33	15
1 (Sunset Country)	15	54	34	60	36	31	10
8 (Mount Howitt)	15	68	34	63	43	44	17
16 (Mount Tingaringy)	15	64	34	69	46	37	12
20 (Genoa R)	14	58	33	75	49	40	16
22 (Croajingolong)	12	67	33	68	43	41	13
10 (Catherine R)	12	61	34	64	38	33	18
6 (Avon)	12	52	32	68	20	34	19
17 (Reedy Ck)	11	65	32	66	48	25	10
21 (Cape Howe)	10	67	31	59	42	39	19
19 (Errinundra)	9	60	33	76	53	42	17
14 (Wabba/Dartmouth)	8	69	33	59	45	29	8
13 (Upper Nicholson)	8	58	30	60	46	29	5
9 (Wongungarra)	7	74	33	63	42	36	18
2 (Annuello)	7	51	29	66	37	33	15
15 (Murray headwaters)	5	68	31	55	39	18	12
All	< 1	56	27	80	59	35	-
Any	79	-	71	-	-	-	-
None	17	-	2	52	24	13	2
Couldn't say	4	-	27	34	20	13	-
Total Victorian population ⁷	-	-	-	59	37	27	11

Notes:

1. Block numbers refer to descriptive blocks used in this report. See also Appendix II.
2. Includes those who have been to all areas (0.8%).
3. Excludes those who have been to all areas.
4. Values include those who had visited a block and thought all were most important to preserve as wilderness.
5. Values include those who thought all most important to preserve as wilderness.
6. Small dash means data not available due to the manner in which the questions were framed, or not relevant to question.
7. Note all responses have been weighted to reflect the total Victorian population.

population average to describe their perception of wilderness (see Table 16).

Table 16 also includes a cross-tabulation with the response to the question about which areas were considered most important to preserve as wilderness. More than half of all those who had visited such an area also thought that the area was most important to preserve as wilderness. The highest percentage was from those who stated that they had visited Block 9 (Wongungarra River and Barry Mountains) and Block 18 (Snowy River/Rodger River), with over two-thirds of the visitors to eight of the blocks considering these to be important for the protection of wilderness.

From these correlations it would appear that for many people visiting such areas, the wilderness values of the area were in fact important to them.

Variations Between Visitors and Non-visitors

The survey results show that those who had visited an area were more likely to consider that area as important to preserve as wilderness than those who had not visited. Their responses to some of the survey's attitudinal and perception questions also showed statistically valid differences to the responses of those who said they had not visited a block. For instance, those who stated that they had visited a descriptive block area (all of which include areas of higher wilderness quality) also used words such as beautiful, free, inspiring, and fragile more frequently, although responses for Blocks 1, 2, 15 and 17 were not always outside sampling variation.

There are also marked differences between those who have visited different blocks. Thus, people who had visited the Snowy River or Croajingolong blocks described wilderness as beautiful more often than any other grouping.

Those who had visited a descriptive block (other than visitors to Blocks 1, 2 and 13) generally were more likely to disagree with the statement 'there is no point in spending public money to preserve the wilderness character of an area which is rarely visited'. They also were more likely

to disagree more often (other than visitors to Blocks 13 and 14) with the statement 'economic development is essential to Australia: wilderness areas are not', and the statement 'wilderness areas will become more valuable to society over the next 50 years'.

ATTITUDINAL AND PERCEPTION TRENDS

Changes in Wilderness Perceptions

The first question of the Morgan survey was identical to one asked in the survey conducted by McKenry in 1974. While McKenry's sampling technique is perhaps not as rigorous as that employed by Morgan, it does, however, provide a baseline for assessing change over the last 15 years.

Table 17 provides the results of both surveys with respect to words generally thought to apply to wilderness areas.

The most obvious difference between the two sets of responses is the higher response rate for virtually all of the descriptions in the 1974 survey. The 10 descriptors chosen most and the 10 chosen least often, however, remained relatively constant. In both surveys 'beautiful' and 'natural' were the two words chosen most often as applying to wilderness.

The only word selected more often in 1989 than in 1974 was 'fragile'.

Changes in Wilderness Attitudes

Table 18 shows the responses given in both surveys to an identical series of attitudinal statements.

The results of both surveys are similar to the extent that the majority response did not change for any question. However, for a number of questions there appears to be evidence of a shift of attitudes.

While fewer people agreed with the statement that 'we need occasionally to be alone with nature'; there was an increased percentage of those 'undecided', rather than an increase in those disagreeing with the statement. Fewer people in 1989 also agreed with the statement 'there is a spiritual quality in true wilderness which cannot be experienced elsewhere'.

Table 17

PERCEPTIONS OF WILDERNESS 1974 AND 1989

Words generally applying to wilderness areas	1974 survey response (%)	1989 survey response (%)
Beautiful	77	62
Natural	88	59
Valuable	46	46
Unspoiled	66	37
Wild	45	37
Free	74	34
Unique	53	33
Inspiring	60	33
Restful	74	32
Alive	50	32
Exciting	44	29
Remote	39	27
Fragile	9	24
Good	41	21
Challenging	42	19
Friendly	33	17
Pure	33	15
Sacred	29	15
Huge	31	12
Roadless	18	11
Happy	27	10
Dangerous	16	8
Wasteful	3	4
Bleak	9	3
Uninviting	7	3
Dirty	3	2
Boring	3	2
Dead	2	2
Dull	3	2
Depressing	4	2
Useless	2	1
Repulsive	1	1
Noisy	2	1
Ugly	1	1
Bad	0	< 1
Evil	2	< 1
Total gave answer		97
None		< 1
Can't say		3

More people in 1989 disagreed with the statement 'there is no point spending public money to preserve the wilderness character of an area which is rarely visited', than in 1974 and significantly more people disagreed with the statement 'economic development is essential to Australia; wilderness areas are not'.

References

McKenry, K. (1975). Recreation, Wilderness and the Public. Department of Youth, Sport and Recreation, Melbourne.

Preece, K. and Lesslie, R. (1987). A Survey of Wilderness Quality in Victoria. Ministry for Planning and Environment, Victoria, and the Australian Heritage Commission.

Roy Morgan Research Centre Pty Ltd (1989). Survey on Wilderness Areas in Victoria. Conducted for Land Conservation Council.

Note: The full Morgan Survey results are available for perusal at the Council's offices.

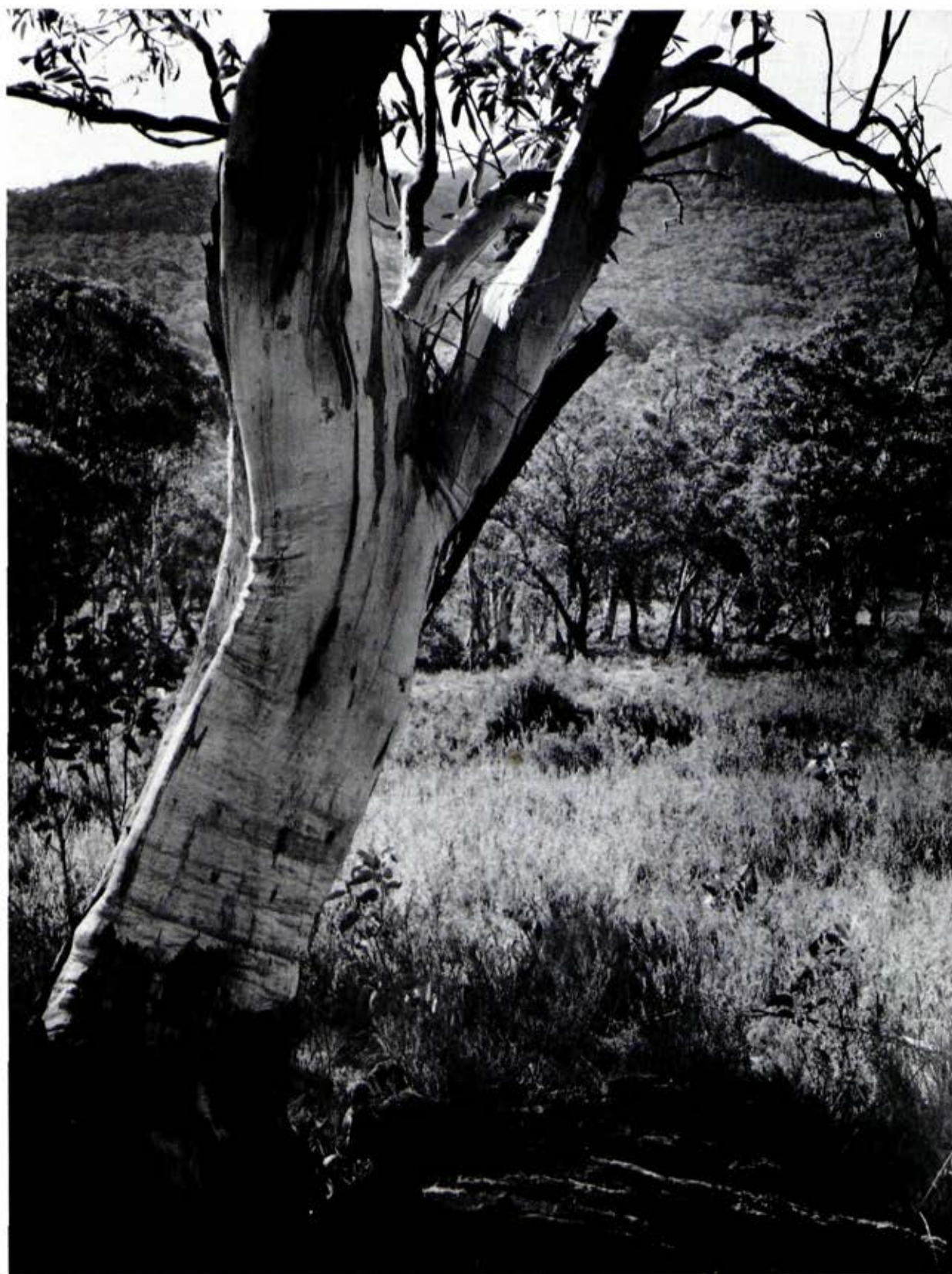
Table 18

ATTITUDES TO WILDERNESS 1974 AND 1989

	Keep some areas free from roads at all costs		No shortage so needn't worry about preservation		Need occasionally to be alone with nature occasionally		Duty to preserve some areas as created		No point spending money to protect if rarely visited		Economic development essential; wilderness is not		Spiritual quality not experienced elsewhere	
	1974	1989	1974	1989	1974	1989	1974	1989	1974	1989	1974	1989	1974	1989
Strongly agree	58	45	6	4	56	42	73	64	11	6	8	4	44	32
Tend to agree	20	29	6	9	33	41	22	29	18	14	11	9	34	39
No opinion	2	5	4	7	2	6	1	4	4	6	8	8	9	13
Tend to disagree	7	9	30	30	2	4	1	< 1	24	24	24	27	4	8
Strongly disagree	4	5	46	47	1	2	1	1	30	43	27	44	1	3
It depends	8	7	4	4	3	6	1	1	11	7	19	8	8	7
Total agree	78	74	12	13	89	82	95	93	29	20	19	13	78	70
Total disagree	11	14	76	77	3	6	2	2	54	67	51	71	5	11
Total undecided	10	12	8	11	5	12	2	5	15	14	27	15	17	19

Notes:

1. Values for 1974 are from McKenry (1975), and those for 1989 are from LCC commissioned Roy Morgan Research Centre survey.
2. All values are expressed as percentages.



The Victoria-wide survey commissioned by the LCC indicated that most people considered wilderness as beautiful, unspoiled, wild and remote areas, which are beautiful, free, inspiring, restful and exciting - Mount Cobberas No. 1 from the Playgrounds

PART III
INFLUENCES AND IMPACTS

8. INFLUENCES AND IMPACTS

Chapters 5 and 6 outlined the influences, past and present, that shape the boundary between cultural landscapes and natural landscapes and provided an overview of the land use context of wilderness in Victoria.

This chapter outlines the influences that have and continue to reduce the wilderness quality of Victoria's natural lands. In particular it summarises the specific physical impacts of such activities.

The land uses and activities of greatest impact on wilderness quality values relate to the utilisation of natural resources, recreational activity, and the associated provision of access and structures. Other influences relate to the introduction of exotic species or the manipulation of fire regimes.

The impacts of these and certain other factors that may modify wilderness quality, along with those which may reduce experiential values, are reviewed below.

These influences do not, however, affect all of Victoria's natural lands and the degree of impact of each influence on natural systems, and thus wilderness quality values, may be very different.

ACCESS AND STRUCTURES

Roads and Tracks

In non urban areas, there are three main types of road that have been established. Major roads are generally the responsibility of the Roads Corporation (for designated roads and highways) or local municipal councils (for local roads generally on Crown road reserves). These roads are used mainly for through traffic between major towns or for access to freehold properties.

Minor roads, which include vehicular (including four-wheel-drive) tracks, occur in a relatively dense network throughout Victoria's public land. Some provide local

access. The greater majority, however, were constructed for resource use (to service timber harvesting, mining, grazing management or fire protection) but have subsequently been used by tourists and recreationists.

Tracks and roads change vegetation, disrupt habitat and alter natural drainage patterns. Depending on the nature of the particular environment, the design, type and standard of the work and generally the level of usage, together with the maintenance commitment, can result in localised soil erosion and earth movement, apart from concentrating water run off. Water erosion is especially associated with gravel roads and earthen tracks constructed on steep grades, or where little provision has been made for run-off. Increased sediment input into streams can have, in particular, a deleterious impact on invertebrates and fish breeding success and may also lead to the death of adult fish.

Roads also cause ecological changes when they bar the movement of ground species or, conversely, facilitate the dispersal of introduced species, for example, foxes and feral dogs. In some places, by increasing light penetration in areas otherwise shaded by a forest canopy, roads can alter the understorey vegetation. Construction or maintenance works involve soil disturbance, which facilitates the establishment of weeds. Sometimes exotic species are deliberately introduced to help stabilise disturbed areas. Road construction can also favour the dispersal of pathogens, notably *Phytophthora cinnamomi* which is responsible for forest dieback disease.

Apart from their ecological impact, roads and tracks can have an aesthetic impact, especially where poorly sited, for example, on ridge lines. Higher standard roads may involve greater cut and fill, increased areas of impervious surfaces, and wider clearance corridors but in the longer term may contribute less to sediment loads in streams.



Tracks and roads disrupt habitats, alter natural drainage patterns and facilitates the dispersal of introduced species. Their construction involves the clearing of vegetation and soil disturbance - Hickeys Creek Track, to the north-west of Ben Cruachan

Vehicular use can also reduce amenity by creating noise which is proportional to the level of use. Noise generated by recreational vehicles is discussed below under Recreation.

Railway Lines

Like roads and tracks railway lines can also reduce the quality of ecosystems through which they pass. Their impact on the movement of wildlife, for example, is proportional to the width of the transport corridor and associated impediments such as fencing and the removal of vegetation. Noise nuisance, generally of greater impact to people than flora and fauna, depends on the frequency of the trains, their speed and is also related to the standard of technology used in the rolling stock and the line works.

Impacts relating to the establishment of a very fast train could involve, during the

construction phase, impacts on flora, fauna, heritage and landscape values, on forest values including loss of productive forest, on water quality and soil stability. During the operational phase floral and faunal habitat and migration routes, landscape values, wilderness experience, national park and forest values, and access networks would be affected. The impacts could arise from direct effects of the track works, together with those relating to necessary associated infra-structure, ongoing maintenance, additional fire protection measures, and changed settlement patterns.

Isolated Huts, Dwellings and Properties

Isolated occupations within otherwise natural areas usually imply earlier alienation of the land, occupation under a land-management agreement or a mining entitlement. They cause direct, localised alteration to the natural environment,

mainly through clearing. They also introduce a range of additional impacts relating to habitation through introduced animals and plants, rubbish and effluent, and perhaps the provision of utility services.

Isolated unoccupied structures (for example, refuges and huts) have a more localised physical and ecological impact. Their greatest impact is probably aesthetic. Use of such structures is generally accompanied by other impacts, such as damage to vegetation by the collection of firewood, trampling, disposal of refuse and human waste, compacting of soil, and perhaps, to some degree, an increased fire hazard. As disturbed areas they are also prone to invasion by weeds.

Structures Associated with Utilities

These include trigonometric stations, gas and oil pipelines, communication and fire towers, electricity transmission lines and telephone lines.

Trigonometric stations are permanent structures and are generally located on prominent points. Their major impact is aesthetic. Other impacts result from the clearing of site lines and the construction and maintenance of vehicular access to the structures.

Gas and oil pipelines are generally within settlement corridors and their impact is usually localised, but direct physical alteration is a consequence. Disruption of faunal movement varies according to the nature of the installation and the level of security required. Generally, easements are relatively narrow. Vehicular access along the easement for maintenance is usually required, however.

The establishment and use of communication facilities and fire towers usually involves the clearance of vegetation and disturbance of the land surface, but the impact is usually localised and mainly confined to aesthetic loss. Again, vehicular access is an ongoing need. Since towers are usually built on elevated sites associated access roads may have a high visual and physical disturbance impact.

Major electricity power transmission lines generally follow the most direct route between terminal stations to minimise costs and power losses. Vegetation is usually removed or greatly modified within the easements, and continuous vehicular access for maintenance is usually provided. Visual impact depends on the nature of the particular environment and the minimisation of such impacts are now being considered in the design stage. The same applies to telephone lines, although they are increasingly being placed underground. In remote areas microwave repeater stations and satellite links are increasingly used.

Water Abstraction and Regulation

Large impoundments as well as smaller low weirs are built to provide town water, supply irrigation schemes, or regulate stream flow. They create an expanse of water by drowning the river valley and produce a totally new cultural landscape.

Their impact involves the alteration of in-stream and off-stream habitat, while both the wall and the water body can affect visual amenity. Construction may also involve quarrying nearby to obtain source materials. Pipeline or aqueduct easements are commonly associated with such structures and accordingly require cleared easements and vehicular access for maintenance. They may create physical barriers to faunal movement.

Dams and weirs bar the movement of individual fish species and can totally disrupt the life cycle of a species such as the Australian grayling. By reducing the variability and seasonality of streamflows and water conditions barriers reduce the breeding success of many in-stream biota which are triggered by environmental cues such as (seasonal) water temperature changes and flooding. In addition, they can have a deleterious impact on some forms of recreation such as white water canoeing, while perhaps enhancing others.

Downstream effects may include the seasonal or permanent reduction of stream flow, changes to flooding regimes and thus loss of habitat for wildlife and reduced recreational amenity for humans.

Conversely, discharges can lower water quality and alter natural streamflow seasonality and variability, leading to substantial changes to in-stream habitat and recreational amenity.

River engineering works may alter channel shape, bed and bank structure and flow characteristics, and course often altering natural habitat and visual amenity. Such works, however, help alleviate stream-bank and gully-head erosion and, by incorporating fish ladders and appropriate work designs, the impact on some in-stream fauna can be reduced.

River-gauging stations can involve the construction of structures across the watercourse. Vehicular access is generally required for maintenance and retrieval of data records. Impacts can include physical disturbance to river banks, aesthetic impact, and those associated with access.

RESOURCE UTILISATION

Grazing

Public land grazing occurs throughout the State, including the more remote areas of the Alps and the Mallee.

Impact varies according to stocking rate, frequency of use and the particular environment grazed. Generally, the higher the stocking rate and usage the higher the impact.

Research into the effects of grazing in Alpine areas, such as the work of Costin, Van Rees, McDougall, and Williams, has indicated that a range of impacts result from grazing. These include reductions in species diversity and abundance through selective grazing, physical damage by trampling including the destruction of particularly sensitive communities such as moss beds, and changes to hydrological processes. The introduction of weed species and exotic pasture species is also frequently associated with grazing.

The Land Conservation Council's recent investigation in the Mallee found that grazing pressure has a dramatically detrimental effect on the quality and quantity of native vegetation and hence faunal habitat in this semi-arid ecosystem.

Regeneration of woodland species, which are palatable to stock, for example, native pine, belah, buloke, sandalwood and cattlebush, is severely depressed. There has been significant reduction in plant cover in shrublands, and woodland understoreys have changed - once dominated by native perennial species, they now comprise mainly exotic annuals.

Changes to the vegetation may also have an impact on the value of such areas for wildlife habitat. Where grazing levels are high, soil erosion hazard is increased and is of particular impact when augmented by the depredation of rabbits or artificially high populations of native species. Sheet and gully erosion can ensue, especially in areas with steep dry slopes and poorly structured soils.

Livestock create tracks in otherwise untracked areas and may reduce aesthetic and recreational values both by their physical presence and their effect on the abundance of wildflowers. Water quality may also be reduced and impact recreational values. Other adverse effects of grazing arise from associated structures such as huts, yards and fence lines.

Apiculture

The main physical impacts associated with the apiary industry relate to the provision of access to sites. Access generally has to be sufficient to enable the use of trucks. Other physical impacts include localised clearing at sites, provision of artificial water supplies where natural water sources are limiting, and minor impacts associated with camping at sites during servicing operations. Conflict with recreational use may occur near areas of surface water when such water is scarce.

Possible ecological effects include competition between bees and native insects, birds and mammals for nectar, changes to the behaviour of nectar-feeding birds, reducing the density of native bees near hives, increased levels of cross pollination and possible hybridisation between native plant species, and competition for nesting sites from swarming domestic bees. Much of the evidence for these possible impacts is, however, tentative or inconclusive. More rigorous research into some of these

aspects has been previously recommended by Council.

The effects of feral colonies on the natural environment, under conditions where food supplies are limiting, may differ distinctly from those of commercial apiculture where large numbers of honeybee colonies are placed in environments with abundant nectar secretion. The interaction between feral bee populations and commercial hive bees is unknown. However, as commercial bees are bred for captivity and managed to prevent swarming (which only occurs in spring), it is thought that domesticated bees do not contribute significantly to the feral bee population. Feral bees are already widespread throughout the Mallee, the Alps and East Gippsland.

Fisheries

Most commercial fisheries in Victoria are based on marine or estuarine areas. They are essentially harvesting operations with mariculture activities being very localised. Recreational fisheries on inland waters are often dependent on the introduced brown and rainbow trout. Most streams carry self-supporting populations of brown trout and sometimes rainbow trout, whereas most lakes need to be stocked each year with trout. Recreational fishing in the more remote areas of the state mainly involves mountain-stream fishing, with most activity between September and April.

Ecological impacts of both recreational and commercial fisheries include changes to the species mix of fauna, especially those under artificial stocking programs. Other impacts of stocking programs are included below under 'Introduced Plants and Animals'.

Broombush Cutting

Broombush cutting is presently carried out in the more remote and natural areas of the Mallee. Harvesting involves the cutting of stems of broombush plants aged from 10 to 30 years. Very little is known about the impacts of broombush harvesting on species composition and abundance of both plant and animal species. Knowledge of regeneration requirements as well as growth rates and

the general ecology of the plant is still imperfect. Accordingly, the possible ecological impact of the broombush-cutting industry is still largely unknown.

The major physical impact, other than the physical removal of stems, is the establishment of access tracks and stockpile areas for the harvested brush. Because the broombush areas were previously untracked the access tracks are particularly obvious. The use of four-wheel-drive vehicles and heavy trucks and tractors for gaining access to cutting areas and for transporting brush bundles can also damage the main access tracks.

Access tracks to cut areas are not maintained but remain evident where subsequently used to gain access to new cutting areas, or by apiarists to reach through their use for access to new sites, or by recreation vehicles.

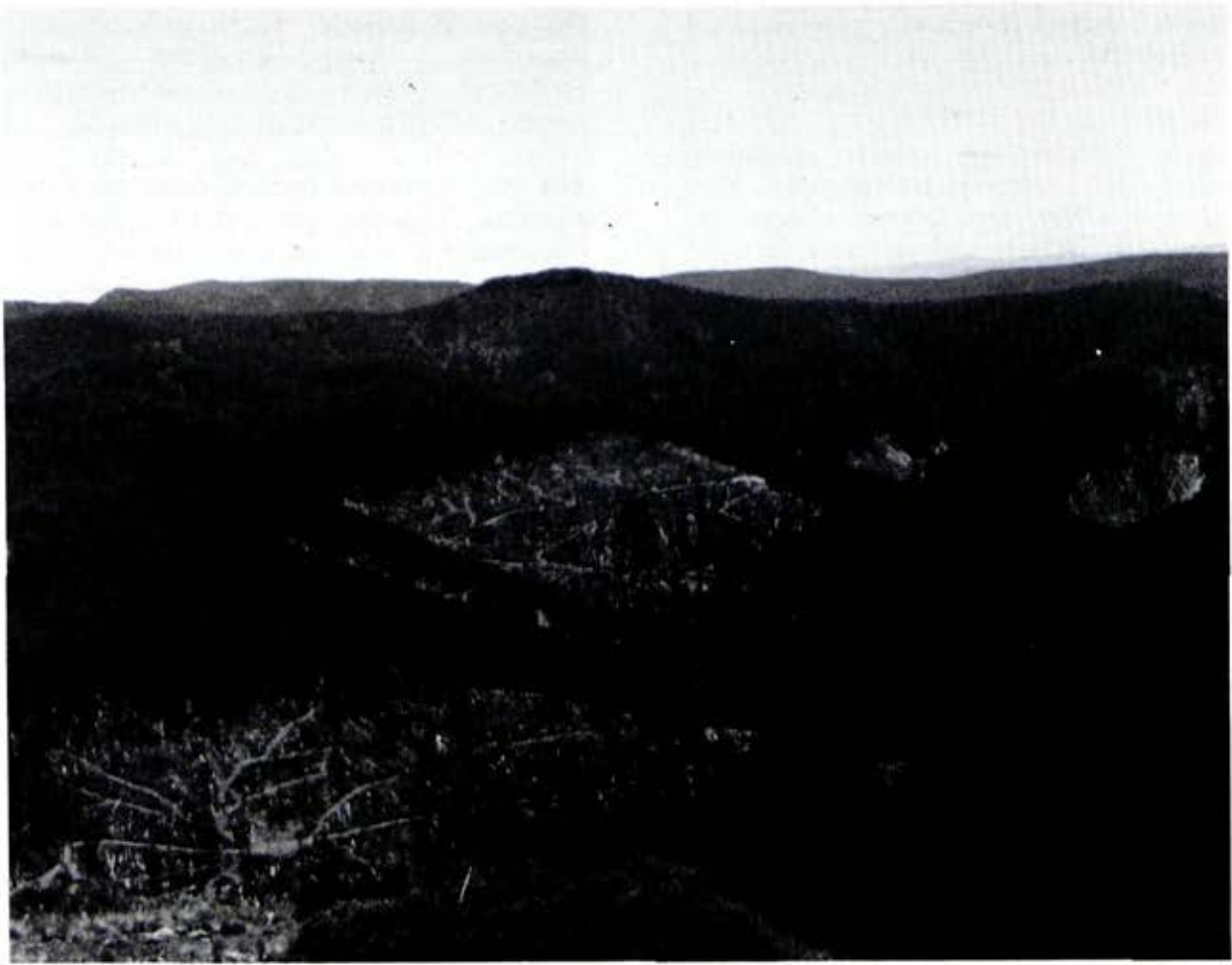
While impacts are generally localised, the track networks may be extensive. Land Conservation Council recommendations confine legal operations to specific areas in the Big Desert.

Hardwood Production

The harvesting of hardwood species is the main form of timber production in the more remote and natural areas of Victoria. Large-scale harvesting of sawlogs has taken place mainly since the 1950s.

The level of impact of harvesting on the natural values of an area is related to the methods used for harvesting and those used in regeneration. A review of the impacts of timber production and harvesting on native flora and fauna is available in a report commissioned by the Board of Inquiry into the Timber Industry, Victoria (Australian Biological Research Group Pty Ltd, 1984) parts of which are summarised below.

Selective harvesting techniques concentrate on the removal of species of highest wood quality and thus over time there is a reduction of overstorey diversity and quality. In East Gippsland, for example, silvertop, a species which regenerates readily on disturbed sites, has replaced the durable species and reduced the original



Resource utilization activities have an adverse impact on natural systems and thus on wilderness quality - timber harvesting in the King Billies

diversity of the forests. These changes may be short or long term, and appear aggravated by changed fire regimes in such areas. In the past, selectively logged areas were generally not properly regenerated.

Clear felling involves the cutting down of most trees on the logging coupe (the area cut). This has an immediate short-term impact on the vegetation and fauna. Longer term impact is largely proportional to the success of the regeneration techniques. The mix and source of seeds used for artificial seeding can also cause changes in species composition. Regeneration of low elevation forests usually involves the utilisation of seed tree techniques. Silvicultural trials on these effects are presently being undertaken by the Department of Conservation, Forests and Lands.

The impact on fauna is often immediate, causing loss of habitat and direct or

indirect mortality. Successful recolonisation is dependent on coupe size and the quality of the surrounding vegetation. The larger the coupe, the lower the potential for recolonisation. Diversity (due to an edge effect between habitat types) is decreased, and has greater impact on species requiring large areas of mature forest.

Short-rotation cycles will be inadequate for many species and rotation cycles of 60 to 80 years may still not provide for species dependent on fully mature communities which often require up to 150 years. Where rotation periods are short (less than 100 years) the full successional sequence of many forest communities will not occur and the population of species dependent on particular structural forms will be significantly reduced. Similarly some birds and arboreal mammal species are dependent on mature trees, notably greater gliders and bats will also be affected. Full

diversity of species is generally dependent on high levels of habitat diversity.

Water runoff and retention characteristics are altered and soil erosion may be severe until full vegetation cover is restored. Streamflows may not recover to pre-harvesting levels for many years after harvesting. Increased surface flow may lead to increased stream turbidity and increased peak stream flow.

In addition to impacts on natural systems, harvesting operations may have an impact on other values. Logging operations in mountainous areas are often very visually obvious from adjacent ranges and can have a significant visual impact. Visual effects can be reduced by use of visual management systems or, given time, by regeneration. Noise, notably that of chain saws and heavy vehicles, can also have an impact on areas distant from the actual operation area.

Other impacts arising from harvesting (including salvage logging) are those associated with mechanical disturbance and the construction of roads and other facilities. The construction of roading may have severe impacts and haulage roads, many of which are constructed to high standards, often traverse previously inaccessible areas. Their impact often extends through areas significantly greater than the relatively localized areas actually

harvested. The specific impacts of roading were outlined above under Access and Structures. Other structures include temporary accommodation camps, log landings (for the loading of trucks), snig track networks, and temporary log dumps and fuel dumps. Major access routes may also require significant upgrading.

Mechanical disturbance to vegetation and soils and the introduction of soil pathogens through poor hygiene practices can lead to the introduction of weed species into such areas. Timber harvesting in State forest is required to be conducted in accordance with a 'Code of Forest Practice' designed to minimise the impact of logging on other forest values.

Mineral Exploration and Mining

A substantial portion of public land in Victoria is held under exploration licence, but the actual works associated with mineral exploration generally occupy very small areas.

The impact of mineral exploration on wilderness quality depends on the activities and techniques utilised. These range from aerial surveys, to drilling involving levelling of drill pad and construction, where required, of access tracks. Various exploration techniques carried out under exploration licences are shown in Table 19.

Table 19

MINERAL EXPLORATION TECHNIQUES

Activity	Frequency/intensity	Techniques
Geological mapping	Regional traverses, local grids	Walking, chipping rocks
Reconnaissance sampling	All rock formations	Plastic flagging, 20-cm wood pegs, sampling soils
Grid surveying, sampling	Only over reconnaissance sampling anomalies	Machete clearing, plastic flagging, 90-cm pegs, sampling soils
Geophysical surveys - electromagnetic	Only over anomalous grid samples	Walking, laying out wires on ground
Geophysical surveys - induced polarisation	Only over anomalous grid samples	Walking, wires laid, holes with aluminium foil
Drill sites	1-10 per licence	Up to 50 sq.m pad levelled by hand; mature trees generally preserved; drills winched in from nearest track
Primary access tracks	Access to grids	Dead timber, saplings cleared by hand; vehicle over natural surface
Drilling access	10 or less per year, as some drill sites near existing forestry tracks	(i) As for primary tracks, but wider and straighter (ii) Some bull-dozing
Temporary camps	1-3 per year	Tents and caravans
Permanent camp	Maximum 1 per licence	Caravan, sheds, water tanks, weather station

Note: Costeering (trenching) requires ministerial consent

The impacts of these activities is mainly localised and, given that natural surfaces are not usually disturbed, much is reversible. The major impact is from the construction of access tracks, arising from the direct effect of their construction, as well as their subsequent use.

The impact of mining activity also depends on the particular nature of the operation, its scale and the techniques utilised. Impacts arise from the direct physical alterations caused by the mine itself together with those allied to access, storage and processing of material, and occupation.

The direct impact of the mine itself is greatest where surface mining methods are used. Impacts from access arise from its construction, maintenance and use. Storage and processing may involve the need for disposal of overburden, spoil or tailings; noise, dust, air emission and effluent from grading, crushing or primary treatment of materials; and the needs of water supply. Such impacts may affect areas some distance from the mine site itself visually, audibly and ecologically.

Impacts of occupation arise from construction camps, operational facilities, provision of electricity transmission lines, telephone lines, and sewerage effluent disposal.

Most mines have a defined economic life arising from the extent and quality of the ore body and the market price. At the completion of an operation much of the site can be rehabilitated to approximate the original surface and vegetation structure. Road and utility surface networks are costly and this provides an incentive to seek other purposes for their use, other than their removal and regeneration.

Water Resources

The impacts of water storage structures on natural systems was outlined above under Access and Structures. In summary, they relate to those arising from the physical impact of the structure itself, the associated structures, such as power stations, dam walls, roads, power lines, quarries, the creation of new deep water bodies, and to those impacts that occur

downstream as a result of changed water flow patterns, water quality (including temperature) and water volumes. The calculation and provision of minimal 'environmental flows' is a technique available to reduce such impacts.

INTRODUCED PLANTS AND ANIMALS

Introduced species that have become naturalised, and native species which, subsequent to European settlement, have extended beyond their normal distribution on abundance, are the species of greatest impact. About a quarter of the vascular plants found in Victoria's natural lands are naturalised introduced species (or environmental weeds). Many of them were accidentally introduced during the early period of settlement, but most have been deliberately introduced.

Blackberries were planted for their fruit and as food for certain birds and, later, in attempts to control gully erosion resulting from land clearing and surface mining. Many other plants that were introduced as ornamentals - Scotch thistle, Cape tulip, furze, broom, tufted honey-flower, sweet briar, hawthorn and water hyacinth - spread widely towards weed status. Other plant species were introduced for agricultural purposes, such as for fodder crops, or for land management activities, such as soil stabilisation or wind breaks.

The Acclimatisation Society, established in 1861, had wide support for its efforts to introduce and 'acclimatise' various European animals. Notably hares, deer, pigs and goats, sparrows, starlings, thrushes, blackbirds and Indian mynas, and trout and redfin were introduced. The animals were primarily for public game; other introductions were intended as 'useful species', and the songbirds were to eat caterpillars and add to the re-created English garden settings in towns and on many estates. Rabbits were first introduced as a game species in 1859. by 1890 they had acclimatised so spectacularly that there were hundreds of millions.

It has been claimed that introduced plant and animal species represent the greatest of all threats to the remaining indigenous ecosystems in Victoria (Frood and Calder 1987).

Table 20
INTRODUCED ANIMALS

Name	Status	Distribution
A. Mammals		
House mouse	A	-
Brown rat	U	-
Black rat	C	-
Dog (excludes dingo)	C	-
Fox	A	-
Cat	A	-
Horse	U	-
European cattle	-	-
Goat	C	-
Sheep	-	-
Chital	R	-
Hog deer	U	-
Red deer	U	-
Sambar	U	-
Fallow deer	U	-
Pig	U	-
Brown hare	C	-
European rabbit	A	-
B. Birds		
Mallard	R	W
Common pheasant	R	R
Feral pigeon	C	W
Spotted turtle-dove	C	M
Scaly-breasted lorikeet	R	R
Port Lincoln ringneck	R	R
Skylark	C	W
Red-whiskered bulbul	R	W
Black bird	C	W
Song thrush	U	W
European goldfinch	U	W
European greenfinch	U	M
House sparrow	A	W
Tree sparrow	C	M
Chestnut-breasted mannikin	R	R
Common starling	A	W
Common mynah	C	M
House crow	R	-
C. Reptiles		
None known		
D. Amphibians		
None known		
E. Fish		
Murray cod*	R	-
Golden perch*	R	-
Macquarie perch*	R	-
Chinook salmon	-	R
Rainbow trout	-	W
Brown trout	-	W
Goldfish	-	W
Carp	-	W
Roach	-	W
Tench	-	W
Mosquito fish/black-spotted mosquito fish	-	W
English perch (redfin)	-	W
Convict cichlid	-	R
Black mangrove cichlid	-	R

KEY:**Status:**

A - Abundant
C - Common, moderately common
R - Rare, very rare
U - Uncommon

Distribution:

M - Moderate
R - Restricted
W - Widespread

* Natural range is north of the Divide, have been introduced south of the Divide
- Data not available

Source : Frood and Calder (1987)

Environmental Weeds

It appears that there are virtually no parts of Victoria's natural lands completely free of weed species. The distribution of weeds across the State is, however, far from uniform. Map 7 shows the relative proportion of weeds to native species based on 10-minute grids. It is based on records (of the Department of Conservation, Forests and Lands' Flora Survey Group) derived from mainly native or near native vegetation. Thus, while representative of weed abundance in vegetated areas, this representation is an underestimate of the abundance of weed species for the grid as a whole.

Those areas least affected by weed invasion are on the largest expanses of unalienated land. The areas which are least weedy are those where disturbing influences have been minor, have taken place long ago, or have taken place only once. The real problem areas are those where the disturbances have been major or have persisted for long periods of time (Gullan 1988).

The three most weedy communities are those where the understorey is dominated by grasses and herbs, coastal vegetation and riverine vegetation (Gullan 1988). These areas also coincide with some of the most heavily disturbed environments and each has specific susceptibilities.

Native vegetation may be disturbed by natural agents, such as fires and floods. These agents, while potentially contributing to the colonisation rate by introduced species, only do so where such species already occur. Presence of riparian weeds may also be the result of upstream disturbance, not necessarily *in situ* disturbance.

It has also been noted that many of the common weed species that invade disturbed areas often fail to persist once the disturbance is removed. Invasive success also depends on the nature of the weed source, a range of physical environmental variables, the structure and floristics of the vegetation and the nature of the disturbance.

Environmental weeds can have major impacts on indigenous vegetation - both

structurally and floristically. For instance, blackberry or furze can form dense thickets and lead to substantial alteration to plant community composition. Over time, weed invasion or hybridisation may eliminate indigenous vegetation and is thus a particular threat to individual populations of rare plants.

Alteration of the structure of a plant community by environmental weeds will also have an impact on the habitat of animals, usually by affecting the availability of breeding sites. Weeds may also increase food supplies in favour of a particular species.

Other impacts include increasing fire hazard, as the rapid growth of many environmental weeds may lead to a significant build-up of biomass and thus fuel loads. They can also have a significant aesthetic impact by reducing species diversity. Recreational capability can also be lost when heavy infestations impede access.

Weed control strategies can also have an impact. While most strategies are species specific, some may adversely affect non-target species and their application by means of vehicles usually causes some soil disturbance which in turn can affect relict native species or create an environment conducive to re-invasion.

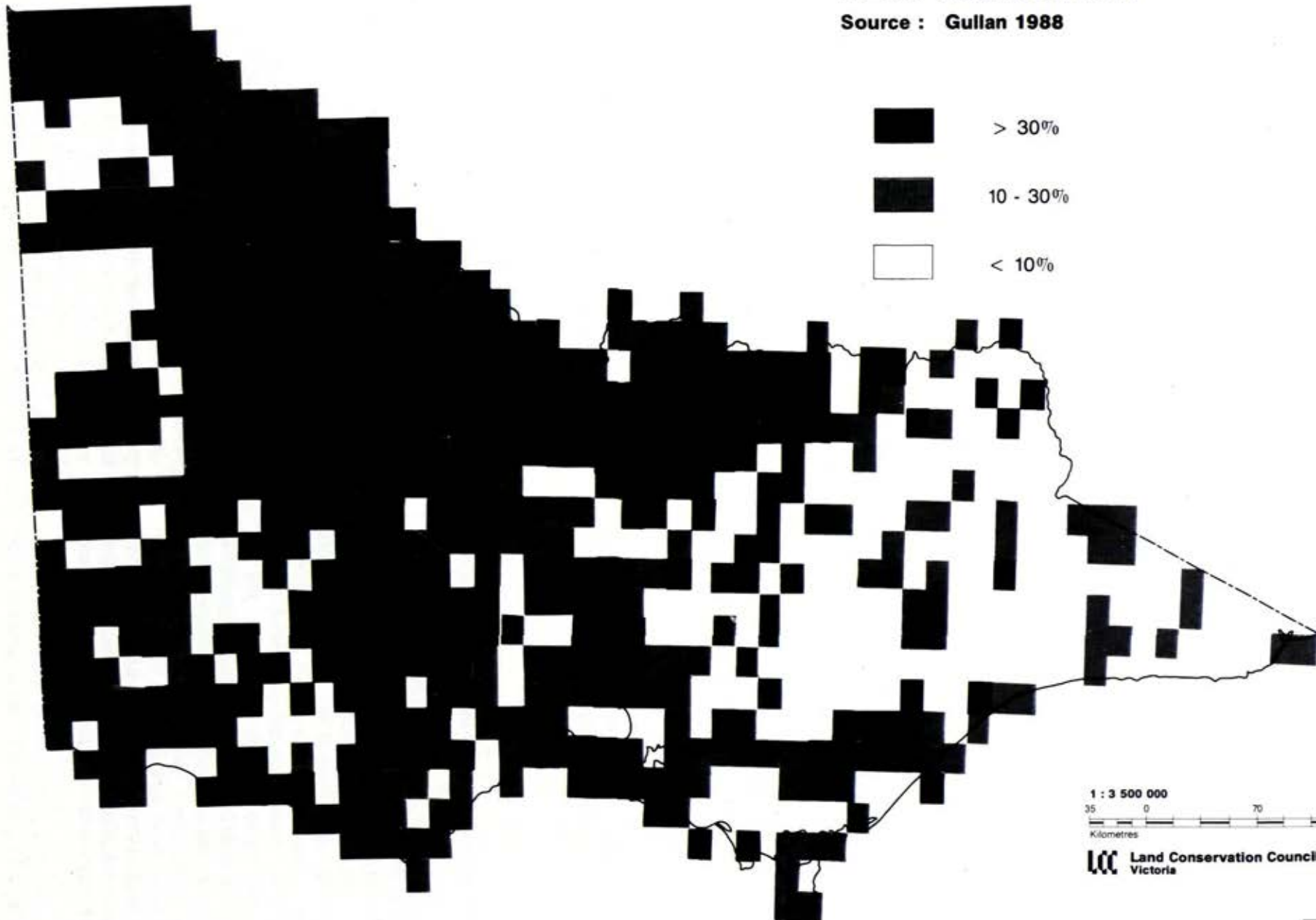
Introduced Animals

A wide range of introduced animals occur in the natural lands of Victoria. They include 18 species of mammals (20% of the 87 non-marine or extinct mammals recorded in Victoria), 12 species of fish (21% of the approximately 57 species of fish recorded in Victoria), and 18 species of introduced birds. The introduced vertebrate species presently recorded in Victoria are listed in Table 20 (see page 93).

A number of these introduced species are abundant and widespread, for example, the house mouse, fox, cat, European rabbit, house sparrow, and the common starling. Feral dogs are common throughout the eastern highlands and feral goats, sheep, pigs, horses, and cattle, may occur in different parts of the State.

WEED COMPOSITION

Source : Gullan 1988



1 : 3 500 000
35 0 70 140
Kilometres

 Land Conservation Council
Victoria

Many were introduced over 100 years ago and have now reached stable self-sustaining populations. Some populations such as those of the sambar deer appear to be still expanding in distribution. There has also been recent infestations of exotic species in some areas that have resulted from deliberate re-introduction.

Exotic species may affect indigenous species and ecosystems in many ways. Exotic herbivores may change habitats so greatly that indigenous species may have difficulty finding food and shelter. Exotic predators (such as foxes, dogs, cats) may prey on native species in a way and at a rate that the native species have not evolved to withstand. It is also thought that exotic predators outcompete indigenous predators such as quolls (which used to be common but may now be extinct in Victoria) and tiger quolls (which now have a restricted range within Victoria).

The impact of introduced species varies but often falls most severely on the small ground-dwelling marsupials especially in dryland and woodland areas where sheep and rabbits have removed the ground cover and the small mammals are preyed on by cats and foxes at night and birds of prey by day.

The impact of some of the main introduced species on the natural lands of Victoria is reviewed below.

Rabbits

The European rabbit has caused enormous damage to native plant communities and remains as a serious pest. It is widespread within Victoria, although rare in areas of high elevation. Studies undertaken in the north-west of the State in the 1960s and 1970s showed that about 80 species of plants reappeared when rabbit grazing was excluded. Some had not been seen in the area for 40 to 50 years. Rabbits kill or severely retard tree seedlings. Vegetation cover is thus reduced, the amount of bare soil increased, non-forage species increased in abundance, and there was loss of natural regeneration. Rabbits also compete directly with native wildlife for food especially when their numbers are high.

Cats

Studies in the late 1970s indicated that rabbits are the single most frequent component of the diet of feral cats across Victoria. Native animals were still a very significant part of their diet, particularly in the eastern highlands, (where they comprise up to 40% by weight). Death of native species may also be due to bacterial infection from a bite or from the trauma of attack.

These studies also indicated that feral cats have large home ranges and high populations in bushlands. While the dumping of unwanted cats no doubt contributes to the problem, it appears that feral cat populations in the more remote areas are self-sustaining. Litters are produced throughout the year, and feral populations, though infected with viral diseases, appear relatively healthy.

Wild dogs

Wild dogs are largely confined to heavily forested areas in the eastern highlands, although they are also recorded (in low numbers) in the Sunset Country and the Big Desert. They may have a significant impact on local wildlife populations as native species form the major part of the diet of wild dogs. Dogs also disturb, frighten, or maim native species, in addition to direct killing.

Other mammals and birds

Foxes catch and eat many water birds and the larger ground-dwelling birds such as the bustard and the brolga. They also eat and spread blackberries and are carriers of bacterial and virus diseases. The population in Victoria is considerable (despite years of bounty payments).

Horses are known to be relatively close-grazing animals compared with cattle and are known to graze certain areas preferentially. They create tracks, although generally on the contour, and may assist in the dispersal of weeds (further impacts are discussed below under Recreation).

The most widespread introduced deer found in Victoria is the sambar. Family

groups or small herds of sambar appear to feed by browsing a range of shrub species. Stags form mud 'wallows' to define their territories and, particularly when in rut (during the breeding season) roll in the wallows and rub their bodies and antlers against trees which removes part of the tree's bark. Other localised impacts include soil pugging of watercourse banks. Knowledge of the possible impact of deer on native species is limited.

Goats are heavy browsers and have the potential to alter vegetation communities significantly.

The European hare, while it once reached plague proportions in the north and west of the State in the 1920s and 1930s is now only locally common. They can, however, breed rapidly. On the alpine plains their grazing pressure may have a significant impact on vegetation.

Feral pigs provide a reservoir for a range of diseases. They may eat native animals and ground-nesting birds, and can cause considerable soil disturbance through rooting.

Widespread introduced bird species such as the sparrow and starling compete with native birds for food and shelter. The starling is particularly aggressive. Many compete with the native birds for nesting space and thus lower the breeding success of the indigenous species.

Fish

The effect of introduced fish species on the indigenous aquatic fauna is difficult to ascertain as their introductions were closely accompanied by other changes to Victorian waters. There are indications that some introductions such as the brown and rainbow trout have had deleterious effects on some native species. For example, in the Kiewa River one species of native galaxid has been observed to occupy only places inaccessible to trout, for example, above waterfalls. These species have been shown to have mutually exclusive distributions elsewhere. Smaller native fish may also have been reduced in abundance as a result of predation by the introduced English perch. Conversely, some introduced fish such as carp, goldfish and roach provide a significant

food source for some of the larger native species.

Impact of control programs

Programs for the control of introduced species are not always species specific and may have an adverse impact on native species.

Most baits for terrestrial animals involve the use of '1080' (sodium monofluoroacetate). This bait is effective in the control of rabbits, wild dogs, cats and foxes. Many native animals are not as susceptible. Use of buried baits helps to reduce the impact on those native species which are susceptible. But even if the bait is eaten by target species the carcass may subsequently be ingested by a native predator. Predators, such as birds of prey can concentrate the 1080 by consumption of a number of affected prey, and are at risk in this way. Uneaten 1080 breaks down in the soil.

Trapping techniques are less specific and non-target species can be caught.

FIRE

Fire is a natural component of most Australian ecosystems. It has a major influence on the composition and nature of plant and animal communities. Some adult plants, such as mature mountain ash in the alpine areas, *Callitris* in the mallee, and banksias in coastal heathland, are easily destroyed by fire. However, most Victorian plants are capable of successful regeneration following fire and some species appear to depend on it for their long-term survival. Species diversity of communities often peaks a few years after a fire, and many structural forms are dependent on frequent firing, such as heathlands. Others, such as a closed rainforest, depend on the absence of fire.

Fire can also lead to the loss of soil nutrients, and cause drastic changes to the density of soil flora and fauna. These are not necessarily detrimental - ash beds can enhance germination and growth. Fire has mainly a short-term impact on water quality but regrowth forest can greatly reduce water yields. Recovery to pre-fire yields may take up to about 150 years in some communities. The effect of fires on

animal species include mortality of many individuals, both directly or subsequent to the fire through predation or shortage of food and shelter.

The location of major bushfires (those exceeding 1000 ha) that have occurred in Victoria since 1939, are shown on Map 8.

Manipulation of Fire Regimes

The natural regime of fire was modified by Aborigines and later, more particularly, by European settlers.

The role of Aboriginal fires in shaping the forests and plant communities found by the first settlers is largely unknown. Certainly burning appears to have been infrequent in rainforests and wet sclerophyll forests. Research into evidence of burning in the annual rings of snow gums and in swamp sediments suggests that fires have been more common since European settlement.

European settlers, however, used fire to clear the native vegetation in preparation for agriculture, and pastoralists used fire to remove dry grass and encourage green shoots for livestock. The area fired was now more extensive.

Severe forest fires apparently occurred in the alpine area before settlement. Regular fires in the early years thereafter were attributed to lightning and to grazing and mining activities. Prior to 1939, access was poor and fires such as those in 1851 often burnt unchecked for many weeks and covered large areas before rain extinguished them.

Today non-natural fire ignition sources are the main sources of wildfire. Table 21 provides details of fire sources and areas burnt during 1987--88.

The Department of Conservation, Forests and Lands' objectives in fire protection are to control wildfire in order to prevent destruction of life and private property, to minimise loss of bushland and to provide an effective, environmentally sensitive fire prevention program.

While all fires are controlled, the actual suppression strategy depends on the fire conditions of the day, assets and life being

threatened, the resources available, and the possible adverse environmental effects of control. That is, the control of a fire does not necessarily involve immediate suppression at all costs. In practice, however, the potential for successful fire suppression is greater in the early stages of the fire.

Fuel reduction burning is the main technique used in Victoria to reduce fuel loads. It is used in most forest types and lowers the intensity of wildfires so that they can be controlled. It relies upon burning the litter in autumn or spring so that a wildfire in summer has little fuel to support it, thus reducing its rate of spread and intensity.

In 1988, fuel reduction burning was carried out by ground (15.6%) and aerial (84.4%) ignition on 200 000 ha of State forest and national park, mostly during favourable autumn conditions.

There is little use of the fuel-reduction technique in the public land of the Mallee and the Wimmera. The major emphasis of fire protection work in these areas is the construction and maintenance of firebreaks. Substantial breaks have been established on the boundaries of all of the larger blocks of public land. Their effectiveness has been increased by fuel-reduction burns of up to a kilometre in depth from the firebreaks. Such burns have also been used to subdivide the larger blocks, particularly the Big Desert. These internal burns have been carried out beside tracks and within large untracked areas by using aerial-ignition techniques.

Fire may be manipulated to maintain or enhance 'natural' conditions, or to protect a biologically important area. This is particularly the case where the area is small or isolated.

A fire regime can be manipulated to produce a particular set of vegetation conditions, or successional state. Biological diversity can be stimulated by prescribed fire, especially where a mosaic of fire intensity is achieved.

Modifications of fire regimes may involve changes to fire frequency, fire intensity, and fire seasonality.

MAJOR BUSHFIRES 1939 - 1989

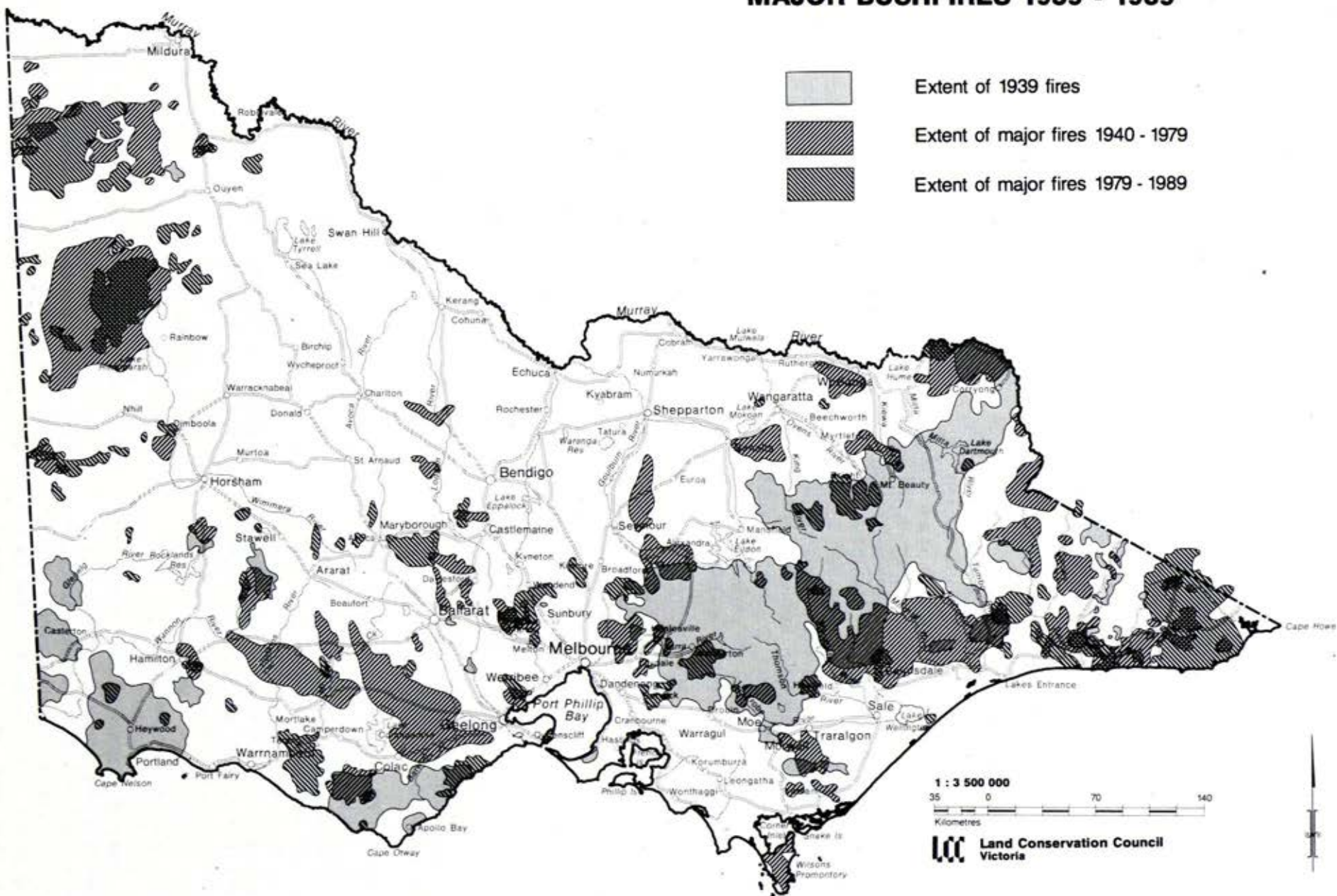


Table 21

NUMBER OF FIRES AND AREA BURNT, CLASSIFIED BY CAUSE 1987-88

Source	No of fires	% of total	Area burnt (ha)
Lightening	339	39.0	20 437.0
Exhaust, chainsaw	3	0.3	4.3
Exhaust, other	14	1.6	300.0
Snigging, hauling	0	0.0	0.0
Burning vehicle machine	20	2.3	368.6
Pipe, match, cigarette	56	6.4	151.6
Campfire, barbecue	98	11.3	230.7
Prescribed burn - Dept.	1	0.1	0.0
Burning off - Railway	0	0.0	0.0
Burning off - grass, scrub	50	5.7	1 108.7
Burning off - window, heap	37	4.3	385.1
Train	3	0.3	0.0
Deliberate lighting	120	13.8	8 232.3
Waste disposal - domestic	17	2.0	42.3
Waste disposal - Industrial/tip	24	2.8	10.5
Power transmission	3	0.3	2.1
House, flue, stove	7	0.8	0.7
Burning building	1	0.1	0.1
Fireworks	1	0.1	0.0
Relight - wildfire	5	0.6	17.0
Relight - prescribed burning	1	0.1	300.0
Relight - burning off	14	1.6	50.3
Other	19	2.2	224.8
Unknown	36	4.1	485.9
Unspecified	1	0.1	0.0
State total	870	100.0	32 352.0

Source : Department of Conservation, Forests and Lands 1988

In addition, the clearing of extensive areas of lowland and foothill forests across the State for agricultural purposes would also have had a major impact on fire regimes.

Ecological Impacts of Fire Regime Modification

Changes in fire frequency can have major effects on the composition of flora and fauna communities. If fire frequency is increased some communities, such as those requiring a period of 100 years or more to regain their full floristic potential after a major crown fire, are greatly affected. Conversely, if fire frequency is decreased, some communities, such as coastal heathlands, will become species poor.

The repeated removal of litter layers and ground flora by frequent burning, such as used in fuel-reduction burning, may have long-term adverse impacts on these natural communities. Their removal is known to have short-term impacts, for example,

increased water runoff and hence increased soil erosion. Changes in fire intensity and season can also markedly affect species composition and structure of the vegetation.

Increasing fire frequency may not permit recovery of some communities to maturity and stored sources seed could become exhausted. Frequent firing in alpine environments, where many species are fire sensitive and environmental conditions are stressful (combined with a short growing season) is thought to lead to local extinction of species.

Physical Modifications Arising from Fire Protection

A wide array of fire protection installations have been constructed throughout Victoria. Presently, there are 3939 km of constructed and maintained firebreaks, 289 helipads, 23 airstrips, 81

firetowers and lookouts, 16 dugouts and shelters, 112 weirs and tanks, and 1683 dams (DCFL 1988). In addition, many thousands of kilometres of vehicular tracks are maintained principally for fire protection purposes.

Firebreaks are mainly only effective for the control of ground fires or for helping to slow the rate of crown fires, and where associated with a vehicular track permit safe access through and to fires. They are often used in conjunction with fuel-reduction burns or for back-burning operations. They may involve the removal of all vegetative growth with the soil being ploughed, or be restricted to the maintenance of low mowing of undergrowth.

Water points, such as tanks and dams, provide water that otherwise may not be available in summer. Both helicopters and vehicular tankers use such installations. Helicopters are more readily able to utilise water points at greater distances from fire fronts.

Despite increased availability and use of helicopters for the suppression of fires, the provision of vehicular access is still considered essential in most circumstances. A network of tracks and roads provides for rapid access.

Likewise, firetower networks are designed to facilitate the early detection of fires. The use of aircraft for fire spotting, particularly during lightening storms, is now also common.

Aircraft are also used in suppression operations to release fire retardant ('Phos-chek'), foam and water.

Suppression techniques vary according to the resources available, the values threatened and the likely behaviour of the fire. At the discretion of the fire officer in charge, other techniques include use of ground crews with handtools, use of earth-moving machinery to create control lines and back-burning from control lines.

RECREATION

A wide range of recreational activity is undertaken in more remote natural areas. The impact of recreational activity is

dependent on factors such as activity type and area and, in particular, the intensity, frequency and period of use. Impact is also proportional to the nature of the particular physical and biological environment.

Impacts from vehicle-based activities include those arising from the direct and indirect effects of providing and maintaining tracks and roads, as detailed previously under Access and Structures, as well as dust, emissions, and visual impacts, the increased probability of refuse material being left, non-indigenous animals dumped, introduction of non-indigenous plants, and accidental and deliberate fire lighting. The noise associated with mechanised vehicles, especially those not conforming to legal standards, has a significant impact on experiential values. Vehicle-based camping is more likely to involve the use of generators and chainsaws with their associated noise impacts, than other forms of camping. Compliance with voluntary restrictions of use, such as the Victorian Association of Four-Wheel-Drive Clubs code can help reduce such impact.

Many tracks in forest areas were constructed primarily for fire protection purposes and are designed to cope with only low intensity use. Where such tracks are subject to increased use by recreational vehicles, especially on steep slopes or through sections subject to periodic water logging, significant damage can result. Such impact can be reduced through re-alignment. This frequently results in an upgrading of the track to meet both its original purpose and the new use.

Impacts arising from pedestrian access involve trampling of vegetation, establishment of tracks, as well as increasing the possibility of accidental fire and possibly the introduction of non-indigenous plants. Impacts are often localised with American research indicating that 50% of use occurs on about 10% of the tracks. Impacts from skiing or canoe-based transport occur mainly at the interface of the snow or water with the land or vegetation. Damage is greatest at river access points and crossings and camp sites. Impacts also arise from the

provision of associated facilities such as track construction, toilet facilities and defined camp sites.

The impact of horses is similar to that of cattle grazing (see previous discussion under Resource Utilisation), although generally of lower intensity. Impacts arise from the trampling of vegetation, particularly ground cover in alpine areas, the establishment of tracks, the disturbance of soils especially in steep areas or areas subject to water logging by off-track riding, as well as nutrient input, exotic species introduction, and the reduction of water quality (from experiential viewpoints as well as from increased turbidity and nutrients). The presence of horses may be intimidating to other users. Off-track riding may reduce some of these impacts in open areas such as snow grass plains, as may use of feed hygiene practices.

Recreational horse riding is frequently reliant on associated facilities such as camp sites, yarding, water provision and vehicular access for the transport of animals to riding areas as well as for back-up support.

Mountain bike use of existing tracks can lead to increased deterioration of track surfaces and soil erosion, particularly where such tracks are narrow, on steep grades or unconsolidated surfaces.

Rock climbing may disturb and affect breeding success of some species, for example, the peregrine falcon, although temporary restrictions of use can mitigate this, and some techniques, now less frequently used, involve the use of mechanical aids (such as bolts and pitons) which can mar rock faces (and reduce the experience available for subsequent climbers).

Hang gliding is essentially reliant on vehicular access and local damage may arise from the clearing and maintenance of launching or landing sites or from retrieval from remote areas.

Activities such as fishing of native species may lead to alteration of natural population dynamics and species composition. Most fishing activity is, however, restricted to introduced species.

Most hunting activity is also restricted to introduced species. Where firearms are used, impacts could relate to real or perceived safety hazards. Where hunting animals (dogs) are used, impacts may include the frightening of non-target species or other recreationists.

Recreational prospecting may have direct physical impacts and is also generally dependent on ready vehicular access.

The impacts of camping activity arise from soil compaction, loss of ground cover, damage to vegetation from firewood collection, increased risk of fire, refuse and human waste disposal. Use of 'low impact' practices and technological advances in equipment standards can help reduce such impacts. The most attractive camp sites, those near streams are often also sites of environmental or historical sensitivity. Indirect effects arising from disturbance to vegetation include soil loss and increased potential for establishment of weeds.

American studies of use of wilderness areas, where only pedestrian access is permitted, have indicated that the damage at camp sites is the key observable impact of human use of such areas.

Many recreational activities, which in themselves may have little impact on wilderness quality may lead to additional impacts arising from management response to apparent 'needs'. These could involve increasing the standard of access or facilities in popular areas, including sign posting and delineation of tracks, or the provision of refuge huts or snow pole lines for public use or for real or perceived safety and management requirements. Facilities provided at popular or over-used camp sites could include water supply, picnic tables, fireplaces and pit toilets. Such incremental response may lead to changes in recreational use as well as having an impact on aesthetics and naturalness.

As noted in Chapter 6, the Department of Conservation, Forests and Lands has identified five classes of recreation settings within the total spectrum, each of which provides a different experience for users regardless of the particular activity being undertaken. (The largest relative



Camping can have impacts such as soil compaction, loss of ground cover, damage to vegetation from firewood collection, refuse and human waste disposal, and increased risk of fire

proportion of Victoria's public land is presently within 'Roaded Natural' settings.) With the provision of increased level of access and facilities there is a gradual shift of the available opportunity from remote to more developed. The shift from remote to developed is largely dependent on input of capital, but it is essentially irreversible. Small incremental changes can, over time, thus lead to major changes in the proportion of recreational settings available in Victoria.

The provision of track markers or huts may also encourage use of more remote and hazardous areas by people who lack suitable equipment, or a sound knowledge of survival. Reliance on such structures by inexperienced users may be a particular safety hazard during inclement weather when such facilities may not be visible or otherwise available.

Similarly, management responses can have a significant impact on influencing the location, intensity and timing of

recreational use through the provision or absence of provision of facilities, access or signs, the nature and amount of information provided, or the regulation of activity.

Conversely any increase in recreational usage in areas without ready access may impose difficulties for search and rescue responses, enforcement and other management requirements, especially where resources are limited.

Any particular recreational activity may have an adverse impact on the experiential values obtained from another. Participants in pedestrian or horse-based activities may consider vehicle-based activities to be in conflict with their activities. Likewise, a mountain-bike rider may disturb walkers or horse riders. Activities involving firearms or animals such as dogs or horses can often reduce the recreational experience of other users, especially when they engender real or perceived fear.

Conversely, walkers or vehicles may frighten horses.

Conflicts are often greatest where activity groups are attracted to a particular locality - notably a camp site, lookout point, historical artefact, hut, a natural feature of significance, or where restricted to a single multi-use trail.

The impact of commercial tours or structured activities, on natural systems or experiential values is not necessarily any different to any other like form of recreational use. Impacts are associated rather with the size of groups and frequency of use by such activities.

Compatibility, both physical and experiential, is also dependent on the size of groups and the frequency of use - and the behaviour of individuals.

MILITARY TRAINING

The Australian Army occasionally undertakes training on public land. Often such use is no different from the operation of many other organisations involved in skill training in outdoor activities. For instance, the Army uses Mount Arapallies for climbing training subject to the same controls and restrictions imposed on any other group proposing such training.

The army also uses a number of Proclaimed Training Areas. These are proclaimed under Section 69 of the *Defence Act*. Some of these are owned by the army or other services, for example, HMAS Cerberus and Puckapunyal. They may also be proclaimed over public land and are usually reproclaimed every three years. Wilderness areas, reference areas, parks and other such areas are normally excluded from military training exercises. Exercises are also regulated by standing instructions.

Training exercises range from simple bush survival and small-scale infantry manoeuvres to large-scale exercises involving large numbers of personnel, a variety of transport including four-wheel-drives and tracked vehicles. Larger and more remote areas are used relatively infrequently for training exercises, ranging

from a few times a year to once every few years.

Impact is greatest where large base camps are established and tracked vehicles used, particularly in dune areas. Vegetation and soil profiles may be disturbed, new tracks created, with subsequent increased potential for erosion, the establishment of weeds and increased recreational vehicle use.

EXTERNAL INFLUENCES

An extensive array of land uses and activities that are external to the boundaries of natural areas can, nonetheless, have physical impacts on unmodified natural lands, as well as on the experiential values of such areas.

Such impacts include those arising from agricultural activity, urban effluent disposal, and industrial air pollution.

Both intensive and extensive farming reduces water quality through increasing stream turbidity, sediment loads and, where stock have direct access, by increasing the bacterial levels in the water. Use of fertilisers, herbicides, pesticides and fungicides comprise part of normal farming practice. Export of these substances to adjacent water bodies causes a reduction of water quality.

The 'edge effect' of cleared land can lead to changes in forest vegetation composition and increase the likelihood of introduced or pest plants and introduced animals.

In some areas, notably the Murray Basin, vegetation clearance and irrigation have created local and regional salinisation, with regional saline discharges often distant from cleared infiltration areas.

Impacts of urban areas arise from decreased water quality from stormwater and other effluent disposal, increased likelihood of introduction of exotic and pest species, increased demand for resource utilisation, increased recreational pressure, increased 'background' noise and light 'halo' effects at night.

The presence of settlement is also a major influence on fire protection and control

strategies within surrounding natural lands.

Industrial effluent and discharges to the air can have an impact on experiential, physical and biological values, through agencies such as smoke plumes, haze, acid rain, dust fall-out and odour. Water quality is reduced by licensed and unlicensed point source discharges and diffuse source discharges such as run-off.

The presence of air traffic can have a detrimental impact on the experiential values that are obtained from an area. Such air traffic may involve private, commercial, or military aircraft.

Major domestic airline traffic generally follows well-defined corridors between Australia's capital cities and major regional airports. Private charter and recreational flights by smaller planes can utilise a wider range of landing areas. They also have virtually unrestricted flight path potential subject only to minimum height restrictions, fuel loads and prohibitions related to defence establishments and training areas. Impact arises from visual as well as noise effects.

CLIMATE CHANGE

Over the past decade there has been much research into the physical and chemical processes of the earth's atmosphere. It has been observed that the concentration of a number of gases and other components of significance to the atmosphere's normal dynamics, is changing. From measurements of these changes, estimates of their effects on the climatic response have been made.

Two major issues appear to have greatest potential to affect climate - increase of greenhouse gases and ozone depletion. To date, most work has been carried out on the impact of the Greenhouse Effect which appears to be the issue of greatest and most immediate effect.

Many scientists believe that over the next 50 years global temperatures may increase by 3°C, thereby altering the existing climatic conditions. A rise in sea levels of 30 to 40 cm may result from thermal expansion of oceans, and climatic changes may lead to more frequent storms, heavier

rainfall, reduced snowfall and longer droughts, higher evaporation rates, drier soil and less runoff.

In terms of ecological systems the greatest impacts will arise from the rate of change. The environmental conditions may change at a faster rate than species are able to adapt. Migration of vegetation community boundaries and fauna may also be limited by the lack of natural (public land) areas available for migration. Smaller, isolated areas of natural vegetation and faunal assemblages may not survive and species may become locally extinct. Species dependent on presently restricted habitats and migratory species dependent on climates in a number of hemispheres may become threatened. The value of large natural areas and corridors of natural vegetation will become increasingly important. The Greenhouse Effect would, however, affect the capacity of established parks and reserves to support existing ecosystems.

The relationships within food chains could become unbalanced as the species of each trophic level respond differently to climatic changes. Some species may in fact reach epidemic proportions, such as those parasites which are favoured by warmer climates. As indigenous ecosystems become stressed from climatic change, environmental weed problems are also likely to be exacerbated.

USE COMPATIBILITY

Each type of land use requires a certain set of resources for its operation, and these may overlap both in time and space with other land uses. Such overlap of use may be complementary with facilities provided for one use beneficial to another. For instance, the construction of forestry roads for timber harvesting may be beneficial to subsequent vehicular based recreation. Uses may also conflict with each other, or be of little effect. Compatibility between different forms of recreational activity may be real or perceived.

Uses can have varying levels of compatibility. With respect to the protection or enhancement of wilderness quality, uses that lead to a change in the boundary between cultural and natural

landscapes are incompatible. Such incompatible uses include those where the natural vegetation is largely or completely replaced as in urban settlement, agriculture (including broad-acre pastoral use), timber plantations, and major water reservoirs. These uses are irreversible and block future options for enhancing naturalness values.

Other uses may have varying levels of compatibility according to the nature of the particular environmental conditions, and the particular manner in which the activity is undertaken. However, any activity which modifies natural processes, features, or habitat will reduce wilderness quality values to some degree. The impacts of some may be reversible over time given active management input.

The management of an area for the protection or enhancement of wilderness quality will also have consequences on other uses and values - notably those associated with resource utilisation, but perhaps also some forms of recreation or tourism activities.

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PART IV
SURVEY OF WILDERNESS QUALITY

9. MEASURING WILDERNESS QUALITY

Any inventory of wilderness depends on the particular definition of wilderness used. The range of inventory approaches that have been utilised has thus been influenced by the development of the wilderness concept. It has also been dependent on the purpose of the inventory. (Definitions of wilderness are listed in Appendix V).

In the United States of America the wilderness concept is highly developed and both the concept and the inventory procedure well defined. Much of the early United States' inventory work was based on the premise that wilderness was essentially a recreational resource, with wilderness defined in terms of spiritual and heritage values, and recreational experience. Others saw the definition of wilderness in ecological terms and considered the lack of human disturbance as being of primary importance. Both concepts were integrated in the 1964 *Wilderness Act*.

Under this Act, a process of review of Federal lands was established for their consideration as part of the wilderness preservation system, and a number of *inventories of roadless areas compiled*. Wilderness inventory, designation, and management in the United States still, however, tended to emphasise anthropocentric (that is. human-orientated) viewpoints.

Likewise, Australian inventories, such as the early primitive area inventories of Dunphy in New South Wales, emphasised areas of interest to bushwalkers. However, the first systematic inventories undertaken in Australia in the 1970s, if anything, emphasised a biocentric (biological) viewpoint of wilderness.

AUSTRALIAN INVENTORIES OF THE 1970S AND EARLY 1980S

Most broad-scale land-use planning in Australia prior to the 1970s concentrated on resources with direct economic value. Land use studies of natural areas tended to

be localised or State based. The Victorian Land Conservation Council was the first and, to a large extent, the only on-going body with a statewide charter to investigate and recommend areas for conservation purposes. Its recommendations are prepared on the basis of the importance of an area for a particular use, taking into account local, State and national interests.

While the Land Conservation Council applied the first systematic process that made recommendations for wilderness in Australia, a review of the Land Conservation Council's approach to wilderness (Helman *et al.* 1977) felt its 'approach to wilderness has lacked the rigour applied to many other land uses and the areas they have zoned as wilderness do not reflect the ideals of the Council and are basically left-over areas'.

The first major study to identify wilderness in Australia was conducted by Helman *et al.* (1977). This was, in many ways, similar to those carried out in the United States during the previous decade. This study surveyed and inventoried potential wilderness in those tracts subject to greatest pressure of development in eastern New South Wales and south-eastern Queensland.

The Helman *et al.* study defined wilderness as a large area of land perceived to be natural, where genetic diversity and natural cycles remain essentially unaltered, and derived a series of dimensional and a level of acceptable naturalness criteria from this definition.

Russell *et al.* (1979) used essentially the same approach, definitions and criteria for a similar study of Tasmania. An inventory of Victorian wilderness undertaken in 1979 by Feller *et al.* (1979) also took the same approach. The Feller *et al.* survey, while using the same definitions of wilderness as the Helman *et al.* study did, however, revise the dimensional criteria and assessment guidelines to take account of semi-arid areas in particular,

which had not previously been considered. In effect, these two studies formed an additional part of an envisaged Australia-wide survey.

These studies had a similar result to those in the United States of America, in that they identified a large number of discrete 'wilderness areas' capable of providing a certain combination of wilderness-related recreation and nature conservation benefits. These procedures resulted in the exclusion of other areas of lesser, but perhaps of significant, wilderness quality.

The inventories used the criteria of size, shape and disturbance to delineate these particular areas of wilderness. The application of some of these was open to some interpretation and therefore not necessarily repeatable. In particular they did not readily provide the ability to determine the relative effects of any disturbance by humans on the wilderness. (Kirkpatrick 1979).

Subsequent surveys have attempted to provide a comprehensive inventory of remote and natural land and to identify the variation in wilderness quality within and between areas of value. They attempt to consider wilderness on the basis of its essential environmental attributes rather than from its derived values and benefits.

Kirkpatrick (1979) developed a method of wilderness analysis based on inherent properties of wilderness, with exactly defined criteria, and consistent procedures of application. He utilised this quantitative methodology to identify the amount of wilderness loss for different levels of hydro-electric development in Tasmania. The method was based on the assumption that the only two inherent characteristics are remoteness and primitiveness.

Lesslie and Taylor (1983) developed a wilderness inventory procedure based on the concept of wilderness as a continuum of remote and primitive conditions varying in intensity from wild environments to urban environments. The procedure was used to identify the most remote and primitive areas of South Australia and to assess their total wilderness quality.

The inventory methodology was based on a definition of wilderness being 'land which is remote from and undisturbed by the presence and influence of settled people' (Lesslie & Taylor 1983).

Remoteness was considered a function of proximity to settlement and accessibility for settled people, and primitiveness a function of perceptual and objective components. Four indicators were used to assess these attributes: remoteness from settlement; remoteness from access; aesthetic primitiveness; and biophysical primitiveness.

Hawes and Heatley (1985) developed a method for assessing wilderness and used it to prepare an inventory of wilderness in Tasmania. The method aimed to assess remote primitive land for different degrees of primitiveness and remoteness. Primitive land was identified from defined criteria and within these, wilderness was defined by measurements of direct-remoteness and access-remoteness.

THE AUSTRALIAN HERITAGE COMMISSION NATIONAL WILDERNESS INVENTORY

The early work of the 1980s established the usefulness of measuring the quality of wilderness. It provided a better base for identifying areas of highest quality and also for measuring variation in quality and the effect of impacts.

The Australian Heritage Commission, around 1985, was intending to compile a National Wilderness Inventory as part of its work in identifying places of National Estate significance, and was very interested in further methodological work on inventory procedure. Rob Lesslie received a grant to refine the methodology with a view to computerising it.

At about the same time the Ministry of Planning and Environment initiated a survey of wilderness quality in Victoria, using the manual method developed by Lesslie and Taylor (1983) in South Australia. Kathy Preece was employed as Project Officer.

The two projects were merged with the result that a computer-based methodology was developed (Lesslie, Mackey and

Preece 1987) and applied as a pilot study in Victoria (Preece and Lesslie 1987) thereby producing the first part of the National Wilderness Inventory.

Although this methodology does not define actual wilderness areas, it assists in the identification of areas suitable for designation and protection as wilderness, and also permits the monitoring of the status of the resource. It also potentially provides an interactive technique for the assessment of management proposals and activities on wilderness quality. The program aims to compile and maintain a wilderness data base within a standard spatial framework linked to standard national topographic mapping.

The methodology is based on the concept of a continuum of wilderness quality where wilderness quality is defined 'as the extent to which land is remote from and undisturbed by the influence of modern technological society'. This definition is the one adopted by CONCOM (1986). It puts emphasis on measuring variation in wilderness quality using the four indicators listed above.

Following the pilot Victorian survey, another one using essentially the same methodology, has been undertaken in Tasmania: 'Wilderness Quality in Tasmania' (Lesslie *et al.* 1988). Additional surveys are presently being undertaken in South Australia, and in northern Queensland.

THE VICTORIAN SURVEY BY PREECE AND LESSLIE

The approach used in the Survey of Wilderness Quality in Victoria by Preece and Lesslie (1987) accords with the standards now adopted by the Australian Heritage Commission for its National Wilderness Inventory and reflects the interpretation of wilderness quality adopted by the Council of Nature Conservation Ministers. The underlying premise of the methodology, namely that there is a continuum of wilderness quality, has now been accepted world-wide. The methodology includes consideration of most of the attributes of wilderness outlined in the Wilderness Special Investigations terms of reference.

As indicated in Chapter 1, the wilderness quality survey conducted by Preece and Lesslie (1987) is a major source of new information and provides an important basis for the Land Conservation Council's investigation. It was also used by the Council to identify areas of potentially high wilderness quality for further investigation. These areas are within defined blocks (see Chapters 11 and 12).

The following overview of the methodology used in the Survey of Wilderness Quality in Victoria is derived from Preece and Lesslie (1987). Further details of the methodology are provided in National Wilderness Inventory - A Computer Based Methodology for the Survey of Wilderness in Australia (Lesslie *et al.* 1987).

In essence, the survey assessed wilderness quality with respect to the variation in the degree of remoteness and naturalness by means of four indicators: remoteness from settlement, remoteness from access, aesthetic naturalness, and biophysical naturalness. Grid cells of about one square kilometre were used to sample the values of the four wilderness quality indicators. Wilderness quality was then determined by calculating and summing the values of each of the four indicators.

The areas evaluated by the survey included all roadless natural areas of more than 10 000 ha (as well as some smaller areas on the coastline) which also had at least one point that was a minimum of 3 km from any natural area boundary or major two wheel drive road. Such areas were included regardless of land tenure.

Remoteness from Settlement

This was defined as remoteness from settled land or, within natural areas, points of permanent occupation.

Settled land was, for the purposes of this survey, defined as the cultural landscape, rather than the individual points of human occupation within it. Cultural and natural environments were distinguished from each other by means of the working definition of a natural environment as one in which the original species composition and structure of native vegetation (as far as can be determined) remain essentially

intact. For instance, within Victoria cultural landscapes were considered principally as areas where natural vegetation has been largely or completely replaced for urban, agricultural, timber plantation, recreational or water storage purposes. Settled land boundaries were derived largely from 1:250 000 LANDSAT imagery (1981).

Points of permanent occupation in Victoria generally consisted of individual residential buildings or small settlements located in natural areas. Towns, houses, resort developments, homesteads, operating mines and sawmills, staffed lighthouses, staffed electricity generation facilities and staffed communications installations were all included (camping grounds were not considered as settlements). Points of permanent occupation were derived largely from Natmap 1:100 000 mapsheets.

A value for each grid cell (an area 36 seconds by 36 seconds or approximately one square kilometre) was calculated as 'map' distance from its centre to the nearest settlement feature. The values were classified into five classes to allow easy representation on maps and for further analysis.

Remoteness from access

This was defined as remoteness from constructed vehicle access.

Roads and vehicle tracks, constructed and maintained airstrips, and operating railway lines were considered in the assessment of the remoteness from access indicator. Roads and tracks were also incorporated in the data set for assessing aesthetic naturalness because they have an aesthetic impact on wilderness quality in addition to facilitating access. Neither unconstructed landing sites for boats, nor constructed walking tracks were considered in wilderness indicator assessments.

Three grades of access were defined, according to the level of access provided and the degree of use received, as follows:

A - major two-wheel-drive roads: generally sealed or at least surfaced and maintained to ensure frequent and continuous public use. (Note that A grade standard roads that are

impassable due to snow cover in winter retained their A grade classification)

B - minor two-wheel-drive roads/tracks: generally unsurfaced, or, if surfaced, then infrequently used and maintained

- constructed and maintained airstrips
- operating railways

C - four-wheel-drive tracks

Roads and tracks were allocated to one of the three specified grades largely from information on Natmaps 1:250 000 and 1:100 000 mapsheets. For each grid cell, measurements were made from its centre to the nearest:

A grade access route; and
B or A grade access route; and
C or B or A grade access route.

A total remoteness from access value was derived by the addition of the distance measures of these three access route groupings. This procedure accommodates the differing degrees of access provided by different grades of road: thus the summed figure reflects the greater influence of, for example, a highway compared with that of a minor road in reducing remoteness values. The values were classified into five classes to allow easy representation on maps and for further analysis.

Aesthetic Naturalness

This was defined as the degree to which the landscape is free from the presence of the permanent structures of modern technological society.

This indicator was designed to account for the aesthetic impact that certain human artefacts have on wilderness quality. The relevant features included in the survey were: roads, vehicle tracks, huts, ruins, unoccupied communication facilities, windmills, yards, bridges, helipads, towers, quarries, camping grounds, small dams, lighthouses, jetties, channels, pipelines, aqueducts, fence lines, power lines, disused railway lines and snow pole lines. These were identified largely from Natmap 1:100 000 mapsheets.



The presence of roads and tracks influences the values of two indicators used to measure wilderness quality; remoteness from access and aesthetic naturalness - vehicular track across the Annuello block

For the survey, values for aesthetic naturalness were obtained simply by calculating the 'map' distance from the centre of each grid cell to the nearest defined structure or, when adjacent cultural land was closer, to the natural area boundary. Values were also classified into five classes for easy representation on maps and for further analysis.

Biophysical Naturalness

This was defined as the degree to which the natural environment is free of biophysical disturbance due to the influence of modern technological society.

Unlike the other three wilderness indicators, the biophysical naturalness indicator was qualitative in nature. Because of the difficulty of assessing the degree of ecological change the relative intensity of land use (a causal component of ecological change) was assessed as a surrogate. Guidelines to the procedure used in the

survey to classify the data are given in Table 22.

The biophysical naturalness classifications were determined mainly from information on past and current grazing and timber harvesting activities, these being considered to be the main intensive uses of natural land across the broad areas of the Victorian survey area. These data were largely derived from information mapped at 1:250 000 scale.

Certain less intensive production activities relevant in some regions were also considered. For example, apicultural (bee keeping) and brush-cutting operations in the Mallee were taken into account. In significant cases the use of land (mainly river valleys) for mining operations in the past was broadly considered, even though its extent could not be mapped accurately. Except in one or two cases, the modification of natural land by frequent fuel-reduction burning was not considered in the survey because of the lack of

Table 22

GUIDELINES FOR ASSESSING INTENSITY OF LAND USE: VICTORIAN SURVEY

Descriptor	Timber harvesting	Livestock grazing	Class
Essentially unused	Unlogged areas	Ungrazed areas	4
Low intensity use, now ceased	Areas that have been selectively logged in the past for which no logging operations are current or planned	Low intensity grazing country, previously grazed but no longer subject to grazing	3
High intensity use, now ceased	Areas that have been clear felled (with or without shelter-wood) for which no logging operations are current or planned	High intensity grazing country, previously grazed but no longer subject to grazing	2
Low intensity use, continuing	Areas that have been selectively logged in the past, and that are designated for logging operations	Low intensity grazing country subject to continuing grazing	1
High intensity use continuing	Areas that have been clear felled (with or without shelter-wood) and that are designated for logging operations	High intensity grazing country subject to continuing grazing	0

Source : Preece and Lesslie 1987

Note:

The presence of mining operations and brush cutting were also considered.

consistent, mapped data and the inadequate understanding of the long-term ecological effects of that practice.

The five classes of biophysical naturalness (Table 22) required no manipulation for further analysis, the class number was simply used as the grid cell value.

Total Wilderness Quality

All wilderness quality indicator values were classified into five classes to enable the variation within individual indicators to be shown consistently. Percentiles of the total range of values recorded for the State were used in the classifications of the three equal distance-based indicators. Because the distribution of values is so skewed, classes based on unequal percentiles were used to display variation. The groupings used were class 0 - 0% to 5% of the total range of values, 1 - 5% to 15%, 2 - 15% to 25%, 3 - 25% to 40% and class 4 - % greater than 40%.

In order to provide relative measures of total wilderness quality, the class scores for each of the four indicators were summed. The range of total wilderness quality scores is thus from 0 to 16. The total wilderness quality scores were grouped into 5 or 8 classes depending on the mapping scale. The eight-class version is used in this report.

The survey data sets included an extensive range of features, being those which were considered in the survey analysis to influence wilderness quality to some degree. The features included in the survey data sets are listed in Table 23.

The first six features listed in Table 23 in effect defined the 'natural cover' boundary. The presence or absence of the remaining features listed was not used to define wilderness or its quality. Rather, their presence, within this boundary, influenced indicators of wilderness quality and thus the assessment of total wilderness quality.

Table 23

FEATURES INFLUENCING WILDERNESS QUALITY

1. Urban areas where natural vegetation has been largely or completely replaced	17. Minor two-wheel-drive roads/tracks
2. Agricultural areas where natural vegetation has been largely or completely replaced	18. Constructed and maintained airstrips
3. Timber plantations where natural vegetation has been largely or completely replaced	19. Railways, both those operating and disused
4. Pastoral areas where natural vegetation has been largely or completely replaced	20. Four-wheel-drive tracks
5. Recreational areas where natural vegetation has been largely or completely replaced	21. Huts
6. Water reservoirs where natural vegetation has been largely or completely replaced	22. Ruins
7. Towns	23. Windmills
8. Houses	24. Yards (and fencelines)
9. Resort developments	25. Bridges
10. Homesteads	26. Helipads
11. Operating mines	27. Towers
12. Operating sawmills	28. Quarries
13. Lighthouses, both those occupied and unoccupied	29. Camping grounds
14. Electricity generation facilities, whether occupied or unoccupied	30. Small dams
15. Communication installations, whether occupied or unoccupied	31. Jetties
16. Major two-wheel-drive roads	32. Channels
	33. Pipelines
	34. Aqueducts
	35. Powerlines (major and minor)
	36. Snow pole lines
	37. Abandoned equipment
	38. Selectively logged areas
	39. Clear-felled areas
	40. Areas grazed at low and high intensity
	41. Bee-keeping sites
	42. Brush-cutting areas
	43. Past mining operations in river valleys
	44. Areas of frequent fuel-reduction burning

Source : Preece and Lesslie (1987)

INTERPRETATION OF THE SURVEY RESULTS

The Survey Area

The survey did not cover all natural areas across the whole of the State: it was limited in that it surveyed only roadless natural areas of at least 10 000 ha. This was done largely to keep the survey to a manageable size. The survey report (Preece and Lesslie 1987) stressed that the criteria used for defining its survey area 'do not directly imply anything about the actual wilderness qualities of the included or excluded areas'. However, given the criteria and approach of the survey, the areas excluded, being urban areas, agricultural land and generally small blocks of natural land are likely to be of the lowest total wilderness quality.

Moreover, it cannot be assumed that all of the areas surveyed are public land. The survey did not differentiate between public and private land, both of which are included within the defined 'natural lands' boundary. The survey report did, however, note that 'in fact most of the surveyed area is public land, as little private land remains uncleared'.

The survey did not cover offshore islands. Some of these may have high wilderness quality and therefore have been considered in this report (see Chapter 13).

Wilderness Quality Indicators

In the interpretation of the indicator values it is important to note that the data base was compiled from a variety of sources of variable quality. Thus the

scarcity of readily available information on biophysical naturalness was a limiting factor. Even data on the intensity of land use, which was used as a surrogate for actual ecosystem disturbance, are not readily available in Victoria. This is limiting mainly in more detailed applications, with the data sources used providing a sound indicative measure for broad-scale comparative purposes. (More detailed, site-specific information has been used in this report).

The values recorded for remoteness from settlement and aesthetic naturalness were based on distance measures from the cultural land boundary and other features, all of which were considered to have an equal influence on total wilderness quality. For example a transmission line had the same influence on aesthetic naturalness values as did a fence line or minor picnic area, and on occupied dwelling in the bush land the same influence on remoteness from settlement as did the boundary between bush and agricultural land. They also do not provide information on land use beyond this boundary. Therefore the results cannot be used to make detailed assumptions about the relative impact of any particular land use or structure, on particular values of wilderness. (More detailed information on the nature of land uses and features and their impacts have been included in this report). Historic relics, where recorded, had the same impact on values as did maintained structures.

Remoteness measures were map distances. They took into account the curvature of the earth but not terrain. This provides a relatively objective distance measure (as opposed to the highly anthropocentric travel-time distance used in the earlier South Australian work). However, a measurement of remoteness, being remoteness from the presence and influences of settled people, may in fact be better measured using other factors such as a surface distance, relief or vegetation. These may be a better proxy of influences such as physical access by people, viewsheds, noise impact, remote experience potential. Influences such as air pollution may, however, be independent of topographic distance.

The aesthetic naturalness measures consisted of distance to the nearest structures recorded in the survey and thus only measures the immediate environment of the grid centre. Previous work has used a density measure of impact which probably gives a more accurate representation of the relative degree of visual disturbance in an area. However, for an overview and comparison studies at a broad scale the approach used in the Victorian Survey is useful and relevant, if not ideal. (It is also much easier to measure with the computer programming available.)

It is important to note that the aesthetic naturalness indicator is not a measure of visual aesthetics of a particular point. For any given grid cell value of aesthetic naturalness, the actual visual impact will vary according to the density and height of the vegetation, a structure's position in relation to topography, and the season - with winter snowfall notably 'hiding' a modification.

Biophysical naturalness should ideally assess ecosystem change. It should measure ecosystem disturbance, for example, intensity of utilisation, as well as the effects of such disturbance, such as presence of exotic plants and animals, or presence or absence of a native vegetation cover, rate of erosion, loss of species, or percentage occurrence of opportunistic species. The survey, due to the lack of data, considered only land use. (This report utilises additional information where available).

The classification was based on both intensity and absence or continuance of use. An area subject to continuing use may not necessarily be actively used for that purpose at the time of survey. For instance an area designated for logging operations may not have been recently logged.

Total Wilderness Quality

The values of total wilderness quality were derived from an unweighted summation of the classified values of each indicator.

Such classification of total wilderness quality assumes that each indicator

measure contributes equally to total wilderness quality value. This may not always be so, however. For instance, it has been argued that the biophysical naturalness indicator should be more highly weighted than the other indicators. High remoteness is likely to correlate with larger areas of high biophysical naturalness but smaller areas with lower remoteness values may, nevertheless, have high biophysical naturalness values.

While the values of total wilderness quality are presented in the form of discrete classes, it is important to recognise that these classes are merely a representation of a continuum of wilderness quality. The class boundaries do not necessarily relate to any specific features on the ground.

It is also important to note that the wilderness assessment results should only be interpreted within the context of the survey area. In any survey the highest measurements set the range for each indicator. In the Victorian survey, extremely high measurements for each indicator were recorded in the north-west and this sets the context in which results for other areas need to be interpreted.

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10. OVERVIEW OF VICTORIA'S WILDERNESS QUALITY

The survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) described in the previous chapter provides, for the first time, a basis for the quantitative comparison of the wilderness quality of lands throughout Victoria.

This chapter uses their results to present an overview of these wilderness quality values. The total wilderness quality values recorded in the survey are shown on Map 9.

In summary, their survey found that the Sunset Country and the Big Desert in the north-west clearly contained the major proportion of the State's highest wilderness quality land.

Areas of high wilderness quality were also recorded throughout the eastern highlands

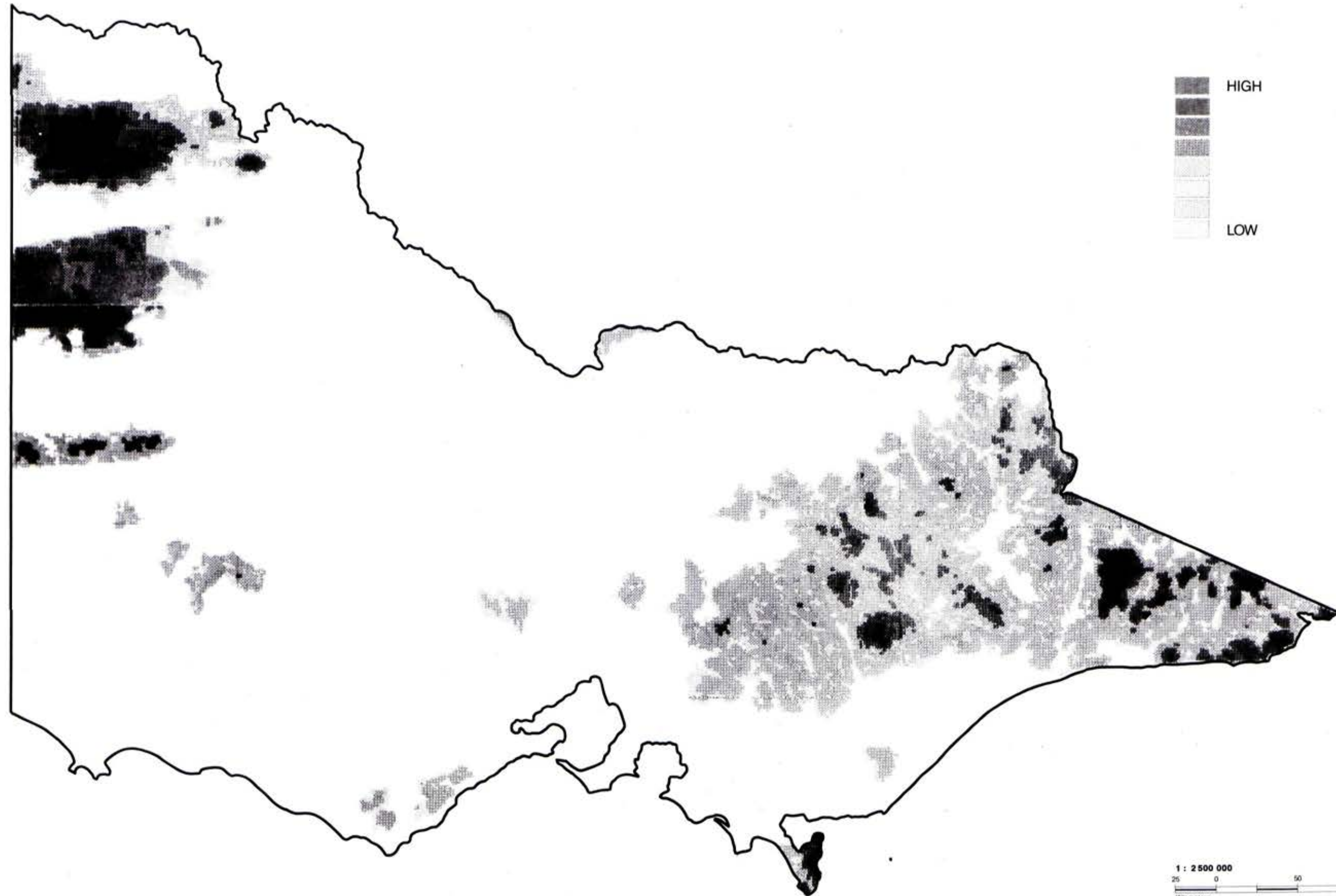
and East Gippsland. Though compared with those in the north-west of the State, these were few, small and scattered, they were, however, generally associated with extensive areas of at least relatively high value. The largest areas of higher wilderness quality in eastern Victoria included Cape Howe, parts of the Croajingolong Coast, the Upper Genoa River, Rodger River--Mountain Creek, and Upper Avon River. These areas are all discussed in detail in Chapter 12.

Other areas in the State included in the survey, such as the Little Desert, the Otway Ranges and the Grampians were identified as having generally low to moderate wilderness quality values, with a notable exception being the eastern half of Wilsons Promontory where they were significantly higher. Smaller areas



The 1987 Survey of Wilderness Quality in Victoria by Preece and Lesslie found that the Sunset Country and the Big Desert in the north-west clearly contained the major proportion of the State's highest wilderness quality lands - Sunset Country, looking towards Mount Cowra

WILDERNESS QUALITY



included in the survey, such as the Black Range, Jilpanger Flora and Fauna Reserve, Mullungdung Forest, Barmah Forest, Gunbower Forest, Wombat Forest, and Burrowa-Pine also received generally low wilderness quality values.

The major limiting factors on wilderness quality for most of Victoria, especially for the smaller blocks surveyed, were proximity to settlement, relatively high levels of accessibility, and generally their history of land use. In virtually all instances, the high density of features contributing to a reduction in aesthetic naturalness values, was the most significant limiting factor. It consistently registered the largest extent of the lowest value classes.

The density of roads and tracks was a major influence on two indicators - remoteness from access and aesthetic naturalness. The Sunset Country and the Big Desert were the only parts of the State that had large areas with a low density of vehicle tracks (as is also reflected by these being the major areas of the highest aesthetic naturalness class).

There were very few areas across the State which were rated within the highest class of biophysical naturalness. With the notable exception of East Gippsland, virtually none of Victoria was classified as being essentially unused. Extensive areas were classified in East Gippsland, with others identified being small areas within closed water catchment areas around Melbourne, heathlands near the Carlisle River in the Otways, and an area of low

elevation forest at Yarrarabulla Creek in the north-east. (Subsequent to the survey, more detailed data has indicated that much of the Sunset and Big Desert areas could also be considered as essentially unused, whereas Yarrarabulla Creek has, in fact, been utilised).

The survey did not assess areas under 10 000 ha and, while such areas are unlikely to include land of higher wilderness quality, they may include areas of relatively high quality. Notably the 8 300 ha French Island State Park (which includes most of the natural lands of the island) may be expected to have such value.

French Island is known to contain areas of essentially undisturbed vegetation which is largely free of introduced species. The use of fertilisers, introduction of European pasture plants, the density of settlement, the drainage of low-lying areas and the construction of roads on adjacent cleared areas have all been limited. Much of the remaining natural lands have, however, been subject to artificial burning regimes and low intensity grazing. Rabbits, feral cats and goats and a range of introduced plants such as blackberry, Cape Tulip and Austral Sarsaparilla also occur. Values are likely to be highest towards the north east of the island.

References

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PART V
DESCRIPTIVE BLOCKS

11. BACKGROUND TO THE DESCRIPTIVE BLOCKS

PURPOSE OF THE DESCRIPTIVE BLOCKS

Chapter 10 provided an overview of wilderness quality throughout Victoria. It indicated that wilderness quality varied greatly within the State. Much of the area surveyed, however, recorded relatively low values of wilderness quality. It is therefore appropriate in meeting the requirement to identify those parts of Victoria of existing or potentially high wilderness quality that should be protected, to consider in detail only those areas of Victoria which recorded higher values.

To help facilitate the description and assessment of these areas of higher wilderness quality, they have been grouped into descriptive blocks.

While all of the descriptive blocks include areas of higher wilderness quality, they have no particular significance in terms of any recommendations the Council may make about wilderness.

The blocks have been established for descriptive purposes only - **they are not the boundaries of identified high wilderness quality, nor are they the boundaries of areas proposed for protection.** Areas proposed for protection will only be considered by Council when it prepares proposed recommendations, subsequent to an assessment of all available information, including that provided in submissions.

METHODS USED TO DETERMINE BLOCK BOUNDARIES

The block boundaries were principally derived from an analysis of the results of the Survey of Wilderness Quality in Victoria by Preece and Lesslie (1987).

As described in Chapter 9, the total wilderness quality values recorded in this survey are derived from the sum of the values of four defined wilderness quality indicators.

The use of total wilderness quality values as a basis for defining the descriptive blocks would minimise the influence of any discrepancies in the measures of individual indicator values. Such an approach, however, does not consider the relative contribution of individual attributes: a low value for one attribute indicator may profoundly affect total quality, despite the indicator values of other attributes being high. Such an approach also considers each indicator to be of equal importance which may not necessarily be appropriate. For instance, the naturalness indicators are considered by some to be more significant in determining wilderness quality, than the other indicators used in the survey.

The use of individual indicators by themselves, however, makes the analysis more difficult as they are not necessarily well correlated, and could give additional weighting to areas of where the original data sources were less reliable.

To reduce the disadvantages of both approaches, the descriptive blocks were derived from a combination of a total wilderness quality value and individual wilderness quality indicator values, with the threshold used for the total wilderness quality component being lower than that used for the individual indicator values.

The blocks were centred on areas which were included in total wilderness quality Class 5 or above in the Preece and Lesslie survey (that is areas included in the highest three of the survey's eight class classification), together with associated areas which the survey included in individual wilderness quality indicators Class 4 (that is, areas within the highest class or 60% of the total range of values identified).

The boundaries were drawn to ensure that the descriptive blocks were:

- (i) not restricted to the extent that they (in effect) define the areas of highest quality alone;

- (ii) not restricted to the extent that they could omit areas that, while not considered in the broad-scale survey as being of high or potentially high wilderness quality, could be included within such category on the basis of refined, more detailed information;
- (iii) not restricted to the extent that they omit areas that, while not of high wilderness quality, could have a direct effect on areas that are of high quality;
- (iv) not too broad and thus necessitate the collection of detailed information that will be unused or of peripheral relevance in meeting the requirements of the investigation.

To this end, the block's generally encompassed surrounding areas of total wilderness quality Class 4 as identified in the Preece and Lesslie survey (that is, areas included in the highest four of the eight classes) and areas identified in the survey as being of individual attribute Class 3 (that is, areas included in the two highest attribute classes).

In addition, the location of 'essentially unmodified' catchments (as defined in recent studies using the Macmillan methodology; see Macmillan 1987), the boundaries of areas of wilderness identified in the 1979 Inventory of Wilderness in Victoria by Feller *et al.* (1979), areas of abutting high quality land in New South Wales and South Australia not covered in the Preece and Lesslie survey and local knowledge were also considered in the delineation of boundaries.

The final boundaries of the descriptive blocks were drawn to form consolidated areas and correspond with:

- (a) Generally a dominant human feature, such as a major road (given its significance in terms of the wilderness quality indicators used in the Preece and Lesslie survey), or the nearest road to a cultural land-use boundary; or
- (b) in the absence of a dominant human feature, a minor human feature that

coincided with a natural feature (such as a track following a ridge line).

The preceding process led to all areas of Class 5 or above total wilderness quality, as identified in the Preece and Lesslie survey (1987) and all but one of the areas of wilderness identified in the Feller *et al.* survey (1987) being included in descriptive blocks. In addition, the majority of areas identified in the Preece and Lesslie survey of Class 4 total wilderness quality and Class 3 and 4 individual quality indicator were also included.

Two areas that have been included in descriptive blocks do not include areas of at least Class 5 total wilderness quality. These are the Tingaringy and the O'Shannassy descriptive blocks.

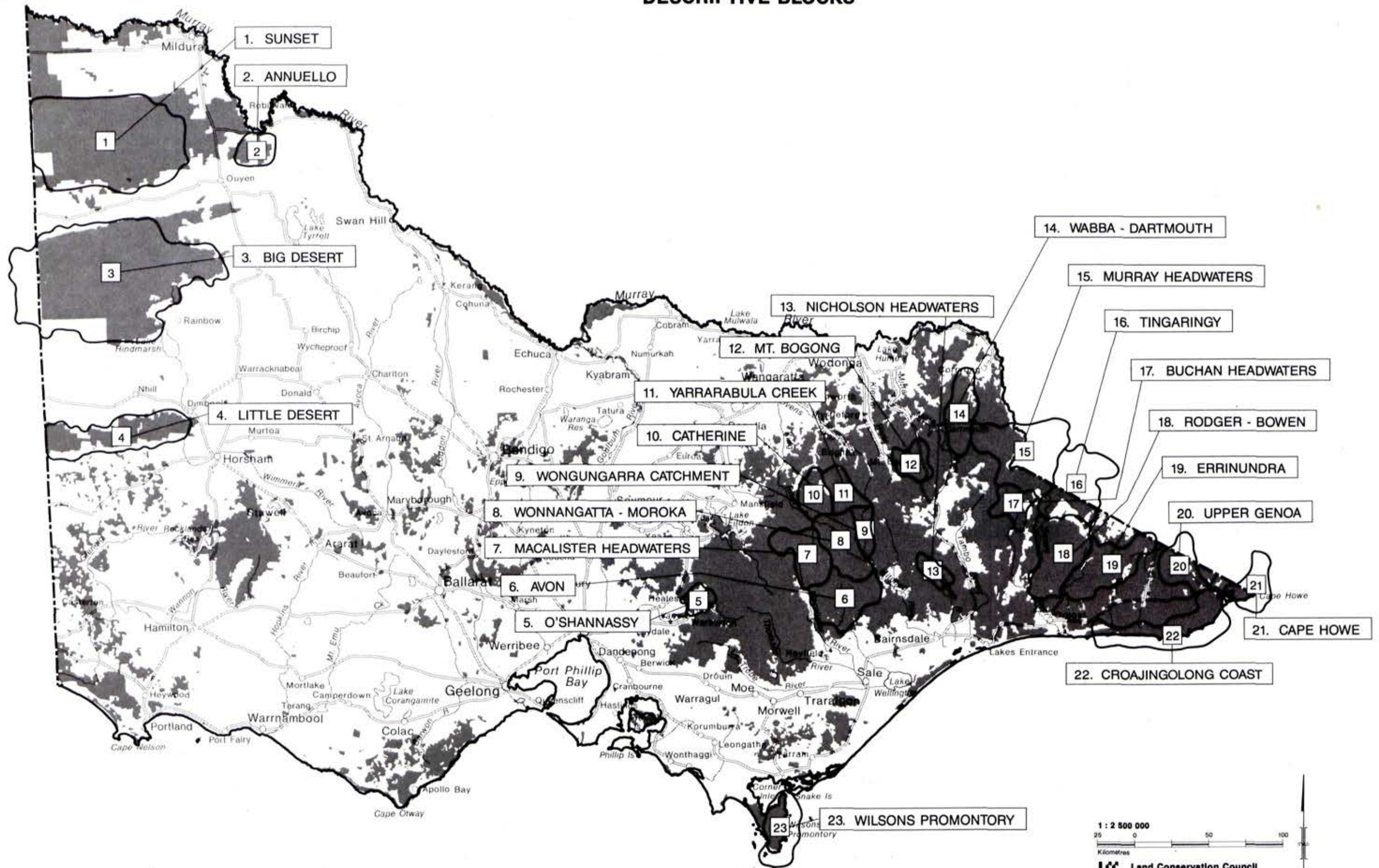
The total wilderness quality values recorded for the Tingaringy block in the Preece and Lesslie survey are considered conservative as the recorded biophysical naturalness value (discussed further in the block description; see Chapter 12) are believed to be underestimated. It also meets a number of the other criteria used in determining the block boundaries - including the presence of essentially unmodified catchments and identification in the 1979 Feller *et al.* inventory of wilderness. It is also known to be contiguous with a large area of essentially natural lands in New South Wales.

The O'Shannassy block includes a substantial area classified in the highest class of an individual wilderness quality indicator - being Class 4 biophysical naturalness value. It covers the only such area associated with relatively high total wilderness quality not otherwise included within a descriptive block.

THE DESCRIPTIVE BLOCKS

Twenty-three descriptive blocks have been defined across the State. Their locations and boundaries are shown on Map 10. Four of these are in the north-west, five in East Gippsland, with the majority of the others in or adjacent to Victoria's alpine area. Two isolated blocks were defined. One is the eastern half of Wilsons Promontory and the other is a

DESCRIPTIVE BLOCKS



Cartography by Thematic Mapping Unit
Division of Survey and Mapping
Department of Property and Services

1 : 2 500 000
Kilometres
Land Conservation Council
Victoria

small block centred on the water supply catchment area of the O'Shannassy Reservoir to the south of Marysville.

Detailed descriptions of each of the descriptive blocks are provided in the following chapter. Each block description has the following four components :

1. **Background** - covers the location and boundaries of the block, its tenure and land-use designation, as well as summaries of any relevant planning policies, strategies or management plans. It also includes an overview of the physical, biological and cultural setting of the block. (Greater detail on the natural features of blocks is available in the Land Conservation Council regional study area descriptive reports).
2. **Wilderness Quality** - states the total wilderness quality values recorded for the block and an outline of the influences affecting the component wilderness quality indicators. It includes discussion of settlement influences, all tracks and structures, land use, and where available, other indicators of naturalness. This section updates, explains and expands the information available in the Preece and Lesslie survey.
3. **Other Attributes** - covers attributes, other than remoteness and naturalness, required for consideration, that is, size and ecological viability. (Discussion of the other required attribute, namely capability for appropriate recreation activities is included in Section 4).
4. **Land Use Capabilities** - outlines the capability and use of the block for land uses such as nature conservation, recreation, agriculture, apiculture, and timber, mineral, and water production.

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12. INDIVIDUAL BLOCK DESCRIPTIONS

BLOCK 1 : SUNSET

Location and Boundaries

The Sunset block in the north-west of State (see Map 10) encompasses most of the public lands within the area bounded by the Calder Highway in the east, the Sturt Highway to the north, the Ouyen Highway to the south and, in the west, the Victorian/South Australian border. The block's boundaries follow minor roads and vehicular tracks along the edge of these public lands. The area of the block is 564 030 ha, and lies within the Shires of Mildura and Walpeup.

Tenure and Land Use

Nearly all the block is public land and most is within an area recently recommended by the Land Conservation Council (LCC 1989) to become the Murray Sunset National Park. In addition, there are seven reference areas within the boundaries of this national park, with other public land, including small areas recommended for alienation.

Details of previous Land Conservation Council's recommendations and planning scheme controls relevant to these land uses are outlined in Table 24, and the boundaries of the separate area are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The Land Conservation Council's recommendation for this area (LCC 1989) state that areas of high wilderness quality be protected and it specified that the area between the Sunset, Underbool, Phenev and Millewa South Bore Tracks be managed to maintain and enhance its wilderness value.

The Shire of Mildura has recently released a draft strategy plan covering its municipality. A management plan has been prepared for the Sunset Reference Area and the development of a proposed management plan for the Wyperfeld National Park and the Lake Albacutya Park is proceeding. A revised fire protection plan for the Department of Conservation, Forests and Lands' Mildura region is also presently being devised and will encompass the block.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

The block consists of low calcareous dunes in the northern half and high siliceous dunes similar to those in the Big Desert in the southern half. Low calcareous dunes also occur along the southern edge of the block.

East-west dunefields dominate the low calcareous dune area. These are generally 80 to 120 m wide, 2 to 10 m high and between 0.5 and 5 km long; their typical length is 1.5 km. They are often regularly spaced, with crests about 300 m apart.

Irregular dunes are the predominant feature of the high siliceous dunes, although large areas are also characterised by east-west dune landforms. Elevations are generally between 40 and 80 m, with dunes rising 12 to 16 m, though a number rise to over 100 m above sea level (for example, Mount Crozier is 111 m). In the southern half of the block there are a number of lakes and associated lunettes.

Biological Setting

The dominant vegetation of the descriptive block is mallee. Ground flora consists of grass hummocks or bushes and semi-shrubs and/or annual grass and perennial herbs. Interspersed with the mallee are considerable areas of dry heath, grassland and saltbush, as well as succulents on the beds of salt pans and gypsum flats.

Major communities present include chenopod mallee, mainly in dune swales on heavier soils, east-west dune mallee communities on the dune crests and broombush mallee often occurs on sandy areas overlying Parilla sandstone.

Heavier soils associated with underlying Parilla sandstone support red-swale mallee. Isolated stands of 'big mallee' dominated by bull mallee and black mallee box also occur, often in association with deeper soils and soaks. Deep sand mallee occurs on the dune crests and swales of the irregular dunes.

The dominant vegetation on most of the sandplains is mallee scrub, although woodlands of slender cypress pine, belah and buloke are found on sandy red duplex soils in the plains.

The lake basins are generally relic features of earlier wetter climatic periods. They are generally dry but have associated lunettes. Pine-buloke woodland communities, small areas of sandplain grassland and degraded grasslands also occur, for example at Sunset, Mopoke, and Last Hope Plains.

Savannah woodland (scattered slender cypress pine and cattle bush) and savannah mallee (scattered white and grey mallees) communities are heavily disturbed by stock grazing and rabbits.

The dunefield and other communities support a diverse range of mammals, birds and reptiles, many of which occur only in the Mallee area. Historical evidence indicates, however, that up to 12 species of mammals present in 1857 no longer exist. These are mainly medium-sized mammals. This could be due to increased predation by foxes and cats,

Table 24

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁴
National park	A6 (Murray--Sunset)	478 270	Rural B ²	Apiculture permitted subject to conditions, no harvesting of salt or timber, grazing subject to phase out by July 1994.
Reference areas	C3, C6, C13, C14, C15, C16, C17, C20 (Sunset, Purnya, Settlement Road, Millewa South, Berrook, Darnya, Rocket Lake, and Mt Crozier)	23 000	Rural B ² Rural zone ³	
State forest	S1 (Several blocks)	20 010	Rural B ² , rural zone ³	
Bushland reserves	118, 60, 72, 76, 237	360	Rural zone ³	
Mineral and stone production	N5	340	Rural zone ³	
Agriculture				
Public land for exchange or alienation	F1 Several blocks	6 560	Rural B ² , rural zone ³	
Private land	Not Applicable	35 490	Rural B ² , rural zone ³	

Notes:

1. Refers to LCC's Mallee Area Review Final Recommendations 1989. (Note: These have yet to be adopted by Government.)
2. Refers to the Shire of Mildura Planning Scheme.
3. Refers to the Shire of Walpeup Planning Scheme.
4. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II).

destruction of habitat by grazing by sheep, cattle and European rabbits, or an inability to cope with changes to the pattern of fires.

Cultural Setting

Archaeological investigations have shown that, while the Murray River valley was inhabited by Aboriginal groups up to 16 000 years ago, most known sites around the Sunset descriptive block are less than 4000 years old.

It is thought that the Raak Plains (to the north-east of the descriptive block) were occupied by an expansion of people from the Murray River in times of resource abundance, with sites in the dune country more closely related to groups further south (extending to the Grampians).

By 1869 most Aborigines worked on pastoral stations, with minor archaeological sites the main remaining evidence of their traditional activities. Though such occupation sites are found throughout the descriptive block, they are more common around the Raak Plains, the lakes, old lake beds, soaks around and to the west and north of Pink Lakes, and isolated rock holes.

Pastoral settlement first occurred in the mid-1840s, but was restricted to areas abutting the Murray River. The Sunset country had little appeal to early settlers as it was essentially waterless, offering little fodder for stock. It was described (c. 1850) as an 'abomination of desolation'.

In 1859 runs covered the Raak Plains and some on its northern edge. In 1865, near the peak of pastoral occupation, areas were still not covered by runs, and some, perhaps most, of the others are likely to have been speculative. Certainly little evidence of occupation remains of many of the runs.

The early squatters developed the wells, soaks and catchments traditionally used by the Aborigines where, after heavy rains, water collected and lay for months in depressions or clay pans. They built log tanks, iron tanks and excavated earth tanks. Grazing would have been concentrated on the more open grassplains and dry lake beds. Rabbits, dingoes, and a run of dry seasons meant that by 1883 the area occupied by pastoralists had dropped by about two-thirds and little of the block is likely to have been grazed subsequently.

It wasn't until the 1900s that agricultural settlement started to encroach on the edges of the descriptive block. Areas on the northern edge of the block (in the Millewa) and around Berrook were opened up under the Land Act 1911. Soldier settlement schemes, promoted further development of the northern and southern edges for wheat farming up until 1926.

This expansion of settlement was allied to the provision of water supplies and elaboration of the railway network. Large earthen catchment tanks were constructed by the then State Rivers and Water Supply Commission around the turn of the century until about 1928. More recent catchment tanks were built at Sunset and Birthday Plains. These were intended

mainly as drought reserves, but failed to be useful for this. Many bores were sunk between 1911 and 1930, but groundwater was limited. They were largely confined to the western edge of the block, for example at Bellbird, Millewa South and Rock Holes. Most are now abandoned. Experimental, iron clad, tanks were built along the Millewa South branch railway line route in anticipation of development.

Several railway lines were proposed through the block, but anticipated settlement was withheld due to a lack of water from the exploratory lines of bores. The small part of the proposed Millewa South line which was constructed (to Rocket Lake 1929), was dismantled as far as the Raak Plains in the 1940s. Road transport networks of the region also generally avoided the descriptive block and it wasn't until the 1920s that even the major centres of Ouyen and Mildura were linked by road.

Although little permanent settlement occurred within the block, parts were still grazed, generally by neighbouring land owners. This grazing continued to occur mainly on the edges of the block (notably the Raak Plains in the north-east, and Neds Corner) and in the south around the Pink Lakes, extending up into the Birthday Plains. Some licences in the north appear to have been little grazed, but were speculative in anticipation of this area being opened up for agriculture.

Gypsum extraction commenced in 1902. Copi reserves were surveyed in 1914 and used for agriculture. By 1931 crystalline gypsum was mined on Raak Plain for the building industry. Pink Lakes were worked for salt harvesting since 1916.

WILDERNESS QUALITY

The Preece and Lesslie survey identified extensive areas of very high wilderness quality throughout the Sunset descriptive block. The block, together with areas within the Big Desert descriptive block, includes by far the largest areas of the highest class of total wilderness quality identified in the State.

The areas of higher wilderness quality (Class 5 and above as recorded by Preece and Lesslie) form a large consolidated tract covering most of the Sunset Country, notably to the west of the Underbool Track. Areas of wilderness quality Class 5 and above are somewhat fragmented to the east of the Underbool Track where they were largely influenced by the network of four-wheel-drive tracks. They are, however, expansive relative to elsewhere in the State.

Most of the block, west of the Underbool Track, was included in a wilderness identified in the survey conducted by Feller et al. (1979).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The settled land (mainly freehold) surrounding the descriptive block is predominantly used for dryland wheat farming and sheep production. Some parcels of native vegetation remain uncleared on the freehold land on the northern and, to a lesser extent, on the southern boundary of the block. The freehold boundary is largely fenced with stock-proof fencing.

Settled land on the western edge of the descriptive block, in South Australia, is mainly either freehold or land held under perpetual lease and used for cropping or grazing.

An area of public land in the south-western corner of the block is currently licensed for cultivation. A number of dwellings, and other facilities have been developed here. Some parcels of native vegetation remain on the licensed areas and the perimeter of the area licensed has stock-proof fencing. One property here raises goats. In the north-west corner, a portion of the block is licensed for grazing. The area includes tanks, fences, a shearing shed and a house. This point of occupation also influenced values recorded for remoteness from settlement.

The settlement boundary is likely to remain essentially static, although the areas of native vegetation on freehold lands could be cleared. Large areas of public land have been cleared in the south-east corner of the descriptive block since 1972 but most remaining naturally vegetated public land would not be cleared under the Land Conservation Council's recent recommendations for these areas (LCC 1989).

The settlement (cleared land) boundary has less influence on recorded values in the north-west and eastern areas as the block abuts public land which retains natural vegetation (albeit degraded).

Remoteness from Access

Virtually the whole of the descriptive block recorded high value for the remoteness from access indicator. There are few major two-wheel-drive roads, few minor two-wheel drive roads and, other than in the north-east and on its margins, relatively few vehicular tracks. An extensive consolidated area covering much of the block was rated within the highest class of remoteness from access in the Preece and Lesslie survey and, together with lands within the Big Desert descriptive block, is the only large extensive area in Victoria of such high value.

Major two-wheel-drive roads external to the block influenced the recorded remoteness from access values. These are to the north, the sealed Red Cliffs-Morkalla Road, the sealed Calder Highway to the east, the Ouyen Highway to the south, and the unsealed Pinnaroo-Meribah to Renmark Road to the west, in South Australia.

Other roads which influence remoteness from access values follow the public land-freehold land boundary in the north and south-west and, within the descriptive block, include the Ring Road in the Pink Lakes State Park, the Underbool Track, which bisects the block (part of which was classified as a four-wheel-drive track in the Preece and Lesslie data base) and, in the west, part of the Bellbird Track/Millewa South Bore Track. All other tracks are essentially vehicular tracks, mostly of four-wheel-drive standard. The tracks are concentrated on the sandplains. They usually skirt dune crests and traverse through the swales of the east-west dunes. Very few are located in the irregular dunefields.

The network of straight tracks in the north-west was established when it was proposed to open up the country west of Millewa for agriculture. Many are now overgrown.

Most through tracks are maintained usually by the passage of vehicles and serve for fire access purposes. Firebreaks have

been constructed along some of the track margins. None of the tracks are subject to particular seasonal impacts and there are no seasonal closures. Many include sections of deep sand which reduce their trafficability.

All tracks and roads are listed in Table 25 (see page 134) and the locations of each shown on Map 12. There are 138 km of trafficable roads within the block.

No specific walking tracks or horse-riding trails traverse the area but several walking tracks have been constructed in the Pink Lakes area.

Aesthetic Naturalness

The descriptive block includes the second most extensive area of the highest class of aesthetic naturalness value recorded in Victoria by Preece and Lesslie. This is located between the Sunset, Underbool, Phenev and Millewa South Bore Tracks. Other areas of high aesthetic naturalness value occur in the descriptive block and, together with those in the Big Desert, are virtually the only large areas of very high aesthetic naturalness value recorded by the Preece and Lesslie in their survey of all of Victoria. The areas within the block are separated from the main area of highest value by the Phenev and Sunset Tracks. The smaller areas of highest value in the northern blocks are separated by tracks on old survey-lines, one of which, the South Bambil Track, is maintained.

Other small areas of high value occur to the north-east of Mount Crozier and in a wide arc of country to the north of Mount McArthur. These are separated by an overgrown fire access track.

A major influence on aesthetic naturalness is the track network. Virtually all untracked blocks have moderate values of aesthetic naturalness - tracks being the major influence. Other structures found here include a number of trigonometric stations, tanks, and bores, and a house and shearing shed associated with licenced grazing in the north-west corner. A camping area has been established at Pink Lakes. These are listed in Table 26 (see page 136) and shown on Map 14.

There are few serviceable fencelines within the block, and are concentrated in the north-west (associated with the more recent pastoral activities), and a major north-south fenceline east of Rocket Lake.

Biophysical Naturalness

Land-use Indicators of Biophysical Naturalness

Biophysical naturalness values recorded by Preece and Lesslie took into account the presence of activities such as livestock grazing, brush cutting and apiculture. Much of the



Honeymoon Hut Track

central section of the block to the west of the Underbool Track, and areas included within the Pink Lakes State Park to the south were allocated high biophysical naturalness values, with most of the remaining area that was still subject to grazing licences being allocated moderate values. No areas were considered as being of very high quality.

The values recorded by Preece and Lesslie are conservative. More recent information on the grazing licence areas has indicated that large sections of these licenses are not used for grazing. In addition, the areas of extensive irregular dunes were probably grazed only lightly, if at all. Most grazing pressure in these areas would have been concentrated on the small isolated grassplains. Accordingly, extensive areas would have very high naturalness values, including those given only moderate ratings by Preece and Lesslie.

Areas actually grazed are shown on Map 14 which also shows the areas from which broombush has been cut (in the south-west section of the block).

Areas abutting the south-west corner of the block near Berrook have been used in the past for eucalyptus oil production but this is no longer carried out. The *Callitris-Casuarina* woodlands have been selectively and heavily harvested in the past for their durable timber. However, there is no timber harvesting within the descriptive block at present.

Salt was harvested in the past from a number of the lakes in the Pink Lakes area and this activity continues on the edges of the block on the Raak Plain and north of Boinkas. Gypsum is also mined from these areas. Material has also been removed at the 'opal' (chalcedony) mine in the south of the block. These areas are shown on Map 14.

Much of the descriptive block has also been used for some form of military training, including the use of tracked vehicles and large-scale training exercises.

Biological Indicators of Biophysical Naturalness

The descriptive block is one of the relatively few areas in the State where weed species make up less than 10% of the total species comprising the native vegetation. Areas with a higher relative proportion of weeds occur around the edges of the block and in the south-eastern sector. This co-incides with areas of vegetation disturbed by clearing and/or grazing. Such areas can be detected from aerial photographs and satellite imagery which show that disturbance is limited largely to the grassplains in the south-eastern sector of the block.

A number of sites of botanical significance have been identified within the block by the Flora Survey Group of the Department of Conservation, Forests and Lands (DCFL 1988). The areas identified covered a 20-km wide strip on the western edge of the descriptive block, many of the sandplains, and the land around and to the south-west of the Pink Lakes.

Sites of high value for wildlife identified (DCFL 1988) contain the best examples of the range of Mallee habitats, as well as known significant and notable species. Areas identified covered most of the western, southern and eastern sectors of the block.

Most grazing pressure is now due to rabbits, feral goats, domestic stock and kangaroos. The advent of myxomatosis, about 40 years ago, reduced rabbit numbers somewhat. The irregular dunefields support relatively few rabbits, while the northern section supports low to moderate numbers. Rabbit populations in woodland and grassland communities are frequently high and their grazing pressure, combined with the grazing of domestic stock in such areas, can lead to substantial degradation of the vegetation.

Feral goats are widespread and relatively common throughout. They may exert heavy localised browsing pressure. They are dependent on access to water in summer and the provision of water for licensed stock grazing has enabled them to persist and even increase in numbers in areas remote from agricultural land.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of the size attributes of the block.

The descriptive block is of about 563 670 ha, with the largest road and trackless area being approximately 114 800 ha. This is the second largest area without roads or tracks in the State. Of this, nearly fifty percent was included in the highest three classes of wilderness quality in the Preece and Lesslie survey (Class 5, 6, or 7), with over 70% of at least Class 4 quality.

The block is about 145 km long and 55 km wide.

Ecological Viability

The descriptive block is a large consolidated area and biophysical naturalness values are generally high. Such features would contribute to the blocks ecological viability. A large number of (12) major vegetation communities occur in it.

Responses to fire by the Mallee vegetation communities vary widely. Many species have adaptations that assist their survival during and after fire. Indeed, for a number, regeneration is negligible in the absence of fire, while others are killed by it and their subsequent regeneration is problematical. For instance, scrub-cypress pine takes 60 years without fire to reach co-dominance with the mallee eucalypts.

The frequency of fires seems to be the most important long-term influence on fauna. Some species thrive under post-fire conditions which promote greater diversity of flora. Others need the greater structural complexity of older, pre-fire, mallee vegetation, such as the nesting hollows it provides. The composition of the reptile fauna also changes with the age of habitat regeneration. Most native animals appear to require a mosaic of vegetation of varying age since burning, with a bias towards older ages. In the past 10 years, fires have burnt vast areas of public land, and long-unburnt stands of mallee are now scarce.

A number of fires of greater than 10 000 ha have been recorded in the block (see Map 8). The largest fire was one of 137,725 ha in 1980/81. In addition to attempting rapid control of fires in order to prevent surrounding freehold lands being threatened, fire regimes may, in the future, need

to be manipulated to maintain a variety of vegetation age classes and a mosaic of burnt and unburnt mallee.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of the block are very high, with the block including a wide variety of land forms and vegetation types, many of which have been extensively modified elsewhere. Vegetation communities of particular interest are chenopod shrubland, gypseous and sandplain grasslands and the stands of *Eucalyptus cyanophylla*. A number of other rare plants also occur. A wide variety of fauna is present, including a high diversity of reptile species. Many rare and significant species are found, including the greater long-eared bat, black-eared miner, rufous *calamanthus*, red-lored whistler, small skink, western pygmy possum and the fat-tailed dunnart.

The nature conservation values result from, and are considerably enhanced by, the descriptive block's high wilderness quality values.

Recreation

The block has a high capability for recreation dependent on remote settings and provides significant opportunities for solitude and inspiration. Opportunities for nature study and four-wheel-drive touring are high, although bushwalking and associated activities are limited by the lack of drinking water, high summer temperatures and high fire hazard.

Features of natural interest include: natural water sources such as the Rock Holes; major land forms such as the Berrook dunefront, Pink Lakes, Rocket Lake and the Raak Plains; the summits of Mount McArthur, Mount Crozier, and views from higher dune crests and isolated sand plains.

Species of special interest include the mallee fowl, black-eared miner, parrots, and the variety of native vegetation.

There are no obvious traverse routes within the area. The generally closed canopy of the predominant mallee vegetation and its open understorey, together with the topographic variation, results in relatively small viewscape areas and thus high solitude opportunity. Walking is, however, relatively easy, because of generally sparse understorey vegetation. Winter and spring are popular periods of visitation with summer heat usually oppressive.

The existing Pink Lakes park is increasing in popularity for camping and nature study and considerable numbers of people visit the Raak Plains and Rocket Lake. Vehicular-based camping also occurs throughout the area and many excursions have been conducted here by field naturalists and other nature-study groups. Poor access, lack of water, and poor information about the particular scenic and recreational values in the past have resulted in limited use. The block has a high capability for recreation in a semi-arid environment.

Some hunting of rabbits, foxes and feral goats has occurred in the area.

Two commercial companies have licences to operate vehicle based bush tours through the block. Itineraries of these include safaris and wildflower tours to and through sites such

as Rocket Lakes, Birthday and Campbells Tanks, and the Pink Lakes.

Agriculture

The deep sands of the block and the saline soils of the gypseous plains are generally unsuitable for agriculture. The capability of the remaining areas is therefore low. The northern half has a higher capability and is similar to land cultivated in the Millewa area. The southern edge of the block also has a higher capability, but erosion hazard is still high and dryland salting is a problem.

Eight licensees run sheep and cattle on the public lands of the Sunset Country. The carrying capacity varies according to the vegetation. In areas of dense mallee, grazing is limited. These areas can support only dry stock. Carrying capacity on the saltbush and grassland plains is somewhat higher. The overall capability for grazing based on the native vegetation is low. Details of present grazing is shown in Table 27.

Under the Land Conservation Council's final recommendations for the Mallee Area Review all grazing on the public lands of the block (within the proposed Murray Sunset National Park) is to be phased out by July 1994.

Apiculture

Licensed apiary sites have been defined around the fringes of the block, along the Merrinee-Cowangie Track, around Rocket Lake, and along the east-west track that runs from Hattah through to the Merrinee Track.

A number of eucalypt species in the block are of major significance to the honey industry. These provide a range of flowering periods from early September to late February. The block is one of the most productive areas of the State for the honey industry although access is a problem.

Most of the sites presently used are around the fringes of the block, notably in the north-west, as well as along the Underbool Track, around Rocket Lake, and the eastern end of Pheeny Track. Some six apiarists rely on these sites.

Timber Production

The only timber resources of the area are small scattered stands of slender-cypress pine and the capability is very low.

Stands of mallee broombush occur in the block, mainly in the north and has been utilized in the past. Commercial cutting for use as brush-fencing panels is, however, centred on the Big Desert. Cutting within the block would not be permitted under Land Conservation Council Mallee Area Review Final Recommendations (LCC 1989).

Mineral Production

Evaporites, such as gypsum and salt, are known to occur in the north-west (copi plains), north-east (Raak Plains) and southern edge (Pink Lakes) of the descriptive block. Calcrete, a hard limestone, and sandstone, occur within the block and are used for road-making. Both, however, are widely distributed throughout the region. Minor 'opal' deposits were worked in the southern edge of the block around World War I.

Table 27
PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no of stock carried	Comments
6/4	Sunset Pastoral Co.	Pine/belar, woodland grassland and copi	3530	Fenced, grazed by sheep; under LCC Mallee Area Review Final Recommendations (LCC 1989) grazing to be phased out by July 1994
10460/130	B.R. Henschke	Pine/belar woodland	25 ¹	Partially fenced; grazed by cattle. Under LCC recommendations grazing to be phased out by July 1990.
8552/130	A. Symes	Saltbush	29 ¹	Partially fenced; grazed by beef cattle. Under LCC recommendations grazing to be phased out by July 1990.
10373/130	A.C. Henschke	Grassland, saltbush, belar/pine	40	Part only. Partially fenced; grazed by beef cattle. Under LCC recommendations grazing to be phased out by July 1990.
8562/130	R. Henschke	Belar/pine, grassland, saltbush	33	Part only. Grazed by beef cows and yearling steers. Under LCC recommendations grazing to be phased out by July 1991.
8078/130	A. Burstall	Saltbush, pine woodland and grassland	1000	Grazed by wethers
9096/130	A.K. Burstall	Pine woodland, grassland	500	
5005/130	J.F. and M.F. Lockett	Pine woodland, grassland	150	
10380/130	R.J. and N.W. Corbett	Mallee	1120	

Note:

1. Larger number of stock carried when feed permits as part of management of adjacent freehold property.

Table 28
MINES ACT TENEMENTS
(As at August 1989)

Tenement type and reference no.	Lessee	Location
Mining Lease		
ML 592	Mildura Plaster Mills	West of Spectacle Lake
ML 1492	Mildura Plaster Mills	West of Spectacle Lake
ML 897	CSR Ltd	Raak Plain
ML 618	Boral Australian Gypsum Ltd	West of Lake Boinka
ML 678	Boral Australian Gypsum Ltd	West of Lake Boinka
Mining Area Lease		
MAL 5	CSR Ltd	Raak Plain

Extensive mineral exploration is being undertaken in the general region, but largely to the east of the block. The Parilla Sand and overlying unconsolidated materials are prospective with respect to mineral sands.

Basement rocks underlying the block have potential for oil and gas deposits and are being explored. Black coal may also be present. Gold, base metals and chromium may occur in basement rocks along the western sector of the block where a pronounced aeromagnetic anomaly is thought to correlate with the stavelly greenstone belt.

A number of mining tenements are current in the block, as at August 1989; all are associated with the extraction of evaporites. These are mainly located on the edges of the block. Details of these tenements are included in Table 28.

Under tenure proposed in Land Conservation Council's recent recommendations for the Mallee Area, about 11% of the block would be potentially available for mineral exploration or mining. All of the block, including national

park areas, is potentially available for the exploration and production of oil and gas resources.

Water Production

There are no proclaimed water supply catchments or reservoirs in the block. Some licensees of grazing blocks in the north and east maintain catchment tanks and groundwater bores. There are no perennial streams. Surface water resources have effectively no value for water production.

Groundwater resources occur in three aquifers, unconfined Parilla Sand, the Duddo Limestone and associated Winnabool Formation, and the deeper Renmark Group sands. While the Duddo Limestone/Winnabool Formation and Renmark Group aquifers are thought to be reasonably high yielding, water quality for all aquifers is poor. Regional groundwater discharge occurs via numerous saline lakes and gypsum flats.

The block includes six existing groundwater observation bores and a further 11 are proposed.

Table 25

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose ¹	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Settlement Rd		*		CFL/shire	PA, F/h, FP	Nil	Boundary only
2	Border Tk			*	CFL	R	Nil	Boundary only
3				*	CFL		Nil	
4	Millewa South Bore Tk or Bellbird Tk		*	*	CFL	FP, R	Nil	Heavily used north-south access
5	Unnamed			*	Shire			
6				*	CFL	SM, R	Nil	
7				*	CFL	R	Nil	
8				*	CFL	R	Nil	
9				*	CFL	R	Nil	
10	Pheney Tk			*	CFL	FP, R	Nil	
11				*	CFL	Nil	Nil	Old allotment boundary
12	Nunn Rd			*	CFL		Nil	
13				*	CFL		Nil	
14				*	CFL		Nil	
15				*	CFL		Nil	
16	South Bambil Tk			*	CFL	FP	Nil	
17				*	CFL		Nil	
18				*	CFL		Nil	
19	Underbool Tk		*	*	CFL	FP, R	Nil	Heavily used, north-south access
20				*	CFL		Nil	
21	Rocket Lake Tk			*	CFL	R	Nil	
22				*	CFL	SM, R	Nil	
23				*	CFL		Nil	
24				*	CFL		Nil	Boundary only
25				*	CFL		Nil	Boundary only
26				*	CFL		Nil	
27				*	CFL		Nil	
28				*	CFL		Nil	
29				*	CFL		Nil	
30				*	CFL		Nil	
31				*	CFL		Nil	
32				*	CFL		Nil	
33	Meridian Rd		*	*	CFL/shire		Nil	Part boundary
34				*	CFL	R	Nil	
35				*				
36				*	CFL		Nil	
37				*	CFL	R, SM	Nil	
38				*	CFL		Nil	
39				*	CFL		Nil	
40				*	CFL		Nil	
41	Mt Crozier Tk			*	CFL	R	Nil	
42	Honeymoon Hut Tk			*	CFL	R	Nil	
43			*		CFL		Nil	

44	Meridan Rd		*	Shire		Nil	Boundary only
45	Parrallel Rd	*	*	CFL/private		Part private	
46			*	Shire/private	F/h	Nil	Part boundary
47			*	CFL/private		Part private	
48		*		Shire	F/h		Part boundary
49		*		Shire		Nil	Boundary only
50	Druss Rd	*	*	CFL/shire		Nil	
51	Gnarr Rd	*	*	CFL/shire		Nil	
52			*	Private	F/h	Private	
53	Linga Lakes Rd	*		CFL		Nil	Boundary only
54	Ring Road	*		CFL		Nil	
55	Grub Tk		*	CFL	R	Nil	
56		*		Shire		Nil	Boundary only
57	Wisneskes Rd		*	Private	F/h	Private	
58			*	CFL		Nil	
59			*	CFL		Nil	
60			*	Private	F/h	Private	
61			*	Shire		Nil	Boundary only
62	Sunset Tk		*	CFL	FP, R	Nil	
63			*	Shire		Nil	Boundary only
64			*	Private	F/h	Private	Boundary only
65			*	Shire/private	F/h	Private	Boundary only
66	Murrayville North Rd		*	Private	F/h	Private	
67			*	Shire		Nil	Boundary only
68	No. 6 North Rd		*	Private	F/h	Private	
69			*	Private	F/h	Private	
70			*	CFL		Nil	
71	Carina North Rd		*	CFL		Nil	
72	Unnamed		*	CFL		Nil	
73			*	CFL		Nil	
74	Berbrook Rd	*		Shire	PA, F/h	Nil	Boundary only
75			*	CFL		Nil	
76			*	CFL		Nil	
77			*	CFL		Nil	
78			*	CFL		Nil	
79			*	CFL		Nil	
80			*	CFL		Nil	

KEY:

B - Beesite access	MA - Mine Access	SM - Stock Management
F/h - Freehold Access	PA - Primary Access	R - Recreation
FP - Fire Protection	PSC - Pest Species Control	U - Utility

Notes:

1. Detailed data on road and track names and purposes was not available prior to publication.

Table 26
PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Sunset Pastoral Co.	Prefabricated dwelling and sheds	Licensee	Pastoral use	
2	-	Shearing shed, and shearers quarters, yards	Licensee	Pastoral use	Most buildings built in late 1940s
3	-	Concrete tank and trough	Licensee	Pastoral use	
4	Millewa Sth Railway Line	Remains of two railway stations, track formation and telegraph posts	Nil	Nil	Built in 1929, main remnant of Sunset development plan, 18 km of track formation
5	Brunswick Plaster Mills	Old gypsum mine	Lessee/Dept Industry, Technology & Resources	Mineral extraction	Oldest and most intact and most substantial gypsum mine in State, c1931. Mine still operated by CSR (see Table 28)
6	Dry Lakes Tank	Catchment tank formed by grading lake bed, yards, airstrip	Licensee	Pastoral use	Major alterations to lake bed
7	Mopoke Hut	Grazier's hut and yards	Licensee	Pastoral use	
8	-	Metal tank	CFL	Fire protection	(Excluding freehold lands and Public Land in Berrook area)
8a	Mt. Jess	Elevated trig station	Dept. Property and Services	Utility	Proposed CFL repeater station
9	Lake Becking Tramway	Old railway formation	CFL	Historic interest	Associated with former salt harvesting
10	Pink Lakes Camping Ground	Toilets, fire places, picnic tables	CFL	Recreation	
11	Birthday Plains	Yards, tanks	CFL	Ex-pastoral use	
12	-	Yards, concrete tank, troughs	Licensee	Pastoral use	
13	Rock Hole Bore	Groundwater bore, earth tank, mill ruins	Nil	Nil	Important evidence of early pastoral industry c1913, few structures remain however.
14	Millewa Sth Bore	Minor remains of water bore	Nil	Nil	Built in 1913 by SRWSC as water source for Berrook, abandoned c1980
-	Sunset, Monkey Tail Perry, Campbell, Underbool, Birthday and Wymlet tanks	Earthen dams	CFL	Ex-pastoral use	Mainly abandoned c1980, Wymlet tank still filled from channel
-	Last Hope Tank	Earthen catchment tank	CFL	Pastoral use	
-	Mt McArthur, Last Hope, Mt Crozier, Pheeny Tk and Sunset Tk Trig Points	Trigonometric stations	Licensee DP&S	Utility	
-	-	Electricity supply distribution line	SEC	Utility	On block boundary

Notes:

- Table excludes public land in Berrook area.
- Tanks and trigonometric stations are shown by symbol on Map 14.

BLOCK 2 : ANNUELLO

Location and Boundaries

The Annuello block lies to the north-east of Ouyen and immediately south of the Murray River as shown on Map 10. It is of 58 560 ha within the Shires of Walpeup and Swan Hill.

The northern boundary is the Murray Valley Highway and the southern boundary is the Kiamal–Kulwyne Road. The eastern and western boundaries follow minor roads and tracks.

Tenure and Land Use

The greater part of the block is included within the recently recommended Annuello Flora and Fauna Reserve. Two areas of cleared Crown land have recently been recommended (LCC 1989) for alienation and the rest of the block is freehold.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 29, and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The only known planning exercise affecting the block is being carried out by the Department of Conservation, Forests and Lands' Mildura region, which is currently preparing a draft fire protection plan.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

This descriptive block lies within Murray Basin Plains physiographic division and consists of low calcareous dunes typical of the Mallee dunefields.

The low calcareous dunes are comprised chiefly of east–west dunefields of both fine and coarsely textured unconsolidated materials. These east–west dunes carry mallee vegetation and are generally 80 to 120 m wide, with an average height of about 9 m. Most have formed in response to the predominant westerly winds.

There are no permanent areas of surface water or perennial streams and little, if any, runoff.

Biological Setting

The characteristic vegetation of the block is mallee. Three main communities have been identified, these being chenopod mallee, shallow-sand mallee and deep-sand mallee.

Chenopod mallee occurs in patches throughout the block in the swales of the dunes. Its overstorey is characterised by mallee eucalypts such as the white mallee with understorey being very open and consisting of scattered low shrubs and semi-shrubs (particularly chenopods). It has an open ground layer of saltbush, annual herbs and perennials, and spear-grasses.

Shallow-sand mallee occurs in large stands throughout the block generally where a relatively shallow layer of sand overlies the heavier soils. Overstoreys are characterised by one or more eucalypt mallees, and a shrub layer, with porcupine grasses typically dominating the ground layer.

Table 29

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁴
Flora and fauna reserve	G48 (Annuello)	35 030	Rural zone ^{2, 3}	Nil
	G7 (Annuello)	170	Rural zone ³	Nil
Agriculture (public land)	F1	1 440	Rural zone ^{2, 3}	Specified areas of native vegetation to be protected by conservation covenant
(Freehold land)	Not applicable	21 920	Rural zone ^{2, 3}	

Notes:

1. Refers to LCC Mallee Area Review Final Recommendations. (Note: these have yet to be adopted by Government).
2. Refers to the Shire of Walpeup Planning Scheme.
3. Refers to the Shire of Swan Hill Planning Scheme.
4. Specific provisions relevant in addition to standard land-use provisions of LCC recommendations (as outlined in Appendix II).

Deep-sand mallee also occurs in large stands throughout the block generally on areas of loose pale yellow sand on younger, less weathered dune areas. Yellow mallee dominates the overstorey. It has an open shrub layer and a diverse ground layer.

Other vegetation communities within the block include east-west dune mallee in the north, with an overstorey of eucalypt mallees and a small area of pine-buloke woodland in the north of the block, two areas of savannah woodland (with black box and hop bush) in the west of the block, and pockets of broombush mallee in the south.

A diverse fauna is associated with this variety of vegetation communities. Mammal species within the block include the echidna, the mallee ningau, common dunnart, western grey kangaroo, Gould's and chocolate-wattled bat, and the lesser long-eared bat. A large number of bird species have been recorded including the emu, brown falcon, mallee fowl and mulga parrot.

Cultural Setting

Clans of the Madhi-Madhi dialectal tribe had territories (clan estates) within the boundaries of the descriptive block. Social and economic links appear to have been with dialectal tribes further south extending to the Grampians.

European pastoralists generally squatted only on lands adjacent to water sources such as the 'Gayfield' run to the north of the block which was established on the Murray River in 1847. By 1865 runs covered all of the block. There is little evidence of occupation however, and no areas were taken up under 19th Century Land Acts.

Only after new farming techniques permitted the ready clearing and cultivation of the Mallee were areas adjacent to the block settled - mainly between 1911 and 1922. However, changed economic circumstances and poor soils meant most of the block was only marginally viable. Closer settlement, with railway and road networks, never extended into the block and permanent settlement was restricted on its edges. Most of the block remained as unalienated Crown land with additional areas alienated or granted limited cultivation leases following the Council's recommendations for the area in 1977. Leasehold and freehold land has been gradually cleared and used largely for wheat cropping and/or sheep production.

WILDERNESS QUALITY

The descriptive block includes a large consolidated area of high wilderness quality. A large central area was classified as Class 5 or higher in the Preece and Lesslie survey, with contiguous areas classified as Class 4. The remainder of the block recorded moderate values (see Map 12).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The major influence on remoteness from settlement values of the natural lands of the block is the surrounding cleared farmlands. These are used for mainly dryland wheat farming with sheep also carried.

The boundaries of the settled land are not static. Areas of leasehold and freehold lands within the block have been cleared over the last 17 years, particularly to the south-west and north of the block, and native vegetation remains on freehold lands abutting the main public land area with the largest such areas being on the areas of the northern and southern edges. Consequently, the settled land boundary may continue to change in the future.

The present influences have resulted in the highest remoteness from settlement values being recorded towards the centre of the block. Relative to the rest of the natural lands in the State covered by the Preece and Lesslie survey, the area beyond the settled area boundary is small and thus recorded values are moderate.

Remoteness from Access

Preece and Lesslie recorded high remoteness from access values throughout much of the natural lands of the block. The major influence on values were major roads which, with the exception of a section of the Murray Valley Highway, are all outside the boundaries of the block, as were most of the minor roads influencing values.

Vehicular tracks are generally located in areas towards the edge of the block and provide access between freehold allotments or follow the boundary between unalienated Crown land and freehold and leasehold lands. There are few vehicular tracks within the main body of the public lands. These tracks have no restrictions on usage but they are used only infrequently.

A number of minor tracks in the west and on the southern edge of the block and two fire protection tracks, which bisect the centre of the block, were not recorded in the Preece and Lesslie survey; also the Angle Track was classified mainly as a two-wheel-drive minor road, rather than more correctly as a four-wheel-drive vehicular track. The presence of such tracks influences both remoteness from access and aesthetic naturalness values, and thus the total wilderness quality values recorded for the block may not truly reflect the existing quality.

All tracks and roads are listed in Table 30 (see page 141), and their locations shown on Map 12. The only road within the public lands of the block is the southern extremity (4 km) of Angle Track.

No walking tracks have been constructed. The nearest airfield is at Robinvale.

Aesthetic Naturalness

Aesthetic naturalness values were influenced by a limited number of structures - the most notable being the 220 kV Kerang to Red Cliffs electricity transmission line which crosses the eastern half of the block. All structures are listed in Table 31 and their locations shown on Map 12. In addition, the track network influenced values.

Fences are maintained on the boundaries of freehold or leasehold land. Minor disused yarding is located on Box Flat.

As a result of these influences the values recorded in the Preece and Lesslie survey were highest in the centre. The block contains the only area in the State which recorded the highest class (Class 4) of aesthetic naturalness identified in the Preece and Lesslie survey, outside the Big Desert and areas in the west of the Sunset Country, and included one of the largest areas falling into Class 3.

Preece and Lesslie, however, as noted above, did not record the two recently upgraded fire tracks which bisect the centre of the block. These tracks would significantly reduce aesthetic naturalness values.

Biophysical Naturalness

The whole of the natural lands of the block have high biophysical naturalness values.

Land-use Indicators of Biophysical Naturalness

With the exception of an area of leasehold in the south-west of the block none of the public lands of the block are known to have been cleared or subjected to intensive forest product utilisation such as broombush cutting.

The Preece and Lesslie survey classified all the natural lands of the block within the second highest class of biophysical naturalness because the area is considered to have been previously subjected to low intensity grazing. It appears, however, that most of the natural lands of the block are in effect ungrazed, although areas to the west of Angle Track in the west have been, and are presently subject to grazing. As such, most of the block is more correctly classified in the highest class identified in the Preece and Lesslie survey, with

a resultant positive influence on total wilderness quality values. Values on its western margin would, however, be reduced.

Other Indicators of Biophysical Naturalness

Nolan (1981) provided data which indicated that the lands of the block had infrequent to frequent rabbit problems. Those parishes surveyed with the largest area of public land appear to have lesser problems. In addition, wild dogs, foxes, the house mouse, cats and goats, have been recorded from the area, together with introduced birds such as the starling.

The only vegetation communities, within the naturally vegetated public lands of the block, identified as being disturbed (by grazing or clearing) are savannah woodland areas along the Box Flat Track and a similar area in the north-west of the block on the freehold boundary.

A large area covering the central portion of the block was included within a site of major botanical significance identified by the Department of Conservation, Forests and Lands (1988). The significance of this site was based on the presence of a number of interesting plant species and its peculiar north-south gradient of mallee communities.

The public land in the block was also included in a defined area of high value for the conservation of wildlife (DCFL 1988), because of the presence of a diverse fauna associated with at least seven floristic communities. Significant species include the mallee fowl, black-eared minor, Mitchell's hopping-mouse and the Mallee ningau.

The detailed survey work by the department recorded a number of exotic species within communities represented in the block. However, the density and distribution of exotic vertebrate species appears low.

OTHER ATTRIBUTES

Size

The public land of the descriptive block covers 58 560 ha and is about 30 km long and 25 km wide. Of this about 10% was classified in the survey of wilderness quality in Victoria (Preece and Lesslie 1987) within the three highest classes

Table 31

PUBLIC LAND STRUCTURES

Ref. no. (Map 12)	Name	Description	Management responsibility	Purpose	Comments
1	Kerang Red Cliffs Line	220 kV electricity supply transmission line	SEC	Utility	Main line servicing Mildura area. Has a 52 m wide easement
-	-	Trigonometric station	Dept Property and Services	Utility	-
-	Box Flat Tank	Earthen tank	Licensee	Stock management	Associated with licensed grazing which is proposed to be eliminated ²

Notes:

1. The location of trigonometric stations and tanks are shown on Map 12 by symbol.
2. LCC Mallee Area Review Final Recommendations (LCC 1989).

(Class 5, 6 or 7) of total wilderness quality, with a total of about 20% classified as Class 4, or above. The largest area presently without any vehicular tracks is approximately 7100 ha.

Ecological Viability

The area's history of little modification or disturbance, and its relatively high remoteness from access would contribute to ecological viability. A number of major plant communities (seven in all) also occur.

The area has relatively high fire hazard, although the only recorded major bushfire (>1000 ha) affecting the block is a 10 000 ha fire which burnt much of the eastern half of the block in 1982. This was started by a lightning strike.

Fire protection techniques in the area are based primarily on the construction and maintenance of firebreaks, with fuel reduction carried out in association with these firebreaks.

LAND-USE CAPABILITIES

Nature Conservation

The block has a high capability for nature conservation. It includes a range of vegetation communities that have been little disturbed. A number of significant plant species have been recorded, four of which are considered rare or vulnerable. Significant wildlife species include the Mallee ningau, Mitchell's hopping-mouse, the regal sparrow, black-eared minor, striated grass wren and a number of amphibians and reptiles.

These nature conservation values of the block have been previously recognised by the Land Conservation Council with virtually all of the natural lands of the block recommended to be included within a proposed flora and fauna reserve.

Recreation

The block has a generally moderately high capability for recreation with the natural features of the block limiting the range of activities to walking and nature study.

There are no obvious traverse routes within the block. The generally closed canopy of the predominant mallee vegetation, together with its topographic variation, results in relatively small viewscapes, and thus a high capability for solitude.

It has low to moderate capability for most other recreational pursuits, although there is some recreational use of vehicular tracks in the west of the block. Other vehicular tracks provide some opportunities for four-wheel driving.

Natural features of particular interest include species such as the mallee fowl and black-eared miner, the dunefield landscapes, especially from points of higher elevation on dune crests, the variety of mallee communities, and the more open savannah woodlands in the west of the block.

The absence of permanent water sources is limiting for many activities such as extended walking or car-based camping.

High summer temperatures and relatively high fire hazard are also major limiting factors on recreational use.

Agriculture

The sandy dune soils of the public lands of the block have low to moderate capability for cropping, but the erosion hazard on the dunes is high. In any case, present tenure precludes such use for the greater part of the public lands in the block.

The capability for grazing on the native vegetation is generally low, although one area of higher quality centred on the savannah woodland around Box Flat Track is presently used for licensed grazing. Under the recent final recommendations for the Land Conservation Council Mallee review, grazing would not be permitted within the public lands of the block.

Apiculture

Some 10 apiarists make extensive use of the block, mainly from sites which exist on freehold land around the block. Access to these sites is good.

There is also a good potential for apiculture within the public lands but, at present, apiarists cannot utilise this country due to lack of appropriate access.

There are no known licensed bee sites on the public lands of the block, although hives have been placed in the Box Flat area.

Timber Production

The capability for timber production is low. There are small isolated areas of cypress pine and belah, and broombush mallee. However, utilisation would not be permitted under the Land Conservation Council's recent final recommendations for the Mallee review.

Mineral Production

No areas of mining activity have been recorded within the block. The basement rocks underlying the block may have some potential for hydrocarbon (oil and gas) deposits. As at August 1989 no Mines Act tenements cover the block.

Under existing tenure, the whole of the block is potentially available for mineral exploration or mining, and for the exploration and production of oil and gas resources.

Water Production

There is no permanent water in the block and effectively no runoff. The licensed grazing area in the west of the block includes an earthen tank. The block has no value for surface water production.

The block includes four existing groundwater observation bores and a further four are proposed.

Table 30
ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major road	Minor road	Vehicle track				
1	Murray Valley Hwy	*			Roads Corp	PA	Nil	Boundary only
2	Angle Track		*	*	CFL	FP, R	Nil	Part boundary
3				*	CFL/private	FP, F/h	Part Private	
4				*	Private	F/h	Private	
5			*		Shire	F/h	Nil	
6				*	CFL/shire	FP, F/h	Nil	
7			*		Shire	F/h	Nil	Part boundary only
8	Service Track			*	CFL	U	Nil	Follows alignment of the Kerang- Red Cliffs power transmission line
9				*	CFL	FP	Nil	
10				*	Shire	F/h	Nil	
11				*	CFL/private	FP, F/h	Part Private	
12				*	Shire	F/h	Nil	
13				*	CFL	FP	Nil	
14				*	Shire	F/h	Nil	
15				*	CFL	FP	Nil	
16			*		Shire	F/h	Nil	Boundary only
17				*	CFL/Shire	F/h	Nil	
18				*	CFL/Shire	F/h	Nil	
19				*	CFL	FP	Nil	
20	Manjey Road			*	CFL	FP	Nil	
21	Healy Track		*	*	Shire	F/h		Boundary only
22	Box Flat Track			*	CFL	CM, FP, R	Nil	
23				*	CFL	FP	Nil	
24				*	CFL	FP	Nil	
25			*	*	CFL/shire	F/h		Part boundary only

KEY:

CM - Cattle Management	PA - Primary Access
F/h - Freehold Access	R - Recreation
FP - Fire Protection	U - Utility Access

Note:

1. Detailed data on road and track names and purpose was not available prior to publication.

BLOCK 3 : BIG DESERT

Location and Boundaries

Encompassing some 798 930 ha of public land, the Big Desert block lies west of Hopetoun in Victoria's far north-west (see Map 10). It includes portions of the Shires of Dimboola, Kaniva, Karkarook, Lowan and Walpeup and extends westward across the Border (the Ninety Mile Desert) into South Australia as far as the Pinnaroo-Bordertown Road, where it covers an area of about 78 170 ha.

Much of the northern, eastern and southern boundaries are along roads or tracks at or near the public land-freehold interface. To the west, the boundary is the Pinnaroo-Bordertown Road in South Australia, this being the first major break in the contiguous tract of mallee scrub and heath beyond the border.

Tenure and Land Use

The existing Wyperfeld National Park comprises the eastern third of the block. In its final recommendations for the Mallee area, in August 1989, the Land Conservation Council provided for substantial additions to this park such that it would occupy the eastern half of the Big Desert. The proposed enlarged park includes five reference areas (two of which are recent recommendations) and an education area. Another reference area and the Lake Albacutya Regional park are located respectively on the southern and south-eastern edges of the block.

The 113 500 ha Big Desert Wilderness occupies much of the western third of this block. To its south lies the Red Bluff Wildlife Reserve, which is now recommended by the Council to be set aside as a flora and fauna reserve.

In Victoria, the block is surrounded by freehold land with small inliers of freehold land in the Pine Plains region and west of Lake Albacutya.

The South Australian sector of the block is mostly public land included within the Scorpion Springs, Ngarkat, and Mount Shaugh Conservation Parks. The northern and southern boundaries of these are cleared freehold, with a cleared freehold inlier to the north-west of Mount Shaugh.

Details of the Council's recommended public land uses and the present planning scheme controls relevant to the Victorian sector of the block are provided in Table 32 (see page 148).

Planning Policies, Strategies and Management Plans

A management plan is currently being prepared for the existing Wyperfeld National Park and have been adopted for two reference areas - Dattuck and Telopea Downs.

Management plans are also proposed to cover the harvesting of broombush in the block (five discrete areas were delineated by the Council in 1989) and the Council has

suggested guidelines which should be incorporated in the plans.

The Department of Conservation, Forests and Lands is presently preparing a revised fire protection plan for the Mildura region which will encompass the block.

Draft management plans have also been prepared covering the South Australian Conservation Parks (NP&WS 1984). Most of the area is within a general planning zone, with a beekeeping zone (where existing beekeeping sites are to be retained and monitored) on the south edge. A large wilderness zone is defined in the Ngarkat Conservation Park to the west of the block.

Specific management practices of relevance include the maintenance of eco-logical processes as closely as practicable to natural condition, stabilising minor historic relics in their present condition, providing simple picnic and bush-camping facilities on the Bordertown-Pinnaroo Road and Pine Hut Soak in the north of the block. Fuel-reduction burning and firebreaks are proposed on the edges of the public lands of the planning area, with the Border Track proposed to be maintained for fire control and available for public vehicular access.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of the Wimmera River and Catchment also apply.

Physical Setting

The Big Desert occupies portion of the Mallee dunefield region of the vast flat to gently undulating expanse of the Murray Basin plains. Elevation reduces gradually from 140 m in the south-west to about 60 m in the north-east.

The area is mantled with younger wind-blown sands (Lowan Sand) and relative relief rarely exceeds a few metres, although large irregular parabolic dunes here attain heights of between 20 and 40 m. Underlying the Lowan Sand, north-south trending ridges of Parilla Sand (of Pliocene origin) can be traced and these are exposed in places.

No permanent stream occurs in the region. In the east, Outlet Creek (which originates from the northern end of Lake Hindmarsh and is the terminal stream of the Wimmera River system) meanders through Lake Albacutya and a series of smaller lakes to terminate at Wirrengren Plain. The last time that water entered the lower reaches of this system was in 1918. In 1976 water flowed into Lake Brambruck - midway between Lake Albacutya and Wirrengren Plain.

Biological Setting

The semi-arid climate is the major influence on the nature and distribution of plant and animal communities of the region, and adaptations and behavioural characteristics of most species are a response to dry conditions.

A number of major plant communities can be identified within the Big Desert, their presence determined largely by soil depth or type and the substratum.

A tree-heath, characterised by stunted brown stringybark and often associated with yellow mallee, occupies the crests of major dunes. Low dunes and the vast open plains are dominated by sand-plain heath - an essentially treeless community of banksia and dwarf she-oak with a wide range of heath species. Yellow mallee and slender-leaf mallee with a heathy understorey (mallee heath) dominate on the Lowan Sand; where these sands are more stable and heavier loamy sands develop, the understorey is more open and shrubby.

Scrub cypress pine is a frequent component where fire has been absent for many decades; a low woodland dominated by this species may occur and, in the oldest stands, only annuals occur in the understorey.

The Parilla Sand ridges produce another suite of plants and broombush-dominated communities are found where this rock outcrops. Broombush also occupies a variety of other sites, including loamy soils and broad dunes which overlie Parilla Sands.

Red-swale mallee occurs on heavier soils and pine-buloke woodlands dominate the lunettes beside the Outlet Creek course and the associated lakes. The floors of the lakes support herbfields, while river red gum and black box fringe the lakes and creek course.

The fauna of the Big Desert are not distributed evenly throughout but respond to the changes in vegetation that follow the dune-swale pattern of the landscape. Little pygmy-possum, western pygmy-possum and silky mouse are widespread in the heathlands. Mallee ningau, common dunnart, and Mitchell's hopping-mouse are also present. While not abundant, a number of bat species occur. Many species of reptiles are also found.

A distinctive feature of the avifauna is the abundance and diversity of honeyeaters. The mallee fowl is also present. The taller canopy of red-swale mallee provides roosting sites for raptors and those birds, such as white-browed woodswallows and rainbow bee-eater, that seek insects above the canopy. The more open understorey here supports fewer reptiles and small mammals than the heath communities. Five species of fish are recorded in Lake Albacutya and four in Lake Brambruck. Only two of these are native species.



Mallee heath south of the Milmed Track

Cultural Setting

Aboriginal occupation of the Big Desert would not have been as intensive as that along permanent watercourses elsewhere in the Mallee. Nevertheless, numerous sites in the area reveal evidence of Aboriginal occupation. These sites are, or were, associated with fresh-water soaks which would have been important for the survival of Aboriginal groups, when Outlet Creek and its associated lakes were dry. They pre-date 1861 after which no Aboriginal groups have been recorded.

Pine Plains, at the termination of Outlet Creek, was occupied by a squatter (Reverend J. M. Clow) in 1847, and between 1849 and 1851, E. R. White surveyed the border between Victoria and South Australia. By 1865, following a run of good seasons, squatters' runs covered the whole of the Big Desert, but little evidence of occupation remains and it is probable that few of them were actually taken up.

The boundary to the Big Desert is governed by the limits of arable land - these areas having been taken up for agriculture, for the most part, from the turn of the century to the 1920s. The most recent development was in the south-west, at Telopea Downs, which was taken up by 1968.

Other than the grazing of public land primarily around Pine Plains, where a small home paddock and waterholes are held in freehold, there has been little utilisation for much of the 20th century. In recent years, however, beekeeping and broombush harvesting have been developed as productive activities.

Recreational use has been centred on the Wyperfeld National Park, parts of which (3000 ha) were first reserved in 1909.

WILDERNESS QUALITY

The Big Desert includes the most extensive tracts of highest wilderness quality in Victoria and, indeed, in south-eastern Australia. The largest lies between the Murrayville-Yanac track and the South Australian border; it includes the Big Desert Wilderness Area, set aside following the Land Conservation Council's recommendations in 1977. This area was placed in Class 7 - the highest total wilderness quality in the Preece and Lesslie survey of 1987. Few such areas were recorded across the State.

Other, smaller areas of Class 7 total wilderness quality occur in the eastern portion of the block. They are separated by four-wheel-drive tracks.

Much of the block was also identified as wilderness in the Feller et al. inventory of 1979. Two areas separated by the Murrayville Track were delineated.

The influences affecting the four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The northern, eastern, and southern limits of the block abut mainly cleared agricultural land. The Pinnaroo-Bordertown road in South Australia, which delimits the block in the west, passes through essentially unmodified mallee scrub of the Ngarkat Conservation Park.

Land with high quality for remoteness from settlement, identified by Preece and Lesslie, forms a contiguous tract from west of the border almost to Pine Plains - some 75 km by 35 km. It forms one of the most extensive (together with lands in Block 1) areas of highest remoteness from settlement value in the State.

Small areas of cleared freehold within the vegetated public lands at Kirra (South Australia) and to the west of Lake Albacutya reduce recorded values.

Most surrounding freehold lands have been cleared since 1972 or earlier, although some naturally vegetated areas remain - principally on the descriptive block's southern margin.

Remoteness from Access

The block forms one of the most extensive (together with lands in Block 1) areas of highest remoteness from access value recorded in the Preece and Lesslie survey. These high values for remoteness from access are attributable to the relatively dispersed nature of the tracks and the fact that almost all are of four-wheel-drive standard only.

Two-wheel-drive roads form most of the block boundaries and the low-grade two-wheel-drive road between Murrayville and Yannac bisects it. A four-wheel-drive track (officially closed) intrudes west from the Murrayville Track for some 13 km into the Big Desert Wilderness and another track follows the length of the Border in the west.

Beekeeper tracks and those formed by broombush cutters and by the passage of army vehicles, extend through much of the eastern part of the block. Not all of these were included in the Preece and Lesslie data base. A number of recreational and management tracks are located in and around the Wyperfeld National Park.

There are 119 km of trafficable roads within the block, including 15 km of major road standard. These have the greatest influence on recorded values for remoteness from access. All tracks and roads of the block are listed in Table 33 (see page 149) and their locations shown on Map 13.

Aesthetic Naturalness

Few structures are located within the block. A number of buildings are found in the main camping area of the Wyperfeld National Park and several trigonometric points are scattered throughout the Big Desert. Minor artefacts of settlement also remain, including the State border fence.

In the west, the Big Desert Wilderness reveals the highest value for aesthetic naturalness and, indeed, the most extensive area of the highest value (Class 4) recorded in the Preece and Lesslie survey across the State. In the east, the network of tracks reduces this value, such that three reasonably large parcels and seven small ones, each with high values, are dispersed across the block. These represent, however, some of very few areas recording the highest class of aesthetic naturalness across the State.

All structures on the public lands of the block are listed in Table 34 and their locations shown on Map 13.

Table 34

PUBLIC LAND STRUCTURES

Ref. no. (Map 13)	Name	Description	Management responsibility	Purpose	Comments
1	-	Old homestead site, minor relics, bore	CFL	H	
2	Little Billy Bore	Bore head only	-	-	Non functional
3	Big Billy Bore	Mill, tanks	CFL	FP, R	
4	-	Cement tank	CFL	FP	
5	Nine Mile Square Track Camping Grounds	Camp sites, toilets, picnic tables, fire- place, interpretation centre	CFL		Main tourist base for Wyperfeld National Park
6	Wyperfeld Camping and Picnic Area	Camp sites, toilet, fireplaces	CFL		
7	No 2 Bore	Minor remains			Non functional
8	Chinamans Well	Well structure, fencing	CFL	H	
9	Broken Bucket	Mill, tank, trough, picnic tables, fireplaces	CFL	B, R, FP	
-	Ngallo, Yensleys, Mt Shaugh, Milmed Rock, Lake Albacutya Trigs	Trigonometric station	Dept Property and Survey	U	

KEY:

B - Beekeeping
FP - Fire Protection
H - Historic Interest

R - Recreation
U - Utilities

Note:

1. The location of trigonometric stations and tanks, where not associated with structures, are shown by symbol on Map 13.

Biophysical Naturalness

Recorded biophysical naturalness values in the Preece and Lesslie survey were generally high except for areas in the centre of the block and around Pine Plains, where they were low.

Land-use Indicators of Biophysical Naturalness

In the Preece and Lesslie survey, biophysical values were reduced largely by the delineation of areas licenced for broombush cutting. Harvesting does not extend throughout the whole of each licenced area, however, permitting re-interpretation of the values here. Consequently, recorded wilderness quality values in these areas is conservative. Nevertheless, biophysical values are reduced by these harvesting activities in the central and southern portions of the block (east of Murrayville Track) and along the northern fringe. In the east a current grazing licence at Pine Plains reduces the values there and past grazing activities along the course of Outlet Creek still have an influence on the naturalness of its associated vegetation.

Elsewhere the records of licensed grazing areas across the block reduced values. It appears, however, that most of the block was only lightly grazed, if at all, and thus recorded values may not truly reflect the actual biophysical quality of the area.

The impact of beekeeping on biophysical values is unknown. Tracks providing access for this industry, however, reduce the recorded aesthetic naturalness values. They are largely confined to a fringe along the public land boundary, along the Murrayville Track, and across heathlands in the north.

Other Indicators of Biophysical Naturalness

Unpublished work by the Department of Conservation, Forests and Lands (DCFL 1988) identifies a number of major sites of botanical significance, and a number of areas with particularly high values for the conservation of wildlife within the block. These generally correspond with areas of high biophysical naturalness recorded by Preece and Lesslie.

Botanical sites include two areas of relic river red gum in the north-west of the block, extensive undisturbed mosaics of the vegetation communities of the two major Big Desert land systems within the Big Desert Wilderness Area, small areas of sandstone rise broombush and heath woodland, and a number of associated significant species in the south-west, large areas of very old (100 to 200 plus years) and little disturbed scrub-pine woodland in the north. Further sites included large areas of red-swale mallee and undisturbed broombush mallee and sandplain heath in the centre of the block, a site covering extensive stands of the Pine/Buloke woodland (which are, however, disturbed) and an extensive relatively undisturbed area east of Outlet Creek which

includes a number of uncommon communities and significant plant species.

Areas documented as being of particularly high wildlife value extend across the north of the block where a variety of vegetation, including old communities, support an extremely diverse fauna of significant species; Mitchell's hopping mouse, western pygmy-possum, silky mouse, western whipbird, black-eared minor, *Unechis spectabilis* and possibly the rare night parrot. Much of the southern half of the block was included in such areas. The south-west is extremely important for a number of significant species, for example, the only remaining population of the bustard in Victoria persists there and it is the major stronghold of the western whipbird. A very large area across the south-east of the block is important due to its array of different vegetation communities, its provision for an extremely wide range of species, including many significant or rare species. The Outlet Creek system was also identified as an area of high value.

Although rabbits can be found throughout, the paucity of water and unsuitable vegetation means that their population is relatively low. In the freshwater soak areas rabbits are generally controlled by a routine (usually annual) program.

Except in the areas currently grazed, or where stock grazing has ceased for only a few years (for example, immediately south of the present Pine Plains grazing licence), there is little evidence of exotic plant infestation. Exotic and non-indigenous trees (such as pines and almonds) have been planted around the freshwater soaks in the far north-west of the block.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The block encompasses an area of about 798 930 ha of which a tract, 90 km wide and 60 km deep, within Victoria, is uninterrupted by few major intrusions other than the Murrayville Track. The largest area presently without roads or vehicular tracks is 138 400 ha. This the largest area without roads or tracks in Victoria.

From the Preece and Lesslie report, nearly 60% of the Victorian sector of the block was included in the three highest classes of wilderness quality, (Class 5 or above) with 70% of Class 4 quality.

Ecological Viability

Its large size, uninterrupted by major intrusions, the wide diversity of plant communities, and the broad spectrum of age classes of the Big Desert combine to endow this area with considerable ecological stability.

Fires are common and lightning the major source. The semi-arid climate with its typically hot dry summers adds significantly to the fire hazard. Litter accumulates slowly under mallee, taking some 15 to 20 years after one intense fire to become sufficient to support another. The heaths and scrubby plant communities form dense, continuous and highly flammable fuels in which fires burn fiercely,

consuming all low vegetation and killing the aerial parts of taller trees.

No broad-scale fuel-reduction burning is undertaken in mallee areas. The major emphasis of protection work is the construction and maintenance of firebreaks; the effectiveness of which is enhanced by fuel-reduction burns of up to a kilometre in depth from the breaks.

Vermin and noxious weeds are not a major problem in most of the Big Desert.

LAND-USE CAPABILITIES

Nature Conservation

The wide diversity of plant communities and their generally unmodified condition contribute to the Big Desert's high capability for nature conservation. The area supports many plant communities that are now much diminished in extent in the Mallee - principally due to the expansion of agriculture. The dense, old stands of scrub cypress pine here are particularly important.

The diverse vegetation types support an equally diverse faunal population. Many animal species, such as those described below, are unique in the Victorian context and are uncommon or rare anywhere in Australia.

Mallee emu-wren and Mallee ningauai are found in mallee stands with a *Triodia* understorey, while the little pygmy-possum, western pygmy possum, and common dunnart occur in mallee with a heath understorey. Silky mouse and slender-billed thornbill live in the heathlands. The Big Desert also supports populations of the kori bustard, red-lored whistler, Mitchell's hopping mouse and, perhaps, the western whipbird.

Lake Albacutya on the south-eastern edge of the block is recognised in the Ramsar convention as a wetland of international significance.

Recreation

The Big Desert offers exceptional opportunities for solitude and inspiration in a semi-arid environment. The Big Desert Wilderness, totalling 114 000 ha, has been proclaimed Schedule 3 of the National Parks Act 1975 specifically for this purpose. Elsewhere, vehicle-based camping, walking and nature study are popular and the opportunities for these activities are extensive.

The major focus of most visits to the region is the Wyperfeld National Park. However, there is a largely unrecorded but widespread and increasing interest in visiting the less-developed portions of the Big Desert - particularly by four-wheel-drive. The potential for this activity is high. Mid-summer recreation is limited, principally by the high temperatures.

There are many sites of natural interest, for example, the freshwater soak line along the northern fringe, the outcrops of Parilla Sands (such as at Red Bluff and Rudd Rocks), pine-buloke woodlands in the Wyperfeld Park and at Pine Plains, as well as the variety of vegetation types. These areas support a similarly wide variety of native animals. Many dunes throughout the area offer broad views across the

'desert'. Red Bluff in the south-west and O'Sullivan lookout in the north-east are popular vantage points.

Wyperfeld Park offers several serviced camp sites and Pine Plains is used frequently by visitors for picnicking, shooting and motorised excursions. Lake Albacutya has high value for redfin and yabby recreational fisheries.

Two commercial companies operate vehicle-based bush tours through the block, with itineraries including locations such as Wyperfeld National Park and Pine Plains (the latter on the block's north-eastern boundary).

Agriculture

Generally, agricultural capability is low due primarily to the deep, infertile Lowan Sands. Present tenure precludes it from the public lands of the block.

Lake Albacutya has high value for a redfin commercial fishery.

Pine Plains supports an extensive grazing enterprise. Grazing on the public land here (under grazing licence 2245/130 to O. L. O'Sullivan) would be phased out by July 1996 under the Land Conservation Council's Mallee Review Final Recommendations (LCC 1989).

Apiculture

The mild winter climate and the range of nectar-producing plants that flower at different times throughout the year provide a favourable situation for both honey production and the over-wintering of hives and so the area is used extensively for apiculture. Permanent bee sites are located along the Murrayville Track. Temporary sites adjoin these, and are arrayed along the southern boundary of public land, near the freshwater soaks at White Springs, Majorlock, and 12-mile. About 30 apiarists utilise the area in winter.

Sites are excluded from reference areas and because of the exclusion of vehicles from the Big Desert Wilderness area, they are also excluded from most of this area as well.

The *Banksia ornata* sites constitute the most important winter and early spring source of nectar and pollen in the State, and are considered vital by the industry to reconstitute colonies that have been run down on autumn honey flows. They are also important to develop colonies to a condition suitable for pollination of almonds within the irrigated areas further north in July.

The proliferation of tracks by beekeepers into previously untracked country compromises the area's wilderness quality. Council has recommended that tracking be rationalised and that no further sites on public land be permitted pending the outcome of research into the impact of feral and commercially managed bees in the natural environments.

Timber Production

Broombush harvesting is currently expanding into previously unharvested and untracked country. The Land Conservation Council's Mallee Review Final Recommendations (1989) would confine this activity to five areas which have either been cut over in the past or are close to existing tracks. A recent assessment of the broombush resources of the areas

defined by the Council, indicate that these areas can support a sustainable cut at or close to the current legal output of 68 000 bundles (about 1360 tonnes) in the long term, but that the short term yield, until 2005, is about 49 500 bundles per year.

Mineral Production

The Parilla Sands which underlies the Big Desert have potential for minerals sands and are being investigated elsewhere in the Mallee. Younger stratigraphic units, such as the Lowan Sands, also have some mineral sand potential.

In the west, a marked geophysical anomaly is thought to be associated with the Stavelly greenstone belt and has a high potential for the occurrence of minerals, such as gold, base metals and chromium.

Three exploration licence applications under the Mines Act are active. Details of these are included in Table 35.

Table 35

MINES ACT TENEMENTS

Tenement type & ref. no.	Lessee	Location
Exploration licence		
ELA 2309	T.C. Pacific Resources and Burmine Ltd	Red Bluff Nature Reserve
ELA 2532	Fidunu P/L	North end of Lake Hindmarsh
ELA 2531	Fidunu P/L	Lake Albacutya

A petroleum exploration permit held by Continental Resources N. L. is current for most of the Big Desert.

Under tenure proposed by the Land Conservation Council in its 1989 recommendations for the Mallee Area Review about 58% of the block is potentially available for mineral exploration and mining. All of the block is potentially available, including national park areas, for the exploration and production of oil and gas resources.

Water Production

There are no proclaimed water supply catchments or reservoirs, and no perennial streams occur. Surface water resources have effectively no value for water production.

Groundwater resources occur in three aquifers, unconfined Parilla Sand, the Duddo Limestone and associated Winnambool Formation, and the deeper Renmark Group Sands. While the Duddo Limestone/Winnambool Formation and Renmark Group aquifers are thought to be reasonably high yielding, their water quality is poor.

The includes four existing groundwater observation block bores and an additional bore is proposed.

Table 32

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL¹

Land use	LCC reference ²	Area (ha) within block	Planning scheme control	Special provisions ^{8,9}
National park	A1, A2, A3, A4 - (Wyperfeld)	296 400	Rural zone ³ , national park ⁴ purposes, Rural 'B', ⁶ balance of shire	Apiculture be permitted on existing licensed sites subject to conditions, no harvesting of timber products, a range of recreational activities be permitted, grazing not be permitted or subject to phase out in defined areas by July 1990 or July 1996, areas of high wilderness quality be protected,
Reference area	C7, C8, C9, C10, C21, C22 (O'Sullivan Lookout, Lake Jerriwirrup, Dattuck, Telopea Downs, Broombush and Rudd Rocks)	11 780	Rural zone ³ , balance of shire ⁶ blanket control, Rural 'B' ⁴	Nil
State forest	S1 (Dryland)	204 010	Rural zone ³ , Rural 'B' ⁴	Mineral exploration and mining permitted subject to conditions ¹
Wilderness area	B1 (Big Desert)	110 400	Rural zone ³ , balance of shire blanket control ⁶	
Flora and fauna reserve	G37, G50 (Red Bluff and Bird Cage)	11 400	Rural 'B' ⁴ , balance of shire blanket control ⁶	
Regional park	A8 (Albacutya)	7 600	National ⁴ park purposes	Hunting, boating, fishing, horse riding, ⁸ and camping, water skiing be permitted, grazing subject to conditions
Education area	H1 (Outlet Creek)	730	National ⁴ parks purposes	Nil
Bushland reserve	I168	580	Balance of shire blanket control ⁶	Nil
Agriculture - Public land - Freehold land	F1 Not applicable	1 390 76 470	Not zoned ⁵ Rural ⁴ zone, Rural 'B' Zone, balance of shire blanket control ⁶ , (Not zoned ⁵)	

Notes:

1. Refers only to those areas within Victoria.
2. Refers to Mallee Area Review, Final Recommendations, LCC 1989.
3. Refers to Shire of Walpeup Planning Scheme.
4. Refers to Shire of Dimboola Planning Scheme.
5. Refers to Shire of Karkarook Planning Scheme.
6. Refers to Shire of Kaniva Planning Scheme.
7. Refers to Shire of Lowan Planning Scheme.
8. Refers to LCC Mallee Study Area, Final Recommendations, 1977.
9. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II).

Table 33
ROADS AND TRACKS

Ref. no. (Map 13)	Road or Track Name	Standard of access			Management responsibility	Management purpose ₁	Present restriction	Comments
		Major road	Minor road	Vehicular track				
1				*	CFL	FP	Nil	Boundary only
2				*	CFL		Nil	
3				*	CFL		Nil	
4				*	CFL		Nil	
5	Nhill-Murrayville Road		*		Roads Corp	PA	Nil	Subject to closure when wet
6						B		
7				*	CFL	BC	Nil	
8				*	CFL	BC	Nil	
9	Danyo South Road			*	CFL	BC	Nil	
10				*	CFL			
11				*	CFL			
12				*	CFL			
13	Deviation Road		*		Shire	PA, F/h	Nil	Boundary only
13						BC		
14	Underbool Track			*	CFL	FP, R, SM	Nil	
15	Underbool Patchewollock Road		*		Shire	PA, F/h	Nil	Boundary only
16	Meridian Track			*	CFL	FP	MVO	Boundary only
17	Wirrengren Plain			*	CFL	SM	Nil	
18								
19								
20				*	CFL		Nil	
21				*	CFL		Nil	
22				*	CFL		Nil	
23	Freeway Track			*	CFL	FP	MVO	
24	Moonah Track			*	CFL	FP	MVO	
25				*	Shire	F/h	Nil	Boundary only
26	Eagle Track			*	CFL	FP	MVO	
27	Ginap Track			*	CFL	FP	MVO	
28				*	Not known		Nil	Follows Murtoa-- Patchewollock Railway Line
29	North South Track			*	CFL	FP	MVO	
30	Dattuck Track			*	CFL	FP	MVO	
31	Allen Track			*	CFL/private	FP, F/h	Part MVO	
32	Wirrbibial Track			*	CFL	FP	MVO	
33	Webster Road			*	CFL/shire		Part MVO	Part block boundary
34	Cambacanya Track			*	CFL	FP	MVO	
35	Lowan Track			*	CFL	FP	MVO	

Table 33 (continued)

Ref. no. (Map 13)	Road or Track Name	Standard of access			Management responsibility	Management purpose ₁	Present restriction	Comments
		Major road	Minor road	Vehicular track				
36	Rainbow-Wyperfeld	*	*		Shire/CFL	PA	PA, R, F/h	Nil
37	Yaapeet North Park Road							
38	Nine Mile Square Track			*	CFL	FP	MVO	
39	Hopping Mouse Hill Track			*	CFL		Nil	
40	Archbold Track			*	CFL/private		Part Private	Boundary only
41	Krurbin Road		*		CFL	FP	MVO	
42	Booligal Track			*	Shire		F/h	Boundary only
					CFL/private	F/h	Part Private	No public access through freehold
43	Burma Road		*		Shire	F/h	Nil	Boundary only
44	Milmed Track			*	CFL	R	Nil	
45	Heinrich Road		*	*	Shire	F/h, R	Nil	Part boundary only
46	Wedding Road/Amy Johnson Highway		*		Shire	F/h	Nil	Boundary only
47	Unnamed			*	CFL	BC	Nil	Boundary only
48	Rainbow Nhill Highway	*			Shire	PA	Nil	Boundary only
49	Pella Track			*	CFL/shire		Nil	
50	Bullock Track			*	CFL		Nil	
51	Chinamans Well Track			*	CFL	FP, R	Nil	
52				*	CFL		MVO	Closed
53	Red Bluff Road			*	CFL	FP	Nil	
54	Arthurs Road			*	Shire/CFL		Nil	Part boundary
55	Border Track			*	CFL	FP, R	Nil	
56	Unnamed			*	NP&WS	B	Nil	
57	Unnamed			*	NP&WS	B	Nil	
58	Unnamed			*	NP&WS	B	Nil	
59	Unnamed		*		NP&WS/private	F/h	Nil	
60	Unnamed			*	NP&WS	FP, part R	Nil	
61	Unnamed			*	NP&WS	FP, R	Nil	
62	Unnamed			*	NP&WS	FP	Nil	
63	Pinnaroo Road	*				PA	Nil	Boundary only
64	Unnamed			*	NP&WS	FP	Nil	Boundary only
65	Unnamed			*	NP&WS	FP	Nil	

KEY:

B - Bee Site Access
 BC - Broombush Cutting
 CM - Cattle Management
 F/h - Freehold Access

FP - Fire Protection
 L - Logging
 MA - Mine Access
 MVO - Management Vehicles Only

PA - Primary Access
 PSC - Pest Species ControlNote:
 R - Recreation
 U - Utility Access

Notes:

1. Detailed data on road and track names and purposes was not available prior to publication.

BLOCK 4 : LITTLE DESERT

Location and Boundaries

The Little Desert block covers an area of about 170 200 ha and extends from the South Australian border to the Wimmera River (see Map 10). It includes parts of the Shires of Kaniva, Lowan, Dimboola, Kowree and Arapiles.

Public land in the descriptive block lies within three major parcels each of which is separated by cleared farmland and a major (sealed) two-wheel-drive road. These three areas of public land incorporate most of the remaining vegetation of the Little Desert and, indeed, of the whole Wimmera region.

Tenure and Land Use

The majority of the public land within the Little Desert block is included within the Little Desert National Park. Two reference areas are located within the park and an education area is on the northern edge.

A contiguous 647 ha block of public land on the south-east corner of the western parcel is held under perpetual lease. These leases give the lessee the right to graze and cultivate

the land. Other small isolated blocks of public land are included within the block boundaries.

Freehold land in the block is largely on the boundaries, other than an inlier block on the Nhill-Gymbowen Road.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 36 and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The waters of the Wimmera River and catchment are the subject of State Environment Protection Policy No. W-15A which was gazetted in May 1985. This policy outlines beneficial uses of water that are to be protected, desirable water quality standards, and the ways these standards and levels of protection will be achieved. The provisions of the State Environment Protection Policy for the Air Environment also apply.

Table 36

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁷
National park	A1 (Little Desert)	119 530	(National Parks ² (Purpose, balance (of shire blanket (control, 3,6 and (Rural ⁴	Apiculture, horse riding permitted subject to conditions; existing road network be substantially maintained; no timber harvesting; grazing or hunting
Reference areas	B1, B2 [Little Desert (west) and Little Desert (east)]	5 440	National Park Purpose ²	
Education areas	M1 (Catiabrim)	1 350	Balance of Shire blanket control ⁵	
Bushland reserve	112, 156	60	Balance of Shire blanket control ⁶	
Public land water frontage	K2	110	Rural ⁴	
Stone reserve	R11	10	Balance of Shire blanket control ⁵	To be included in education area when rehabilitated
Agriculture (perpetual lease)	Q6	650	Balance of Shire blanket control ⁶	Remaining areas of native vegetation to be protected
(freehold)	Not applicable	43 050	Rural A and B ² , Rural ⁴	

Notes:

1. LCC Wimmera Area, Final Recommendations, 1986

2. Shire of Dimboola Planning Scheme.

3. Shire of Kaniva Planning Scheme.

4. Shire of Arapiles Planning Scheme.

5. Shire of Lowan Planning Scheme.

6. Shire of Kowree Planning Scheme.

7. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II).

The block is within the area covered by the Department of Conservation, Forests and Lands' Horsham Region Fire Protection Plan (DCFL 1989). Under this plan most of the block is included within a general (Priority 4) fuel-reduction burning zone whose aim is to reduce fuel accumulation in strategic areas. A strategic fuel-reduction burning (Priority 2) corridor on the perimeter of the public lands will aim to maintain low fuel levels. Other Priority 2 zones delineate some of the internal tracks of the block. Protective burning will not be carried out in reference areas and no additional roads and tracks are specifically proposed.

Physical Setting

Physiographically, the block consists of flat to generally undulating land. Unlike most of the Wimmera, the area is dominated by fine to medium grained, white to yellow siliceous aeolian sands (Lowland Sands) in the form of dunes and sand sheets up to 12 m deep. Dunes tend to be orientated east-west (and subparabolic) under the influence of the westerly winds which formed them. They are somewhat irregular in some areas.

Underlying these sands are broad north-north-west and south-south-east trending ridges and inter-ridge flats of Parilla Sandstone. Outcrops occur on the Craters Track and Mount Turner, as laterised (iron rich) sandstone ridges with a local relief of up to 80 m.

The Little Desert is generally devoid of surface water due to the sandy (permeable) nature of the soils, low rainfall and high evaporation rates. It contains no perennial streams other than the Wimmera River at its eastern edge south of Dimboola. The river flows northwards within a narrow alluvial plain. The Wimmera River system is characterised by great variability and unreliability of flow.

There are some short ephemeral streams from Parilla Sand ridges, e.g. on the edge of the eastern block, which terminate in swamps to the south (and north) of the block. These swamps are associated with the parallel sequences of the Parilla Sand ridges and are generally non-saline groundwater recharge sites.

During prolonged wet periods, swamps and depressions within the block itself may fill and at this time extensive flooding can occur. A number of clay pans and saline lakes occur in the eastern block (again generally aligned in a north-east or south-west direction under the influence of the Parilla ridges).

Biological Setting

Vegetation types range from large tracts of treeless low open heath on the deep sand plains in the drier eastern areas to tall yellow gum woodlands (with slender cypress pine and black box) on sandy clay soils in the interdune depressions of the wetter western parcel. Brown stringybark (with Oyster Bay pine) woodland and open scrub occur extensively throughout the block on the sandy soils. They have a heathy understorey.

Mallee broombush communities occur generally where the underlying Parilla Sands are at, or close, to the surface and shrublands of mallee honey-myrtle occur around several clay pans and salt lakes, particularly in the eastern parcel, e.g. Salt Lake.

Small areas of river red gum and black box woodland are found in interdune depressions, such as Red Gum Swamp in the central parcel and in the south-west corner of the western parcel, and along the Wimmera River. Black box occurs on the less frequently inundated sites. Such areas are generally ringed by yellow gum woodlands on the slightly higher areas.

The different vegetation types of the Little Desert support many faunal communities because of the diversity of habitat they provide. Mammal abundance is, however, generally low and there are a relatively limited number of species including a few small ground and climbing carnivores, arboreal herbivores and bats. This is most likely due to the low rainfall, lack of structural diversity and previous disturbance to habitats. The red-necked wallaby occurs throughout.

An abundant and diverse variety of birds occur, however, including the mallee fowl (which breeds in unburnt mature stands of mallee broom bush). Red gum and yellow gum woodlands (notably Red Gum Swamp) are the areas of highest bird populations and, in particular, provide nesting hollows for many species. Banksias and yellow gums, when flowering, are a prolific source of nectar for insects and birds such as babblers, wattle birds, and other honeyeaters.

Many species of reptiles live in the Little Desert, notably the sand monitor, common scaly-foot, bearded dragon and painted dragon.

Cultural Setting

Aborigines seem to have occupied the Wimmera region for about 10 000 years and probably longer. Population levels appear to have increased about 4000 years ago.

Available evidence suggests the Aborigines of the Wimmera (and Mallee) dune areas were closely related to groups extending from the Murray River area, along the Wimmera River, and in the Grampians, with whom they shared language characteristics, trade items and ancestral beliefs.

Most recorded archaeological sites are scarred trees and scatters of stone artifacts along the Wimmera River. There has, however, been no detailed archaeological survey work undertaken in the area. The camp sites of the Aborigines, being the swamps and soaks within the dune country, are likely to provide much evidence of occupation. They are also, however, the areas most disturbed by European settlers.

The first pastoral settlement by Europeans in the area was in 1840, with the settled area expanding rapidly after 1844.

The first pastoral runs were established in the area in 1841, and by 1851 grazing runs occupied all but the poorest land in the Wimmera. An 1868 map shows runs covering the whole of the Little Desert. Grazing was, however, concentrated along the major streams and rivers.

While these pastoral holdings were extensive most carried sheep (and occasionally cattle) at a low average stocking rate. Settlers dug dams and wells for water.

Following the Land Act of 1869, the better watered lands around the descriptive block became freehold closer settlement blocks (of 126 ha each) displacing the former grazing runs. They were developed for wheat growing at a rate of about 8 ha per block per year.

Following two droughts in the late 1870s a system of bores, wells and dams was introduced in lands west of the Wimmera River. This, together with new technologies in the 1890s which introduced the use of superphosphate and, in the early 1900s, fallowing and combine harvesting, enhanced the productivity of the area.

The poorer sandy soils of the block and similar country to the north-west (around Telopea Downs) were still not developed, although plans to farm the Little Desert have been put forward by local councils since 1905.

The Little Desert continued to be (licensed and) used for bush grazing by neighbouring land owners of dry sheep for wool production. Most of the area was licensed and grazed up to the 1950s. The yellow gum-box woodlands have the highest capability for grazing and are likely to have been the areas most heavily used. Some timber was also taken from such areas. Little Desert was also used as part of a bombing range in World War II.

Given the relative lack of development within the descriptive block, there are few sites or relics of cultural heritage interest relating to European settlement. Nonetheless, the area does include a number of relics remaining from its pastoral period. Sections of remnant fencing in the central portion may be relics of the land development schemes of the 1960s (which were not pursued), as is part of the track network.

WILDERNESS QUALITY

Areas of moderately high wilderness quality were recorded for much of the central sectors of the three main portions of public land.

The major influences on wilderness quality values were the settlement boundary, the major north-south vehicular access routes and the internal track network.

The highest values in the west were centred on the existing reference area, to the south-west of Stans Camp Track in the central portion of the block. In the eastern portion they are found mainly around Salt Lake, where, while identified as of moderate wilderness quality in the Preece and Lesslie survey (see below) the values allocated by them may have underestimated wilderness quality.

Remoteness from Settlement

The boundaries of the values recorded in the Preece and Lesslie survey reflect the boundaries of the cleared farmland. High values were allocated only in the geographic centre of each portion of the block. These boundaries are subject to slight change as areas of freehold native vegetation are, or could be, cleared. The largest areas of vegetated freehold are to the north-west of the central portion of the block. The closest major settlements are Nhill and Dimboola.

Remoteness from Access

Major areas of high value were recorded in the central sectors of the western and central portions of the block, and in the eastern half of the eastern portion. The major north-south roads separating the blocks are a major influencing factor on values. The Salt Lake Track, a north-south track through the eastern block, was recorded as a minor two-wheel-drive road in the Preece and Lesslie data base.

However it is, other than for its northern extremity, more correctly classified as a four-wheel-drive track. Since values recorded for the area are conservative, wilderness quality is under-estimated.

The relatively dense four-wheel-drive track network reduced remoteness from access values, although the Preece and Lesslie data base included a number of minor four-wheel-drive tracks that are disused and now largely revegetated.

The two roads dividing the three public land areas of the block are the only roads within the block, other than minor sections providing access from the Kiata Road to the national park camping ground and providing access from Dimboola into a nature trail on the eastern edge of the park. In all there are 32 km of trafficable roads in the block, 28 km of which are of major road standard.

Other vehicular access in and through the descriptive block is of vehicular track (four-wheel-drive) standard.

There are approximately 790 km of trafficable roads and tracks within the public lands of the block. Most of these occur in the central and eastern portions of the block. Several tracks are subject to seasonal closures.

Much of the existing track network has been upgraded and maintained primarily for fire protection purposes. The roads are sometimes rough and steep, and have not been designed to cope with increasing use by recreation vehicles. They are, however, all open for public use and well signposted. Most are utilised for recreational driving.

All firebreaks, around the perimeter of the Crown/freehold boundary, contain a four-wheel-drive track.

Details of all the roads and tracks in the block are provided in Table 37 (see page 157)

There is a network of walking tracks south of the camping ground in the eastern portion, extending as far as Salt Lake. These mostly follow old vehicle tracks. There are also three small nature walks on the periphery of the public land area, one of which, the Stringybark Walk, extends into the adjoining private land of the Little Desert Lodge.

Aesthetic Naturalness

Recorded aesthetic naturalness values were low throughout the block, due largely to the track network, although, as noted previously, a number of tracks included in the Preece and Lesslie data base are now re-evaluated. As such, recorded values are probably conservative. There are few facilities or utilities within the descriptive block. A formal camping ground with gravel road access is located at the northern edge of the eastern block near Kiata. Visitor accommodation is also provided on freehold land located on the Nhill-Gymbowen Road south of Winiam. Basic picnic facilities are at a water-hole on the Mallee track in the eastern block, and there are a number of constructed water points throughout the block.

All structures are listed in Table 38 and shown on Map 13.

Municipal aerodromes are located at Nhill and to the south-east at Horsham; a number of authorised landing strips are scattered throughout surrounding areas.

Table 38
STRUCTURES

Ref no. (Map 13)	Name	Description	Management responsibility	Purpose	Comments
1	-	Minor relics of former hut/homestead, yards	CFL	H	Relic of former grazing period
2	-	Electricity supply distribution line	SEC	U	
3	Dahlenburgs Mill	Remains of windmills, tanks, water troughs	CFL	H	Relic of former grazing period
4	Little Desert camping ground	(60 sites) fireplaces, picnic tables, pit toilets, water tanks	CFL	R	Services national park
5	-	Picnic table	CFL	R	
-	Mt Moffat, Mt Turner Trig Stations	Trigonometric Station	Department of Property and Services	U	
-	Tanks and dams	Excavated tanks	CFL	H,MP	Most are relics of former grazing, but many maintained as fire water points

KEY:

H - Historic interest
MP - Management Purposes

R - Recreation
U - Utility

Notes:

1. Trigonometric stations are shown on Map 13 by symbol.

Biophysical Naturalness

High biophysical naturalness values were allocated for most of the public land, other than areas licensed for grazing as at 1985 (mostly now discontinued), and peripheral areas subject to regular fuel-reduction burns, past brush-cutting and apiculture - including freehold areas. Previous grazing was the major limiting factor on biophysical naturalness values.

Land-use Indicators of Biophysical Naturalness

Much of the block has been historically utilised for grazing at various levels of intensity. Areas were burnt, with stock (mainly sheep) feeding off the post fire 'green pick'. While such areas have been licensed within the past 10 years none of these are known to have been regularly grazed and there is presently no licensed grazing on the public lands of the block. The areas allocated moderate values in the Preece and Lesslie survey are thus conservative.

Selective timber extraction of river red gum and black box along the Wimmera River and of yellow gum (mainly) in the western block for farm (fencing) timbers occurred after both World Wars. Cutting of brush has been sporadic and minor, with recent utilisation restricted to areas cleared as part of the construction of the public land perimeter firebreaks.

The natural streamflows in the Wimmera River have been reduced by diversion of some of its waters into the Wimmera-Mallee Stock and Domestic Water Supply System.

Other Indicators of Biophysical Naturalness

Much of the public land of the block has very low numbers of alien species present, particularly in the heathland and brown stringybark woodland and open shrublands, and it is one of the few areas in the State with the flora recording less than 10% of alien species.

Alien plant species are found on the margins of public land and along tracks, picnic and camping areas and other disturbed areas. The understoreys of yellow gum woodlands and river red gum woodlands have a higher proportion of alien species, with those along the Wimmera River being most degraded.

Six mammal species probably present in the Wimmera at the time of European settlement are no longer found anywhere in Victoria and two are totally extinct. They were predominantly woodland inhabitants and disappeared soon after selectors moved into the area with their flocks of sheep in the 1840s and 1850s and subsequent clearing for agriculture. Rabbits probably played a part in their demise as well.

Several bird species have also disappeared or become rare since European settlement, among them the magpie goose, plains wanderer, bush thick-knee, night parrot and grey-crowned babbler.

Rabbits are presently not a serious problem in the Little Desert. Foxes and feral cats are seen in the block. Foxes, in particular, appear to have a deleterious impact on mallee fowl. Mice are mainly found in cropping areas. Sparrows, starlings, occasional hares and other introduced species also occur.

OTHER ATTRIBUTES**Size**

This relatively large descriptive block has an area of 170 200 ha, extending over a 10 to 20 km wide strip for 95 km. Very little area was included within the Classes 5, 6 and 7 of wilderness quality, with less than 15% classified as Class 4 or above. Within the block, the largest area without any vehicular tracks is 4700 ha.

Ecological Viability

The block's long history of, albeit low intensity, utilisation, the depletion of native faunal species an extensive abutment to cleared farmlands, and its relatively dense vehicular access network would all reduce its potential ecological viability. It does, however, have a relatively low level of weed species and is now managed for nature conservation purposes.

Fires are a natural part of its environment, with about half of all fires started by lightning. They are a major hazard to surrounding freehold. Six major bushfires have been recorded in the area since 1939. A large area in the west was burnt in 1967 and another in the east in February 1977. More recently, in 1980, a fire burnt 8000 ha in the western portion of the block, and 5770 ha were burnt in the central portion of the block in 1988. Early in 1989 another fire burnt 7000 ha in the south-eastern corner of the western portion (and part of the central portion).

Several fire prevention measures are presently adopted on the public lands. Surrounding the entire Little Desert block is a 20 m wide firebreak constructed in the early 1970s. It incorporates a vehicle track and is extended by a controlled burning regime. Fuel-reduction burning is practicable, although not always appropriate, in most vegetation types, with strategic internal strip and/or block burns being implemented in April and October of each year. Boundary tracks were disced, but are now graded to provide a mineral earth break and the remainder of the firebreak is slashed, and internal tracks upgraded and slashed on a rotational basis.

Fire management is based on the twin aims of fire prevention and ecological management.

On-going vermin and noxious weed control programs, and the fuel reduction program, are also undertaken.

LAND-USE CAPABILITIES

Nature Conservation

The existing conservation values of the block are high. The moderately high wilderness quality values of the area are a major contributory factor to the conservation values, as well as contributing to their protection and enhancement.

The vegetated lands of the block have a high capability for conservation owing to the wide floristic and faunal diversity and the rarity of many species. The large number of yellow gum woodland areas are particularly important as this community has been greatly reduced over its former range and the block contains the least degraded areas remaining.

The diversity of habitat supports a wide variety of birds and reptiles, while several mammal and bird species reach the limits of their distribution in the area. Restricted species occurring in the block include the western pygmy possum and the delicate skink.

Recreation

Access to the general area is good, being on the Western Highway route between Melbourne and Adelaide, with recreation use currently concentrated in the eastern portion of the National Park. It is estimated that the Little Desert

National Park has 50 000 visitor days including 5000 camper nights. The most popular time to visit the area is in spring (August to November) when the wild-flowers are a big attraction.

The block provides the only substantial area in the Wimmera available for bushwalking, with opportunities for solitude and inspiration being high. Although it has traditionally been considered as a large remote undeveloped area, visitors pursue a wide variety of recreational activities. These include nature study, bird watching, four-wheel-drive touring, trail-bike riding, horse riding, bushwalking, camping and picnicking.

Natural features of particular interest include the various swamps and water-holes, and lookouts on the higher dune ridges. Views over the Little Desert can also be obtained from a large sandhill in the Moree Lismore Reserve to the north of the western portion.

Most walking is along constructed tracks. The Little Desert with its large areas of native vegetation in a remote setting, make it excellent country for bushwalking. The lack of reliable water sources is a constraint on extended walks. Both natural and cultural features provide destination points.

Many people visit specifically for nature study, but most combine nature study with other activities such as walking, picnicking, camping and recreational driving. The large areas of relatively undisturbed vegetation are a major attraction. Self-guiding nature walks are popular.

Although most visitors to the area use conventional two-wheel-drive vehicles, car touring is limited to the main through routes and access points. Four-wheel-drive vehicles or motorcycles can gain access to the more isolated areas of the track network. Organised tours are conducted in the central area and four-wheel-drive touring and vehicle-based camping is the most popular activity outside the developed camping and picnicking areas, with much use made of the central and western portions of the block at certain times of the year.

Camping may occur throughout the area, but is concentrated at the water-holes and especially at the Park's camping ground on the edge of the block. From time to time, local children and other residents ride horses in the area.

Agriculture

Agricultural land is virtually restricted to freehold lands. Much of this land is still in a state of partial development. Some blocks are well developed, while others are reverting to natural vegetation. The main farming enterprise is grazing dry sheep for wool production, although there is some limited cropping of wheat, oats, barley and lupins, but cropping is marginal.

The sands of the Little Desert have limited agricultural potential because of their low natural fertility, low water storage capacity, and high wind erosion hazard. It is more moderate in the small areas of yellow gum woodland in the wetter western portion.

The heathy vegetation of the Little Desert does not provide good grazing forage and stock grazing this type of vegetation

frequently exhibit symptoms of mineral deficiencies, although capability is also higher in the small areas of yellow gum woodland in the wetter areas in the west. Given present tenure, no public lands are presently licensed for grazing other than the leasehold area in the south-east corner of the western parcel of the block.

Apiculture

The Little Desert is important for over-wintering of bees and some coarse honey production. Brown stringybark provides good nectar flows in sporadic years and yellow gum provides good spring honey flow in many seasons. The stands of desert banksia in the heathlands are very useful to beekeepers in the south of the State because they flower in winter, when no other blossom is available.

There are numerous bee site locations on the public land of the block, with no more than 40 sites occupied at any one time. Most are near to boundaries of the public land. Sites are slashed prior to use and subsequently rehabilitated. A number of bee sites are also located on private property immediately adjacent to public land.

Timber Production

Much of the vegetative cover in the Little Desert consists of open scrub and heaths with the only tree species being stunted eucalypts such as mallees and brown stringybark, which are unsuitable for timber production. The scattered yellow gum stands of the block, particularly in the western portion are thought to have been harvested to at least some extent in the past and are still capable of yielding some timber products. Timber extraction is not, however, permitted throughout the public lands of the block.

Any timber products required can be obtained from substantial areas of State forest immediately south of the Little Desert.

Broombrush occurs in the block but no harvesting has been permitted since at least 1987.

Mineral Production

Since 1980, considerable exploration effort has been directed towards investigating potential oil, gas and brown coal basins in the region. Exploration for mineral sands has also increased and has concentrated on the Parilla Sand. A pronounced magnetic anomaly underlies the eastern side of the Little Desert. This is thought to be associated with basement rocks which have a potential for gold and base metal mineralisation. Ancient river channels (deep leads) that have the potential to contain gold and diamonds and diamond-bearing pipes and metallic mineral prospects within the basement rocks have also been investigated.

Exploration has concentrated to the east of the Wimmera River, but has been unsuccessful to date. There are presently 7 exploration licences or licence applications, which cover much of the block, outside the Little Desert National Park. Details of these are included in Table 39.

The only recent mineral and stone extraction from the block was 2000 cu.m of gravel and sandstone removed in 1983 from the Nhill Gymbowen No. 1 Pit. This is used intermittently by the Shire of Lowan.

Under present tenure about 27% of the block is potentially available for mineral exploration and mining, and all of the block, including the national park is potentially available for the exploration and production of oil and gas resources.

Water Production

The Little Desert has very little capability for surface water production, as there is no significant runoff. High yielding bores tap into the groundwater and produce good quality water suitable for domestic and agricultural uses, particularly in the west. The source aquifer (the Duddo/Tresfore) is large and extends well beyond the public land of the descriptive block. It includes seven existing groundwater observation bores and an additional bore is proposed.

A number of fire water points are maintained.

Table 39

MINES ACT TENEMENTS

(as at August 1989)

Tenement type & reference number	Lessee	Location
Exploration licence¹		
ELA 2301	T.C. Pacific Pty Ltd	EMU Downs area
ELA 2446	Fiduny Pty Ltd	North of central sector of block
EL 2302	T.C. Pacific Pty Ltd	Goroke area
ELA 2447	Fiduny Pty Ltd	Gymbowen area
EL 2305	Euraust Minerals Pty Ltd	Winiam area
EL 2306	Euraust Minerals Pty Ltd	Mainly north of eastern sector of block
EL 2307	Euraust Minerals Pty Ltd	South of eastern sector of block

Notes:

1. All exploration licences covering the block exclude areas within the Little Desert National Park and Reference Areas.

Table 37

ROADS AND TRACKS

Ref. no. (Map 13)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction ⁵	Comments
		Major Road	Minor Road	Vehicle Track				
1	Border Track			*	CFL	FP		Boundary only
2	Blackboy Track			*	CFL	FP, R		
3	Mount Moffat Track			*	CFL	FP, R		
4	Elliot's Track			*	CFL	FP, R		
5	Tallageira Track			*	CFL	FP, R	Part seasonal road closure	
6	East West Track			*	CFL	FP, R	Part seasonal closure	
7	Southern Firebreak			*	CFL	FP, R		Firebreak includes trafficable track
8	Kellys and Rapsons Road	*		*	Shire	F/h		Boundary only
9	Minimay Tallageira Frances road				Shire	F/h		
10	Laidlaw Dam Track			*	CFL	FP, R	Subject to seasonal closure	
11	Neuarpuur Track			*	CFL	FP, R		Boundary only
12	Lillimur Tk/Central Tk			*	CFL	FP, R	Part seasonal road closure	
13	Elliot Road		*		Shire	F/h		Boundary only
14	Jacobs Track			*	CFL	FP, R		
15	Unnamed			*	CFL	FP, R		
16	Northern Break			*	CFL	FP		
17	Spriggs Lane			*	Shire	F/h		Firebreak includes trafficable track Boundary only
18	Unnamed			*	CFL	FP, R		
19	Bulls and Blacks Road		*		Shire	F/h		Boundary only
20	Kaniva-Edenhope Road	*			Roads Corp	PA		
								Part boundary 5.5 m wide sealed road in good condition. A declared main road (minor widening proposed)
21	Unnamed			*	CFL			Boundary only
22	Worsleys Road		*		Shire	F/h		
23	Crabtree lane			*	Shire	F/h		
24	McDonald Highway			*	CFL	FP, R	Part seasonal road closure	
25	Broughtons Track			*	CFL	FP, R		
26	Link Track			*	CFL	FP, R		
27	Plains Track			*	CFL	FP, R		
28	Mt Turner Track			*	CFL	R		
29	Mortat Track			*	CFL	FP, R		
30	Sambells Track			*	CFL	FP, R		
31	Sister Hills Track			*	CFL	FP, R		

Table 37 continued)

Ref. no. (Map 13)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major Road	Minor Road	Vehicle Track				
32	Lawloit Track			*	CFL	FP, R	Part seasonal closure	
33	Fenceline Track			*	CFL	FP, R		
34	Koonik Track			*	CFL	FP, R		
35	Bore Track			*	CFL		Closed to all vehicles	
36	Sand Track			*	CFL	FP		
37	Brooks Track			*	CFL	FP, R		
38	Browns Dam Track			*	CFL	FP		
39	Stans Camp Track			*	CFL	FP, R		
40	Whimpeys Track			*	CFL	R		
41	K. Clarks Road		*		Shire	F/h		Boundary only
42	Kinimakatka Road	*			Shire	PA		Boundary only
43	Old Nhill Road			*	CFL	FP, R	Part seasonal road closure	
44	Pilgrims Road		*		Shire	F/h		
45	Phillips Track			*	CFL	FP, R		
46	Crater Track			*	CFL	FP, R		
47	Lost Flat Track			*	CFL	FP, R		
48	Breens Lane			*	Shire	F/h		
49	Tom Redfords Road		*		Shire	F/h		Boundary only
50	Nhill-Gymbowen Road	*			Roads Corp	PA		Part boundary
51	Two Dams Track			*	CFL	FP, R		
52	Matthews Track			*	CFL	FP, R		
53	Dahlenburgs Mill Track			*	CFL	FP, R	Part seasonal road closure	
54	Red gum Track			*	CFL	FP, R		
55	Beekeepers Track			*	CFL	FP, R		
56	Jungkum Track			*	CFL	FP, R		
57	Settlement Road			*	Shire	F/h		Boundary only
58	Link Track			*	CFL	FP, R		
59	Salt Lake Track			*	CFL	FP, R		
60	Trig Point Track			*	CFL		Closed to all vehicles	Walkers only
61	Kiata South Road		*		Shire	PA		Boundary only
62	Jordan Road		*		Shire	F/h		Boundary only
63	Warners Track			*	CFL	FP, R		Part boundary
64	Centre Track			*	CFL	FP, R		
65	Pump Jack Track			*	CFL	FP, R		
66	Mallee Track			*	CFL	FP, R		
67	McCabes Hut Track			*	CFL	FP, R		
68	River Track			*	CFL	R		
69	Dry Well Track			*	CFL	FP, R		
70	Eagle Swamp Track			*	CFL	FP, R		
71	One Tree Hill Track			*	CFL	FP, R		

KEY:

F/h - Freehold access
 FP - Fire protection
 PA - Primary access

PSC - Pest Species Control
 R - Recreation

BLOCK 5 : O'SHANNASSY

Location and boundaries

Located to the north-east of Healesville, see Map 10, the O'Shannassy block covers 26 020 ha of mountainous terrain on the edge of the Great Dividing Range.

Major roads form most of the boundaries. The Acheron Way marks the western edge, on the north-west are vehicular tracks across to Marysville, with the Marysville and Cumberland Road and the Reefton Spur Road in the north and east respectively. The O'Shannassy Aqueduct and Cement Creek form the southern boundary. It is situated within the Shires of Healesville and Upper Yarra.

Tenure and Land Use

The catchment of the O'Shannassy River is public land vested in the Melbourne and Metropolitan Board of Works (MMBW) and is part of a MMBW Catchment Area in which public access and land use are strictly controlled. It includes

the 995-ha Deep Creek Reference Area occupies the central portion of the block. To the east is the Armstrong Creek Catchment Area. This is State forest used by the MMBW for water supply purposes; when timber is harvested, which is a permitted use, water is not diverted. Public access is also restricted in this area. A similar designation applies to the Cement Creek Catchment Area: a small area in the south-west corner of the block. The area to the north-west and west of this catchment is State forest.

Private land occurs at Marysville, where the settled area extends into the block, and a small area at Reefton along the Acheron Way. These account for only a small proportion of the block's total area.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 40, and the boundaries of the separate areas are shown on Map 11.

Table 40

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Area (ha) within block	Planning scheme control	Special provisions ⁶
Multi-purpose park	A29 (Yarra Valley) ²	1 330	Balance of shire ³ blanket control	Within a recreation and hardwood zone, ¹
Reference area	B13 (Deep Creek) ⁷	995	Balance of shire ³ blanket control	Nil
Water production	D63, 75, 76 and 77 (Stevenson River diversion, O'Shannassy Reservoir, Armstrong (West) diversion, and Armstrong (East) diversion)	-	Balance of shire ³ blanket control	Delineation subject to land use determination of water supply catchment
Hardwood ⁵ production	E9 (Marysville forest)	8 030	Public purposes ⁴	Conservation of Leadbeater's possum be provided for, environs of Keppels Lookout and Steavensons Falls be reserved for recreation, and environs of Acheron Way be protected, ¹
Uncommitted	A29 (Yarra Valley) ²	15 545	Balance of shire ³ blanket control	Used primarily for water supply purposes, timber production permitted in Armstrong Creek catchment (when catchment not being used for water supply purposes)
Agriculture (Reefton)	Not applicable	120	Rural 2 ³	

Notes:

1. Refers to LCC Melbourne Study Area, Final Recommendations, 1977.
2. Much of the area recommended as park by the LCC was not accepted by the Government, and these areas remain uncommitted public land.
3. Refers to Shire of Upper Yarra Planning Scheme.
4. Refers to Shire of Healesville Planning Scheme.
5. The hardwood production and uncommitted categories have been generally included within State forest in more recent LCC recommendations.
6. Specific provisions relevant to area in addition to the standard land-use provisions of LCC recommendations (as outlined in Appendix II).
7. The proclaimed reference area includes an additional area of 275 ha to the north-west of the area recommended by the LCC.

Relevant Planning Policies, Strategies and Management Plans

The State of the Environment Protection Policy W-29 (Victorian Government 1984) covers the waters of the Yarra River and its tributaries. Relevant provisions include that access should continue to be restricted in the water supply segment (which corresponds with the MMBW catchment area). The State Conservation Strategy (Vict. Govt. 1987) states that the harvesting of timber will continue to be prohibited in those of Melbourne's water supply catchments which are presently unavailable for logging (which corresponds to the majority of the O'Shannassy River catchment).

The block is within the boundaries of the area under the jurisdiction of the Upper Yarra Valley and Dandenong Ranges Authority, and is encompassed by the Authority's Regional Strategy Plan (UYVDRA 1989). The plan recognised the value of the MMBW catchment areas for nature conservation and reference and stated that these areas be used and managed primarily for water harvesting and production purposes. It lists a number of sites of botanical and zoological significance whose values are to be protected. Freehold areas around Reefton are within an area to be used primarily for agriculture or recreation purposes, with Warburton, to the immediate south of the block, designated as an urban area but where development is constrained by the present lack of sewerage facilities. (The Upper Yarra valley is, however, being systematically sewered by the Melbourne and Metropolitan Board of Works.)

Management of the water supply catchment areas is the responsibility of the MMBW which controls access, land use and fire protection to protect the significant water production values. A management plan has been prepared for the Deep Creek Reference Area which proposes no facilities, restoration, or other works other than minor maintenance of fire access. Plans are being prepared over the remaining catchment areas.

Timber harvesting and other land uses in the State forest areas in the west of the block are controlled by the Department of Conservation, Forests and Lands and falls within the Central Forests Management Area. A management planning process is underway for this area and a final plan should be completed by September 1990. The remainder of the block, excluding MMBW vested lands, is encompassed by a management planning process for 'The Yarra Forests' (Dandenong Forest Management Area) with a final plan to be available by August 1991. Revised fire-protection plans for lands of the block within the Department of Conservation, Forests and Lands' Alexandra and Dandenong regions are presently being prepared.

The Department of Conservation, Forests and Lands has also commenced a road construction and upgrading program to gain access to timber in Victoria's Central Highlands. A recent discussion paper (DCFL 1989) notes that new road works (including widening and realignment) were proposed along Paradise Plains Road and Poley Road within the block, but not be proceeded with prior to the specific investigation of potential impacts.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of the Yarra River and Tributaries also apply.

Physical Setting

Situated in the Great Dividing Range, the block straddles both north- and south-draining catchments. Physiographically, remnants of the Cerberian, Kinglake and Acheron Plateau surfaces are the dominant feature, which is bounded by strongly dissected river valleys. Steeply plunging waterfalls (Steavensons, Cumberland and Coralynn Falls) occur on the margins of these elevated surfaces. High points on the plateaux include Mounts Kitchener, Observation, Ritchie, Strickland and Edgar and Smith Hill; elevations reach around 1200 m.

The broad valley of the Acheron River runs along the western boundary and with Steavenson River and Wilks and Oxley Creeks, drains to the north. The steeper river valleys of the O'Shannassy River, Armstrong and Smith Creeks drain to the Yarra River in the south.

Biological Setting

Mountain ash forests dominate the area, with only a few areas not covered by the tall (over 40 m) mature or regrowth forests.

Above 950 m, however, alpine ash is the dominant species, usually associated with shining gum and an understorey of ferns, sparse to dense shrubs and scattered small trees. At lower altitudes, mountain ash is dominant, in association with shining gum, manna gum, mountain grey gum and messmate stringybark. Tree ferns, dense layers of shrubs and small trees make up the understorey vegetation. Where gullies are sheltered, a closed forest develops comprising myrtle beach, sassafras and blackwood. Within the O'Shannassy catchment mature eucalypt stands are several hundred years old, containing spectacular trees up to 85 m high.

On the lower slopes open forests of messmate stringybark, narrow-leaf peppermint and silvertop occur. Understoreys vary with local climate and fire history. These open forests are confined to the Armstrong Creek catchment and the north-west corner of the block.

The vegetation communities provide a range of habitats for fauna, with wet sclerophyll forests being of particular value. Mammals known to occur in the block include the bobuck, Leadbeater's possum, the yellow-bellied glider, greater, sugar and feather-tailed gliders and a number of different bat species. A wide variety of avifauna, reptiles and amphibia are also thought to occur.

As part of the Land Conservation Council's review of the Melbourne Area, District 2, major surveys of the area's vegetation and fauna have been recently undertaken.

Cultural Setting

Aborigines have occupied the region since about 20–30 000 years before present. In the period prior to European settlement, tribal groups would probably have visited the block during the warmer months, returning to the lowlands during the colder months. Little evidence of their occupation remains, with few archaeological sites recorded by the Victoria Archaeological Survey. These include lithic scatters at Paradise Plains and a scarred tree at Cement Creek (du Cros 1988).

European use and settlement of the region followed on from the survey of the Yarra River in 1840.

Unlike most of Victoria, none of the block was taken up for grazing or agriculture. Timber harvesting soon became an established use in the forests to the west of the block. Timber harvesting occurred on the edges of the block for many years, particularly in the Acheron River catchment and on its northern edges (around the former Cambarville sawmill and township) following the 1939 bush fires for salvage logging.

In the 1860s, the Cumberland (Woods Point) Road, on the block's northern boundary was developed as a major route for goldfield traffic, and mining tracks were cut between Warburton and Marysville to link with part of the old Yarra Track which followed the Great Divide between Mount Strickland and Mount Grant. Another track was cut along the O'Shannassy River (then known as the Ligar River). A clearing on the former track, at Paradise Plains, is a relic of a small settled area which serviced travellers.

While prospecting would have occurred across the block, the only recorded mining is at the Sovereign Mine which operated in the 1870s on the north-eastern edge of the block on Reefton Spur, at Cambarville on the block's northern edge and, up until the 1930s at Mount Morgan on the north-east corner of the block. Water races were cut to service the mine and evidence of these remain.

Marysville, on the north-western edge of the block, became an important tourism centre in the 1870s, and perhaps reached its heyday in the 1920s as the train connected with Healesville and motor vehicles became more plentiful. The ridges, spurs, tall forests, fern gullies and waterfalls were the main attractions for pedestrians. Steavensons and Cumberland Falls were popular destinations within the block. The Acheron River dray track developed into a tourist drive.

In 1889 the catchments of the O'Shannassy River and Armstrong Creek were gazetted as reserves for water supply purposes (with the O'Shannassy vested in the Melbourne and Metropolitan Board of Works in 1910). The O'Shannassy catchment has not been used for purposes other than water supply and has been subject to policies of restricted access and utilisation since this time. The nature conservation values of the catchment has, however, been recognised since at least the 1970s. Much of the Armstrong Creek catchment was selectively logged in the 1960s.

In 1914 the O'Shannassy Weir was built. This was superseded by the O'Shannassy Reservoir, completed in 1928. The Armstrong Creek weir came into service in 1971.

WILDERNESS QUALITY

The centre of the block, mainly within the catchment of Deep Creek, a tributary of the O'Shannassy River, is an area of relatively high wilderness quality (classified as Class 4 in the Preece and Lesslie survey). The remainder of the block is of low to moderate quality. The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

Settlements on and beyond the block boundary create a concentric pattern of values for remoteness from settlement.

A band of high values, Class 3 in the Preece and Lesslie survey, extends from the centre of the block, south-west into the Watts River catchment, giving way to moderate and low values in the north, south and east.

Marysville is situated on the northern-most point of the block. About 5 km south-west of the block is the town of Warburton, while to the west and 15 km distant, is Healesville. Other small settled areas are McMahon's Creek and Reefton. These, together with the Upper Yarra Reservoir, which was considered as a cultural landscape feature, and its associated dwellings and facilities, were the major influences on values.

Other influences include a number of occupied dwellings within otherwise naturally vegetated areas of the former settlement at Cambarville, which lies on the north-east boundary close to the Cumberland Falls Scenic Reserve. In the south-east, within or on the block boundaries are the residences of MMBWs' caretaker staff and the O'Shannassy Resort, a former Melbourne and Metropolitan Board of Works' conference centre, now leased by the Victorian Tourism Commission and run privately.

Remoteness from Access

Values for remoteness from access are low largely because the major roads comprising nearly all of the block boundaries, allied to the relatively small size of the block.

There is also a moderately dense network of both minor roads and vehicular tracks within the block with higher densities in timber harvesting areas of the State forest. Most vehicular tracks within the Melbourne and Metropolitan Board of Works' catchment are maintained for fire protection purposes, as are most in the State forest areas. Others provide facilities associated with water supply purposes. Most of the tracks within the MMBWs' catchment areas have been constructed and maintained to a high standard, but have low levels of use with public access restricted. In the State forest areas, tracks are of variable quality but have few restrictions on use.

Details of the roads and tracks are given in Table 41 (see page 165) and their locations shown on Map 14. There are 67 km of trafficable roads within the block, 4 km of which are of major road standard. Only a few areas are more than 2 km from a minor road or vehicular track.

A number of walking tracks have been constructed in the Marysville area, like those in and around the Steavensons Falls Scenic Reserve. One links this area with Keppels Lookout, and there are others in the Cumberland Scenic Reserves to various waterfalls and lookouts. A disused timber tramway is still observable on the block's north-western margin.

Aesthetic Naturalness

A high density of structures results in a low value for the aesthetic naturalness of the area. The block's numerous roads and tracks along with a number of other structures depress aesthetic values. The structures are those associated with water supply, notably O'Shannassy Reservoir and Aqueduct, and other smaller weirs, a fire lookout tower and a number of residences and buildings.

All structures identified with the block are listed in Table 42 (see page 166) and shown on Map 14.

In addition, a helipad and a number of minor fire dams are maintained. Minor electricity supply distribution lines occur on the edges of the block.

Biophysical Naturalness

Biophysical naturalness values recorded in the Preece and Lesslie survey are very high (Class 4 - the highest class) in the O'Shannassy River catchment upstream of the reservoir. Here land-use disturbances have been few and relatively small scale. Elsewhere in the block recorded values are low because of timber harvesting in the past.

As the block lies close to a highly developed region of Victoria, the O'Shannassy catchment (and other closed MMBW catchments) are of notable value in contrast to the lower values of the surrounding areas. Current management practices ensure the protection of the area from most of the influences that have lowered biophysical values elsewhere.

Land-use Indicators of Biophysical Naturalness

Timber harvesting has occurred over most of the State forest areas since the 1920s. In the Acheron River catchment (between the western boundary and Mt Ritchie Track) the forests have been selectively logged several times. The upper Robertson Gully and middle reaches of Wilkes Creek were logged prior to the 1939 fires.

Selective logging throughout the Steavenson River catchment occurred in the 1920s and 1930s; the area was burnt in the 1939 fires and subsequently logged again in the 1960s. Armstrong Creek catchment was logged prior to the 1939 fires, in the late 1960s and, more recently, an area in the Reefton experimental area in the south-east of the catchment was logged as part of ongoing hydrological research. Harvesting in the 1970s and 1980s has taken place at Mount Kitchener, Mount Strickland and around Mounts Stinton and Grant. All areas known to have been logged are shown on Map 14.

A wolframite (an ore of tungsten) mine once operated at Wilkes Creek and there is a quarry near Oxley Creek.

There is no licensed grazing within the block.

Other Indicators of Biophysical Naturalness

In a study of nature conservation values of rivers and streams (BIOSIS 1988), Smith Creek and O'Shannassy River (above Deep Creek) catchments were assessed as being in an essentially unmodified condition. Further data, however, indicate that both are subject to modifying influences.

Timber resource information shows that about 49% of the ash-type forests and 94% of the mixed species forests consist of mature stands.

Some foxes, cats and dogs have been recorded in the block, but no rabbits. Sambar deer also occur.

A survey of sites of botanical significance for the Upper Yarra Valley and Dandenong Ranges Authority (McMahon et al. 1989) rated O'Shannassy River catchment of national

significance. This rating was based on the extensive and extremely high quality vegetation which is old, species-rich, undisturbed and having low or non-existent weed problems.

An earlier study (Gullan et al. 1979) included the O'Shannassy catchment, the Cement Creek catchment (partly in the block), the Acheron River, and Cumberland Creek Scenic Reserve (partly in the block) in sites of botanical significance due to the presence of, respectively, mature wet sclerophyll forest over a wide area, outstanding vegetation in excellent condition including significant species, rich fern-gully vegetation, and mature mountain ash and little-disturbed fern gullies. The O'Shannassy catchment was identified as being of national significance.

A study by Fleming et al. (1979) identified the O'Shannassy catchment and parts of the Armstrong catchment as being a site of national zoological significance due to the undisturbed wet sclerophyll forest having exceptionally high value for wildlife.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block. Measuring 18 km by 22 km at the widest points, the block covers 26 600 ha. Less than 10% has been classified (Preece and Lesslie 1987) as having relatively high (Class 4) wilderness quality, with the largest area presently without roads or vehicular tracks covering about 1250 ha. Essentially unmodified catchments comprise 5580 ha of the block.

Ecological Viability

Areas of high ecological value occur within the block and the likelihood of their maintenance under current conditions is high. Few introduced species occur, a range of habitat occurs and biophysical naturalness values are high. Track densities are comparatively high, however. Urban development also poses a potential threat to ecological conditions but its effects are largely nullified by the restricted access over the central (Melbourne and Metropolitan Board of Works catchment) areas of the block, and the presence of surrounding State forest. Here, and in catchment areas where some logging is permitted, ecological values are, however, lower. Although environmental protection is not the primary purpose of the water supply catchments, their management, which includes strict vermin and weed control, ensures high ecological viability. Maintenance of natural processes does not extend to fire regimes as all fires, where possible, are quickly suppressed.

Fire hazard is high. There have been frequent major bushfires within the block this century: 1918, 1926, 1939 and, most recently on its southern edge, in 1983. None of the fires have burnt the block completely and some stands of eucalypt forest are several hundred years old. Protection of the O'Shannassy and Armstrong catchments is a high management priority of the Melbourne and Metropolitan Board of Works. Fire protection measures - fire roads, fire lookout, dams, tanks, hydrants and fire-fighting equipment form part of the response to the fire hazard. No fuel-reduction burning is carried out in the water supply catchment areas.

LAND USE CAPABILITIES

Nature Conservation

Nature conservation values of the block are very high, largely as a result of extensive areas of mature mountain ash stands that are largely undisturbed, together with their respective faunal assemblages which cover a wide variety of mammals including arboreal and bat species. Different habitats are provided by regrowth forests and by the stringybark and peppermint open forests around Marysville, in the Armstrong Creek catchment and on the southern edge of the block. The Archeron River has a diversity of native fish.

Most of the O'Shannassy catchment area has not been burnt since at least 1939 and is devoid of human impact, other than the irregularly used road network and isolated works associated with water production. These factors ensure high values for nature conservation. Areas of largely undisturbed mature alpine ash and mountain ash forests have become increasingly rare in the State, confirming high conservation

status of the remaining (relatively) undisturbed areas. Some ash stands are considered to be over 250 years old.

Nature conservation values may have recovered, to some extent, in areas selectively logged prior to being burnt in 1939, but continued logging will continue to produce lower values elsewhere in the block.

Recreation

Recreation capability is high throughout much of the block particularly for bushwalking and nature study, and for inspiration and solitude. Recreational use is, however, severely limited by restrictions on public access over much of the block. Elsewhere, capabilities for sightseeing, scenic driving, fishing, deer hunting, picnicking and four-wheel driving are also high.

Recreation capability is high across the block, except where opportunities are diminished by timber harvesting. Access to the block is good and its proximity to Melbourne and the nearby towns ensures a high demand for recreation.



Stand of mature mountain ash in the catchment of Deep Creek

Recreational use of the block, outside the Melbourne and Metropolitan Board of Works' restricted access catchment areas, is quite high.

Natural features offering opportunities for recreation include the tall mature, little disturbed forests, fern gullies and myrtle beech communities, high quality mountain streams, waterfalls and cascades, and a range of scenic outlooks.

Most walking is undertaken on formed tracks in and around Marysville and the Cumberland Reserve. Specific destination points are the Steavensons Falls and associated lookouts, Keppels Lookout, Cumberland and Cora Lynn Falls and associated cascades and lookouts. Steavensons Falls is a major tourist designation, with over 100 000 people visiting this area annually. There are limited opportunities for off-track walking given the network of vehicular tracks on ridges and spurs, and the dense moist understoreys of much of the block's vegetation communities. The Acheron Way, Reefton Spur and Cumberland (Marysville-Woods Point) Roads on the boundary are popular for pleasure driving. Lake Mountain Alpine Resort, 3 km north-east of the block, has a high demand for cross-country skiing and snow play, and the Marysville and Cumberland Roads carry a high volume of winter weekend traffic. Picnic areas have been constructed at several locations, including along the Acheron Way.

Some fishing, of brown and rainbow trout, occurs in the Stevenson River and limited deer hunting occurs, such as in the Acheron Valley.

A number of commercial tour operators provide tours to the Steavensons Falls area in the north-west of the block.

Agriculture

Agricultural capability is low to moderate. Rainfall, which is high, is not a limiting factor, but topography and the short length of the growing season are generally limiting, particularly in the higher altitudes. Soil conditions vary considerably across the block. Under the present land tenure, agricultural development is precluded.

Capability for bush grazing would be moderate on the broader river valleys. No grazing licences are current in the block.

Apiculture

Apiculture is restricted to the State forest area. Alpine ash and messmate stringybark are suitable species and with available access and suitable sites with water, the State forest areas have moderate capability for honey production. There are no licenced apiary sites on the public lands of the block.

Timber Production

Mature alpine ash and mountain ash forests, of the type that cover much of O'Shannassy, are the most valuable timber forests in Victoria. Timber production capability is very high within the area and harvesting has been undertaken since the 1920s in the State forests. Fires have burnt much of the block, especially those of 1939, and as these regrowth stands reach maturity they form a valuable timber resource. Timber harvesting is not permitted in the restricted catchment areas, other than in the Armstrong Creek catchment. Timber production capability is, however, lower in the open forests of Armstrong Creek catchment.

The net available area of timber resources of the block, given current tenure and operational standards, consists of approximately 3436 ha of ash species forest, and 3838 ha of mixed species forest.

The descriptive block lies within the Central Forests and Yarra Forests Forest Management Areas. The blocks contribution to the regional sustainable yields of these management areas is being calculated by the Department of Conservation, Forests and Lands but was not available prior to publication.

Mineral Production

Wolframite exists in small quantities near Wilkes Creek where it has been previously mined. Ilmenite and zircon are present in sand deposits along the Acheron River, and gold has been mined at Canterville and on Reefton Spur. There are no known mineral deposits in the block and, as at August 1989, there were no current tenements under the Mines Act.

Mineral exploration and mining is not permitted in the closed catchment areas, including the reference area. Under existing tenure, about 36% of the block is potentially available for mineral exploration or mining.

Water Production

There is a very high capability for water production because of the reliable rainfall and high discharge. This resource has been well utilised on the south-draining streams, principally by the O'Shannassy Reservoir. The O'Shannassy River provides an important component of Melbourne's water supply contributing about 16% of streamflow of all harvested streams. The watercourses in the north of the block have lower streamflow and are physically less suitable for large-scale water harvesting. Stevenson River, however, has a small storage to supply Marysville. There is limited potential for further water resource development. Given the relatively undisturbed condition of most of the catchment areas, water quality is very high.

Table 41

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major Road	Minor Road	Vehicle Track				
1	Grantons Road		*		CFL	PA, FP		Access to private property & residence Timber extraction route
2	Andersons Mill Tk			*	CFL	FP, R, L		
3	Strickland Link Tk			*	CFL	FP, R		
4	Wilkes Ck Tk			*	CFL	FP, R		
5	Rons Tk			*	CFL	FP, R		
6	Paradise Plains Rd		*	*	CFL	R, FP, L		Parts used for timber extraction
7	Keppells Lookout Tk		*	*	CFL	R		Provides access to major tourist feature
8	Steavensons Falls Rd	*			Shire	PA, R		Provides access to major tourist feature
9	Yellow Dog Tk			*	CFL	R, FP		
10	Robleys Fire Line			*	CFL	FP		
11	Cumberland Rd	*			Roads Corp	PA, R		Boundary only (Marysville-Woods Point Road), crosses historic culvert
12	Road 8			*	MMBW/CFL	FP	Part MVO	
13	Tommy's Bend Rd			*	CFL	FP, R		
14	Olsens Track			*	CFL	FP, R		
15	Bismark Tk			*	CFL	FP, R		
16	Road 5			*	MMBW	FP	MVO	
17	Road 9			*	MMBW	FP	MVO	
18	Road 12			*	MMBW	FP	MVO	
19	Observation Rd		*		MMBW	FP	MVO	
20	Road 4			*	MMBW	FP	MVO	
21	Road 5			*	MMBW	FP	MVO	
22	Road 3			*	MMBW	FP	MVO	
23	Road 2			*	MMBW	FP	MVO	
24	Road 1			*	MMBW	FP, U	MVO	Boundary only
25	Road 6			*	MMBW	FP	MVO	
26	East Armstrong Rd		*		MMBW	FP	MVO	
27	Reefton Spur Rd	*			Roads Corp	PA, R		Boundary only
28	Armstrong Ck Rd		*		MMBW	FP	MVO	
29	Poley Rd (part Rd No. 8)		*	*	CFL/MMBW	FP, R		Timber extraction route
30	Road 3			*	MMBW	FP	MVO	
31	Road 11			*	MMBW	FP	MVO	
32	Road 18		*		MMBW	FP	MVO	
33	Road 1			*	MMBW	F, U	MVO	Boundary only
34	Road 13			*	MMBW	FP	MVO	Boundary only
35	Road 16			*	MMBW	FP	MVO	
36	Road 14			*	MMBW	FP	MVO	
37	Road 10			*	MMBW	FP	MVO	
38	Road 15		*	*	CFL/MMBW	FP, R, L	Part MVO	
39	Dugout Road			*	CFL/MMBW	FP, R	Part MVO	
40	Road 8			*	MMBW	FP	MVO	
41	Acheron Way	*			Roads Corp	PA, R		Boundary only, a declared tourist road. A mainly gravel road in good condition - 5.5 m wide Currently impassable
42	Lowering Gear Tk			*	CFL	FP		
43	Strickland Spur Tk			*	CFL	FP, R		
44	Road 7			*	MMBW		MVO	

KEY:

FP - Fire Protection
L - Logging
PA - Primary Access

R - Recreation
U - Utilities
MVO - Management Vehicles Only

Table 42
PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management	Purpose	Comments
1	Tramway	Old timber tramline	CFL	H	Largely overgrown
2	Anderson Mill picnic/camping area	Picnic/Camping Area shelter, horseyards	CFL	R	Old mill site, major horse/tour camping location
3	Keppel Lookout	Car park and info board	CFL	R	Popular lookout, picnic facilities planned
4	Steavensons Falls Picnic Area	Picnic area, pathway hydropower turbine, shelter, toilets, car-park	CFL(Committee of Management)	R, H	Major recreation area (>100,000 visitors per annum) further developments planned
5	MMBW Testing Station	Minor structures	MMBW	U	
6	Caretakers Dwellings	Residences (2)	MMBW	U	
7	Armstrong Creek Weir	Weir and Storage	MMBW	U	Part of Melbourne water supply system
8	Armstrong Creek Pipeline	Water Pipelines	MMBW	U	Part of Melbourne water supply system
9	O'Shannassy Reservoir	Reservoir	MMBW	U	Major water storage for Melbourne water supply
10	O'Shannassy Weir	Weir	MMBW	U	Part of Melbourne water supply system
11	O'Shannassy Aqueduct	Aqueduct	MMBW	U	Part of Melbourne water supply system
12	Somers Park Picnic Area	Picnic area, tables	CFL	R	(Maintained by Road Corporation)
13	Anderson Way Picnic Area	Picnic area, old timber mill site	CFL	R, H	Limited facilities
14	Poley Tower	Fire Tower	MMBW	FP	
-	O'Shannassy Resort	Conference centre, caretakers residence, lawns, sheds	Victorian Tourism Commission	R	Within closed catchment areas, access only by prior arrangement

KEY:

FP - Fire Protection
H - Historic Interest

R - Recreation
U - Utility

BLOCK 6 : AVON

Location and Boundaries

This block lies to the north of Maffra on the southern edge of Victoria's alpine area (see Map 10). Its northern boundary is contiguous with two other descriptive blocks from which it is separated by major roads. It covers an area of 114 360 ha and lies within the Shire of Maffra.

The block's western and northern boundaries follow the nearest roads surrounding the area of highest wilderness quality, with the southern and eastern boundaries generally following spur and ridgeline tracks that border the edges of the higher quality upper reaches of the area's south-flowing watercourses. It encompasses all of the headwaters of the Avon River.

Tenure and Land Use

The block contains parts of the Alpine National Park, the Avon Wilderness Area (proclaimed as the Avon Wilderness Park), and State forest.

Natural features zones have been defined along a number of major watercourses in State forest and a small natural features and scenic reserve is on the block's southern boundary at Ben Cruachan.

Four small freehold parcels are included within the block on its southern boundary.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 43 and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

A large part of the block (the areas within the Alpine National Park and Avon Wilderness Area) is within the Wonnangatta-Moroka planning unit of the Alpine Planning Project. A draft management plan covering this area has just been released.

The State forests of the block are within the Central Gippsland Forest Management Area. A forest management plan is presently being prepared.

Two areas of the block are within proclaimed water supply catchments. The northern edge of the block (to the north of the Moroka Range) is within the Mitchell River proclaimed catchment which also follows the eastern edge of the block to the east of Freestone Creek. A larger area to the north-west of the Razorback and west of Ben Cruachan Creek is part of the Glenmaggie proclaimed catchment. Offtakes in both catchments are downstream of the block's boundaries. Neither catchment is subject to a Land Use Determination or Notice.

A draft fire protection plan for the Department of Conservation, Forests and Lands' Central Gippsland Region

covers the block. Public submissions to this plan are presently being considered by the department. Key elements of the plan affecting the block are the proposed designation of north-south strategic burning corridors (Priority 2) across the western half of the block (east of the Mount Margaret Track), and in the east along the Moroka Track. Most of the remainder of the block, other than sensitive areas such as ash stands, alpine vegetation and reference areas are within general fuel-reduction burning zones (Priority 3 and 4). No specific additional track requirements are defined.

The provisions of the State Environment Protection Policies for the Air Environment, the Waters of the La Trobe River Catchment (eastern edge of block only) and the Waters of Victoria (remainder of block) also apply.

Physical Setting

The block is within the Eastern Victorian uplands and comprises three main geomorphic units - high plains in the north of the block, dissected plateau (the Wellington uplands) covering much of the Avon, Turtons and Valencia Creek catchments and the dissected uplands unit, which encompasses the remainder.

A thick sequence of gently folded non-marine sediments (sandstones, slates and conglomerates) of Upper Devonian-Carboniferous age underlie much of the dissected plateau areas of the block. Sediments of Ordovician age, as well as conglomerates and volcanics of Devonian age, outcrop elsewhere in the block.

These areas are strongly dissected having a number of high ridges and peaks, for example, Mounts Margaret, Hump and Ronald. Drops of up to 600 m occur between ridges and adjacent valley floors.

Intermontane basins have developed on New Place Creek (at around 500 m) on granitic bedrock and on the sediments in the upper reaches of the Moroka River. Lake Tali Karng, which was formed when a landslide dammed a small creek, occurs within this unit.

Tablelands associated with Gable End, Mount Wellington and Trapyard Hill have elevations from about 1400 to 1600 m, with Mount Wellington (1635 m) being the highest point. Part of the Bennison tablelands occur in the north-west of the block.

Cambrian sediments outcrop in the Dolodrook catchment.

Most of the block is within the Avon basin and most of the watercourses forming part of the catchments of the Macalister, the Avon or the Moroka Rivers.

Biological Setting

The majority of the block consists of low, open, mainly dry sclerophyll forests. They occur throughout the drier foothills and typically on northerly and north-easterly aspects.

Table 43

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Area (ha) within block	Planning scheme control ⁴	Special provisions ⁵
National park	A9, A113 (LCC 1983b) (Alpine)	21 970	Existing Public Purpose - CFL	No logging other than in now completed once only area. Deer hunting by stalking permitted ³ subject to conditions, ³ apiculture be permitted ³ and grazing permitted subject to review (government to variation LCC 1983)
Wilderness area	B1 ^{2,3} [(Avon proclaimed as Avon Area (proclaimed as Avon Wilderness Park)]	39 200	Existing Public Purpose - CFL	No grazing (Alpine ³ Study Area) within ¹ years of gazettal ¹ , or (within Gippsland Lakes Hinterland Study Area) by 1991 ²
including natural features and scenic reserve	D3 ² (Ben Cruachan, Valencia and Freestone Creeks, Avon River)	300	FCV - Reserved Forest	Nil
Hardwood ⁶ production	A8 ² (New Place)	3 270	FCV - Reserved Forest	Nil
State forest	I1 ³	27 200	FCV - Reserved Forest	Specified values to be protected ³
including natural features zone	M7 ³ , K8 ² (Ben Cruachan, Valencia and Freestone Creeks, Avon River)	Not available	FCV - Reserved Forest	No timber harvesting, gravel extraction, new roading only where essential ^{2,3}
Uncommitted Crown land ⁶	U1 ²	20 100	FCV - Reserved Forest	
Agriculture - (Macalister R, Ben Cruachan Ck, Navigation Ck, and at Valencia Ck)	Not applicable	2 365	Rural C	

Notes:

1. Refers to LCC Alpine Area Final Recommendations, 1979.
2. Refers to LCC Gippsland Lakes Hinterland Final Recommendations, 1983.
3. Refers to LCC Alpine Area Special Investigation Final Recommendations, 1983.
4. Refers to Shire of Maffra Planning Scheme.
5. Specific provisions relevant to area in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).
6. The hardwood production and uncommitted categories have been generally included within State forest in more recent LCC recommendations, and they are managed as one unit.

Silvertop is the dominant overstorey species in the dissected south-west areas, and yertchuk to the south-east. In more sheltered aspects, taller forests with mountain grey gum and white and yellow stringybarks dominate the overstorey. Understoreys in these forests vary according to aspect, elevation, soils and fire history and can range from bracken through to dense stands of shrub species. Low open forests of red box-red stringybark occur through the lower areas of the block, especially on the upper reaches of Ben Cruachan Creek and further north towards the Wellington River. They are generally found on the driest, steepest and most exposed sites. Understoreys tend to be tall and shrubby on moister aspects and heathy to low and shrubby on drier sites.

The high tablelands of the Mount Wellington plateau encompass a variety of alpine and subalpine vegetation. The open plains are fringed by areas of snow gum woodland occurring across the plateau with grassy or heathy understoreys. Mountain gum and candlebark also occur in a mixture with snow gum.

Montane forests of fire regrowth and mature alpine ash border these higher elevation areas and occupy the gully heads of the Avon and Turton Rivers, Valencia and Freestone Creeks, and McFarlanes Creek and above Lake Tali Karng. They also occur to the east of the Bennisons Plain Road. The understoreys at the higher elevations tend to be fairly open.

Mature and regrowth wet sclerophyll forest occur at lower elevations, with large areas in the Mount Hump Creek catchment. Overstoreys are dominated by shining gum and alpine ash, while the understoreys consist of shrubs, often with dense fern gullies.

Riverine forests border many of the lower watercourses such as the Dolodrook and Wellington Rivers. These typically occur with manna gum overstoreys.

The wide range of vegetation communities occurring in the block provides habitat for a variety of wildlife, including,

small ground-dwelling mammals arboreal mammals (the sugar and greater glider) and the platypus. Emus, powerful owls and peregrine falcons, mountain dragons and a number of skinks, and a large number of amphibian species are also common. Both introduced and native fish species occur in the streams of the block.

Cultural Setting

The descriptive block is part of the area that was occupied by members of the large Kurnai dialectal tribal grouping. Little visible evidence of Aboriginal occupation remains, with few archaeological sites recorded within the block.

European settlement has largely avoided the block. Access and settlement occurred along the Wonnangatta River to the east. The Macalister River on the western boundary of the block was used by the early European settlers, as had the Aborigines before them, as an important access route, with early mining tracks extending from here, approximately along the present Bennison Plains and Moroka Roads, before leading further north into the Moroka valley.

The alluvial flats of the Macalister River were also a focus for pastoral use, with the Mount Wellington plateau and Moroka basins used for summer high-plains grazing. The Wellington River valley, and the lower reaches of some of the Avon River tributaries (such as Ben Cruachan, Mount Hump, and Valencia Creeks) were also grazed. When areas were made available for selection, however, few were taken up other than along the Macalister River valley (Licola). Selections in the Wellington and Dolodrook River valleys were forfeited. Most of the remaining areas have continued to be used for grazing of unimproved native pasture.

The block was little influenced by goldmining, apart from a minor goldfield on its eastern edge which was part of the

Cobbannah goldfields. Chromite was mined on the Dolodrook River.

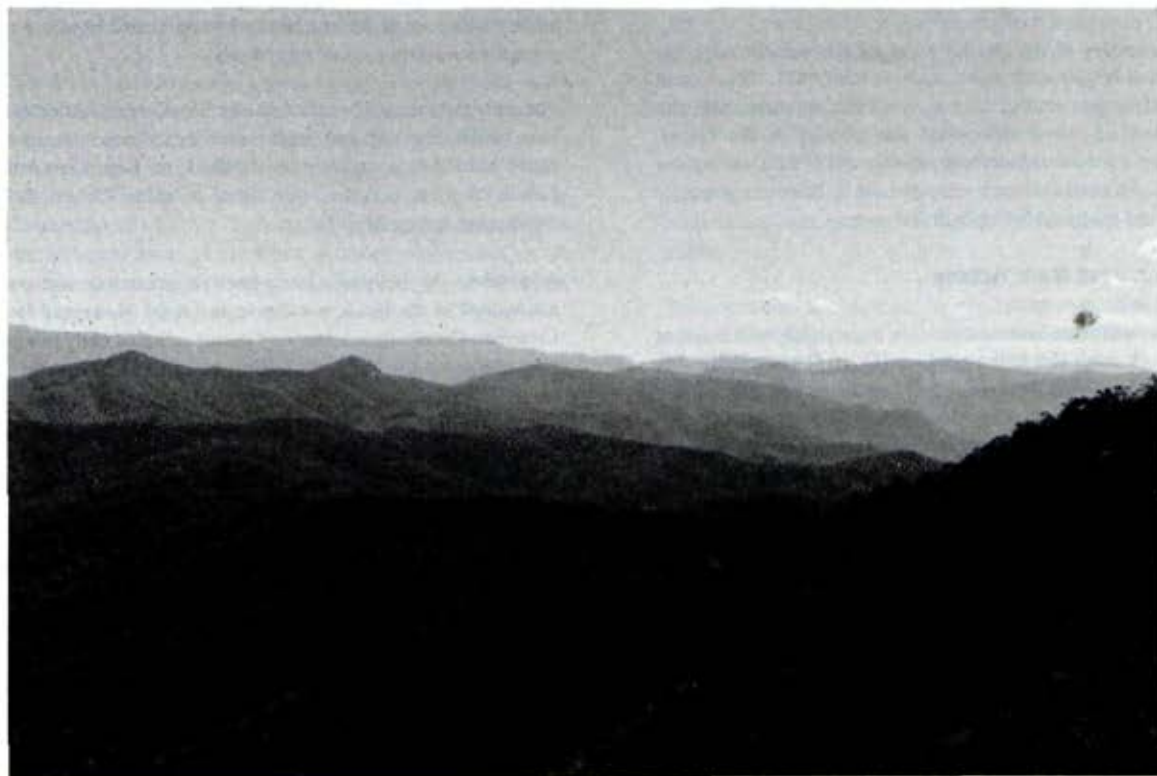
Timber extraction is a more recent influence. The first recorded logging occurred around Ben Cruachan in the 1950s. In the 1960s and early 1970s, it extended into areas in the north and west of the block, in the upper reaches of Carey River and McFarlanes Creek, and after 1975 (until 1987) into the upper reaches of the Moroka River on the block's northern boundary. Associated with this activity (and logging to the north of the block), roads were significantly upgraded and this enhanced access into the area for recreational use. Logging has also been carried out since the 1960s in the east of the block, north of Mount Blomford.

Recreational use has focused on Lake Tali Karng. It is thought to have been first sighted by Europeans in 1886 and in the 1920s became a popular destination for horse-riding trips from the Heyfield area. Since the Second World War, its popularity has increased significantly, with most bushwalking (the major recreational use) occurring in or around this area.

WILDERNESS QUALITY

The block includes extensive areas of high wilderness quality and is one of the largest areas of high wilderness quality in eastern Victoria. The Preece and Lesslie (1987) survey identified most of the block, other than areas towards its boundaries, as Class 4 or above in wilderness quality, with large areas in the upper Avon Creek area including parts of Turtons Creek, the Razorback and the fall into the Dolodrook River included within Class 5 or above wilderness quality.

Much of the Avon catchment and river headwaters around Mount Hump was included within an Avon wilderness in the



To the east of Mount Hump lies extensive areas of high wilderness quality value.

1979 Feller et al. inventory of wilderness in Victoria, with the buffer of the area roughly corresponding with the boundaries of the block.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The descriptive block is, other than parts of its western boundary, virtually surrounded by natural lands.

The major influences on remoteness from settlement values are the cleared cattle grazing properties on and beyond the block's boundaries. These occur along the river flats and adjoining slopes of the Macalister River in the Licola area in the west, small isolated properties at Golden Point, De Moulin Knob, and Hugget and along Valencia Creek. Similar areas occur on the Wonnangatta River and at Castleburn to the east.

The Department of Conservation, Forests and Lands' Surveyors Creek camp on the Moroka Road on the block's northern boundary is a small point of permanent occupation. It serves as a works base for management and logging supervision and, in particular, is used as a base for fire crews in the summer. It was a major influence on values recorded in the survey.

Given the distance of these influences from the centre of the block, substantial areas of very high remoteness from settlement value were recorded in the Preece and Lesslie survey, extending north of the confluence of Mount Hump Creek and the Avon River from Lake Tali Karng to Freestone Creek. The area was one of the more extensive areas included in Class 4 (the highest class) identified in eastern Victoria by Preece and Lesslie. Values were lowest on the block's western and south-western boundaries.

The boundary of the cleared areas on the western edge has remained largely unchanged since at least 1972. Much land on the margins of this area is, however, uncleared and the boundary of the settled lands may change in the future, thereby further influencing remoteness from settlement values. Most of this undeveloped land is, however, generally steep and marginal for agricultural uses.

Remoteness from Access

Remoteness from access values are high throughout much of the block, with the highest values (Class 4) recorded in the centre of the block by Preece and Lesslie.

The major roads influencing the block were the Licola-Heyfield Road, the Tamboritha/Bennison Plains Road and the Moroka Road. The Licola-Heyfield Road and part of the Tamboritha Road, are sealed, but the remainder are unsealed. All are on the boundaries of the block.

The only road within the block is the Marathon Road which crosses the eastern edge of the block and links the Moroka Road with Mount Blomford and Briagolong. The whole of the section within the block was classified as a vehicular track by Preece and Lesslie. The Moroka Track (also known as the Valencia Creek Track) was classified in Preece and Lesslie as a minor road but is more correctly described as a vehicular track. Two short logging roads at the east

boundary of the block were not included in the Preece and Lesslie data base.

Vehicular tracks occur throughout the block and generally follow the catchment divides. The density of tracks is highest in the Wellington River area and areas that have been subject to timber extraction. Most are only suitable for four-wheel-drive vehicles. A number of minor tracks (including some recorded in the Preece and Lesslie survey) have not been maintained and are now overgrown.

Some tracks are within the proclaimed Avon wilderness area and not available for general public use. Some of the roads and tracks in the area are subject to seasonal closure.

There are no major roads within the block with 21 km of minor road standard. It is one of the few areas in eastern Victoria with areas greater than 10 km from major or minor roads. Small areas in the centre of the block are more than 3 km from any grade of access. All tracks and roads of the block are listed in Table 44 (see page 174) locations shown on Map 14.

Walking tracks within the block include the Mount Margaret and Lake Tali Karng Tracks. The nearest landing ground is on the Snowy Plains (restricted use).

Aesthetic Naturalness

The block has virtually no structures within it, but the influence of the track network moderated the aesthetic naturalness values recorded in the Preece and Lesslie survey. Nonetheless, the block included one of the few areas in eastern Victoria identified as Class 3 (the second highest class) for aesthetic naturalness value. The highest values of the block were in the centre to the east of Mount Hump, with other nodes of high value within the Freestone and Valencia Creek valleys, where the track network was sparse, and to the south of Gable End (an area separated from the highest quality area east of Mount Hump by the inclusion of a now overgrown track in the survey analysis).

The only structures identified in the block were cattlemens' huts, a fire lookout and trigonometric stations. A small picnic area has also been established at Ben Cruachan. Details of these structures are listed in Table 45 and their locations noted on Map 14.

A number of helipads have been constructed and are maintained in the block, notably in the Avon River and Ben Cruachan Creek catchments, and minor relics of early mining may remain on the Dolodrook River and Freestone Creek.

There are no radio or air-navigation installations, power lines, fire dams, or constructed camping grounds. No areas of fencing are known to occur within the block's public lands.

Biophysical Naturalness

The Preece and Lesslie (1987) survey allocated low biophysical naturalness values over all of the block except, for the Avon Wilderness Area which was allocated moderate levels, given its previous history of light to moderate grazing.

Land-use Indicators of Biophysical Naturalness

The main intensive land uses within the block are timber extraction and grazing.

Table 45

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Chromite Mine	Mining huts (2)	CFL	R	Constructed in 1950/60s. Tin
2	Millers Hut	Cattleman's hut, yards	CFL	H, R	Former cattleman's hut. In good condition.
-	Gable End, Castle End and Ben Cruachan Trigonometric	Trigonometric station	Dep. of Property and Services	U	
3	Moroka Hut	Cattleman's hut	Private	CM, H, R	In good condition
4	Golden Point Hut	Cattleman's hut	Private	CM, R	Built approximately 1920, in reasonable condition
5	Ben Cruachan Summit	Picnic area, fireplaces	CFL	R	Used only irregularly

KEY:

CM - Cattle Management R - Recreation
H - Historic Interest U - Utilities

Note:

1. Trigonometric stations are shown on Map 14 by symbol.

Most timber extraction has been undertaken on the northern boundary of the block in the Carey River and McFarlane Creek catchments and along the Moroka Range. Extensive areas have also been logged north of Mount Blomford. Most of the harvesting has used clear-felling techniques.

All areas known to have been logged are shown on Map 14.

The main areas currently grazed are on the high plains in the north of the block, along some river valleys and the montane basin on New Place Creek. Areas recently grazed, but which are no longer used for licensed grazing, include the Mount Wellington plateau and other areas of river valleys throughout the block. Grazing use is seasonal. Grazing in the northern areas of the block is usually carried out in the warmer months of November to April, with the river valleys carrying stock during winter.

The main areas currently used for licensed grazing and other main areas previously used are shown on Map 14.

Other Indicators of Biophysical Naturalness

The block was covered by a study of nature conservation values of rivers and streams (BIOSIS, 1989). This study identified a large number (17) of river and stream catchments as essentially unmodified.

These essentially unmodified catchments included those of Valencia, Blanketwood and New Place Creeks, an unnamed tributary of Valencia Creek, the Moroka River, Upper Turton Creek and Upper Avon Rivers, an unnamed tributary of the Avon River, Mount Hump, upper Dolodrook, Thiele and the upper Ben Cruachan Creeks, as well as in the south-west the small catchments of Stony, Hickey, Stockyard,

McColl and Golden Creeks, and of Valencia Creek. The status of some of these (Valencia, Blanketwood and New Place Creeks, the unnamed tributary of Valencia Creek, and the Moroka River) catchments are being reviewed however.

Timber resource information indicates that about 34% of the ash type forests, and virtually all of the mixed species forests consist of mature stands.

Detailed surveys have been undertaken of the alpine vegetation of the block. None of the vegetation units represented in the block recorded mean weed compositions higher than 8%, although the report noted that weed composition was very much higher by roadsides or muster yards.

The block was also covered by the broad vegetation surveys of the East Gippsland sites of botanical significance study (Forbes et al. 1981). Most of the vegetation subcommunities included in the block had low mean weed compositions with the notable exception of riparian communities. Parts of the block were included in two sites of significance identified in the study. The Moroka River catchment site included the high country from Gable End to Mount Wellington as well as the Moroka River basin. The significance was based on the presence of high quality, varied, alpine wet heathlands and particularly on the extensive stands of mature, montane forest communities, as well as records of floristically and biogeographically important species. The study also identified the Wellington River catchment as a site of significance because of the presence of a number of undescribed species.

A broad-scale survey of the rabbit problem in Victoria (Nolan 1981) indicated that the block was considered to be

rabbit free or have very few rabbits, with another broad-scale survey of feral animals (DCL&S 1984) indicating that the area has wild dogs, deer (Sambar) on its western edge, and some feral cattle and horses. Cats and foxes also occur in the block and, on the alpine plains, hares.

The Wellington and Avon Rivers have self-supporting trout populations, having been stocked in 1969 and 1983 respectively.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 114 360 ha and is about 40 km long and 40 km wide. Of this, about 20% was classed in the survey of wilderness quality in Victoria (Preece and Lesslie 1987) as being in Class 5, 6 or 7 wilderness quality, and just over 40% of at least Class 4 wilderness quality. Essentially unmodified catchments, excluding those under review comprise 21 936 ha of the descriptive block. The largest area presently without roads or vehicular tracks is about 23 900 ha.

Ecological Viability

A large number of factors could enhance the ecological viability of the block. They include the area's high remoteness from settlement values, the dissected nature of much of the block, particularly on its western and eastern sectors, the apparent low level of introduced species, the large number of essentially unmodified catchments recorded and the number of major plant communities - ranging from alpine to low foothill forests. In addition, the absence or phasing out of grazing from much of the block, plus the limitations of vehicular access, also contribute to its ecological viability.

The fire hazard is high, especially in the lower elevation dry, predominantly stringybark forests which are readily flammable and very fire-prone. Bushfires are a particular hazard to the timber resources in the State forest areas, the surrounding freehold properties, and to the fire-sensitive alpine and subalpine vegetation communities. The area's dissected topography increases fire hazard. Fuel-reduction burns are undertaken within the block, other than in alpine heathland and snow gum woodlands, and much of the existing track network is maintained for fire protection purposes, as is the helipad network.

Most of the block was burnt in the 1939 bushfires, with major bushfires (greater than 1000 ha) in 1961 and 1964 burning areas on the northern edge of the block and larger areas in the Ben Cruachan Creek and Wellington River catchments. Much of the area north-east of Ben Cruachan, including the Valencia Creek catchment, was burnt in fires during 1964 and 1965.

LAND-USE CAPABILITIES

Nature Conservation

The block has high capability for nature conservation. It includes a range of environments many of which have been

little disturbed. It has varied geology including fossiliferous limestones of Cambrian age, which contain one of the richest occurrences of such fossils in the State, and the best representation of graptolite fauna (late Ordovician) in Australasia. A number of rare and significant plant species occur near Trapyard Holl, Mount Wellington and Castle Hill. The rivers include a diverse range of native fish species, with the Avon River containing the native grayling of vulnerable conservation status.

Recreation

Capabilities are high for remote bushwalking, inspiration and solitude, moderate to high for four-wheel driving, and on its margins, two-wheel driving. Capabilities are also high for fishing and hunting and to a lesser extent, horse riding. Capability for cross-country skiing is low.

Natural features of particular interest include the cliffs and escarpments of the Sentinels, Spion Kopje and Gable End, Lake Tali Karng, the Nigothoruk Creek waterfalls, the summits of Ben Cruachan, Mount Hump and Castle Hill, the snow grass plains, such as the Wellington Plain, the Wellington River, especially its gorge sections (near Gorge Creek), the long rugged divides such as the Razorback, the Avon-Turton Creek Divide, and along the Mount Margaret Track, and the deep-incised valleys, such as those of Ben Cruachan and Freestone Creeks, and the Avon and Turton Rivers.

Much of the area has a long history of use by bushwalkers and is heavily used. Lake Tali Karng is one of the most popular bushwalking destinations in the Victorian Alps. Walkers most commonly use the route from McFarlane Saddle via the Wellington Plains or the route via the Wellington River (Riggall Spur or Clive Lanigan Tracks). Other areas that are heavily used by bushwalkers, often in conjunction with trips to Lake Tali Karng, include Echo Point, Mount Wellington, the Spion Kopje range and the Wellington Plains.

More experienced walkers use the untracked rugged divides such as the Razorback and Purgatory Spurs and along the major watercourses such as the Avon, Turton and Dolodrook Rivers. The dissected topography, much of which is substantially unaltered, with its incised rivers and high ridges contributes to the areas' high capability for solitude and inspiration.

Some of the escarpments such as around Gable End and the Wellington Plateau provide opportunities for rock climbers. The Wellington River on the edge of the block is canoeable during high water. Rivers of the block are generally only canoeable downstream of the block's boundaries.

Spectacular views are obtained from many divides, as well as from peaks like Castle Hill, the Pinnacles (to the immediate east of the block) and Ben Cruachan.

Four-wheel-drive recreation driving and to a lesser extent, trail bikes, use tracks in the McFarlane Saddle and Mount Wellington areas, the Mount Margaret area, Valencia Creek, the lower reaches of the Avon River and Ben Cruachan. Horse-riding groups use a number of parts of the block such as around Lake Tali Karng and the Turton Spur. The Wellington River is a popular camping destination.

The Wellington River provides good trout fishing, and trout are also sought in Lake Tali Karng. Sambar deer are hunted along Valencia Creek and this use is also permitted within the Avon Wilderness Area. Some sections of Freestone Creek provide for limited fossicking.

School groups and other youth groups, such as the Scout Association, often use the Lake Tali Karng areas for walking and adventure activities. Permanent accommodation has been constructed by three schools adjacent to the Tamboritha Road immediately west of the block.

A number of commercial operators use parts of the block for both day and overnight trips. Some companies also provide transport for bushwalking parties. Drop-off points and tracks used include the Wellington River (Lake Tali Karng) Track, Mount Wellington Track, McFarlane Saddle, Moroka Bridge and the Mount Margaret Track. Most use is, however, on the block margins.

Agriculture

The capability of the block for agricultural development is low, although the small intermontane basin on New Place Creek has some potential. Such uses are, however, precluded by present land tenure.

Capability for bush grazing is generally low to moderate, but significant on the high plains country. Presently cattle are grazed under the authority of 11 licences. Details of these licenses are included in Table 46 (see page 176). Public land grazing within the Avon Wilderness Area is to cease no later than 1991.

Apiculture

The block has major significance to the honey industry for its dry subalpine flora, particularly white and red stringybark and red ironbark. The area has a wide distribution of flowering periods, which makes it particularly valuable.

Much of the central part of the block, however, cannot be utilised by beekeepers because of the steep terrain and poor access.

There are presently four defined bee sites licensed in the western corner of the block on the Tamboritha Road.

Timber Production

Present tenure and land use does not permit timber production from much of the block. It is, however, permitted in the eastern part of the block where there are extensive stands of mature alpine ash in the headwaters of Valencia Creek and to the north-west of Castle Hill. Mature and regrowth forests also occur in the Carey River catchment. These areas have high capability for timber production.

Timber production is also a permitted use in large areas of the moderate to high capability moist foothill forests of messmate, mountain grey gum and manna gum to the north of Mount Blomford, including the Valencia and Freestone Creek catchments and the lower capability forests to the south of the Avon Wilderness Area. The foothill forests in the south of the block are, however, readily accessible and important for the production of pulpwood (for the APM mill at Maryvale from integrated harvesting operations).

The net available area of timber resources, given current tenure and operational standards, within the block consists of approximately 1765 ha of ash species forest (including six hectares in once-only logging areas), and 6916 ha of mixed species forest. The descriptive block lies within the Central Gippsland Forest Management Area. The blocks contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation Forests and Lands but was not available prior to publication.

Mineral Production

Chromite has been mined at the Dolodrook River in the past and minor gravel extraction sites are located along the major logging roads on the edges of the block.

The Cambrian rocks in this area are prospective with respect to minerals associated with basic to ultra-basic rocks, while the Upper Devonian - Lower Carboniferous rocks have potential for copper and uranium. Serpentinite at Dolodrook River could have some capability for nickel production.

Two mineral exploration licences are current within the block. Details of these are provided in Table 47. There are no active mining tenements.

Table 47

MINES ACT TENEMENTS (As at August 1989)

Tenement type & Ref. no.	Lessee	Location
Exploration Licence		
2169 (part only)	CRA Exploration	Ben Cruachan east to and including Valencia Creek
2136	CRA Exploration	North of Mt Blomford

Under existing tenure about 54% of the block is potentially available for mineral exploration or mining.

Water Production

The Avon River has highly variable flows and may virtually dry up in severe drought years. It is, together with its tributaries, very important for downstream irrigation, as well as use for domestic, stock and industrial purposes. Diversion is committed to the extent of flows. All such diversion occurs outside the boundaries of the block.

Part of the Macalister River catchment is within the block and supplies high quality water to Lake Glenmaggie, the source of water for the Maffra-Sale irrigation area.

The waters of the block are also important sources of natural flows for the Gippsland Lakes. Water quality is generally good.

Table 44
ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Licola-Heyfield Rd - Tamboritha Road	*	*		CFL/Shire	FP, R, L		Boundary only, CFL past Licola
2	Mount Margaret Track			*	CFL	FP, R	Nil	Part boundary only
3	Wellington River Track			*	CFL	-	Closed to vehicles	Boundary only, walkers only
4	Black Soil Gully Track			*	CFL	FP, R	Closed at Wellington R	Proposed to be linked with B1 track
5	B1 Track			*	CFL	FP, R, L	Closed at Wellington R	
6	Carey River			*	CFL	-	Closed	Overgrown
7	Unnamed			*	CFL	L	Nil	
8	Bennison Plains Road		*		CFL	FP, PA, R, L	Nil	Boundary only
9	Moroka Road		*		CFL	FP, PA, R, L	Nil	Boundary only
10	McFarlane Road			*	CFL	L	Closed	
11	Mount Wellington Track			*	CFL	FP, R	Seasonal closure	
12	Moroka Range Track			*	CFL	FP, R	Nil	
13	Avon Turton Divide Track			*	CFL	FP	MVO	
14	Moroka Track			*	CFL	FP	MVO	
15	Pleydells Spur Track			*	CFL	FP, R	Nil	
16	Valencia Creek Track			*	CFL	FP, R	Nil	
17	Little River Track			*	CFL	FP, R	Nil	
18	Bleak Hill Track			*	CFL	FP, R	Seasonal closure	
19	Pinnacles Road			*	CFL	FP, R	Nil	
20	Castle Hill Road			*	CFL	FP, R	Nil	
21	McDonald Gap Track			*	CFL	FP, R, L	Nil	Boundary only
22	Killen Climb Track			*	CFL	FP	Nil	Boundary only
23	Lees Creek Track			*	CFL	FP, R	Nil	
24	Rim Track		*	*	CF L	L, FP, R	Nil	
25	Freestone Track			*	CFL	FP	Nil	

26	Marathon Road	*	*	CFL	L, FP, R	Nil	Part boundary only
27	Blanketwood Track		*	CFL	FP, L, R	Nil	
28	Williams Road	*		CFL	FP, L	Nil	
29	New Place Creek Road	*		CFL	FP, L	Nil	
30	Upper New Place Creek Track		*	CFL	FP, R	Nil	
31	Lower New Place Track		*	CFL	FP, R	Nil	
32	Bloomford Track		*	CFL	FP, R	Nil	
33	Grand Final Spur		*	CFL	FP, R	Nil	
34	Scrubby Creek Road		*	CFL	FP	Nil	Boundary only
35	Moroka-Valencia Creek Road		*	CFL	FP, R	Nil	
36	Paddy Lee Track		*	CFL	FP, R	Nil	Boundary only
37	Stans Track		*	CFL	FP, R	Nil	Boundary only
38	Mt Angus Track		*	CFL	FP, R	Nil	Part boundary only
39	Avon Road		*	CFL	FP, R	Nil	
40	McColl Creek Track		*	CFL	-	Closed	
41	Mount Hump Track		*	CFL	FP	MVO	
42	Wombat-Mt Angus Track		*	CFL	FP, R	Nil	Boundary only
43	Huggett-Mt Angus Track		*	CFL	FP, R	Nil	Part boundary only
44	Lower Block Track		*	CFL	FP, R	Nil	
45	Golden Point Track		*	CFL	FP, R	Nil	
46	Dolodrook Track		*	CFL	FP	Part MVO	
47	20 Acre Creek Track		*	CFL	FP, R	Nil	Part boundary only
48	Hickey Creek Track		*	CFL	FP, R	Nil	Boundary only
49	Burgoyne Track		*	CFL	FP, R	Nil	
50	Staircase Track		*	CFL	FP	MVO	
51	Mount Hump Track		*	CFL	FP	MVO	
52	Chromite Mine Track		*	CFL	FP, R	Nil	

Key

FP - Fire Protection
L - Slogging
R - Recreation

PA - Primary Access
MVO - Management Vehicles Only

Table 46
PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approximate no. of stock carried	Comments
L56 - 0562/130	Dunsmuir, Cummings and Bell	Snow gum woodlands and riverine forests	125 head	Part only (remainder in Block 8)
L59 - 83/152	Pritchett and Freeman	Snow gum woodlands and mountain open forest	100 head	Part only (remainder in Block 8)
L59A - 58/130	C. Hodge		96 DSE ¹	
L28	R. Elliot	Open forest		Grazed under agistment
L27 - 218/130	C. Hodge	Riverine forests and woodlands	160 DSE ¹	
L25 - 227/130	J.&J. Gunter	Riverine forests and woodlands	64 DSE ¹	Subject to 1991 phase-out
227/130	R.&M. Brown	Riverine forests and woodlands	64 DSE ¹	Main area outside block
L54 - 0263/130	Higgins	Snow gum woodlands	89 head	
L45 - 83/149A	J. Guy			
NP57A - 14/130	Dunsmuir R.A.	Mountain forest	40 head	Part only (remainder in Block 8)
67/2854	J.D.S. Gunter	Riverine forests and woodlands	1100 DSE	Licence may have lapsed

Note:

1. Represents stock allocation in dry sheep equivalents.

BLOCK 7 : MACALISTER HEADWATERS

Location and Boundaries

This block incorporates the catchment of the Macalister River, including the Caledonia River, above Licola and extends north of the Divide towards Mount Buller to encompass The Governors, Mount McDonald, and The Bluff (see Map 10). It falls within the Shires of Maffra and Mansfield and covers an area of about 91 870 ha.

The Tamboritha and Howitt Roads form the southern and eastern limits. The northern boundary follows King Billy and Bluff Tracks over Mount Lovick before dropping down the Howqua Track to Howqua Hills.

From west of The Governors the boundary traces Mitchells Track, Mount Sunday Road and then follows south along Bull Plain Road to Glencairn.

Tenure and Land Use

The bulk of the block (some 70%) lies within the Alpine National Park, with most of the remaining area being State forest.

A reference area is located on the East Branch of the Caledonia River, with other reserves, an education area, and a historic area on the edges of the block.

The only freehold land here is at Glencairn in the far south of the block, and small inliers towards the edges of the block at Higgins Hut on the Bennison Plains, and on the north-west of the Howqua River.

Table 48 provides details of the Council's recommended public land uses and the present planning scheme controls relevant to this region. The boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

That part of the block within the Alpine National Park is encompassed by the Alpine Planning Project which has just released a proposed management plan covering this area, the Wonnangatta-Moroka Unit Proposed Management Plan 1989, for public comment.

Table 48

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁴
National park	A1, A7 (Alpine)	70 890	Public purpose DCFL ² Forest Zone ³	Once-only logging (defined areas), apiculture, deer hunting (by stalking) permitted, grazing subject to conditions (with phase outs of The Bluff May 1991, and Howitt Plains 1988)
Reference area	C1 (East Caledonia)	570	Public purpose DCFL ²	
Historic area	G1 (Howqua Hills)	950	Forest zone ³	
Education area	H3 (Mt Tamboritha)	420	Public purpose DCFL ²	
State forest	I1	17 610	Forest zone ³	Special values to be protected Logging, gravel extraction zone prohibited. Essential roading only
including natural features	M7 (North branch of Jamieson River)		Forest zone ³	
Quarry	R3 (Warrambat slate quarry)	5	Forest zone ³	
Agriculture (Glencairn, Higgins Hut, Horsehill)	Not applicable	1 420	Forest zone ³ Rural C-Uplands Farming Zone ²	

Notes:

1. Refers to LCC Final Recommendations for the Alpine Area Special Investigation, 1983.
2. Refers to Shire of Maffra Planning Scheme.
3. Refers to Shire of Mansfield Planning Scheme.
4. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix 11).

That part of the block, within the Department of Conservation, Forests and Lands' Central Gippsland region is covered by a draft fire protection plan. Public submissions to this plan are presently being considered by the department. Key elements of the plan affecting the block are the proposed designation of a strategic fuel-reduction burning corridor (Priority 2) in the centre of the block. Most of the remainder of the block, other than sensitive areas, such as ash stands, alpine vegetation and reference areas, are within general fuel-reduction burning zones (Priority 3 and 4). No specific additional track requirements are defined.

The areas of State forest are within the Central Gippsland Forest Management Area. A forest management plan is being prepared for this area.

The whole of the block is within proclaimed water supply catchments; the Upper Goulburn covering the Howqua and Jamieson River catchments, and Glenmaggie covering the Macalister River catchment. No-land use notices or determinations cover these catchments to date. Water offtakes and storages are external to the block.

The provisions of the State Environment Protection Policies for the Air Environment, and, in the south, the Waters of the La Trobe River Catchment, and in the north, the Waters of Victoria, apply.

Physical Setting

A series of north-south ridges dominate the landscape in the Macalister catchment. This country comprises moderately dissected Upper Devonian-Lower Carboniferous sediments. Elevations range from about 400 m on the Macalister River to 1700 m at Mount Clear on the Divide. Drops of up to 600 m are common between ridges and adjacent valley floors. Several of the small plateaux, located on some of the ridges, are capped with Tertiary basalt.

In the east, the Howitt Plains - much of which are capped with Tertiary basalt - and Bennison Tablelands, form a plateau at around 1500 m. The small plateaux of The Bluff (1700 m), Mount Lovick (1540 m), and Mount McDonald (1626 m) are bordered by steep escarpments.

To the north-west, a dendritic stream pattern has developed on Cambrian (greenstones)-Lower Ordovician sediments. The topography is strongly dissected, rising from about 400 m on the Howqua River to 1446 m on the Governor.

Biological Setting

The principal factors governing the distribution of plant communities are elevation and exposure.

Above the treeline, such as on The Bluff and the Howitt and Snowy plains, subalpine open areas comprise herbfields, heathlands, grasslands, and wet heaths. These sites are the most exposed and are covered with snow for much of the winter.

Plant communities immediately below the treeline, such as along high ridges on Mount Clear, The Bluff, and the plateaux of the Howitt and Bennison plains, comprise snow gum open forests and woodlands. Mountain gum is an associated species at lower elevations.

Extensive alpine ash forests occur on sheltered slopes in the headwaters of the Jamieson River and around the Howitt and Bennison Plains.

At lower elevations mixed species forests occur, dominated by narrow-leaf peppermint. Broad-leaf peppermint and candlebark are typical of dry, steep aspects.

The diverse habitats of the region support a similarly diverse array of native fauna. Mammals include a number of species of antechinus. Subalpine areas support a large variety of birds, many of which are summer visitors. The sudden, vast increase in insects in the thaw attracts many species to the high country in spring. At least nine species of native fishes occur in the block, including three species of galaxiids.

Cultural Setting

Past use by Aboriginal groups seems to have followed a seasonal pattern. For most of the year they were restricted to the coast, moving up to the plateaux in spring and summer. Journeys to the forested mountains appear comparatively few. Both the Macalister and Howqua Rivers served as access routes. Greenstone found on the Howqua was important for tool making. Little visible evidence remains of their occupation, with only a few archaeological sites (mainly in the north-west of the block) recorded. Very little of the block has, however, been systematically surveyed for such evidence.

Cattlemen reached the Howqua River area in the 1840s, and began the practice of winter valley and summer highland grazing regimes, which have continued to the present. During this period, grazing runs had been taken up across much of the alpine area, including the Macalister River.

Recreation and tourism in the block gained popularity early in this century with organised bushwalking trips beginning in the 1920s. The Alpine Walking Track, which crosses the northern half of the block was marked during the 1970s. At this time four-wheel-drive and trail-bike use also increased, particularly around the Howqua valley. Such use was frequently associated with deer hunting and fishing.

Timber gathering was small scale and local prior to the 1930s. Following the 1939 fires and the destruction of the mountain ash forests close to Melbourne, sawlog harvesting increased within the block and grew further after 1945. Harvesting continues to the present day.

Gold was discovered and mined at Howqua Hills in the 1860s, leading to further prospecting and contributing to the development of a small mining township and mining tracks through the region. Little physical evidence of this period remains, although part of a smelter furnace chimney and mine shafts still exist.

WILDERNESS QUALITY

The centre of the block includes extensive areas of relatively high wilderness quality, with an isolated area identified further west centred on the Governors. The areas of highest value (Class 5 and above in the Preece and Lesslie survey) were recorded on the Macalister spur to the south of Mount Clear.

Remoteness from Settlement

Nearly all the block is forested public land, with the most notable exception being Glencairn, on the south-west boundary, a cleared area used mainly for cattle production. Part of this freehold retains a native vegetation cover and there remains a potential for clearing.

The only other influencing values of the block are external areas of settled land around Jamieson and Mansfield, at Howqua Hills (where there are a number of holiday homes), the former Wonnangatta Station, and Department of Conservation, Forests and Lands' work depot at Surveyors Creek. The cleared land around Mitchells homestead also influenced values.

As a result, recorded remoteness from settlement values were very high across most of the block, extending northwards into the Catherine River and were accorded the highest class of remoteness value (Class 4) by Preece and Lesslie. This area of highest value, in its entirety, forms one of the largest areas so valued in eastern Victoria.

Remoteness from Access

Values for remoteness from access are high in a large area in the centre of the block and around The Governor in the west. These values are principally influenced by the road networks. As most roads define much of the block's boundaries, remoteness values decline with proximity to the boundary.

There is only one minor road, Low Saddle Road, that traverses the block. It is located adjacent to the north branch of the Jamieson River. This, together with small sectors of other roads in the north and north-west of the block, were recorded as four-wheel-drive tracks in the Preece and Lesslie data base. As such, recorded values are decreased (although the adjacent Knobs Track was over-classified).

In the remainder of the block there are a relatively small number of lengthy vehicle tracks, with most concentrated in a few areas.

There are 37 km of trafficable roads within the block. The centre of the block includes one of the few areas in the State greater than 10 km from the nearest road, although none of the block is more than 3 km from any vehicular track. All tracks and roads of the block are listed in Table 49, (see page 183) and their locations shown on Map 14.

Defined walking tracks include the Alpine Walking Track, which crosses the north of the block along ridgelines via Mount McDonald and Mount Sunday to Mount Howitt (to the immediate north-east of the block). The Howqua Track follows the Howqua River along part of the block's western boundary and links the settlement of Howqua with the Alpine Walking Track. A number of walking tracks have also been constructed in the Howqua Historic Area.

The Bicentennial National Trail also crosses the block, following existing tracks along part of the Macalister River and the Macalister southern divide.

Aesthetic Naturalness

Nearly all the block has a low value for aesthetic naturalness, with small nodes of higher values centered on the Governors,

Macalister Spur and south of Breakfast Creek. These small areas of Class 3 aesthetic naturalness are among the very few areas of this classification in eastern Victoria (Preece and Lesslie 1987).

Values for aesthetic naturalness are mostly influenced by the vehicle tracks rather than by other structures. A number of cattlemen's huts occur, but these are concentrated along the Snowy Range, and the southern boundary. Three schools have also established camps on the southern edge. All structures recorded in the public lands of the block are detailed in Table 50, and their locations are shown on Map 14.

Biophysical Naturalness

Biophysical naturalness was assessed as being of low value by Preece and Lesslie due to the presence of cattle grazing and timber harvesting.

Land-use Indicators of Biophysical Naturalness

Cattle grazing, which began in the last century, has continued to the present day. Most licenced grazing now occurs on alpine and subalpine areas in summer and around Mount McDonald, Mount Clear, and the high plains in the east extending along the Snowy Range to the Bennison plains. Open forests along the Macalister and Howqua Rivers are also grazed.

Grazing has recently been phased out of areas around the Howitt plains and is to be phased out of areas around The Bluff in 1991 (these areas on the north of the block are presently grazed under agistment).

The main areas presently used for grazing are shown on Map 14.

Timber extraction lowered the biophysical naturalness ratings in the Preece and Lesslie survey. Most activity has been in the north, north-east, and east, with the alpine ash forests being the most heavily utilised.

Other Indicators of Biophysical Naturalness

An assessment of nature conservation values of rivers and streams in Victoria's south-east (BIOSIS 1989) found two catchments, those of *Grimme* and *Breakfast Creeks* to be essentially unmodified.

Timber resource information indicates that about 24% of the ash type forests and about 71% of the mixed species forests consist of mature stands.

A detailed survey of alpine vegetation (Forbes et al. 1984) produced an index of introduced plant species in the sites representing the vegetation communities within the block. Weed infestation was highest in riparian forest, montane riparian forest, and wet sclerophyll forest (7% of species and up to 6% cover). Most of the vegetation communities recorded low levels of weed infestation. In the survey of alpine vegetation (Walsh et al. 1984), a site of botanical significance was identified at Snowy Range-East Caladonia River headwaters in the far east of the block, included four areas of high rating because of their being one of the lowest altitude alpine communities and containing four rare plant species.

Table 50

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Fry's Hut	Homestead, yards	CFL	H, R	Built in 1930s
2	Sheepyard Flat/ Davons Flat	Toilets, information board	CFL	R	Major camping area
3	Noonans Hut	Hut	Licensee	R	Permissive occupancy
4	Pickerings Hut	Hut	Licensee	H, R	Permissive occupancy
5	Gardiners Hut	Hut	Licensee	H, R	Permissive occupancy
6	Jamieson Hut	Hut	CFL	R	
7	Bluff Hut	Hut	Licensee	CM, R	Licensed
8	Lovicks Hut	Hut	Licensee	CM, R	
9	Clear Creek Hut	Hut	Sawmill	L	
10	Mitchells Homestead	Ruins	CFL	H	
11	Brissces hut	Hut	CFL	R	
12	Kelly's Hut	Cattleman's Hut	CFL	CM, H, R	Cattleman has prior usage right
13	McMichaels Hut	Cattleman's Hut	CFL	CM, R	Cattleman has prior usage right Freehold
14	Melbourne Grammar School Camp	Dormitories, and associated facilities	Private	R	
15	Traralgon High School Camp	Dormitories, recreation hall and associated facilities	Private	R	
-	Macalister and Barkly River Gauging Stations	River Gauging Station	Rural Water Commission	U	

KEY:

CM - Cattle Management R - Recreation
H - Historic Interest U - Utility
L - Logging Purposes

Notes:

1. Gauging structures shown by symbol on Map 14.
2. Two cattleman's huts are located on freehold lands on the southern edge of the block. (Higgins and Chesters Huts) and the Traralgon Catholic Regional College has also established a school camp with dormitories, recreation hall and associated facilities in this area.

Weed species recorded include blackberry, St John's wort, oxeye daisy and sweetbriar. Feral animals recorded include cattle, horses and dogs, with Sambar deer also found. (DCLS 1984). In an alpine vegetation survey (Walsh et al. 1984), rabbits were recorded as causing vegetation damage due to heavy grazing around Mount Clear, and, although widespread in the alps and subalps, damage was not identified at any other locations. Foxes have also been recorded.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The block encompasses an area of about 93 870 ha and extends about 33 km east-west and 40 km north-south. Of this, about 20% was included in at least Class 4 wilderness quality by the Preece and Lesslie survey, with less than 10% being included in the highest three (Class 5, 6, or 7) classes. Identified essentially unmodified catchments cover an area of about 3596 ha, with the largest area presently without roads or vehicular tracks being approximately 13 300 ha. Note that these areas are overlapping.

Ecological Viability

The block's size, the presence of large untracked areas, the apparent relatively low numbers of introduced plants, and its dissected topography, would all enhance its viability. It also includes a diverse range of vegetation.

Large areas have, however, been disturbed by timber harvesting, cattle grazing and other disturbances, with alpine and subalpine communities proving, in particular, susceptible to fire, grazing and recreation impacts.

Fire hazard is high and wildfires are a regular occurrence, with lightning strikes being the most frequent cause. In addition to the 1939 fires which burnt most of the block, major fires burnt parts of the block in 1964 and 1985. Fire access tracks and helipads are maintained. Fuel-reduction burning is undertaken except in reference areas, areas of alpine ash and snow gum forest and in the subalpine communities.

LAND-USE CAPABILITIES

Nature Conservation

Much of the block has a high capability for nature conservation, although many areas have been disturbed.

It includes a diversity of vegetation communities ranging from alpine and subalpine communities to wet and dry sclerophyll forests. A number of rare and restricted species have been identified in the block such as the sedge, *Carex cephalotes*.

Habitat for native wildlife varies from subalpine herbfields to riparian forests, with the high conservation values for wildlife attributable to the diversity of species and presence of rare and restricted species. Notable species include the smoky mouse and the chocolate-wattled bat. The Howqua, Jamieson and Macalister Rivers include a diverse range of native fish.

Recreation

Recreation capability is high for bushwalking, cross-country skiing, fishing, four-wheel-driving and horse riding and moderate for fossicking, canoeing and deer hunting.

Natural features of interest include the Macalister, Barkly, and Caledonia Rivers, Mount Tamboritha, Butcher Country Spur and rugged country and waterfalls around the Crinoline, the extensive high plain areas - notably the Howitt, Snowy, and Bennison plains, other peaks such as the Governors, Mount Clear and the rugged escarpments of The Bluff. Spectacular views can be obtained from a number of high points - notably from Mount Clear and the Crinoline, as well as from The Bluff-Mount Magdala ridge.

A significant recreation feature is the Alpine Walking Track: also as McMillans Track on the block's southern boundary and the Howqua feeder track in the north. In addition to these long-distance tracks, a number of others are used for shorter walks.

Popular walking areas are around the Howqua valley, with The Governors, The Bluff and Mount Lovick popular destination points. The Bluff-Howitt ridge walk in particular is extremely popular and considered by some to be one of the best in Victoria. Mount Clear and, in the south, the Crinoline are also heavily used walking areas.

Cross-country skiing is focused on The Bluff-Mount Lovick areas, as well as snow plain areas off the Howitt Road. Mount Howitt is increasingly popular for highly challenging cross-country downhill skiing.

Most tracks are used by four-wheel-drive vehicles including the track from Howitt Hut to Bull Plain Spur, traversing the centre of the block. Recreational driving is common around Mount Tamboritha and Bennisons Plains. As road access has been upgraded, the Howqua Hills Historic Area has become popular for two-wheel-drive vehicle based recreation.

Horse riding is popular in the Howqua valley around the Bluff and on the Howitt and Snowy Plains. The Bicentennial National Trail may attract further use by horses in the future. Camping is concentrated over summer and autumn, and popular camping areas are at Caledonia-Macalister Rivers junction, Mitchell homestead, and Sheeppark Flat, as well as in the vicinity of cattlemen's huts - some have four-wheel-drive access only. Trout are sought in all the major rivers and creeks of the block, with the Howqua River having particularly high value for salmonid fishing.

A number of commercial horse-riding operators offer tours within the block. Vehicle-based bush tours also operate

within or through the block. Most involve overnight trips to areas such as The Bluff, Sheeppark Flat, Bull Plain Spur, Mount Lovick and Mount Sunday. Operators also provide transport for bushwalkers, and ski tours in The Bluff, Mount Clear, Howitt Plains and Snowy Range areas.

Agriculture

Capability for agricultural development is moderate in lower areas in the valleys, but low elsewhere. Present tenure precludes such use over the public lands of the block.

Grazing capability is high in snow gum and the grassy understoreys of alpine ash forests in summer/early autumn and on the river flats in winter; elsewhere the capability is moderate.

Grazing is a permitted use over much of the block, with the exception of specified phase-out areas in the north. Presently four graziers hold ten licences covering the block. Details of these licensed areas are included in Table 57. Formerly licensed areas in the north of the block centred on phase-out areas are presently grazed under agistment.

Apiculture

The block includes areas of major significance to the honey industry, with over 25 different eucalyptus species used by about five beekeepers every year.

A major constraint on apiculture has been the lack of access for hive-carrying trucks and thus most of the block has been little used.

There are six defined licensed apiary sites most of which are on the boundaries of the block in the south.

Timber Production

Alpine ash forests are a valuable timber resource and the mature and regrowth forests of the block have a high production capability. Although fragmented, these forests are prevalent in the east and north, particularly around The Bluff, Mount MacDonald, Mount Havelock, Mount Clear and along the Snowy Ranges. Both the subalpine woodlands and dry foothills forests have low timber capability, while the extensive tall open forests are of moderate to high capability.

Much of the block is now unavailable to harvesting, being within the Alpine National Park. However, some areas were harvested prior to their inclusion in the park. In addition to earlier logging, 'once-only' logging was permitted in several areas.

The net available area of timber resources, given current tenure and operational standards, within this descriptive block consists of approximately 2291 ha of ash species forest (including 379 ha in once-only logging areas), and 1475 ha of mixed species forest (including 218 ha in once-only logging areas).

The descriptive block lies within the Central Gippsland Forest Management Area. The blocks contribution to the regional sustainable yield of this management area is being calculated in the Department of Conservation Forests and Lands but was not available prior to publication.

Table 51

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no. of stock carried	Comments
5417	N.E. Chester	Subalpine woodland and open forest		Not known
L49-0228/130	R. Gilder and Higgins	Montane forest	120 head	
L50-0575/130	Chesterfield P/L	Open forest	135 head	
L54-0263/130	Estate of J.C. Higgins	Small amount subalpine woodland open forest	18 head	
NP-48-86/146	Chesterfield P/L	Alpine heathlands and woodlands	156 head	Part only. Remainder in Block 8
L39-579/130	R.A. Gilder	Subalpine woodland	67 head	Licence not to be renewed
L40A-61/130	Chesterfield P/L		54 head	
L40B-20/130	Higgins	Subalpine woodland and montane forest	20 head	
NP40A-83/130	Chesterfield	Subalpine woodland	40 head	
NP40B-83/147	Higgins	Open forest	20 head	

Mineral Production

A small part of the Howqua goldfield, in the far north-west, was mined between 1860 and 1930. Eductor dredging has been allowed in the Macalister River and tributaries. The Cambrian rocks in this area are prospective with respect to minerals associated with basic to ultra basic rocks.

Under existing tenure about 23% of the block is potentially available for mineral exploration or mining. As at August 1989, one exploration licence is current (ELA 2490 - Mount Gipps. Ltd). It covers an area centred on Sheeppyard Flat.

Water Production

Although an important catchment area for two large water storages, there are no water resource developments.

Glenmaggie Reservoir is fed by the Macalister River whose catchment covers much of the block. Waters from Macalister River are also a major source of fresh water to the Gippsland Lakes. The catchments of both the Howqua and Jamieson Rivers which are impounded by Eildon Reservoir, cover the north-west of the block.

Table 49

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Mitchells Rd/Tk		*	*	CFL	FP, R	Seasonal closure	Boundary only
2	Steiners Rd		*		Zemtile P.L.	MA	Nil	Maintained by mining company
3	Howqua Hills Rd			*	CFL	FP, R	Seasonal closure	
4	Howqua Hills Mine Track			*	CFL	R	Nil	To be closed
5	Eagles Peak Tk			*	CFL	FP	MVO	Part boundary
6	Brock Rd		*		CFL sawmill	CM, FP, R	Part seasonal closure	(Part formerly Eight Mile Creek Track)
7	Bluff Link		*		CFL	FP, R	Nil	Boundary only
8	Refrigerator Gap Tk			*	CFL	FP	MVO	
9	Bluff Tk			*	CFL	FP, R	Seasonal closure	
10	Cairn Creek Rd			*	CFL	FP	Nil	To be closed
11	Mt Clear Tk			*	CFL	FP, R	Seasonal closure	
12	Cleak Creek Rd		*		CFL/Sawmill	L	Seasonal closure	
13	Peters Creek Rd			*	CFL	L	Seasonal closure	
14	Howitt Rd		*		CFL	FP, R, L	Seasonal closure	Boundary only
15	Butcher Country Tk			*	CFL	FP, R	Seasonal closure	
16	Caledonia Road Tk			*	CFL	FP, R	Seasonal closure	
17	East Caledonia Tk			*	CFL	FP, R, L	Nil	
18	East Log Tk			*	CFL	FP, R	Seasonal closure	
19	B3			*	CFL	FP, R, L	Seasonal closure	
20	Bennison Plains Rd	*	*		CFL	FP, R, L	Nil	Boundary only
21	Dingo Hill Rd			*	CFL	FP, R, L	Nil	
22	Breakfast Ck			*	CFL	FP, R, L	Nil	
23	Bull Plains Spur Tk		*		CFL	FP, R	Nil	Boundary only
24	Sisters Tk			*	CFL	FP, R	Nil	
25	Blue Plains Spur Tk			*	CFL	FP, R	Seasonal closure	Boundary only
26	Knob Spur Tk			*	CFL	L	Nil	
27	Knobs Tk			*	CFL	FP, R	Nil	
28	Son of a Bitch Spur Tk			*	CFL	L	Nil	
29	Low Saddle Rd		*		CFL	FP, R, L	Nil	
30	Mt Sunday Rd		*	*	CFL	FP, R, L	Nil	Boundary only

KEY: CM - Cattle management MA - Mine access
 FP - Fire protection R - Recreation
 L - Logging

BLOCK 8 : WONNANGATTA--MOROKA

Location and Boundaries

The block covers an extensive part of the Victorian alps centred on the catchment of the Wonnangatta River to the south of the Great Dividing Range. It encompasses an area of 109 300 ha and is totally surrounded by other descriptive blocks. Its location is shown on Map 10.

It lies within the boundaries of three municipalities, being the Shires of Maffra, Bright and Avon.

The boundaries of the block generally follow the alignment of roads surrounding the areas of higher wilderness quality (Howitt Plains Road, Moroka Road and the Tea Tree Range Road). In the north the boundary follows the catchment divide along the Barry Mountains.

Tenure and Land Use

Much of the block is within the Alpine National Park, the boundaries of which also include two reference areas. The

remainder of the public lands of the block are mostly State forest.

There is little freehold land in the block and this is limited to a number of small properties on the Wonnangatta River in the south-eastern corner of the block between Eaglevale and Crooked River. Small allotments in the centre of the block, known as the Wonnangatta Station, were purchased by the Government in 1988.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to the land uses of the block are outlined in Table 52 and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

Much of the block (those areas within the Alpine National Park) is encompassed by the Wonnangatta--Moroka Planning

Table 52

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁵
National park	A1, ⁴ A10, A12, A13 - (Alpine)	82 110	Public purposes - CFL ₂ , public purposes - ³ Crown land, protected forest ⁴	Grazing permitted subject to conditions, other than on the Howitt Plains where it is subject to phase out by 1991, ^{6,7} logging not permitted other than in defined once-only logging areas, ⁸ and deer hunting permitted subject to conditions, ⁸ and apiculture permitted
Reference area	C2, C3 - (Wonnangatta River Mt McAdam)	670	Public purposes - CFL ₂	Nil
Natural features & scenic reserve	D9 - part only (Mt Sarah)	420	Public purposes - Crown land ³	Grazing subject to conditions, apiculture and roading essential for management permitted. ⁸ A 40 m strip of alpine ⁸ ash surrounding the ridge not to be harvested
State forest including Natural features zones	I1 M7	24 780))	Public purposes - CFL ₂ , protected forest ⁴	Defined special values to be protected. No timber harvesting or gravel extraction, and only essential roading, ¹
Agriculture (Eaglehawk/Hawkhurst)	Q2, Q3 Not applicable	10 1 280	- Rural general farming A ₄	

Notes:

1. Refers to LCC Alpine Area Special Investigation Final Recommendations, 1983.
2. Refers to Shire of Maffra Planning Scheme.
3. Refers to Shire of Bright Planning Scheme.
4. Refer to Shire of Avon Planning Scheme.
5. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II)
6. Government amendment to LCC, Alpine Area Special Investigation Final Recommendations, 1983.
7. Grazing was withdrawn from Howitt Plains area in 1988 at the time the government purchased the Wonnangatta Station freehold.
8. Refers to LCC, Alpine Area Final Recommendations.

unit of the Alpine Planning Project. A proposed management plan covering this unit has just been released for public comment.

The block's State forest lies within two Forest Management Areas - in the north, the Wangaratta Management Area, and in the south, the Central Gippsland Management Area. Forest management plans are presently being prepared for these areas.

The whole of the block is also covered by a draft fire protection plan for the Department of Conservation, Forests and Lands' Central Gippsland region. Public submissions to this plan are presently being considered by the department. Elements of proposed pre-suppression strategy include: detection primarily from fire lookouts; maintenance of existing tracks and roads, waterpoints, helipads, and the Snowy Range Airstrip; construction of new tracks where necessary for fire suppression or establishing fuel-reduction burning control lines; and new dams, water points and helipads as required. Most of the block, other than some communities such as ash stands or alpine vegetation and reference areas, is proposed for some form of fuel-reduction burning, with a strategic burning corridor proposed along the eastern boundary of the block.

The whole of the block is within the proclaimed water supply catchment of the Mitchell River. No land-use notice or determination has been declared over this catchment to date.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

The dominant landscape elements are the high gentle undulating Howitt Plains plateau and the Bennison Plains tablelands (1600–1450 m) in the western half of the block. These and surrounding areas, including much of the Moroka River catchment, are formed on Devonian sediments, volcanics and conglomerates. Tertiary basalts cap the plateau at Howitt Plains and near Bryces Plain.

Elsewhere the block consists of highly dissected Ordovician sediments which have formed a rugged mountainous terrain incised by the tributaries of the Wonnangatta and Humffray Rivers. The east margin of the block is formed by the Tea Tree Range which extends south from the granitic intrusion of Mount Selwyn (1410 m) on the Great Divide through the rounded summits of Mount Sarah (1550 m), Mount Hart (1250 m) and Mount Von Guerard (1235 m). The high narrow ridge of the Barry Mountains along the northern boundary of the block is also formed mainly from these sediments. A small cave has been identified near Mount Speculation.

Elevated basins occur on the Wonnangatta River and upstream of the Moroka Gorge in the headwaters of the Moroka River. Alluvial deposits are found here as well as in other broader valley segments of Riley Creek, Humffray River, the Wonnangatta River and Carey Creek.

Streams drain from the elevated tablelands in deeply dissected valleys towards the Wonnangatta and Moroka Rivers, and in areas of Ordovician sediments they generally flow south-east. The lowest point of the block is near the

confluence of the Wonnangatta and Wongungarra Rivers at about 220 m.

The edges of the high plateau and tablelands have, in places, formed precipitous escarpments, particularly on the edge of the Snowy Range and south of Mount Darling, as well as on the edges of the synclines extending towards Snowy Bluff and Mount Kent.

Biological Setting

A wide range of vegetation communities is found within the block. These range from the alpine and subalpine herbfields and heathlands, snow gum woodlands and open forests occurring on the plateaux, tablelands and higher ridges to the mountain swamp gum woodlands and manna gum forests along some of the larger watercourse valleys.

Most of the block is vegetated with wet and dry sclerophyll forests. Narrow-leaf peppermint dominates the overstoreys on moist sheltered slopes such as in the upper Wonnangatta River valley, while open forests of broad-leaf peppermint and mountain gum predominate elsewhere at higher elevations, with red stringybark predominant at lower elevations. Understoreys become more open and heathy on the drier sites.

Some of the more sheltered higher slopes are occupied by alpine ash forests. These consist of logging and fire regrowth as well as mature stands. Understoreys are generally heathy to shrubby. They are mainly found on the margins of the block, as well as around Mount Darling and Mount Kent.

This wide range of vegetation provides habitat for a diverse fauna, for example small ground-dwelling mammals and arboreal mammals, birds ranging from emus to scrub-wrens and honeyeaters, a number of reptiles and amphibians. At least seven native fishes occur including two galaxiids and the grayling.

Cultural Setting

Aboriginal people belonging to a group of tribes known as the Kurnai would have had cultural associations with the lands of the block and utilised it in the warmer months. Little evidence remains of their occupation and only three Aboriginal archaeological sites have been recorded (although there has been no detailed survey undertaken of the block).

Europeans sought gold within the block in the mid-1800s, with goldfields discovered on the Crooked River in the south-east corner of the block in 1860. Subsequently, mining tracks were cut along the Wonnangatta and lower reaches of the Moroka River, linking the goldfield with settled areas beyond the block. Small townships known as Howittville and Winchester were established here but were short-lived.

A pastoral run was established to the north of the goldfields at Eaglevale in 1858 and covered much of the southern half of the block. The Wonnangatta Station, in the heart of the block, was first licensed in 1866 and encompassed most of the northern half of the block. The homestead properties of both runs were selected in the 1880s and in 1870 respectively, and subsequent to that time most of the former runs were included under some sort of grazing licence. The original Wonnangatta homestead, which was the focus of much

activity in the late 1800s and early 1900s, was destroyed by fire, although a small (recently restored) cemetery remains. The areas around the homestead would have been cleared and pasture species introduced.

Summer grazing of the high plains and along the river valleys has remained a significant use of much the block to the present day.

Organised bushwalking, often involving long trips by large parties with packhorse, was well established by the 1920s and boomed in the early 1930s. The Barry Mountains, Mount Speculation, The Cross Cut Saw, Mount Howitt and the Howitt Plains became popular destination points, particularly for less-structured walking parties after World War II, and remain extremely popular with bushwalkers.

The timber resources of the block were first exploited in the south of the block in the mid-1960s, and by the mid-1970s had extended into the headwaters of the Wonnangatta, Moroka, and Humffray Rivers and Carey Creek. The logging of some areas at this time, such as around Mount Kent, and in the upper Wonnangatta was very controversial due to conflict with wilderness and recreational values. Logging has continued in some of these areas and extended into the headwaters of the Humffray River.

Four-wheel-drive touring and trail-bike use became popular in the mid-1970s and the eastern half of the block has become an especially important area for four-wheel-driving.

WILDERNESS QUALITY

Much of the block, generally west of the Wonnangatta River, was included in a wilderness identified in the Feller et al. (1979) survey. The area identified extended north of the block into the Catherine River catchment.

The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) indicated that a number of areas within the block had relatively high wilderness quality. Three main areas were identified: the upper reaches of the Wonnangatta River (extending into the Catherine River catchment in Block 10), part of the Humffray River catchment and, the largest area of the three, extending between Mount Darling and Snowy Bluff in the centre of the block. This last area also recorded the highest values of the block - Class 5. Smaller areas of high value included those around the Moroka Gorge in the south of the block.

Some of the major influences on recorded values were the Howitt Road, the open lands of the former Wonnangatta Station, and land uses of timber utilisation and grazing. Such influences are outlined further in the following discussion of the four major attributes of wilderness quality.

Remoteness from Settlement

While the block is virtually surrounded by natural lands, a number of small inliers of settled (cleared) land had a significant impact on the values recorded in the Preece and Lesslie survey. These inliers include lands associated with the former Wonnangatta Station in the centre of the block and (freehold) land along the Wonnangatta River valley at Eaglevale and further south. It has not been established whether the open lands of the Wonnangatta Station were actually cleared - it seems that they may have been largely

open grasslands at the time of European settlement. If so, the remoteness from settlement values and consequently total wilderness quality values would be considerably enhanced.

The lands of the Wonnangatta Station were used for beef production in conjunction with surrounding licensed grazing areas, with cleared lands along the Wonnangatta River used for beef production or cropping. Some areas of freehold on the Wonnangatta River remain uncleared.

In addition, the Department of Conservation, Forests and Lands maintains a work depot at Surveyors Creek on the southern edge of the block and being an area of occupation within natural lands, this also had a major impact on recorded remoteness from settlement values.

As a result of these influences, values were low surrounding such areas, but increased towards the boundaries of the block where very high remoteness from settlement values (the highest class of the Preece and Lesslie survey) were recorded.

The very low values recorded for the Wonnangatta Station have fragmented the main areas of high wilderness quality identified in the north-east half of the block.

Remoteness from Access

Roads along the block's western, southern and eastern boundaries had the greatest influence on recorded values. Part of the Howitt Road was classified as a major road and this reduced values in the western half of the block significantly.

The Preece and Lesslie data base also classified the Wonnangatta Track, which bisects the northern half of the block, as a minor road. It is, however, essentially a four-wheel-drive track and, as such, remoteness from access values recorded in its environs, as well as the recorded total wilderness quality values, would be conservative.

Values recorded by Preece and Lesslie were high (Class 3 of the four classes used in the survey) for much of the remainder of the block.

The only roads within the block itself are those in the north-east - East Riley Road and, in the south, the Wonnangatta Road and the extension of the Moroka Road to and beyond Mount Kent. There is also a relatively low density of vehicular tracks within the block, many of them being associated with former timber harvesting largely on the edges of the block. There are few tracks on most of the ridges or in the more rugged river valleys, with the notable exception of those along the Wonnangatta and Humffray Rivers and Riley Creek. These are used primarily for fire protection and recreation purposes.

An extensive area in the centre of the block is greater than 3 km from a road or vehicular track, as are smaller areas to the north-east of Mount Howitt and Mount Kent. No areas are greater than 5 km from a road or vehicular track. There are 32 km of trafficable roads within the descriptive block. All roads and tracks are listed in Table 53 (see page 191) and their locations shown on Map 14.

The route of the Alpine Walking Track traverses the northern boundary of the block along the Barry Mountains.

Other defined walking tracks within the block include those along the Dry River linking with the Snowy Range, those at Bryces Gorge, McMillans Track along the lower reaches of the Wonnangatta and the Moroka Rivers, those providing access to the Moroka Gorge off the Moroka Road, and the Mt Howitt-McAlister Springs walking track.

The recently defined Bicentennial National Trail also passes through the block and follows mainly vehicular tracks along the Wombat Spur, Wonnangatta River and along the Dry River to Howitt Hut on the Snowy Range.

Aesthetic Naturalness

Aesthetic naturalness values recorded by Preece and Lesslie reflect the road and track network, as well as the cleared inliers of land, and the presence of structures.

Few structures have been identified within the block. They mainly include a number of huts previously used by cattlemen and the Snowy Plains authorised landing ground. The latter is used mainly for fire protection purposes. These

structures are listed in Table 54, and their locations shown on Map 14. The Pinnacle fire tower, just beyond the blocks' boundaries in the south-east, would also have influenced the recorded values.

The major influence was, however, the track network with moderate values recorded in the main trackless areas of the block in the headwaters of Wonnangatta to the north-east of Mount Howitt, in the headwaters of the Humffray River, and around Snowy Bluff. High values (Class 3 in Preece and Lesslie) were recorded across the centre of the block, around Mount Darling. This was one of the few areas so classified by the survey within eastern Victoria.

Evidence of the workings of the former goldfields and mining settlements on, and around, the Wongungarra and Wonnangatta Rivers in the south-eastern corner of the block, still remain. Minor yarding and fencing also occurs and is generally associated with cattlemen's huts. A number of helipads are maintained. Water tanks have been provided on the Alpine Walking Track at Barry Saddle and near the East Riley Road.

Table 54
PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Vallejo-Ganther Hut (McAlister Springs)	Refuge Hut	CFL	R	Built in 1971
2	Howitt Hut	Former Cattleman's Hut	CFL	H, R	Built early 1900s
3	Guys Hut	Former Cattleman's Hut	CFL	H, R	Built in 1940s
4	Carey Road Hut	Hut		R	Illegal, to be removed
5	Wonnangatta Hut	Hut	CFL	R	Significance to be assessed by HPS
6	Horseyard Flat Hut	Cattleman's Hut	CFL	CM, R	To be removed; prior right Freeman & Estoppey
7	Surveyors Creek Camp	Work depot, accommodation huts, mess hall and associated buildings	CFC	FP, MP	
8	Snowy Plains Airstrip	Landing ground, sheds	CFL	FP	Not available for public use. Used for fire bombing and regeneration seeding.
-	Wonnangatta--Moroka Rivers Gauging Stations	Gauging Station	Rural Water Commission	U	

KEY:

CM - Cattle management	MP - Management purposes
FP - Fire protection	R - Recreation
H - Historic interest	U - Utility

Note:

1. Gauging stations are shown by symbol on Map 14.

Biophysical Naturalness

The Preece and Lesslie survey rated all of the block as having low biophysical naturalness values because of timber extraction and grazing.

Land-use Indicators of Biophysical Naturalness

Virtually all of the block has for many years been covered by grazing licences. Most grazing has, however, been concentrated on the high plain areas in the west along the Snowy Range and in the south around Snowy Bluff and Mount Kent, in and around the Wonnangatta River, and elevated areas in the north-east on the Tea Tree Range. Most such areas have been moderate to heavily grazed.

A number of licensed blocks associated with the former Wonnangatta Station, including those on the Howitt Plains and Snowy Range and much of the Wonnangatta River, are no longer used for licensed grazing. Accordingly the recorded biophysical naturalness values in these areas will increase.

The main areas that have been grazed and those presently subject to licensed grazing are shown on Map 14.

Timber harvesting is the other main influence on values. Most activity has been towards the edges of the block, notably around the Barry Mountains and Mount Selwyn in the north, around Mount Kent in the south, and in the headwaters of Carey Creek and the Moroka River.

Biophysical naturalness values in those parts of the block in once-only logging areas and areas designated for continuing timber production can be expected to decrease in the future. Most such areas are, however, associated with previously logged areas.

Other Indicators of Biophysical Naturalness

The block was surveyed for its nature conservation values of rivers and streams (BIOSIS 1989). This survey identified eight essentially unmodified catchments within the block. These are an unnamed tributary of the Humffray River, Decimal Creek, Pieman Creek, an unnamed tributary of the Wonnangatta south of Mt Darling, and another south of Mount Cynthia, Clear Country Creek and an abutting unnamed catchment, and the headwaters of the Moroka River. The status of the Humffray River tributary and Moroka River catchments are being reviewed however.

Timber resource information indicates that about 37% of the ash type forests and virtually all of the mixed species forests consist of mature stands.

Detailed surveys of alpine vegetation (Walsh et al. 1984) indicate low mean weed compositions (always less than 10%) of communities sampled in the block (particularly in wet heathland communities), as do the broader surveys undertaken as part of a Sites of Botanical Significance study (Forbes et al. 1981). For communities represented in the block, average weed compositions were highest in snow gum woodland and riparian forest communities.

Both studies identified sites of significance within the block: part of Bryce Plain which included rare species; the headwaters of the Wonnangatta which included areas of high quality vegetation with few weeds and a number of species

and communities of significance; parts of the Snowy Range around Bryces Gorge which included high quality areas of alpine wet heathland, snow gum woodland and montane forest and a number of rare species; and the Moroka River catchment which included a range of montane and alpine communities including heathlands free of introduced species, mature montane forest and a range of important species.

The broad-scale survey of Nolan (1981) indicates that there are few rabbits in most of the block, and a broad-scale survey of feral animals (DCL&S 1984) indicates that, at that time, feral cattle and horses (on the west and southern margins), dogs and deer all occurred. Foxes, cats and hares are also present. A number of noxious weed species occur, the most widely spread being the blackberry.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block. It covers an area of 109 300 ha and is about 45 km long and 25 km wide. Of this, nearly 20% was classified in the Preece and Lesslie survey as Class 4 or higher wilderness quality with less than 10% had at least a Class 5 wilderness quality rating. Essentially unmodified catchments, excluding those under review, cover an area of 11 043 ha. The largest area presently without roads or vehicular tracks is 38 800 ha. This is the largest such area in eastern Victoria, and the third largest in the State.

Ecological Viability

A number of factors enhance the block's potential ecological viability. They include the apparent low level of introduced species for much of the block, the presence of a range of vegetation communities and a number of essentially unmodified catchments, the dissected nature of much of the block and large areas that are untracked. Timber production and especially ongoing grazing in parts of the block are limiting, however.

Fire hazard in the block is high. Major bushfires, including those of 1939 and 1964 have affected most of the area. Most fires result from lightning. A number of the vegetation communities are particularly fire sensitive, notably the alpine species, though others are dependent on fires of ranging frequency and intensity. Active management practices include maintenance of the track network and fuel-reduction burning. Fire-fighting crews are based in summer at the Department of Conservation, Forests and Lands' Surveyors Creek Camp and an authorised landing area maintained on the Snowy Plains.

LAND-USE CAPABILITIES

Nature Conservation

The block has very high value for nature conservation. Vegetation communities range from alpine herbfields and snow gum woodlands and grasslands to alpine ash, riverine forests and drier foothill communities, many of which are barely disturbed. It includes a number of rare plant species and animals, and a number of significant geological and geomorphological features including rock exposures, escarpments and periglacial landforms around Mount Howitt, the Howitt Plains high plains, the landforms in and

around Bryces Plain and Gorge, and the extensive outcrops, cliffs, gorge and slopes of the Snowy Bluff, Mount Kent and Moroka Gorge area. Both the Humffray and Wonnangatta Rivers include a diverse range of native fish, with the Wonnangatta containing the native grayling of vulnerable conservation status.

Recreation

The block has a high capability for a range of recreational pursuits including bushwalking, four-wheel-driving, sight-seeing, cross-country skiing, horse riding, fishing, camping and deer hunting. Parts have very high value for remote walking, solitude and inspiration.

Natural features of particular interest include the rocky cliffs and escarpments on the Viking, the Crosscut Saw, at Bryces Gorge and around Snowy Bluff and Mount Kent, the high plains areas with their herbfields, grasslands and snow gum woodlands, Bryces Gorge and the Conglomerate and Pieman Creek waterfalls, the gorge and cascades on the Moroka River, and the elevated basin and river environs of the Wonnangatta River. Spectacular views of the rugged terrain can be obtained from many of the high points of the block, including Mount Speculation, Mount Howitt, parts of the Barry Ranges and Mount Kent.

The block offers a range of rugged and challenging walking routes especially in the north of the block, with popular destination points being Mount Howitt, the Crosscut Saw, Mount Speculation, Mount Despair, the Razor and the Viking. The Wonnangatta River is also a traditional focus for bushwalkers. Many of the spurs and valleys of the block are untracked, as are some elevated areas, e.g. south of Mount Darling and the Snowy Bluff, and are frequently used by experienced walkers. Areas in the north-west around the Tea Tree and Mount Cynthia Ranges and the Humffray River are also used. Sectors of defined long-distance walks, such as the Alpine Walking Track across the north of the block and McMillans Track in the south are used by many walkers.

Day walks focus on the edges of the block with features such as Mount Howitt, Bryces and Moroka Gorge all popular destinations.

Horse-riding parties visit the Howitt Plains, Bryces Gorge and the Wonnangatta Valley, with cattlemen's huts often used for overnight accommodation.

Cross-country skiers utilise a number of the high plain areas, notably at Mount Howitt and on the Howitt, Bennison and Snowy Plains, while some of the cliffs and escarpments are used by rockclimbers. Mount Howitt is increasingly popular for its challenging cross-country downhill slopes.

The Wonnangatta River is a focus for four-wheel drive-touring, with a number of the tracks descending into the valley offering challenging driving. Most use is in the north-east where tracks link with those crossing the Barry Mountains. Popular routes include the Wombat Spur Track, the Riley Creek Track and the Tea Tree Range Track. The Howitt Plains Road and Moroka Road provide good two-wheel-drive access and are often used for sightseeing and recreational touring.

Sambar deer are hunted throughout the block, notably along the Wonnangatta and Moroka River valleys, Riley Creek, and

the Wombat Spur. The Wonnangatta, Humffray and the Moroka Rivers, Riley Creek, and a number of other small alpine streams of the block provide for trout angling.

Minor prospecting and gold panning occurs on the edge of the block around the former goldfields in the Howittville area.

A large number of commercial operators undertake vehicle-based bush tours within the block. Both day and overnight tours are provided. Destination points and traverse routes include Wonnangatta Station, Pioneer Racecourse, Talbotville, the Howitt Plains, Mount Speculation, Wonnangatta Track, Zeka Track, and Tea Tree Spur Track. Companies also provide bushwalker transport to prime walking areas.

Agriculture

Most of the block has a low capability for agriculture, apart from the river flats of the Wonnangatta.

Capability for bushgrazing is high in and around the high plains and areas of grassy river flats, and low to moderate elsewhere.

Presently cattlemen use the public lands of the block for grazing, under licence. In summer, cattle graze the open plains, snow gum woodlands and alpine ash forests of the plateaux and upper slopes, and along the Tea Tree Range, and in winter cattle graze peppermint-manna gum forests of the lower Wonnangatta and Moroka valleys and the Riley and Humffray Rivers. In summer cattle also graze the river valleys, headwaters and valley slopes of the Humffray. Home properties are both to the south and north of the block.

The main areas grazed are shown on Map 14, and details of grazing use are provided in Table 55.

Apiculture

The southern section of the block is used by apiarists with yellow box, red stringybark, red box and long-leaved box the more productive species. This is a very significant area with at least 10 beekeepers utilising the flora regularly. In the north-west corner snow gum and candlebark areas also are of considerable value. Most of the block, however, due to lack of access and its steep terrain, is not used.

There are presently no licensed apiary sites on the public lands of the block.

Timber Production

Capability for timber production is high, with stands of mature and regrowth alpine ash occurring in the headwaters of the Wonnangatta and Moroka Rivers and along the Tea Tree and Barry Ranges in the north-east. Moist foothill forests are of low to moderate capability, with the remainder of the block carrying Forests of low timber production capability.

The net available area of timber resources, given current tenure and operational standards, of this block consists of approximately 8067 ha of ash species forest (including 543 ha in once-only logging areas), and 5947 ha in mixed species forest (including 746 ha in once-only logging areas).

Table 55
PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no of stock carried	Comments
NP 59 - 83/152	Pritchett, Freeman and Sons	Subalpine woodland and montane forest	93 head	Part only, remainder in block 6
L 45 - 83/149	Estate of J. Guy	Subalpine montane forest Open forest	99 head	
NP 46 - 83/150	K.M. Higgins	Open forest, some alpine heath and woodland	54 head	
NP 37 - 349/130, 83/149	J. Guy	Open forest	Not known	
F 36A - 6353	M.J. Hall	Subalpine woodland and open forest	450 head	Part only, remainder in block 9
NP 48 - 86/146	Chester	Alpine heathlands and woodlands		Part only, remainder in block 7
L 56 - 0562/130	Gell, Cumming and Dunsmuir	Alpine woodlands and montane grading to open forest	765 head	Part only, remainder in block 6
57 - 14/130	Dunsmuir	Some Alpine heath and subalpine woodland	120 head	Part only, remainder in block 6
42 - 6399	Hodge	Some subalpine woodlands and montane forest	60 head	Part only, remainder in block 9

The descriptive flock lies within the Wangaratta and Central Gippsland forest Management Areas. The block's contribution to the regional sustainable yields of these management areas is being calculated by the Department of Conservation Forest and Land but was not available prior to publication.

Mineral Production

Mineral production has been focused in the south-east in and around the former goldfield areas shown on Map 14. Gravel-extraction sites are located along major logging roads.

The Wonnangatta beds may have some potential for gold reef production with, as at August 1989, one Mines Act tenement active - an exploration licence application (ELA 1782, Noscita Carla Pty Ltd).

Under existing tenure, about 24% of the block is potentially available for mineral exploration or mining.

Water Production

Most of the water derived from the block is of high quality, with the headwaters of watercourses receiving high precipitation. Capability for water production is moderate to high.

Table 53

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Distances (km)		Vehicle track	Management response	Management purpose	Present restriction		Comments
		Major road	Minor road						
1	Zeka Spur Track			*	CFL	FP, R, PSC	Seasonal	closure	To be closed
2	Zeka Creek Track			*	CFL	FP, R	Seasonal	closure	
3	Wonnangatta Track			*	CFL	FP, R	Seasonal	closure	
4	Sambar Spur Track			*	CFL	FP, R	Seasonal	closure	
5	Van Dammes Track			*	CFL	FP, R, L	Nil		
6	East Rileys Road		*		CFL	FP, R, L			
7	Selwyn Track		*	*	CFL	FP, R, L	Nil		
8	West Humphrey Road		*		CFL	FP, R, L	Nil		Boundary only
9	Upper Humphrey Road			*	CFL	FP, L	Nil		
10	Water Spur Track			*	CFL	FP, R	Seasonal	closure	
11	White Track			*	CFL	FP, R	Seasonal	closure	
12	Humphrey River Track			*	CFL	FP, R	Seasonal	closure	
13	Rileys Creek Track			*	CFL	FP, R	Seasonal	closure	
14	Mt Hart/Hart Spur Track			*	CFL	FP, R	Seasonal	closure	
15	Herne Spur Track			*	CFL	FP, R	Seasonal	closure	
16	Wombat Spur Track			*	CFL	FP, R	Nil		
17	Mt Von Guerard Track			*	CFL	FP	Nil		
18	Long Flat Track		*	*	CFL	FP, R	Nil		
19	Eaglevale Track			*	CFL	FP, R	Nil		
20	Noel Track			*	CFL	FP	Nil		
21	Station Track			*	CFL	FP, R	Nil		
22	Mt Cynthia Track			*	CFL	FP, R	Nil		
23	Tea Tree Range Track		*		CFL	FP, L, R	Nil		Boundary only
24	Randalls Track			*	CFL	FP, R	Nil		
25	Wonnangatta Road		*		Shire	FP, R, L	Nil		
26	Pioneer Track			*	CFL	FP, R	Nil		
27	Billy Goat Bluff Track			*	CFL	FP, R	Nil		Boundary only
28	Unnamed			*	CFL	FP, R	Nil		
29	Kent Creek East Track			*	CFL	L	Nil		
30	Moroka Road		*		CFL	FP, R	Nil		
31	Unnamed			*		L	Nil		To be closed
32	Pinnacles Road			*	CFL	FP, R	Nil		
33	Unnamed			*	CFL	FP, R	Nil		
34	Unnamed			*	CFL	R, L	Nil		
35	Unnamed			*	CFL	R, L	Nil		
36	Unnamed			*	CFL	L, FP	Nil		
37	Unnamed			*	CFL	L	Nil		
38	Moroka Glen Track			*	CFL	FP, R	Nil		
39	Doolan Plains Road			*	CFL	FP, R	Nil		
40	A2			*	CFL	FP, R	Nil		Former logging road
41	A3			*	CFL	FP, R	Nil		
42	Lookout Creek Track			*	CFL	FP, R	Nil		
43	Howitt Road		*		CFL	FP, R, U	Seasonal	closure	Boundary only
44	Carey Road			*	CFL	FP, R	Nil		
45	Guy Hut Track			*	CFL	R	Nil		To be closed

BLOCK 9 : WONGUNGARRA CATCHMENT

Location and Boundaries

The block lies to the south of the Great Dividing Range and south-west of the Mount Hotham resort as shown on Map 10. It encompasses most of the Wongungarra River catchment and covers an area of 36 630 ha. It forms part of the Shires of Bright and Avon.

The boundaries generally follow the alignment of roads on the catchment divide of the Wongungarra River.

Tenure and Land Use

Most of the block is State forest and contains a natural features zone that runs the entire length of the Wongungarra River plus part of a major tributary, namely the Mount Selwyn Creek. Small areas in the north and north-east of the block are included in the Alpine National Park. A reference area is also included. All of the block is public land, other

than a very small area on the edge of the block on the Wongungarra at Howittville which is freehold.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to the land uses of the block are outlined in Table 56, and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

Forest management plans are being prepared for the two Forest Management Areas, Wangaratta and Central Gippsland, which cover the block, and management plans for those sectors within the Alpine National Park are being prepared as part of the Alpine Planning Project. The Wonnangatta-Moroka Unit Proposed Management Plan, which covers most of the park within the block, has just been released for public comment. The Blue Rag Range is within the Bogong Planning Unit.

Table 56

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ²
National park	A13, A14 (Alpine)	5 260	Public purposes - Crown land ₃ , reserved forest ⁴	Grazing and deer hunting subject to conditions, no logging, apiculture permitted ₁
Reference area	C5 (Blue Rag)	670	Reserved forest ⁴	Nil
Natural features and scenic reserve	D9 (Mount Sarah)	470	Public purposes - Crown land ₃	Grazing subject to conditions, apiculture, and roading essential for management be permitted ₅ . A 40 m strip of alpine ash surrounding the ridge not be harvested ₅
Historic area	G2 (Grant)	440	Reserved forest ⁴	Mineral exploration, mining, fossicking and timber harvesting permitted subject to conditions and apiculture and grazing permit
State forest	I1	29 790)	Reserved forest ⁴	Defined special values to be protected ₁
including natural features zone	M7 (Wongungarra River and Mt Selwyn Ck)	)		No timber harvesting or gravel zone extraction, only essential new roading

Notes:

1. Refers to LCC Alpine Area Special Investigation Final Recommendations, 1983.
2. Specific provisions relevant to area in addition to standard land use provision of Land Conservation Council recommendations (as outlined in Appendix 11).
3. Shire of Bright Planning Scheme.
4. Shire of Avon Planning Scheme.
5. Refers to LCC Alpine Area Final Recommendations, 1979.

The whole of the block is covered by a draft fire protection plan for the Central Gippsland region of the Department of Conservation, Forests and Lands. Public submissions to this plan are presently being considered by the Department. This is presently on public exhibition. Elements of proposed pre-suppression strategy include detection (primarily from fire lookouts), maintenance of existing tracks, roads, water points and helipads, construction of new tracks where necessary for fire suppression or establishing fuel-reduction burning control lines, and new dams, water points and helipads as required. Much of the block, with the exception of communities such as ash stands or alpine vegetation and reference areas, is proposed for some form of fuel-reduction burning, and a strategic burning corridor is proposed across the southern part of the block.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of Victoria apply.

The whole of the block is within the proclaimed water supply catchment of the Mitchell River. No land-use notice, however, or determination has been declared to date.

Physical Setting

The block consists almost entirely of deeply dissected Ordovician sandstones and siltstones. The major ridges bordering the block have a generally north-south orientation. The Tea Tree Range extends south from the granitic intrusion of Mount Selwyn (1410 m) at the Great Divide, to the rounded summit of Mount Sarah (1550 m).

Other high points include Mount Murray (1640 m), the Barry Mountains, the highest point, The Twins (1703 m) and the Blue Rag Range (1600 m) in the north of the block. Small remnant plateaux on the eastern boundary occur at Basalt Knob (1400 m) and at the Tablelands. The relief between the ridgetops and adjacent valley floors is up to 800 m.

The Wongungarra River flows southward into the Wonnangatta River, their confluence being just south of the block, and subsequently into the Mitchell River.

Biological Setting

A wide range of vegetation communities occur within the block. Alpine heathlands and herbfields grow on the southern aspects of the highest peaks (Mount Murray, The Twins, and Blue Rag Range). Snow gum open forest and woodland occupy steep exposed mountain slopes and relatively flat tablelands along the Tea Tree Range, the Barry Mountains, Blue Rag Range and Basalt Knob.

Large areas of alpine ash forest occur in the headwaters of most of the tributaries of the Wongungarra, with substantial areas surrounding Mount Murray. Understoreys of these forests may be shrubby, heathy or grassy.

The remainder of the block is vegetated with wet and dry sclerophyll forests dominated by peppermints on the moister and higher sites, manna gum along the watercourses and stringybarks on the drier lower sites.

The range of vegetation provides habitat for a variety of fauna, including a number of arboreal and small ground-dwelling mammals.

Cultural Setting

Aborigines are likely to have traditionally utilised the resources of the block for at least part of the year, but apart from a few recorded artefact sites in the north-east of the block, there is little evidence remaining of their occupation.

The first Europeans to make use of the area are likely to have been gold miners. The Crooked River goldfields at the southern extremity of the block brought large numbers of people into the area, and small townships (Talbotville, Howittville) were established, but most of this activity occurred outside the block.

Mining tracks were, however, cut along the Wongungarra and its upper branches linking the Crooked River Goldfields with the Great Divide at Mount St Bernard and Mount Selwyn. A track was also cut along the Barry Mountains. Little evidence of these remains.

The first recorded occupation by European people was the gazettal of a licensed run over much of the block in 1866.

A hospice was constructed in 1864 near Mount Bernard in the extreme north-east of the block and provided accommodation for those travelling between Dargo and Harriettville. A new building was erected in 1884 and became a popular destination point for tourists. It was upgraded to provide year-round accommodation in the mid-1920s and used largely by skiers. The focus for skiers later shifted eastward to Mount Hotham.

Other than the mainly seasonal grazing however, little human activity was carried out in the block until the 1960s when the ash stands of the block were first exploited. Utilisation of the timber resources continued through the 1970s and 1980s, with the most recent felling being in the headwaters of Mount Selwyn Creek.

WILDERNESS QUALITY

The block is centred on a small node of Class 5 wilderness quality as identified in the Preece and Lesslie survey. A much larger area surrounding this node in the centre of the block, along with much of the Wongungarra River environs, was identified as having relatively high wilderness quality (Class 4).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The block is entirely surrounded by natural lands and accordingly, remoteness from settlement values are high over the whole of the block. A large area in the centre of the block was allocated the highest class (Class 4) for remoteness from settlement value by Preece and Lesslie.

Cleared and settled lands external to the block, including the Mount Hotham resort, pastoral lands in the Wonnangatta valley and on the Dargo High Plains, and the settlement of Crooked River were the only influences on the recorded values, which given present land tenure, are unlikely to change in extent in the foreseeable future.

Remoteness from Access

There is a relatively low density of roads and tracks within the block, but it is bounded largely by major and minor roads. The Dargo High Plains Road is a primary north-south access route across the alps, whereas the other roads are mainly logging roads. Only one minor road, Selwyn Creek Road, crosses the block in the north-west.

Vehicular tracks largely follow the major river divides and are maintained largely for fire protection purposes. Most have no restrictions on public use. They are essentially of four-wheel-drive standard.

These influences have resulted in moderately high remoteness from access values being recorded in the Preece and Lesslie survey over most of the block, with the highest values recorded in the centre of the block near the confluence of the Wongungarra River and Blue Rag Creek.

All of these roads and tracks are listed in Table 57 (see page 197) and their locations shown on Map 14. There are 8.5 km of trafficable roads within the block. Although some parts of the block are greater than 3 km from a road or track, none are greater than 5 km.

The route of the Alpine Walking Track traverses the Barry Mountains on the northern boundary.

Aesthetic Naturalness

Very few structures exist, being limited to a hut and minor utilities, all of which are on the boundaries of the block. These are detailed in Table 58 and shown on Map 14. A number of helipads are also maintained.

The major influence on values was thus the track network. Consequently, the highest values for aesthetic naturalness were found by Preece and Lesslie to be in the headwaters of the (east branch) of the Wongungarra River, and in its middle reaches near its confluence within Blue Rag Creek.

Biophysical Naturalness

The Preece and Lesslie survey allocated low values of biophysical naturalness across the whole of the block because of its land-use history.

Land-use Indicators of Biophysical Naturalness

The two major land uses influencing biophysical naturalness values are timber production and grazing. Timber has been extracted mainly on the eastern and western margins of the block, as well as in the north in the headwaters of Mount Selwyn Creek and at Mount Murray. Most grazing has occurred in the higher snow gum woodlands and mountain forests, as well as in the lower reaches of the Wongungarra River and major tributaries such as Big Running and Brewery Creeks. These areas have the lowest values.

All areas known to have been logged, along with the main areas grazed are shown on Map 14.

Under existing arrangements the use of much of the block for timber production and grazing is continuing, with large areas of alpine ash remaining in the headwaters of the Wongungarra on the slopes of Mount Murray and Blue Rag Range.

Other Indicators of Biophysical Naturalness

The block was covered by a study of the nature conservation values of the rivers and catchments of Gippsland (BIOSIS 1989). Essentially unmodified catchments identified in the study included much of Blue Rag Creek catchment, a number of unnamed catchments in the upper and headwaters of the Wongungarra.

Timber resource information indicates that about 39% of the ash type forests and virtually all of the mixed species forests consist of mature stands.

Detailed surveys of alpine vegetation (Walsh et al. 1984) indicate low mean weed compositions of communities sampled in the block at The Twins and the Blue Rag Range, and surveys undertaken as part of the Sites of Botanical Significance in East Gippsland study (Forbes et al. 1981) indicates that average weed compositions of communities sampled in the block were also relatively low, with none, other than riparian forests (sampled on the Crooked River), having weed compositions higher than 10%. This latter study also rated montane forest on Blue Rag Range and Tea Tree Range very highly.

Table 58

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Hut	Cattleman's hut	Licensee	Licensee	In disrepair
-	The Twins Trig Station	Trigonometric stations	Dept. Property and Services	Utility	
-	Wongungarra River Gauging Station	Gauging station	Rural Water Commission	Utility	

Notes:

1. Trigonometric and gauging stations are shown on Map 14 by symbol.

The broad-scale survey of Nolan (1981) indicated that the block had very few rabbits and a broad-scale survey of feral animals (DCL&S 1984) indicated that the area was considered to have few, if any, feral animals, other than dogs.

A detailed survey of the flora and fauna of part of the upper reaches of the Wongungarra River and Mount Selwyn Creek (Schulz et al. 1987) also recorded low to negligible weed compositions for all plant communities including riparian zones, and few introduced animals. The latter being an earlier record of the European goldfinch, brown hare, European rabbit, foxes, dingo/wild dog and Sambar. The survey also recorded a very diverse range of native mammals including the platypus, small ground mammals, and nine species of bat. It also identified rich amphibian habitats on the two main watercourses and a number of amphibian species, including the nationally significant spotted tree frog.

The survey report identified five sites of significance to protect species of particular importance. These were over much of the Wongungarra River (spotted tree frog), two tributary watercourses to the north of Mount Murray (pink robin), rocky outcrops south at Mount Murray (*E. whitii*), and The Twins (alpine heathland faunal assemblage including the broad-toothed rat).

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the component size attributes of the block. It covers an area of 36 630 ha and is 30 km long and about 10 to 15 km wide. Of this, about 25% was classed in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) at least Class 4 wilderness quality, with very little identified as Class 5 or higher wilderness quality. Essentially unmodified catchments comprise 7070 ha, with the largest area presently without roads or vehicular tracks being 14 800 ha. Note: such areas may be overlapping.

Ecological Viability

A number of factors could enhance the ecological viability of the block. They include the areas of very high remoteness from settlement value, its relatively sparse track network, the apparent low level of introduced species, the dissected nature of much of the block, its range of vegetation communities and the presence of essentially unmodified catchments. Ongoing grazing and timber production in parts of the block are limiting.

Fire hazard is high and a number of major bushfires, most notably the 1939 bushfire, have been recorded. Active management practices within the block to reduce fire hazard include the maintenance of the track network and fuel-reduction burning.

LAND USE CAPABILITIES

Nature Conservation

The block has high value for nature conservation with environments ranging from alpine heathlands and herbfields to riverine forests. The large stands of relatively undisturbed mature alpine ash and the wet sclerophyll forests are of particular interest. A number of significant species occur

within the block, including the smoky mouse, white-footed dunnart, broad-toothed rat, the Austral and downy ground-ferns, mountain hook-sedge, Bogong daisy-bush and the rare spotted tree frog. Grayling occurs in the Crooked River.

Recreation

The block has a high capability for bushwalking, four-wheel-drive touring, fishing and fossicking. In particular, the extensive areas of essentially unmodified vegetation and untracked rivers and ridges, means that the block has a high capability for solitude, inspiration and remote-setting recreational use.

A range of natural features of interest occur in the block. These include the Barry Mountains and other elevated areas such as Mount Murray, Mount Sarah and Blue Rag Range; their alpine heathland and snow gum plains, the extensive stands of mature alpine ash, the rugged headwaters of the Wongungarra, Blue Rag, and Selwyn Creeks, and the riverine environs of the lower reaches of the Wongungarra. A number of rapids and small waterfalls on the Wongungarra area also of interest. Spectacular views can be obtained from the major divides and high points, notably from Mount Murray.

Bushwalking routes include the Barry Mountains on the northern boundary of the block (Alpine Walking Track) and Mount Murray, along the Blue Rag Range and tracks around the former goldfield areas in the south near Hogtown and Talbotville. Both tracked and untracked spurs are also used by bushwalkers.

The former goldfield areas are also very popular for four-wheel-drive touring and are a focus for car-based camping and fossicking. The Tea Tree Range Track and some of the other tracks of the block are also used by four-wheel-drives. The Dargo High Plains Roads on the north-eastern border is becoming a popular tourist road and is accessible other than in winter, to both two- and four-wheel-drive vehicles.

The Wongungarra is a good trout-fishing stream, but it is not canoeable (within the block). There is some potential for cross-country skiing near Mount Sarah and The Twins, with snow persisting in such areas between June and October, and in sheltered sites above 1000 m.

A number of commercial operators offer vehicle-based bush tours through or within the block. Points of interest and access routes utilised include the confluence of the Wongungarra and Crooked River, the Pioneer Racecourse, Talbotville, Mount Sarah, Tea Tree Range Track, Basalt Knob Track and Blue Rag Range Track.

Agriculture

Capability for agricultural development is low, and under present tenure not permitted. The block has low to moderate capability for bush grazing, although grassy snow gum woodland areas and the river flats of the Wongungarra at the south edge of the block, have high capability. Cattle are grazed on the more elevated areas, generally between December to April or May, when they are returned to home properties. Presently four graziers run cattle over five licensed blocks. The main areas currently grazed are shown on Map 14 and details of grazing use are provided in Table 59.

Table 59

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no of stock carried	Comments
F36A - 6353	M.J. Hall	Subalpine woodland, alpine ash and mixed open forest	450 head	Part only, remainder in block 8
Np42 - 6399	Hodge	Alpine woodland on Tea Tree Range	37 head	Part only, remainder in block 8
L6A - 459/130	Spoul	Alpine ash regeneration grading to mountain forest on lower slopes	Not known	
L5A - 65/130	Treasure	Subalpine snow gum woodland	69 head	
L1A - 23/130	Treasure	Subalpine woodland; snow gum	660 head	Part only

Apiculture

The area is not presently used by beekeepers due to the steep, unroaded mountainous country preventing reasonable truck access. The area does, however, have high potential. There are presently five defined apiary sites on the north-west margin of the block on the Dargo High Plains Road.

Timber Production

Capability for timber production is very high in the north of the block where extensive stands of alpine ash occur along the Tea Tree Range, Mount Sarah, The Barry Range, Mount Murray and the Blue Rag Range, as well as in the headwaters of Mount Selwyn Creek and Big Running Creek. Both 1939 fire regrowth and mature stands are within areas currently available for timber utilisation.

Moist foothill forests of messmate, manna gum and candlebark adjoin the stands of mountain forest, such as in Selwyn Creek, and have high to moderate timber production capabilities. The forests of the rest of the block have low capability.

The net available area of timber resources, given current tenure and operational standards, consist of approximately 4406 ha of ash species forest (including 15 ha in once-only logging areas) and 2222 ha of mixed species forest. The

descriptive block lies within the Wangaratta Forest Management Areas. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

The former goldfields of Crooked River occur at the southern edge of the block. As at August 1989 only one exploration licence (an application) was active over this area (ELA1782 by Noseita Carla Pty Ltd). No other mineral extraction has been recorded.

Under existing tenure about 84% of the block is potentially available for mineral exploration or mining.

Water Production

The block has high rainfall with a winter-spring maximum and a mainly naturally vegetated catchment. Water quality and flow in the Wongungarra River are both high, as is its capability for water production.

The Mitchell River, for which the Wongungarra River forms part of its headwaters, is utilised as a source of domestic water for Bairnsdale and irrigation water for Bairnsdale district.

Table 57
ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major road	Minor road	Vehicle track				
1	Tea Tree Range Track		*		CFL	FP, R, L	Nil	Boundary only
2	Selwyn Creek Road		*		CFL	FP, R, L		
3	Mt Selwyn Creek Track			*	CFL	FP, R		
4	Mt Murray Track			*	CFL	FP, R	Seasonal closure	
5	The Twins Road			*	CFL	FP	MVO	
6	Dargo High Plains Road	*			Shire	R	Seasonal closure	Boundary only
7	Blue Rag Range Track			*	CFL	FP, R	Part seasonal closure	
8	Richie Road		*		CFL	L, FP, R	Nil	Boundary only
9	Unnamed			*	CFL	L, FP	Nil	
10	Basalt Knob Track			*	CFL	L, FP, R	Nil	Boundary only
11	Wongungarra Track			*	CFL	FP	Nil	
12	Brewery Creek Track			*	CFL	FP, R	Nil	
13	Bald Top Track			*	CFL	L, FP	Nil	
14	Sarah Spur Track			*	CFL	FP, R	Nil	
15	Unnamed			*	CFL	L, FP	Nil	

KEY:

FP - Fire Protection	MVO - Management Vehicles Only
L - Logging	R - Recreation

BLOCK 10 : CATHERINE

Location and Boundaries

The Catherine block lies between the Mount Buller ski resort and Mount Buffalo National Park, as shown on Map 10. It comprises an area of about 59 800 ha and forms part of the Shire of Oxley.

Abbeyard Road and West Buffalo Track form the boundary in the east, while the Whitfield-Dandongadale Road and Rose River Road form the northern and western extremities. The southern boundary follows the course of King River to Mount Speculation and then along the Barry Mountain divide.

Tenure and Land Use

Most of the northern half of the block is uncommitted Crown land or State forest (the uncommitted Crown land category has been generally included within State forest in more recent Land Conservation Council recommendations), while

most of the southern half is included within the Alpine National Park. Small areas of freehold land occur on the western and eastern margins and small areas of State forest also occur.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 60 and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies, and Management Plans

That portion of the block within the Alpine National Park is encompassed by the Alpine Planning Project which aims to prepare comprehensive management plans covering the Alpine National Park. The Wonnangatta-Moroka Unit Proposed Management Plan, 1989, which covers that part of the block within the park, has just been released for public comment.

Table 60

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference	Approx. area (ha) within block	Planning scheme control ⁴	Special provisions ⁵
National park	A1, A5, A6, A13, A2, (Alpine) ²	28 290	Rural 'A'	Grazing not permitted in defined areas (SW of block) ^{2,5} and permitted elsewhere subject to conditions (government variation to LCC 1983), logging not permitted other than in designated once-only logging areas up until 1988 ^{1,6,7} , apiculture and deer hunting by stalking permitted in in most areas ^{1,6}
State forest	I1 ¹	3 300	Rural 'A'	Specified values to be protected ¹
including natural features zones	M7 ¹ (King River and west branch of the Buffalo River)	-	Rural 'A'	No timber harvesting or gravel extraction, and only essential roading ¹
Uncommitted ⁸	S1 ²	24 340	Rural 'A'	
Agriculture (Rose River, Bennies, Abbeyard, Catherine River)	Not applicable	2 690 1 180	Rural 'A'	

Notes:

1. Refers to LCC Alpine Area Special Investigation Final Recommendations 1983.
2. Refers to LCC North-Eastern Study Area Districts 3, 4 and 5 Final Recommendations 1977.
3. Wabonga Plateau State Park as recommended by Council has subsequently been incorporated into the Alpine National Park.
4. Refers to the Shire of Oxley Planning Scheme.
5. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II).
6. Refers to Land Conservation Council Alpine Area Final Recommendations 1979.
7. This has recently been extended by Parliament to July 1992, and a small additional area designated.
8. The uncommitted category has been generally included within State forest in more recent LCC recommendations and they are managed as one unit.

The areas of State forest (including the uncommitted Crown lands of the block) are within two Forest Management Areas, Benalla/Mansfield (minor areas in the west) and Wangaratta. Forest management plans are being prepared for these areas.

Revised fire protection plans are being prepared for the two Department of Conservation, Forests and Lands regions which encompass the block (being Alexandra and Wodonga).

Most of the block is within the Buffalo River (Lake Buffalo) proclaimed water supply catchment, with the remainder (a minor area in the south-west) within the King River (Lake William Hovell) proclaimed water supply catchment. No land-use notice or determinations cover these catchments to date.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of Victoria also apply.

Physical Setting

The block consists largely of mountainous terrain, with steep hillsides and sharp ridges. Numerous streams dissect the block and both the ridges and main streams are aligned in a generally northerly direction from the Great Divide. These areas have formed on mainly Ordovician sediments of siltstones, sandstones and shales.

In the south-west of the block elevated plateau surfaces have formed on Devonian and Upper Carboniferous sedimentary and igneous rocks. These surfaces, such as the Cobbler Plateau (1200 to 1400 m), are bounded by steep escarpments, associated with faulting, which descend into the Rose, Dandongadale and Catherine River valley headwaters.

The Great Dividing Range (Barry Mountains) extend eastward from Mount Speculation. The highest point is Mount Cobbler (1602 m). The deeply dissected terrain includes descents of up to 800 m from ridgetops to the adjacent valley floors. Lowest elevations are on the broader river valleys to the north (280 m) where river terraces and associated alluvium occur on the Rose River and the lower reaches of the Buffalo.

Granitic rock outcrops at Abbeyard on the eastern edge of the block and is surrounded by a belt of metamorphic rocks.

The whole block is within the Ovens River basin.

Biological Setting

Tall open forests occupy much of the block. The major overstorey species is narrow-leaf peppermint in association with manna gum and mountain gum. Understoreys vary from shrubby to grassy, depending on moisture availability. On the drier ridges and slopes dry sclerophyll forests of broad-leaf peppermint occur, with candlebark and brittle gum predominating. Tussock grasses and heathy shrubs generally form the understorey. A low open forest of broad-leaf peppermint also occurs on the dry precipitous slopes around the Cobbler Plateau, King Spur and The Razor.

At higher elevations (900 to 1350 m) to the south of the block montane forests of alpine ash occur. Mature stands

have grassy understoreys, becoming more shrubby at lower elevations.

Mountain gum-snow gum montane low open forests occur on the Cobbler Plateau, at elevations ranging from 1000 m to 1400 m, as well as on some of the higher points on the Dandongadale and Buffalo River Divide. They have grassy to heathy understoreys, as do the snow gum open forests on the higher ridges and spurs around Mount Cobbler and Mount Speculation. Alpine herbfields and heathlands are found on Mount Speculation (1550 m plus), with a small area of dry heathland on The Razor.

Mountain swamp gum woodlands occur along some of the major streams, for example, the Catherine River and the west branch of the Buffalo River, and manna gums (with or without narrow-leaf peppermint) may also occur along the larger watercourses, in association with dense shrubby understoreys.

The fauna of the block has not been extensively surveyed, particularly in the north, but a range of species reflecting the various habitats occur. A wide range of bird species are recorded. Eleven species of fish have been recorded, including seven species of native fish.

Cultural Setting

Aboriginal people would have traditionally utilised the block for at least part of the year and may have had a range of cultural associations with the land. The Mount Howitt-Cobbler area appears to have formed the edge of the territories of a number of linguistic groups. The major valleys of the block may also have formed access routes to the elevated area from the lower country in the north-east. Little evidence of Aboriginal occupation, however, remains and no archaeological sites have been recorded by the Victoria Archaeological Survey (although detailed surveys have not been undertaken).

More intensive utilisation came with the advent of pastoralists who established grazing runs in the 1840s and 1850s (Clon Leigh, Mount Typo, Dandongadale and Abbeyard). These, while covering much of the block, would have been focused on the more open country along the larger watercourses. Summer grazing of the subalpine and alpine areas in the south of the block would also have occurred. Land abutting the lower reaches of the main watercourses was selected, with grazing licences obtained on land used for summer grazing or less productive areas. This pattern of land use has continued in a more or less similar fashion until now.

The block, unlike much of eastern Victoria, was not subject to any major gold mining activity and by the early 1900s, only one mining track had been cut through the block. Until recent years, there was little timber production. This activity is presently largely restricted to isolated stands of alpine ash.

WILDERNESS QUALITY

The block includes large areas of high wilderness quality, particularly towards the south of the block (see Map 14). A large area in the headwaters of the Catherine River was classified as Class 5 or higher in the Preece and Lesslie survey, with contiguous areas (extending into Block 8) classified as Class 4. The upper headwaters of the King,

Rose and, in particular, the Dandongadale Rivers also included areas classified in the survey as Class 4 total wilderness quality. The remainder of the block recorded moderate values.

Most of the Catherine River catchment was included as part of a Wonnangatta–Moroka wilderness (which extended to the south of the block) and was identified in the 1979 Feller et al. inventory of wilderness in Victoria.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

Most of the block is surrounded by naturally vegetated public lands, with the major influence on remoteness from settlement values being cleared freehold properties along the eastern and western boundaries of the block. The ski resort at Mount Buller and the former pastoral property on the Wonnangatta also influenced recorded values to a some extent.

As a result of these influences the highest remoteness from settlement values were recorded in the south of the block, with much of the upper catchment of the Catherine Creek being included in the highest class of values as recorded across the State. This land of very high value continues southwards into Blocks 7 and 8. Recorded values were moderate within the Dandongadale River catchment, with low values recorded on the northern margins.

Settled lands to the north include both native and improved pastures and are used for beef production. Small areas of tobacco, hops and nuts are also grown. The settled land boundary has changed little in the past 15 years. However, given the presence of large areas of uncleared freehold lands along the Rose River and the Buffalo River (notably at the Catherine Station), it may change in the future and thus alter remoteness values.

Remoteness from Access

The Preece and Lesslie survey recorded high remoteness from access values throughout much of the natural lands of

the block, with the highest recorded values being towards the south. Parts of the Catherine River catchment were included in Class 4, the survey's highest class, and this was one of only five such areas in the eastern half of the State.

The major and minor roads on the block boundaries (Upper Rose River Road, Rose River Road, Abbeyard Road and West Buffalo Track), together with roads outside the block in and around Mount Buller, were the major influences on recorded values. In addition, the Cobbler Lake Road was classified in the Preece and Lesslie data base as a four-wheel-drive track, whereas it is presently maintained as a two-wheel-drive minor road, and thus reduces recorded values in the south-western corner of the block.

Vehicular tracks are generally associated with fire protection purposes or in the more elevated southern areas with timber utilisation. They mainly follow catchment divides, although they also follow the lower reaches of the Dandongadale and Catherine Rivers (the latter being associated with cattle management). Some are subject to seasonal closure, and, other than the southern extremity of Speculation Track, all are available for public use.

All tracks and roads are listed in Table 61 (see page 204) and their locations shown on Map 14. A 15 km sector of the Cobbler Lake Road is the only road that traverses the block. No areas of the block are greater than 3 km from a road or track.

A defined walking track links the Lake Cobbler picnic and camping ground with Mount Cobbler, and another traverses the Cobbler Plateau. The route of the Alpine Walking Track traverses the southern boundary of the block along the Barry Mountains.

Aesthetic Naturalness

The aesthetic naturalness values as defined in the Preece and Lesslie survey reflect the presence of roads, tracks and structures.

Very few structures are within the block; these are detailed in Table 62 and their locations shown on Map 14.

Table 62

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Kiewa to Melbourne transmission line	Powerline (220 kV)	SEC	U	Main line to Melbourne, 40 m easement
2	Lake Cobbler Picnic and Camping Area	Fireplaces, shelter, pit toilets	CFL	R	
3	King River Hut	Cattlemans Hut	Licensee	CM, R	

KEY:

CM - Cattle Management
R - Recreation
U - Utilities

The major influence on recorded values was the road and track network, with the highest values being recorded in the upper Catherine River catchment (where values were moderate), and the middle reaches of the Dandongadale River catchment (where they were moderate to high - Class 2 and 3 in the Preece and Lesslie survey). Another area of recorded moderate quality in the Rose River catchment is influenced by the omission of a vehicular track (the Wild Horse Gap Track) from the survey data base.

Biophysical Naturalness

The whole of the natural lands of the block were allocated low biophysical naturalness values by Preece and Lesslie. These values were based on land-use indicators of biophysical naturalness but, given the absence of detailed data, were given conservative values. However, as discussed below, they may not truly reflect the area's present use.

Land-use Indicators of Biophysical Naturalness

The main land uses influencing biophysical naturalness are grazing and timber harvesting.

Virtually all of the block is encompassed by current grazing licences, other than in the south-western corner (parts of which, including the Mount Speculation area, carries stock under agistment). Most use is mainly bush grazing by local farmers along the major watercourses, some of which have been modified by the removal of small trees and the application of superphosphate and the introduction of clovers. Seasonal summer grazing is undertaken on the Cobbler plateau. The more dissected foothill areas, while within licensed blocks, are likely to experience little grazing pressure, and thus such areas, would have higher biophysical naturalness values than recorded. While the south-west of the block is no longer subject to regular grazing, values are reduced as a result of timber harvesting. Grazing is a permitted use for much of the block and as such has ongoing influence on values. The main areas that have been grazed and those presently subject to licensed grazing are shown on Map 14.

Timber harvesting is a significant influence on recorded biophysical naturalness values. Most has been undertaken in once-only logging areas within the Alpine National Park and as such is not subject to ongoing utilisation. Logging in approved once-only logging areas within the Alpine National Park in the Catherine catchment and, in the Buffalo headwaters is still to be completed and biophysical naturalness values can be expected to decrease substantially in these areas. Areas that have been subject to timber extraction to date are shown on Map 14.

Other Indicators of Biophysical Naturalness

The block was covered by a report on the nature conservation of rivers and streams (BIOSIS 1988). This study identified three essentially unmodified catchments within the block: the Little Dandongadale River, Long Jack Creek and the whole catchment of the Catherine River. The status of the last mentioned is being reviewed, however.

Timber resource information indicates that about half of the ash type forests of the block consist of mature stands, and virtually all of the mixed species forests consists of mature stands.

Walsh et al. (1984) recorded that introduced species represented an average of 6% or less of the total species composition of units of alpine vegetation represented and that most were restricted to mechanically disturbed areas such as road verges. Available data also indicates that the vegetation of much of the block has a low level (less than 10%) of weeds (see Map 7). Blackberries are known to be common on many stream frontages, especially where the land has been disturbed. Other species recorded include St John's Wort, sweet briar and the slender thistle.

There have been few detailed surveys of the block's fauna. The statewide surveys of Nolan (1981) and the Department of Crown Lands and Survey (1984) indicated that rabbits were considered to be well controlled with other feral animals recorded were cattle and dogs, with deer also recorded. Foxes and cats are also likely to occur in the block.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The block is about 59 800 ha and some 35 km long by 25 km wide. Of this, nearly 20% was included in at least Class 4 wilderness quality in the Preece and Lesslie survey with less than 10% in the highest three classes (Class 5, 6 or 7). Essentially unmodified catchments identified in the descriptive block, excluding the one under review, cover an area of about 5280 ha. The largest area presently without roads or vehicular tracks being approximately 12 050 ha, with a trackless area extending into Block 8 encompassing 19 700 ha.

Ecological Viability

The area's high to very high remoteness from settlement and access values, its dissected topography, the apparent low levels of introduced fauna and flora for much of the block, and a number of essentially unmodified catchments all contribute to the level of ecological viability for this area. A range of major vegetation communities also occur.

There are no known programs of active or manipulative management undertaken, apart from periodic vermin and noxious weed control programs to sustain rare or significant species.

Fire hazard is high. The block was burnt during the 1939 forest fires, with the only major bushfire (greater than 1000 ha) recorded since that time affecting parts of the block being in 1985. Active management for fire protection includes periodic fuel-reduction burning in open forest communities, with most of the existing road network maintained for fire suppression access.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of the block are high, with the block including a range of communities from alpine herbfields on Mount Speculation and subalpine woodlands to riverine forests, many of which are relatively little disturbed. The extensive narrow- and broad-leaved peppermint forests

are also little disturbed. Significant species occurring within the block include the Baw Baw berry (Mount Cobbler) and the mountain swamp gum woodlands on the Buffalo River are also of interest. The Buffalo and Dandongadale Rivers include a diverse range of native fish species including the endangered trout cod (Buffalo River upstream of Lake Buffalo), with two vulnerable species also recorded; the Macquarie perch (Buffalo and Dandongadale Rivers) and the freshwater catfish (Dandongadale River). The areas of extensive rock outcrops, notably on the escarpments of the Cobbler plateau and The Razor, are of particular geological interest.

Recreation

A wide range of recreational activity is undertaken in the block, and there is a high capability for bushwalking, fishing and four-wheel-drive touring.

Natural features of particular interest include the watercourses of the main streams, the summits of Mount Cobbler and Mount Speculation, the escarpments and waterfalls of the Cobbler Plateau (notably the Dandongadale Falls - which are the highest in the State), the narrow ridges of the Barry Mountains and the escarpments of the Vikings and The Razor, the narrow ridges and deeply incised streams of the foothill areas, and the alpine herbfields on the higher elevated areas in the south of the block. Such features contribute to the area's capability for inspiration and solitude. The Cobbler Lake, while an artificial impoundment, is also a feature of interest.

The southern part of the block is a traditionally popular area for bushwalking, with Mount Cobbler and Mount Speculation frequent destination points. A range of good camp sites are available. Water is limiting along the Barry Mountains. Many of the ridges, spurs and minor peaks are untracked, as are sections of a number of the watercourses.

More popular traverse routes such as the Alpine Walking Track route along the Barry Mountains have been defined by usage. Off-track capability for walking in the subalpine environments is high. The Barry Mountains area is used mainly in extended trips with the Viking and Mount Despair being popular destinations. Other walking routes include those following spurs into the Catherine River from Mount Speculation and The Razor.

Cross-country skiing takes place on the Cobbler plateau and the broad ridge south to Mount Speculation. Cliffs at The Razor and around Mount Cobbler offer opportunities for rock climbing.

Parts of the block receive moderate use for recreation driving both four-wheel-drive vehicles and by trail bikes. Vehicle-based camp sites include those along the King River, particularly at Pineapple Flat, and at Cobbler Lake. The Buffalo River tracks are regularly used as an access link into popular four-wheel-drive destinations in the Wonnangatta valley.

Sambar deer are hunted, chiefly along the main river valleys such as those of the King, Catherine and Buffalo Rivers. Trout (mainly brown trout) are sought in these rivers and, in the Dandongadale and Rose Rivers. The Rose River has the highest value for sport fisheries. Some fossicking is undertaken on the Buffalo River near its confluence with the Catherine River.

A number of commercial operators offer vehicle-based bush tours within or through the block. These include sightseeing and fishing tours to the King River, Lake Cobbler and Mount Speculation, snowshoeing south of the Bennies, with bushwalking, four-wheel-drive and camping tours and excursions including Pineapple Flat, Mount Cobbler and Mount Speculation and Lake Cobbler in their itineraries.



The headwaters of the Catherine River, looking north towards The Razor

Agriculture

Capability for most forms of agriculture is generally low and limited by steep slopes and cold winter temperatures. The high rainfall environment does, however, allow the growing season to extend well into summer.

Much of the public land is used for light forest grazing, with the capability for such grazing high in the more elevated areas in the south of the block and along the river valleys. Elsewhere capability for bush grazing is low.

Cattle graze the snow gum and alpine ash forests of the Cobbler plateau in summer and the river flats of open manna gum and swamp gum forests. The lower slopes of the Dandongdale, Catherine and west branch of the Buffalo Rivers are grazed throughout the year.

Presently four graziers hold a total of nine grazing licences over the public lands of the block. Formerly occupied grazing blocks to the north-west of Mount Cobbler are now vacant as a result of the phasing out of grazing in the former Wabonga Plateau State Park (now included in the Alpine National Park). Licensed areas around Mount Cobbler, Mount Speculation and The Razor have not been grazed in recent years. Details of these licences are included in Table 63.

Apiculture

There is low usage on the eastern edge of the block, mainly from apiarists operating on adjacent freehold land. Otherwise, the block has little importance for the beekeeping industry.

There are no defined apiary licensed sites on the public lands of the block.

Timber Production

Capability for hardwood production is high in most of the regrowth and mature ash stands. However, other than those in the catchment of the west branch of Buffalo River, most of the present resource has been utilised. Stands of moist foothill forest, generally adjacent to stands of the mountain forest, have moderate capabilities. The principal species sought in these forests are messmate, mountain gum and manna gum. The extensive areas of peppermint forests are generally on steep slopes and, where access permits, these forests have generally low capability for hardwood production.

The net available area of timber resources, given current tenure and operational standards, consists of approximately

Table 63

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no of stock carried	Comments
L7, L8, L9 - 948/130	Hurstdale Pastoral Co.	Foothill and riparian forests	50 head	
L10 - 461/130	F. Ryan	Foothill and riparian forests	40 head	Part of block subject to phase out
N138, L13A, L13D - 83/154, 83/153	Weston and Hearn	Foothill and riparian forests, snowgum woodland	200 head	No stock have apparently been carried in recent years
L13 - 0936/130	M.G. Chalwell	Foothill and riparian forests	100 DSE ¹	
L14 - 649/130	M.G. Chalwell	Foothill and riparian	50 head	Part only; remainder in Block 11

Note:

1. Figure represents dry sheep equivalent allocation.

248 ha of ash species forest (including 64 ha in once-only logging areas) and 769 ha of mixed species forest (including 662 ha in once-only logging areas).

The descriptive block lies within the Bennalla/Mansfield Forest Management Areas and the Wangaratta Forest Management Areas. The block's contribution to their regional sustainable yields is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

There are no known extraction mineral or stone extraction sites, although the area has potential for the discovery of minerals such as gold. An exploration licence (EL 1935, Norgold Ltd) is current, as at August 1989, over an extensive

area in the eastern half of the block and extends into Block 11. There are no active mining tenements.

The exploration or mining of minerals is not permitted in the southern portion of the block within the national park.

Water Production

The block has high capability for water production, with high rainfall and well-forested mountainous terrain. Water quality is good.

Lake William Hovell (to the west) is sited on the King River and provides water mainly for irrigation purposes, as well as securing the local water supply, and Lake Buffalo (to the north) is located on the Buffalo River, and safeguards irrigation, urban, stock and domestic supplies in the area.

Table 61
ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Upper Rose River Rd		*		Shire	F/h, PA, R, U	Nil	Boundary only
2	Rose River Rd	*			Shire	F/h, R	Nil	Boundary only
3	Dandongadale Tk/ McCready Tk			*	CFL	FP, R	Nil	
4	Dandongadale-Buffalo Divide Tk			*	CFL	FP, R	Nil	
5	Abbeyard Rd		*		Shire	F/h, R	Nil	Boundary only
6	Worseldine Tk			*	CFL	FP, R	Nil	
7	Brandy Ck Tk			*	Private	F/h	No public access	
8	Cobblers Lake- Abbeyard Tk			*	CFL	FP, R	Nil	
9	Catherine River Tk			*	CFL	CM, F/h, FP, L	Nil	Part of freehold
10	Razor Tk			*	CFL	FP, L	Seasonal closure	
11	West Buffalo Tk		*		CFL	FP, L, R	Nil	Boundary only
12	Harry Shepherds Tk			*	CFL	FP, L	Nil	Boundary only
13	(no name)			*	CFL	L	Nil	
14	Speculation Tk			*	CFL	FP, R	Part MVO, past seasonal closure	
15	King Basin Rd			*	CFL	FP, L, R	Nil	Boundary only
16	Cobbler Lake Tk			*	CFL	FP, R	Seasonal closure	
17	Little Cobbler Tk			*	CFL	FP, L, R	Seasonal closure	
18	Cobbler Lake Rd		*		CFL	FP, R, U	Nil	
19	Wild Horse Gap Tk			*	CFL	FP, R	Seasonal closure	
20	Burnt Top Tk			*	CFL	FP, R	Nil	

BLOCK 11 : YARRARABULA CREEK

Location and Boundaries

This block lies immediately to the south of Mount Buffalo National Park (see Map 10) and covers an area of about 56 400 ha. It is located within the Shires of Myrtleford and Bright.

The western boundary follows Abbeyard Road and the West Buffalo Track. The southern boundary follows the catchment divide formed by the Barry Mountains. The northern boundary follows the alignment of a major transmission line, while the eastern boundary following the Buckland Road.

Tenure and Land Use

The greater part of the block is uncommitted Crown land or State forest (the uncommitted Crown land category has been generally included within State forest in more recent Land Conservation Council recommendations), with the southern edge of the block included within the Alpine National Park.

Small areas of freehold land are also included in the block. These lie on the western (on the Buffalo River) and eastern (Buckland River) margins.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 64 and the boundaries of the separate areas shown on Map 14.

Relevant Planning Policies, Strategies and Management Plans

That part of the block within the Alpine National Park is within the area for which the Alpine Planning Project is preparing comprehensive management plans. The Wonnangatta-Moroka Unit Proposed Management Plan 1989 covering this area has just been released for public comment.

The Victorian Tourism Commission's 'Wine and High Mountain Country Tourist Development Program' (VTC 1987) encompasses the block. It notes that subalpine areas

Table 64

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁵
National park	A13 (Alpine)	12 100	Public purpose - Crown land ³	Grazing permitted subject to conditions (government variation to LCC 1983), apiculture and deer hunting by stalking be permitted and once-only logging permitted in defined areas (government variation to LCC 1983)
State forest	I1 ¹	9 160	Public purposes ^{3,4}	Specified values to be protected
including natural features zone	M7 ¹ (east branch of the Buffalo River)	-		No timber harvesting or gravel extraction, and only essential roadings
Uncommitted ⁶	S1 ²	33 610	Public purposes ⁴	
Agriculture (Abbeyard, Catherine River, Buckland)	Not applicable	1 240	Rural 'A' ⁴	

Notes:

1. Refers to LCC Alpine Special Investigation Final Recommendations, 1983.
2. Refers to the LCC North-Eastern Study Area Districts 3, 4 and 5. Final Recommendations (1977)
3. Refers to the Shire of Bright Planning Scheme.
4. Refers to the Shire of Myrtleford Planning Scheme.
5. Specific provisions relevant to area in addition to standard land use provision of LCC recommendations (as outlined in Appendix II)
6. The uncommitted category has been generally included within State forest in more recent LCC recommendations and they are managed as one unit.

and waterways, such as the Buckland River, form part of the region's competitive tourism strengths.

The areas of State forest are within the Wangaratta Forest Management Area, for which forest management plan is presently being prepared.

Revised fire protection plans are being prepared for the Department of Conservation, Forests and Lands' Wodonga region which will cover the public lands of the block.

All of the block is within proclaimed water supply catchments: in the west the Buffalo River (Lake Buffalo) is a proclaimed catchment and in the east the Buckland River is a proclaimed catchment.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of Victoria also apply.

Physical Setting

Virtually the whole of the block consists of deeply dissected mountainous terrain, with steep hillsides and narrow ridges. A dense network of streams occur, most of which trend in a northerly direction from the Great Dividing Range. Other than small areas of granitic rock and associated metamorphics at Abbeyard and Mount Selwyn (1410 m), the area is comprised of Ordovician siltstone and sandstone sediments.

Small areas of alluvial flats lie along the watercourses of the Buckland River and, to a lesser extent, the lower reaches of the Buffalo River.

The areas of highest elevation are in the south of the block on the Great Dividing Range (the Barry Mountains), with the highest peaks being Mount St Bernard (1548 m) and The Twins (1701 m). Elsewhere the deeply dissected terrain of the block includes descents of up to 800 m from ridgetops to valley floors. The lowest points of the block are in the north on the Buffalo River (280 m).

The whole block is within the Ovens River basin and includes the entire catchments of the Annie River and Yarrarabula Creek.

Biological Setting

Most of the block is vegetated with foothill open forests. The major overstorey species of the moister sites is narrow-leaf peppermint with associated tree species, including manna gum and mountain gum. Understoreys vary from mountain tea-tree through Victorian Christmas bush in wet gullies, to shrubby and grassy. On the drier ridges and slopes dry sclerophyll forests of broad-leaf peppermint with candlebark also occur. Tussock grasses and heathy shrubs generally dominate their understoreys.

Montane forests of alpine ash occur at higher elevations (900 m to 1350 m). Mature stands have grassy understoreys, while younger stands and those at lower elevations have understoreys that are more shrubby. The major stands occur in the headwaters of the streams near the Barry Mountains and Annie River. Isolated stands occur Yarrarabula Creek–Buckland River Divide. Most are fire or logging regrowth.

Small areas of mountain gum–snow gum montane low open forests and snow gum woodlands occur on the Yarrarabula Creek Divide, in the Annie River headwaters, and on the Barry Mountains at elevations ranging from 1000 m to 1400 m. They have grassy to heathy understoreys.

Alpine herbfields and heathlands occur on The Twins (1550 m plus), in the south-east corner of the block.

Mountain swamp gum woodlands are found along some of the major streams and manna gums may also occur along the larger watercourses in association with dense shrubby understoreys.

The fauna of the block has not been extensively surveyed, particularly in the north of the block but a range of species reflecting the various habitats occurs here. Twelve species of fish have been recorded including eight native fish species.

Cultural Setting

Aboriginal people probably utilised the block for at least part of the year. They would have occupied lower areas most of the year and used some of the major valleys as access to the higher plateaux in spring and summer. Mount Buffalo is known to have been an important location for the gathering of people from a number of related groupings. Little evidence of Aboriginal use is now evident and no archaeological sites have been recorded by the Victoria Archaeological Survey (although detailed surveys have not been undertaken).

It appears that most of the block was not used intensively by early pastoralists, with the only licensed grazing runs recorded within the block covering the lower reaches of Yarrarabula Creek (Buffalo East), along the Buffalo River (Abbeyard) and another centred on Mount Selwyn. These areas are still grazed today.

It was, however, the scene of much gold mining activity with the goldfield area centred on the Buckland River at the eastern boundary of the block. Most activity was in the form of alluvial mining, with the richest area from Fairley's Creek along the west branch of the Buckland. A number of payable quartz reefs have also been worked. Mining tracks were cut up the Buffalo and Buckland Rivers to the Barry Mountains, and mining timber would have been cut along the Buckland.

Most timber utilisation within the block, however, has occurred only within the last few decades and been restricted to the higher elevation alpine ash forests in the south of the block.

WILDERNESS QUALITY

The highest wilderness quality values recorded were in the north of the block, mainly within the catchment of Yarrarabula Creek, and included areas of very high quality - Class 5 in the Preece and Lesslie survey. Some of the nearby upper reaches of tributaries of the Buckland River, notably Nelson Creek, also recorded high values. Values recorded elsewhere in the block were moderate.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The block is almost entirely surrounded by naturally vegetated lands, with only minor cleared lands occurring on the eastern and western boundaries. These cleared lands are the main influences on remoteness from settlement values which were highest in the centre of the block.

The areas of settled land on the western margin are used for beef production, on both improved and native pastures, with small areas of hops and tobacco grown near Dandongdale. Horticulture (apples, pears, cherries, walnuts, chestnuts and almonds) and cattle grazing are also carried out in the north-east corner on the Buckland River. There are also some areas of uncleared freehold associated with the presently (cleared) settled lands, notably at Abbeyard. Development of a small block of freehold land at Buckland Junction would also reduce recorded values, particularly as some of the highest values presently recorded in the block are centred on the headwaters of Nelson Creek.

Remoteness from Access

Most of the block has high remoteness from access values, as identified in the Preece and Lesslie survey, with the lowest values being towards the north and eastern extremities. This pattern largely reflects the influence of major roads external to the block.

Minor roads on the boundaries also influenced recorded values, as did the logging roads in the south of the block (including the East Buffalo Road which was classified as a four-wheel-drive track in the Preece and Lesslie data base).

The vehicular track network, other than that associated with timber extraction in the south of the block, is relatively sparse and confined to the major catchment divides. Few have restrictions on use, with fire protection the dominant management purpose.

There are 47 km of trafficable roads within the block. No areas of the block are greater than 3 km from a road or track. All roads and tracks of the block are listed in Table 65 (see page 211) and their locations shown on Map 14.

The Alpine Walking Track traverses the southern boundary of the block along the Barry Mountains

Aesthetic Naturalness

Aesthetic naturalness values, as defined in the Preece and Lesslie survey, reflect the presence of roads, tracks and structures.

Few structures were identified in the area and these are on the boundaries of the block (see Table 66 and Map 14). As a result, the major influence on aesthetic naturalness values is the track network. The largely trackless catchments of Annie River, Yarrarabula and Nelson Creeks record the highest values, although still moderate on a State-wide basis.

Biophysical Naturalness

The whole of the natural lands of the block were allocated low biophysical naturalness values by Preece and Lesslie, except for the Yarrarabula Creek catchment which scored the survey's highest class (Class 4) because it was identified as little used owing to its inaccessibility. As noted below, however, the allocated values do not truly reflect the areas present use.

Land-use Indicators of Biophysical Naturalness

The main land uses influencing biophysical naturalness are grazing, timber harvesting and, to a minor extent, mining along the tributaries and valley of the Buckland River.

The whole of the block is encompassed by current grazing licences. Most grazing is bush grazing along the major watercourses. Some of the higher montane and snow gum forests are also included in licensed areas and are subject to seasonal grazing. These current grazing licences include the Yarrarabula Creek catchment and its lower watercourse and environs. Because grazing continues, naturalness values are significantly lower than recorded and negatively influence total wilderness quality values.

Grazing is a permitted use for all of the block and has an ongoing influence on values. The main areas that have been

Table 66

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Kiewa to Melbourne transmission line	220kV Electricity supply transmission line	SEC	Utility	Part of main Melbourne line
-	The Twins Trig.	Trigonometric station	Dept Property and Services	Utility	

Note:

1. Trigonometric stations are shown on Map 14 by symbol.



Mixed species forests on Mount Buggery Track.

grazed and those presently subject to licensed grazing are shown on Map 14.

Timber harvesting has been carried out predominantly in the ash forests on the southern boundary where a significant negative impact on recorded biophysical naturalness values is apparent. Some harvesting has been undertaken in areas now within the boundaries of the Alpine National Park and, as such, are not subject to continuing utilisation.

Once-only logging in the Buffalo River headwaters is permitted until 1993. Elsewhere where logging is an ongoing permitted use and as such may further reduce values, especially if mixed species forests are utilised.

Areas that have been logged to date, as well as the approximate boundaries of the old Buckland valley goldfield, are shown on Map 14.

Other Indicators of Biophysical Naturalness

The block was covered by a report on the ecological values of Victorian rivers and streams (BIOSIS 1988). This study identified three unmodified catchments within the block: Yarrarabula Creek, the Annie River, and the headwaters of the east branch of the Buckland River. The status of the last two catchments are being reviewed, however.

Timber resource information indicates that about 27% of ash species forests of the block and virtually all of the mixed species forests of the block consist of mature stands.

No detailed surveys of the quality of the vegetation or of the distribution of introduced species are known for this block, although a compilation of available data indicates that the vegetation composition has a low level (less than 10%) of weeds (see Map 7). Blackberries are common on many stream frontages, especially where the land has been

disturbed and clover species have been introduced along some of the grazed river valleys.

There have also been few detailed surveys of fauna in the block. An indication of the distribution of the presence of introduced mammals can be obtained by parish-based, Victoria-wide, surveys of feral animals (DCL&S 1984) and rabbits (Nolan 1981). These indicate, that at the time of survey, some rabbits were present but for most of the block they were not a problem. The only feral animals recorded were cattle (in the southern margins of the block) and dogs. Deer were also recorded. Foxes and cats are also likely to occur.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The block is about 56 400 ha and roughly 30 km long by 15 km wide. Of this, about 15% was included in at least Class 4 wilderness quality in the Preece and Lesslie survey, with less than 10% within the highest three classes (Classes 5, 6 or 7). Essentially unmodified catchments identified in the descriptive block, excluding those under review, cover an area of about 9030 ha. The largest area presently without roads or vehicular tracks is 7000 ha.

Ecological Viability

The relatively high remoteness values, the dissected topography, the apparent low levels of introduced fauna and flora for much of the block, and a number of essentially unmodified catchments, all contribute to the level of ecological viability. A range of major vegetation communities is also present.

There are no known programs of active or manipulative management undertaken within the block to sustain rare or significant species, but there are periodic vermin and noxious weed control programs.

Fire hazard is high. The whole of the block was burnt during the 1939 forest fires and parts of the block were also burnt in major bushfires in 1985. Active management for fire protection includes periodic fuel-reduction burning in open forest communities (and generally not in subalpine communities), with much of the existing road network maintained for fire suppression access.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values are high, with the block including a range of communities from subalpine snow gum woodlands to riverine forests, many of which are relatively little disturbed. Significant species occurring here include Omeo gum (in the headwaters of the Buckland River), and the broad-toothed rat. The Buckland and Buffalo Rivers include a diverse range of native fish including the *endangered trout cod* (in the Buffalo River upstream of Lake Buffalo), and the vulnerable Macquarie perch (Buffalo River).

Recreation

Capability for recreational activity is high for bushwalking, fishing, four-wheel-drive touring and camping.

Natural features of particular interest include the Barry Mountains, the high points at and to the east of Mount Selwyn, the narrow ridges and deeply incised streams of the foothill areas, the attractive stream environs, and the subalpine woodlands in the south of the block. Such features contribute to the area's capability for inspiration and solitude.

The Barry Mountains and the Alpine Walking Track are the focus for bushwalking and are mainly used as part of extended trips. Opportunities for remote walking in the foothill areas are also high and many of the ridges, spurs and minor peaks are untracked, as are the watercourses of many of the block's creeks and streams.

Little four-wheel-drive touring is presently undertaken in much of the block, although the Buffalo and Buckland River valleys are regularly used as access links into the Wonnangatta valley and Tea Tree Range to the south. The more accessible streams are popular areas for sightseeing and picnicking and the Buckland River and its tributaries are of interest to fossickers. Sambar deer are hunted, particularly along the main river valleys, such as the Buffalo and Buckland Rivers. *Many rivers and streams are important for trout fishing, with the Buckland, in particular, having high value.*

While no commercial tours are known to operate within the block, a number of day and overnight four-wheel-drive tours use the main access roads en route to the Wonnangatta River area.

Given its relatively close proximity to the increasingly popular tourist focus of Bright, recreational usage may increase in the future.

Agriculture

The public lands of the block have low capability for agriculture principally as the land is too steep for clearing and flatter areas have low capability because of the short growing season.

The river flats of open manna gum and swamp gum forests and the lower slopes of narrow-leaf peppermint forest are used for grazing throughout the year with some of the higher snow gum and alpine ash forests in the south of the block used for summer grazing. Capability for bush grazing in such areas is high; elsewhere capability is low.

The higher elevation blocks are fully utilised by graziers, while the lower elevation blocks in the north-east have had little use recently. Home properties are downstream along the main river valleys. Presently four graziers are running stock on seven grazing licences which cover most of the public lands of the block. Details of these licences are included in Table 67.

Apiculture

There is some low apicultural usage on the north-western end of the block, but otherwise it is of little interest to the beekeeping industry.

There are no defined licensed beekeeping sites on the public lands of the block.

Timber Production

Capability for hardwood production is high in most of the regrowth and mature ash stands. Some of these stands, however, are not available for utilisation, being within the Alpine National Park where such use is not permitted, or are available for once-only logging.

Stands of moist foothill forest, which generally adjoin the ash forests, have moderate to high capabilities, with the principal commercial species being messmate, mountain gum and manna gum. The extensive areas of peppermint forests are

generally on steep slopes, and where access permits, these forests have low to moderate capability for hardwood production.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 1310 ha of ash species forest, and 367 ha of mixed species forest (including 25 ha in once-only logging areas).

The descriptive block lies within the Wangaratta Forest Management Area. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Table 67

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no of stock carried	Comments
L6 - 325/130	Ivone and Jackson	Foothill and riparian forest	Not known	
L16A, L19, L25 - 930/130	M.J. and N. Hall	Foothill and riparian forest	150 head	
F16	M.J. Hall	Foothill and riparian forests and snow gum woodlands		
L17 - 814/130	M.J. Hall	Foothill forests and snow gum woodlands	30 head	
L14 - 649/130	M.G. Chilwell	Foothill and riparian forests	50 head	Part only, remainder in block 10
L15 - 0185/130	K. Heywood	Foothill and riparian forests	40 head	

Mineral Production

With the exception of the Buckland River and its tributaries, there has been no known extraction of minerals or stone from the block. The goldfield still has possibilities for further gold production and presently there is some interest in this area. Exploration licences currently cover much of the Buffalo River catchment and a number of mining leases have been taken out along the environs of the Buckland River.

Details of mining tenements current over the block are included in Table 68. Under existing tenure about 80% of the block is potentially available for mineral exploration or mining.

Water Production

The block has high capability for water production, with high rainfall and forested mountainous terrain. Water quality is good.

Lake Buffalo, on the Buffalo River and downstream of the block, safeguards irrigation, urban, stock and domestic supplies in the area.

TABLE 68

MINES ACT TENEMENTS (As at August 1989)

Tenement type and ref. no.	Lessee	Location
Exploration licence		
EL 1935	Norgold Ltd	Buffalo River and Yarrarabula catchments, extends into Block 10
EL 1494-2 (part only)	P. Gillard	Buckland River
Mining lease		
MLA 1882-1883, ML 1885-1887 (part only)	Meekathara Minerals Ltd	Buckland Junction, Buckland River east branch

Table 65

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major road	Minor road	Vehicle track				
1	Goldies Spur Tk			*	SEC	U	Nil	Boundary only
2	Mt Buggery Tk			*	CFL	FP, R	Nil	
3	Durline Tk			*	CFL	FP	Nil	
4	Yarrarabula Tk			*	CFL	FP, R	Nil	
5	Buffalo Range Tk			*	CFL	FP, R	Nil	
6	Buckland River Rd		*		Shire	PA, R	Nil	Part boundary
7	Scotchmans Creek Tk		*	*	CFL	FP, R	Nil	
8	Nelson Creek Tk			*	CFL	R	Nil	
9	Paddy Hill Tk			*	CFL	PR, R	Nil	
10	Gunns Tk			*	CFL	FP, L	Nil	
11	Alpine Rd	*			Roads Corp	PA, R		Boundary only
12	Twins Rd			*	CFL	FP, L, R	MVO	
13	Mt Murray Tk			*	CFL	FP, R	Seasonal closure	
14	Selwyn Creek Rd		*		CFL	FP, L, R	Nil	
15	Montana Tk			*	CFL	FP	Nil	
16	Dingo Creek Tk			*	CFL	FP	Nil	
17	Mt Selwyn Rd		*		CFL	L, R	Nil	
18	Seed Rd			*	CFL	FP, R	Nil	
19	Twins Creek Rd			*	CFL	FP, L	Nil	
19a	Camp Creek Tk			*	CFL	FP, R	Nil	
20	Walsh Tk			*	CFL	FP	Nil	
21	East Branch Tk			*	CFL		Nil	
22	West Humphry Rd		*	*	CFL	R, L	Nil	Boundary only
23	East Buffalo Rd		*		CFL	FP, L, R	Nil	
24	Dugont Rd			*	CFL	FP, R	Nil	
25	East Riley Rd		*		CFL	FP, R	Nil	
26	Selwyn Tk			*	CFL	FP, L, R	Nil	
27	West Buffalo Tk		*	*	CFL	FP, R	Seasonal closure	Boundary only
28	Furlong Tk			*	CFL	FP, R	Nil	
29	Penny Tk			*	CFL	FP	Nil	
30	East--West Buffalo Divide Tk			*	CFL	FP	Nil	
31	Abbeyard Rd		*		Shire	F/h, PA	Nil	Boundary only
32	Gunn Creek Tk			*	CFL	FP	Nil	

KEY:

F/h - Freehold Access	PA - Primary Access
FP - Fire Protection	R - Recreation
L - Logging	U - Utility

BLOCK 12 : MOUNT BOGONG

Location and Boundaries

This block of 47 840 ha in the north-east of Victoria encompasses the highest area of the Victorian Alps (see Map 10). It falls within the municipalities of Bright, Tallangatta and Omeo.

The western and eastern boundaries follow major roads - Bogong High Plains Road in the west and the Omeo Highway in the east - with the northern boundary following minor roads and major transmission lines and the southern boundary following a vehicular track (Kelly Track) which traverses the Middle Creek divide.

Tenure and Land Use

Much of this block is now included within the Alpine National Park. Two reference areas occur within the national park boundaries. The remaining public land of the block includes a large area of State forest in the north-east and part of the Mount Wills Historic Area in the south-east.

Three small areas of freehold land fall within the block - on its margins. These are parcels of land at Mount Beauty, Glen Valley and on the Snowy Creek south of Granite Flat.

Details of previous Land Conservation Council recommendations for the block are outlined in Table 69 (see page 218). The boundaries of the different land uses and controls are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The national park areas of the block are specifically referred to the Tourism Development Program for the Wine and High Mountain Country Resort Zone (VTC 1987). It identifies the park as a key tourist asset to be used to increase all round tourism, and recommends the possible enhancement of the Trappers Gap Road (on the northern edge of the block) as a tourist road linkage.

All of the national park area within the block is encompassed by the Alpine Planning Project. As part of the project a proposed management plan (DCFL 1989) has been prepared for this area and released for public comment. A final management plan should be completed in 1990.

The draft plan allocates most of the area within the descriptive block as a Conservation 'A' Zone, covering alpine and subalpine areas, where visitor facilities are generally limited and the existing road network generally remains open for use, and a Conservation 'B' Zone, covering less sensitive lower elevations, where road networks and visitor facilities may be upgraded and extended. Smaller areas are within reference and special protection zones. The draft plan proposes to retain most existing huts. A seasonal snow recreation zoning is proposed in which limited or no facilities (no new pole lines, or limited sign posting) are to be provided other than for areas around Rocky Valley Storage where provision for skiers is more intensive.

The block's State forest area is mainly within the Wodonga Forest Management Area. A forest management plan is presently being compiled for this area.

The whole of the block lies within proclaimed water supply catchments. These apply over the eastern half of the block, the Lake Hume catchment (land-use notice applies, consent required for specified land uses such as clearing of steep lands) and over the western half of the block, the Upper Kiewa catchment. Water offtakes and storages are all external to the boundaries of the block.

A draft regional fire protection plan is being prepared by the Department of Conservation, Forests and Lands (Wodonga region), which will cover this block.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

The whole of the block is part of the East Victorian Uplands. The main physiographic feature is the Bogong Tablelands (1650 to 1750 m) which are flat to gently undulating high plains extending across much of the southern section of the block. High points include Mount Bogong (1986 m), the highest mountain in Victoria, Mount Nelse North (1885 m), Spion Kopje (1837 m), Hollands Knob (1813 m) and on the eastern edge of the block Mount Wills (1750 m).

Ordovician metamorphic schists and gneisses, which grade into Ordovician sediments in the north-east dominate the block. Lower Silurian granites occur along the East Kiewa valley (upstream of Clover Dam) between the Big River and the Omeo Highway (including Mount Wills) and scattered localities elsewhere on the Bogong Tablelands, while Lower Devonian granite occurs on the Big River. A cave has been recently located on Quartz Ridge near Mount Bogong.

The block includes all of the headwaters of the Big River, the catchments of the Bogong branch of the Snowy Creek and Mount Wills Creek in the north-east, and the eastern fall of the Kiewa River's east branch. The divide of the Big River from Mount Bogong to Hollands Knob forms the western edge of the major Mitta Mitta basin. These rivers have formed deeply dissected terrain.

Biological Setting

The block includes large areas of alpine vegetation. Most occurs above 1650 m on the flat to gently undulating Bogong Tablelands in the south of the block and on the tablelands around Mount Bogong itself and a small area at Mount Wills.

This vegetation forms a complex of 23 communities, of which the most extensive are heathlands and tussock grasslands.

Snow gum woodlands, sometimes in association with small areas of subalpine heathlands and grasslands, are distributed

throughout the block, including those at Mount Wills. Understoreys may be dominated by shrubby or grassy species.

Montane forests of alpine ash are extensive, particularly on moist sheltered sites, generally between 900 and 1400 m in elevation. Understoreys are generally herbaceous or shrubby.

Open forests of narrow-leaf peppermint, manna gum and eurabbie (St John's blue gum) are found below the montane forests in the north of the block and on the Big River. Their understoreys are variable and may include wet elements such as blanket-leaf and tree ferns, or be shrubby or grassy. On drier, north-facing sites on the Big River open forests of broad-leaf peppermint and candlebark occur with generally grassy open understoreys.

Cultural Setting

Aboriginal groups inhabited the lower areas during much of the year, but during summer neighbouring groups would gather on the high plateaux to catch and eat the Bogong moths.

The search for grazing land led to the settlement of surrounding areas by European pastoralists. Grazing licences were first taken out on the Bogong High Plains in 1851 and stock have grazed there ever since. Most grazing is of the alpine meadows in summer. Both horses and cattle were grazed, together with sheep in drought years. Much of the block was overgrazed in the past and regularly burnt to promote grassy species.

Since the 1940s, by which time extensive degradation was obvious, grazing was excluded from the immediate environs of Mount Bogong, sheep and horses not permitted and deliberate firing of the vegetation prohibited. Summer

grazing of cattle has continued to be a feature of much of the area, although it will be phased out of the alpine areas of the block by May 1991.

The block, like much of Victoria, was also the site of gold working. Alluvial gold mining, mainly in the Mount Wills area, was pursued in the 1850s and 1860s, but unlike most other areas of the eastern highlands mining continued well into the 20th Century. Mining for gold expanded between 1890 and 1924 with large companies working the Glen Wills field and smaller mines working on the Sunnyside field. Since the 1950s there has been little activity until recently. Tin was also exploited in the 1890s. Much evidence remains of this period, with a wide variety of features such as machinery, shafts and water races still observable.

The timber of the forests would have been utilised in association with early mining. Major logging of the alpine forests commenced in the mid 1930s around Mount Wills and continues in this area as well as on the Big River and Snowy Creek tributaries.

Skiing began as an organised sport in the early 1920s, with the Bogong High Plains used for cross-country skiing. Cattlemen's huts were used for refuge and accommodation, though some huts, for example, the Cleve Cole and Summit huts were built especially for cross-country skiers and bushwalkers. (Summit hut was burnt down in the mid 1970s and not replaced.) Huts have continued to be used for such purposes ever since.

Work began on the Kiewa Hydro-electric Scheme in 1938 and led to major physical changes on the western edge of the block with dwellings, huts, aqueducts, water storages, tunnels, power stations and transmission lines being constructed, together with a network of roads and tracks. The scheme also greatly extended recreational access to the area. The Hydro-electric Scheme was completed in 1961.



Open alpine vegetation communities on Mount Nelse North, Mount Bogong is in the distance

WILDERNESS QUALITY

Areas of relatively high wilderness quality occur on the elevated tablelands around Mount Bogong and further south near Batty Spur. The area of highest quality (Class 5 or higher) identified by Preece and Lesslie was centred on Mount Bogong.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The only areas of settled (cleared) land affecting remoteness from settlement values were on or beyond the block boundary.

Most areas of settled land are cleared freehold. Freehold land near Mount Beauty has traditionally been used for tobacco production and the grazing of beef cattle. Other areas of cleared freehold in the Snowy Creek valley, to the north-east, and Glenn Valley in the south-east, are run as cattle properties. The Mount Beauty township, Bogong settlement and Falls Creek ski resort on the block's western boundaries are major influences on remoteness values. The Rocky Valley storage above the Falls Creek resort was classified as settled land in the Preece and Lesslie survey and also influenced recorded values.

Howman's Gap camp on the western edge of the block, is the only isolated point of permanent occupation on public land within the block. It is a recreation camp run by the Department of Sport and Recreation and serves as a base for a wide range of outdoor adventure training programs.

High values were recorded by Preece and Lesslie across much of the block, with the highest values around the Long Spur on the edge of the National Park boundary. This general area recorded Class 4 - the highest. Similarly high values extended towards, and beyond, the block's eastern boundary.

The boundaries of the settled, cleared, land have been essentially stable for many years. Land in the south-eastern corner of the block is the only large area of uncleared freehold.

Remoteness from Access

Remoteness from access values of the block are generally moderate, due to the influence of major roads on the block boundaries - the sealed Bogong High Plains Road in the west, (and a gravelled section of this road in the south-west) and the unsealed Omeo Highway in the east. Logging roads in the Mount Wills Creek catchment in the east of the block is also a major influence on remoteness from access values.

The large number of vehicular tracks within the block occur mainly towards its boundaries. They are associated with timber harvesting in the east and fire tracks associated with the State Electricity Commission works area to the west. The most notable exception is the Big River fire track which traverses the Bogong High Plains and extends north towards Mount Little Bogong. Most of the tracks within the block are not open for public vehicular use throughout the year. Most are snow-covered in winter.

The Omeo Highway can be closed by snow north of Glen Wills, as can the Bogong High Plains Road south of the Bogong settlement.

As a result of these influences, the highest values recorded in the Preece and Lesslie survey extend in a north-south band across the block, generally to the east of the Big River Fire Track, with the highest values recorded (Class 3 - the second highest class in the Preece and Lesslie survey) to the south-east of Mount Bogong.

All roads and tracks are listed in Table 70 (see page 219) and their locations shown on Map 14. A number of small areas within the centre of the block are more than 3 km from an existing road or track, but no areas are more than 5 km distant. There are approximately 19 km of trafficable roads within the descriptive block.

A number of walking tracks have been defined - the most notable being a section of the Alpine Walking Track. This track traverses the centre of the block from Mount Nelse to Mount Bogong, and then to Mount Wills and Sunnyside via the Long Spur. It is marked within this block by snowpole lines or tree markers, and in places follows vehicular tracks. Other defined walking tracks include those to Roper Lookout, along Heathy Spur, along the Grey Hills and Quartz Ridge, the Staircase and Eskdale Spur tracks to Mount Bogong, and a number linking the various huts to vehicular tracks or other major walking routes.

The nearest airstrip to the block is at Mount Beauty township.

Aesthetic Naturalness

Aesthetic naturalness values recorded reflect the structures and, in particular, the track network of the block.

A large number of structures occur on the western edge of the block. These are all associated with the hydro-electricity scheme works areas. They range from picnic areas and power transmission lines to power stations. The Tallangatta Ski Club has a club house and operates a small ski tow on the block's eastern boundary at Mount Wills, and the Roads Corporation has a snow clearing patrol depot on the Omeo Highway, also near Mount Wills.

Thirteen huts have been built within the block, mainly on or adjacent to the high plain areas. Most are used as refuge huts for winter recreational use, with some also still maintained and used in conjunction with licenced grazing purposes. They also form popular destination points for summer forms of recreation. Snow pole lines have also been constructed across the high plain areas.

All such structures are listed in Table 71 (see page 220) and their locations shown on Map 14.

The values recorded in the Preece and Lesslie survey were low to moderate, with the highest values being on the edges of the high plains at Mount Bogong and a larger area centred on the middle reaches of Holland's Creek.

Artefacts associated with mining activities remain in the Glen Wills and Glen Valley area; hut ruins and a number of maintained helipads occur within the block. A small number of fenced research plots are also maintained.

Biophysical Naturalness

Biophysical naturalness values recorded for the block by Preece and Lesslie were low to moderate, with the highest values being centred on Mount Bogong. Principal influences on the recorded values were the extent of grazing and timber extraction.

Land-use Indicators of Biophysical Naturalness

Large areas have been and are presently licenced for grazing. While some areas of subalpine montane forests and peppermint open forests within the block have been grazed in the past, most grazing is carried out on the alpine and subalpine herbfields, grasslands and heathlands. The grazing season extends from December to April.

The main areas which have been grazed, and those presently subject to licenced grazing, are shown on Map 14. In addition, two graziers agisted 155 head at Long Spur and Sheevers Spur in 1988/89. Grazing is to be phased out from virtually all areas by 1991. Non-licensed areas of the block have been vacant for many years.

Timber extraction is the other major influence on biophysical naturalness values recorded in the Preece and Lesslie survey.

The main logging areas are in the north and east of the block. Areas around Bull Hill were mainly logged in the 1960s and 1970s, together with some more recent logging. Since the 1960s, to the present day logging has gradually extended east and north-east of Mount Wills, and more recently in the Big River catchment. All areas known to have been logged are shown on Map 14.

Most of the timber utilised is alpine ash, with mixed species forests also harvested.

As grazing is phased out from most of the block, biophysical naturalness values, as defined in the Preece and Lesslie survey, will increase. Values will decrease in the eastern half of the block as further areas of State forest are harvested.

Other Indicators of Biophysical Naturalness

The block was covered by a report on the nature conservation values of rivers and streams (BIOSIS 1988). No essentially unmodified catchments were identified within the block.

Timber resource information indicated that about 55% of the ash species forests and all of the mixed species forests consist of mature stands.

Detailed surveys have been undertaken of the alpine vegetation of the block (McDougall 1982). Of the 23 different vegetation units identified in the survey area (which extended beyond the block's boundary) the average number of introduced species per sampled quadrat was less than 5% of the total species recorded in all units, represented in the block. Most of the introduced species were restricted to mechanically disturbed areas such as road verges.

The study also identified a site of botanical significance, based on the presence of rare and restricted species, at Mount Nelse. It also noted the presence of hares and foxes.

No other detailed surveys of the quality of vegetation or on distribution of alien species are known with respect to this block.

Nolan (1981) recorded that, rabbits were not considered to be a problem. Another broad-scale survey (DCL&S 1984) indicated that the area had populations of wild dogs and feral horses, but no feral deer (although other sources suggest Sambar deer may occur in the Mount Wills area), goats, pigs or sheep. Feral cats also occur.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 47 840 ha and is about 20 km long and 35 km wide. Of this area, very little was included in the highest three classes in the Preece and Lesslie 1987 survey, that is, Class 5, 6 or 7 and less than 10% classed as at least Class 4 wilderness quality. The largest area presently without roads or vehicular tracks is about 15 300 ha.

Ecological Viability

The high remoteness from settlement values, the dissected nature of the eastern half of the block, and the apparent low level of introduced flora (at least in alpine vegetation units) and fauna, all contribute to the block's level of ecological viability. The proposed removal of grazing from most of the block will also add to its future ecological viability. A range of major vegetation communities are also present.

Fire hazard is highest in the foothills at the north of the block where frequent lightning strikes occur. The villages of Bogong and Falls Creek, the Howman's Gap camp and the Kiewa hydro-electric scheme are vulnerable to fire and protection of these areas from fire is a priority. Much of the existing road network is maintained for fire protection purposes, as are a network of helipads. Fuel-reduction burning is carried out to help protect the valuable stands of alpine ash timber.

Much of the block was burnt in the 1939 bushfires, but no major bushfires (> 1000 ha) have since been recorded.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of much of the block are very high. This has been recognised in part by the inclusion of a large section of the block in the Alpine National Park.

The block incorporates extensive areas of alpine and subalpine plant communities, a number of rare plant and animal species, a range of contrasting geomorphical features, varied geological features, and a range of lower altitude forests, including areas of snow gum woodlands at Mount Wills and mature stands of alpine ash. The block also includes habitat, around Mount Bogong, that may be important for the management of the rare mountain pygmy possum.

Recreation

The block has a high capability for bushwalking because of its extensive and spectacular alpine scenery and the variety of walking routes, both across the high plains and along the adjacent ridges and spurs. The Alpine Walking Track route, which traverses the block, is a focus of walking activity.

In addition, it has a high capability for cross-country skiing, nature study, fishing, sightseeing, picnicking, horse riding, and fossicking, and lower capability for four-wheel-drive touring, trail-bike riding, hunting and canoeing.

Natural features of particular interest include the alpine and subalpine flora, the summits of Mounts Bogong (the highest in Victoria), Nelse and Wills and other high points such as Timms Spur and Roper Lookout, waterfalls such as Howman's Falls, those on Hollands Creek and the rocky outcrops and escarpments of Mount Bogong, the granite tors and escarpments of Mount Wills, the broad Mount Bogong tablelands and Bogong Plains and the extensive winter snowfields. All these features, together with the spectacular scenery, contribute to the area's capability for providing experiences of inspiration and solitude.

As indicated previously, most walking is on the high plains along walking or management-vehicle-only tracks. Day visitor use occurs on the edges of the block where two-wheel-drive access is possible - principally on Mountain Creek in the north, and off the Bogong High Plains Road. Many of the spurs and ridges of the block are untracked, as are most river valleys. Capability for off-track walking in alpine and subalpine environments is also high.

Mount Bogong is a major destination point, as is Roper Lookout and the Mount Nelse area. Overnight walking trips and cross-country skiing occur mainly on the tableland areas at Mount Bogong and the Bogong High Plains, and are associated with the huts some of which are also of historic interest. Bush camping is permitted throughout the block. Use is increasing as the area is readily accessible to a wide spectrum of the community - especially on long weekends and during other holiday periods throughout the year.

Four-wheel-drive vehicles mainly use areas to the north of the block, and horse riding occurs throughout, particularly on tracks in the Mount Beauty area and is increasing in popularity. Trout are sought mainly in the Kiewa River and adjacent to the block, in the Rocky Valley storage. They also occur on the Snowy, Little Snowy and Mountain Creeks, and in Lake Guy. Alluvial gold is sought on Glen Wills Creek. Popular car-based camping sites are on the edge of the block at Mountain Creek and Big River bridge.

A small private ski lodge and ski run served by a rope tow provides for downhill skiing at Mount Wills.

A number of commercial bushwalking, skiing, horse riding and nature tours, as well as educational and leadership courses, operate in the area. Competitive events such as the Bogong Conquestathon are also held in the area.

Erosion hazard is greatest at the highest altitudes and moderate to high elsewhere. Alpine wet heathland, moss bed areas and the sedgeland are very sensitive to trampling.

Agriculture

The potential for agricultural development in the block is low and precluded by present land tenure.

Its capability for alpine grazing is generally high, although high erosion hazards limit the capability of some areas. Capability for bush grazing is generally low to moderate in the east of the block. Presently six graziers hold a total of seven grazing licences over the public land, and seasonally graze about 800 head of cattle (see also Table 72). Grazing is to be withdrawn from most of the block by 1991. Much of the non-licensed areas offer poor grazing or present major problems in preventing access of stock from the 1991 exclusion areas.

Apiculture

Beekeepers utilise honey flora on the northern and eastern sides of this block. Species utilised are alpine ash, snow gum, narrow-leaved peppermint and manna gum. The area is rated as being of major importance to local beekeepers.

Table 72

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no. of stock carried	Comments
NP24 - 11/5095	W.J. Hodgkin	Alpine	80 head	To be phased out by 1991.
NP34	I. Roper	Alpine	120 head	To be phased out by 1991.
NP24A - 11/5097	I. Roper	Alpine	30 head	To be phased out by 1991.
NP35 - 11/5100-5102	Fitzgerald	Alpine	270 head	To be phased out by 1991.
NP36 (part) - 11/5103	Estate of H.G. Faithfull	Alpine	150 head	Most to be phased out 1991.
NP37 (part) - 11/5104	Estate of B. Cooper	Alpine	150 head	Most to be phased out 1991.
NP37a (part) - 11/5105	Kelly Brothers	Alpine	300 head	To be phased out 1991.

Most of the block is, however, not used due to lack of access and there are currently no licenced apiary sites in the block.

Timber Production

Capability for timber production is very high with areas of alpine ash occurring around all the major streams flowing from the Bogong high plains, notably around the Kiewa and Big Rivers, and Mountain, Trappers and Snowy Creeks. The timber resource also includes large areas of alpine ash regrowth resulting from the 1939 bushfires.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 3993 ha of ash species forest (including 324 ha in once-only logging areas) and 168 ha of mixed species forest.

The descriptive block lies within the Wodonga Forest Management Area. The block's contribution to the regional sustainable yield, of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

Minor road-gravel quarries exist on edges of the block and silver, tin, bismuth and gold have been worked in the Glen Wills-Sunnyside area which is considered to have high potential for further discoveries of minerals. Presently there is much interest in the area, principally for gold.

Most of the block outside the national park is covered by exploration licences and there are a number of active mining tenements including a mining lease. These are focused in and around Glen Valley.

Details of tenements under the Mines Act are included in Table 73.

Under existing tenure about 49% of the block is potentially available for mineral exploration or mining.

Water Production

Capability for water production is high. The block has high and reliable levels of precipitation and the water is of high quality. Water from the east branch of the Kiewa River is utilised by the Kiewa River hydroelectric scheme which mainly supplements peak-load demands for power. Two power stations below the Rocky Valley storage and Clover Dam (on the edges of the block) are used to generate this electricity. Water drawn from the block's catchments also provides domestic water for Falls Creek, Bogong and Mount Beauty, irrigation for downstream agricultural purposes, and contribute to the Murray River's flow.

The high quality waters of the block are also important for both in situ and downstream aquatic fauna and flora and riparian communities.

Table 73

MINES ACT TENEMENTS (as at August 1989)

Tenement type & reference number	Lessee	Location
Exploration licence		
EL 1787 (part only)	Bendigo Gold Associates	Granite Flat
EL 1934	Norgold Ltd	Mt Wills Creek
ELA 2444 (part only)	Mt Wills Gold Mines NL	Glen Wills
ELA 2449 (part only)	Bendigo Gold Associates	Glen Wills
Miner's right claims		
MRC (Application) 2280	Mount Wills Gold Mines NL	Glen Valley
MRC (Application) 3052	I.G. Ledson	
Prospecting area licence		
PAL 700 (MLA 1892)	Bendigo Mining NL	
Development lease		
DL 602	Mount Wills Gold Mines NL	Glen Valley
DL 610	Mount Wills Gold Mines NL	Glen Valley
DL 667	Mount Wills Gold Mines NL	Glen Valley
DLA 1058	Mount Wills Gold Mines NL	Glen Valley
Mining lease		
ML 910	Wattle Gully Gold Mines NL and Swan Resources Ltd, and Mineral Exploration NL	
Tailings removal licence		
TRL (Application) 5289	Mount Wills Gold Mines NL	Glen Valley

Table 69

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions
National park	A2 (Alpine)	28 710	Public open space - Bogong National Park	Particular attention be given to the protection of the mountain pygmy possum, grazing be permitted subject to conditions ² but remain excluded from the Mt Bogong area and be phased out by 1991 from large areas around Mt Nelse and Hollands Knob, no apiculture, hunting or firearms and no logging other than logging in the once-only Dead Horse Creek area up to 1988 ³
Reference area	C10, C11 (Hollands Knob & Whiterock Creek)	570	Public open space ⁴	Nil
Hydro-electricity production area	F1 (Kiewa Hydro- Electric Scheme)	630	Existing public purpose reserve - SEC	Areas to the east are to be adequately protected to ensure the quality, quantity and timing of water produced to SEC requirements and fire protection including track construction be planned in conjunction with the SEC
Historic area	G6 (Mount Wills)	3 510	(Balance of shires ⁵ blanket control)	Environs of Alpine Walking Track to be protected, particular attention be given to the protection of the spotted tree frog and leadbeaters possum. Exploration and extraction of gold, minerals and petroleum be permitted subject to conditions, grazing and honey production permitted, deer hunting permitted Ski subject to conditions. Tallangatta Club be permitted to use existing facilities, and that timber harvesting be permitted in defined areas, subject to conditions
Education area	H4, H5 (Sunnyside)	460	(Balance of shires ⁵ blanket control)	Consideration be given to providing facilities
State forest	I1 M7 - Natural features zone (Mountain Creek and the Big River)	13 080))	Rural zone ⁶ (Balance of shires ⁵ blanket control)	Specified values to be protected, including recreation, landscape, nature conservation, historic sites, and natural features along streams No timber harvesting or gravel extraction, and and only essential roading subject to conditions
Agriculture (Mt Beauty, Glen Valley, and Snowy Creek)	Not applicable	880	Rural zone ⁴ , Balance of shires ⁵ , blanket control, Rural zone	

Notes:

1. Refers to LCC Alpine Area Special Investigation Final Recommendations (1983).
2. Refers to specific provisions relevant to the area in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).
3. Grazing conditions as varied by the Governor-in-Council.
4. Shire of Bright Planning Scheme.
5. Shire of Omeo Planning Scheme.
6. Shire of Tallangatta Planning Scheme.

Table 70

ROADS AND TRACKS

Road or Track name	Ref. no. (Map 14)	Distances (km)			Management responsibility	Management purposes	Present restrictions	Comments
		Major road	Minor road	Vehicular track				
Mountain Creek Road	1	*	*		Shire of Bright/CFL	FP,PA,R	Nil	Boundary only
Mountain Creek Tk	2			*	CFL	FP, R	Nil	Boundary only
Unnamed	3			*	CFL			
Unnamed	4			*	CFL			
The Holloways Track	5			*	CFL	FP,L,R	Nil	
Bull Hill Track	6			*	CFL	FP,L,R	Nil	
Omeo Highway	7	*			Roads Corp	PA	Nil	Boundary only Boundary only, good 7 m wide part sealed (part gravelled declared highway, minor curve improvements proposed)
Dunstons Snowy Ck Rd	8		*		CFL	FP,L	Nil	
Unnamed	9			*	CFL			
Big River Road	10			*	CFL	FP,L	Nil	
Unnamed	11			*	CFL			
Razerback Spur Track	12			*	CFL	FP,R	Seasonal closure	
Kangaroo Creek Road	13			*	CFL		Nil	
Shannonvale Rd	14		*		CFL	F/h, R	Nil	Boundary only
Kelly Track	15			*	CFL	CM,FP	Nil	Proposed MVO Boundary only
The Lanes	16			*	CFL	FP,R	Nil	
Race Line Patrol Tk	17			*	SEC	U, L	Seasonal closure	Boundary only
Big River Fire Tk	18			*	SEC/CFL	FP	MVO	
Spion Kopje Fire Tk	19			*	SEC/CFL	FP, U	MVO	
Junction Spur Fire Tk	20			*	SEC	FP	MVO	
Little Arthur Tk	21			*	SEC/CFL	FP	MVO	Possible logging
Black Possum Spur Tk	22			*	SEC/CFL	FP	MVO	
Upper Lt Arthur Tk	23			*	SEC/CFL	FP	MVO	
East Kiewa Track	24			*	SEC/CFL	FP	MVO	
Little Bogong Tk	25			*	SEC/CFL	FP	MVO	
Wild Dog Spur Fire Tk	26			*	CFL	FP	MVO	
Moncrief Gap Tk	27			*	SEC	FP	MVO	
Cooper Track	28			*	SEC/CFL	FP	MVO	
Unnamed	29			*	SEC	U		Edge of block transmission (line access Boundary only)
Bogong High Plains Rd	30	*	*		Roads Corp	FP,PA,R		

KEY:

CM - Cattle Management
 FP - Fire Protection
 L - Logging
 MVO - Management Vehicles Only

PA - Primary Access
 R - Recreation
 U - Utility Access

Table 71

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Management purpose	Comments
1	Mt Beauty to Dartmouth Power Line	220kV electricity supply Transmission Line	SEC	U	
2	Mountain Creek Picnic Area	Fireplaces, Toilets	CFL	R	
3	Mountain Creek Camping Area	Fireplaces, Toilets	CFL	R	
4	Bivouac Hut	Refuge Hut	CFL	R	
5	Mitchell Hut	Refuge Hut	Mt Bogong Club	R	
6	The Hollow Hut	Cattleman's Hut, yards	Private	CM, R	
7	Cleve Cole Hut	Refuge Hut, Yards	Mt Bogong Club	H, R	
9	Tallangatta Ski Lodge	Lodge, Ski tow	Tallangatta Ski Club	R	
10	Mt Wills Firetower	Firetower	CFL	MP	
11	CRB Snowy Patrol Depot	Workshops, Garages	Roads Corp	U	
12	Fitzgerald Hut	Cattleman's Hut	Private	CM, H, R	
13	Kelly Hut	Cattleman's Hut, Yards	Private	CM, R	Proposed to be removed in 1991
14	Johnson Hut	Refuge Hut	East Gippsland Ski Club	R	
15	Edmonson Hut	Refuge Hut	Bogong School Camp	R	
16	Batty Hut	Refuge Hut	-	-	Proposed to be removed
17	Roper Hut	Cattleman's Hut	Private	CM, R	
18	Cairn Ck Hut	Refuge Hut	-	-	Proposed to be removed
19	Howmans Gap Recreation Camp	Dormitories, Workshops Recreation Halls	Dept. of Sport & Recreation	R	
20	Mountain View Picnic Grounds	Toilets, Fireplaces, Picnic Tables	SEC	R	
21	Clover Dam Power Station	Power Station, Dam, Transmission Line	SEC	U	
22/23	Bogong Ck Huts	Refuge Hut	Bogong School Camp	R	One hut to be removed
24	Clover Dam Tramway	Tramway	SEC	U	
25	Mt Beauty to McKay McKay Power Station Power Line	220kV electricity supply Transmission Line	SEC	U	
-	Unnamed TV Tower	TV Tower	-	U	
-	Mt Bogong, Mt Nelse North and Mt Nelse Trigs	Trigonometric Station	Dept. of Property and Services	U	
-	Kiewa River - east branch, Big River and Mountain Ck Stations	Stream Gauging Station	Rural Water Comm	U	
-	Alpine Walking Track/Mt Bogong, Staircase Spur, Eskdale Spur, Johnson Hut, Fitzgerald Hut	Snow Pole Line	CFL	R	
-	Rocky Valley Aqueduct, Bogong High Plains Rd	Snow Pole Lines	SEC	R, U	

KEY:

CM - Cattle Management
H - Historic Interest
MP - Management Purpose

R - Recreation
U - Utility

Notes:

1. Trigonometric stations and river gauging stations are shown on Map 14 by symbol.

BLOCK 13 : NICHOLSON HEADWATERS

Location and Boundaries

The Nicholson block lies in the foothills of the Alps to the north of Bairnsdale. It encompasses an area of 30 650 ha. Its location is shown on Map 10 and it falls within the Shires of Avon (minor areas), Bairnsdale and Omeo.

The block boundaries follow roads and tracks bounding the Nicholson River catchment upstream of its confluence with Barmouth Creek, as well as those bounding part of the adjoining Wentworth River tributary catchments to the north.

Tenure and Land Use

With the exception of a small area of freehold land on the western edge, the whole of the block is public land and is entirely State forest.

Details of previous Land Conservation Council's recommendations and planning scheme controls relevant to these land uses are outlined in Table 74 and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

No management plans have been prepared over the public lands of the block, but all of it is within the Central Gippsland Forest Management Area for which a forest management plan is presently being compiled.

The whole of the block is within proclaimed water supply catchments - those parts draining into the Wentworth River being within the Mitchell River Proclaimed Catchment, with the remainder in the Nicholson River Proclaimed Catchment. A land-use determination applies to the Nicholson River catchment, which restricts uses that may disturb soils or vegetation in sensitive areas.

A revised fire protection plan is being prepared for the Department of Conservation, Forests and Lands' Bairnsdale region which will encompass this block. The plan should go on public exhibition soon.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

Dissected mountainous tracts are the dominant landform, with Ordovician sandstones, siltstones and shales the most common rock types. Areas of granitic and associated metamorphic rocks occur at Marthavale which is at the centre of a large intermontane basin. The granitic rocks extend further north to Mikado Hill and Mount Baldhead and are also within the Pheasant Creek catchment.

A remnant of a higher land surface remains as an elevated plateau around Mount Dow on the eastern edge of the block

(900 m), and further north around the Strobridge Ridge (1000 m).

The mountainous tracts are characterised by high ridges and deep ravines. In the north of the block watercourses plunge from 1000 m to about 400 m. The highest points of the block, towards Mount Baldhead, are over 1200 m above sea level, with the lowest points being about 200 m on the Wentworth and Nicholson Rivers.

Small stream flats occur along the Nicholson River, notably at Marthavale, as well as on the Wentworth River and the lower reaches of Wild Horse and Pheasant Creeks. The two principal streams in the block are the Nicholson and the Wentworth. The Bullumwaal-Mount Baldhead Road follows the major divide between these two rivers.

Biological Setting

Virtually all of the block carries tall open forest. Wet sclerophyll forests of mountain ash occur on moist elevated areas throughout the block, principally on the plateau areas surrounding Mount Dow and the Strobridge Ridge. Both fire regrowth and mature forests are present. They have a tall substrata of wattles and wet shrub and fern dominated understoreys. Stands of shining gum are associated with mountain ash in the headwaters of the Nicholson below Mount Baldhead.

Tall damp sclerophyll forests of messmate-mountain grey gum commonly grow in association with these ash stands, but cover more extensive areas at lower elevations. The understoreys of these forests are typically dense shrubs, herbs and grasses.

The most exposed and driest sites of the block (generally those at lower or north-facing elevations) are occupied by dry sclerophyll forests and woodland with overstoreys dominated by red stringybark, silvertop and red box. These forests usually have sparse understoreys, with low shrubs and grasses dominating.

Riparian elements appear only along the main watercourses where species such as manna gum become dominant and diverse understoreys occur.

No detailed fauna surveys have been undertaken in this block, although a range of species typical of the major habitats have been recorded. Riverine habitats are important for many species in the otherwise drier environments. The block's two main rivers include a range of native fish, including the grayling.

Cultural Setting

Evidence of Aboriginal occupation, prior to the 1840s and 1850s, is limited with only one archaeological site recorded by the Victoria Archaeological Survey (although no detailed surveys have been undertaken).

Table 74

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Approx. area (ha) within block	Planning scheme control	Special provisions ⁶
State forest	I1 ¹	8 910	Forest/reserved forest ³ Protected forest ⁴	Specified values to be protected
Hardwood production ⁷	F4 ¹ (part Nicholson --Mt Alfred)	18 270	Forest/reserved forest ³ , balance of shire blanket control ⁵	
Natural features zone	K8 ² (Nicholson R)		Forest/reserved forest ³	
Uncommitted ⁷	U1 ²	3 420	Forest/reserved forest ³ , balance of shire blanket control ⁵	
Agriculture ('Jones')	Not applicable	50	Forest/reserved forest ³	

Notes:

1. Refers to LCC Final Recommendations for the Alpine Area Special Investigation, 1983.
2. Refers to LCC Final Recommendations for the Gippsland Lakes Hinterland Area, 1983.
3. Refers to the Shire of Bairnsdale Planning Scheme.
4. Refers to the Shire of Avon Planning Scheme.
5. Refers to Shire of Omeo Planning Scheme.
6. Specific provisions relevant to area in addition to standard land-use provisions of LCC recommendations (as outlined in Appendix II).
7. The hardwood production and uncommitted categories have been included within State forest in more recent LCC recommendations, and they are managed as one unit.

Grazing runs had been established on the Nicholson River and Barmouth Creek (Mount Baldhead and Marthavale) and over the Wentworth River catchment in the north of the block (Pheasant Creek and Birregun) by the 1860s.

The area remained fairly remote, however, until gold was discovered in and around the block. The whole of the Nicholson River valley was worked for alluvial gold. Marthavale and Yahoo Creek appear to be the two main centres of activity. Mining tracks were cut through the area linking such areas with other larger mining settlements and adjacent goldfields to the north-east in the Angora Range and Haunted Stream catchment. Many of the present-day tracks follow their alignment.

Allotments were selected on the Wentworth River, at Marthavale, and on the Mount Baldhead mining track in the headwaters of the west branch of the Nicholson River (although, of these, only some on the Wentworth River were actually alienated).

Timber was cut from the mature ash and shining gum forests in the Nicholson River north branch headwaters and mills established around 1930, including one at Seldom Seen on the Mount Baldhead Road. Timber tramways linked the mills with the areas cut. Scant evidence of these two mill sites now remains.

Timber production increased substantially in the 1970s and 1980s and the road networks along the main ridges were substantially upgraded to improve access to the ash stands.

WILDERNESS QUALITY

The centre of the descriptive block includes extensive areas of relatively high wilderness quality and three small areas of higher quality that were classified as Class 5 in the Preece and Lesslie survey in 1987. However, as discussed below, some of the values recorded may be overstated.

Remoteness from Settlement

The block is remote from extensively cleared lands and much of it recorded values in the highest class of remoteness from settlement recorded in the Preece and Lesslie survey for the State. The nearest cleared lands influencing these values were along the Tambo River and Swifts Creek to the east, and the Dargo region in the west. These are all surrounded by areas of naturally vegetated freehold, particularly to the south of Dargo. Remoteness from settlement values for the block would be reduced to some extent if such areas were cleared.

Small areas of cleared land also occur on the western edge of the block ('Jones'), and there is also a point of occupation within the natural lands of the block, namely on the Nicholson River near its confluence with Yahoo Creek, (a dwelling associated with a mining tenement). Neither of these features appears to have been incorporated into the Preece and Lesslie data base and thus the block's remoteness from settlement values would be lower than the recorded values.

Beef production and lucerne cropping for hay are the main uses of cleared land.

Remoteness from Access

A number of roads occur, the most notable being the Mount Baldhead--Bruthen and the Deptford--Mount Sugarloaf in the east and, in the west, the Mount Baldhead--Bullumwaal Road. Other minor roads link these to the larger watercourses or to timber-harvesting areas.

Vehicular tracks follow many of the ridges and are often associated with past timber harvesting. Tracks also follow some of the watercourses, notably along part of the Nicholson River. Few are subject to seasonal closure.

Remoteness from access values recorded in the Preece and Lesslie survey are, however, high, as under their methodology, major roads exert the greatest influence on values. Such roads were only associated with the more distant settled areas (such as the Omeo Highway).

In addition, some existing minor roads were classified as four-wheel-drive tracks. Consequently, the area recording high values for remoteness from access is less than that indicated by Preece and Lesslie.

There are 36 km of trafficable roads within the block. No areas are further than 3 km from a road or vehicular track. All are listed in Table 75 (see page 226) and their locations are shown on Map 14.

Aesthetic Naturalness

The relatively dense track network is the major influence on aesthetic naturalness values which are low for most of the block. A small area of moderate value was recorded for the Pheasant Creek catchment in the north.

There are few other structures in this block, the most notable being the dwelling and battery on Yahoo Creek (see Table 76 and Map 14). A number of structures are, however, just beyond the boundaries of the block (a firetower, trigonometric station and forestry huts) and also influenced recorded values.

Several helipads have been constructed in the block.

Biophysical Naturalness

Most of the natural lands of the block have low biophysical naturalness values, with moderate values recorded in the Preece and Lesslie survey towards the southern edge of the block around the confluence of the Nicholson River and Barmouth Creek.

Land-use Indicators of Biophysical Naturalness

The area's long history of modification by mining, timber harvesting and, in the north, grazing, together significantly reduce biophysical naturalness values. In particular, recent and ongoing timber harvesting in the more elevated areas of the block is a significant influence on values.

The manna gum--narrow-leaf peppermint stands along the river flats of the Wentworth River and Wild Horse Creek have been grazed, together with, more sporadically, the

grassy understoreys of montane forests along the Strobridge Ridge up into the alpine grasslands of Mount Baldhead (beyond the block). These have not been grazed for some time and no licensed grazing now occurs in these areas, or elsewhere in the block.

Other Indicators of Biophysical Naturalness

No essentially unmodified catchments have been identified in regional studies of the nature conservation values of the rivers and catchments undertaken in Gippsland (BIOSIS 1989) and no sites of botanical significance (whose criteria include botanical quality) were recorded in the Sites of Botanical Significance in the East Gippsland Study (Forbes et al. 1981).

Flora surveys undertaken as part of the Forbes et al. study did, however, sample vegetation communities within the block. All (on a regional basis) had mean weed compositions of less than 10% (see also Map 7). Weeds such as blackberry, are, however, widespread in disturbed areas, notably within the riparian vegetation along the Nicholson River.

Timber resource information indicates that about 53% of the ash species forests and 97% of the mixed species forests consist of mature stands.

Available records of introduced fauna occurring in the block appear to indicate relatively low levels of introduced animals, an absence of serious rabbit problems (Nolan 1981), and few feral domesticated animals, other than wild dogs and horses. Foxes and cats have also been sighted in the block, as have sambar deer.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the block covers an area of about 30 650 ha and is about 30 km long and 10 km wide. Of this, about half was classified in Preece and Lesslie's 1987 survey as being as Class 4 or above wilderness quality, with less than 10% within their three highest classes of wilderness (Class 5, 6 or 7). The largest area presently without any vehicular tracks is approximately 2900 ha.

Ecological Viability

While the area has a range of vegetation communities, apparently moderate levels of alien species and, in places, dissected topography, the block's ecological viability would be limited by the dense track network and the level of land-use modification.

Fire is an ongoing hazard and, although not burnt in the 1939 bushfires, most of the block has been subsequently burnt by major (> 1000 ha) bushfires in the 1950s and mid-1960s (see also Map 8). Fire protection measures such as fuel-reduction burning and maintenance of track networks and helipads are carried out.

Continuing programs aim at controlling wild dogs and noxious weeds.

Table 76
PUBLIC LAND STRUCTURES

Ref. no. Map 14	Name	Description	Management responsibility	Purpose	Comments
1	Seldom Seen	Forestry huts (2)	Sawmiller/CFL	P, R, H	Huts used annually by timber workers, also old sawmill site
2	Marthavale	Hut and shed	CFL	R, H	Hut sometimes used as shelter - other structures are proposed to be removed
3	Yahoo Mine	Dwelling and battery	Lessee	M	Current operation

LAND-USE CAPABILITIES

Nature Conservation

Nature conservation values are moderate given the ongoing timber harvesting of the block. Vegetation communities range from montane forest to dry sclerophyll and riparian forests and provide habitat for a variety of faunal species. A number of notable plant species have been recorded in the upper Wentworth River catchment, including the shiny fan-fern which is only known in the upper reaches of Pheasant Creek (and is far eastern Gippsland). The Wentworth River includes a diversity of native fish and the vulnerable grayling occurs in the upper Nicholson River.

Recreation

Capabilities are low to moderate for most uses, including hunting, fossicking, recreation driving, bushwalking, canoeing and fishing and the block provides only limited opportunities for solitude and inspiration.

Natural features of special interest are the rugged landscapes of the Wentworth River tributary catchments and the riparian environment of the Wentworth and Nicholson Rivers. There are few obvious traverse routes through the block other than along tracked ridges and watercourses, although the open understoreys of the drier slopes have high capability for off-track access. Modifications arising from timber harvesting on and towards ridge lines are visually obvious from many vantage points of the block. Areas more isolated from timber harvesting and tracks, notably in the Wentworth River tributary catchments, may provide limited opportunities for those seeking solitude.

The Bruthen--Baldhead Road has moderate capability for scenic driving, with the vehicular tracks of the blocks providing opportunities for four-wheel-drive touring. The use of the main access routes by log trucks, however, limits recreational touring.

The Mount Sugarloaf firetower (just to the south-east of the block) provides a public lookout over much of the southern part of the block. Other lookouts are located on the Bullumwaal--Baldhead Road (Morrison's Lookout which also overlooks the Nicholson catchment) and on Jones Road (Cavis Lookout which looks across the Pheasant Creek catchment).

While much mining activity occurred within the block, former goldmining settlements to the south of the block (Deptford) and to the east (for example, Dawson City, Dogtown, and Stirling on the Haunted Stream) are now the main focus of recreational interest. Some fossicking, however, still occurs.

The Nicholson and Wentworth Rivers have moderate capability for (brown) trout fishing. They are also a popular access point for car-based camping, deer hunting (particularly in the north of the block) and walking.

The Wentworth River, downstream of Jones Road, has moderate capability for canoeing. It is a popular canoe stream with Grades 2 and 3 rapids. Overnight camping on the river banks is often associated with canoeing.

A limited number of vehicle-based commercial bush tours are known to operate in the block, with some wide-ranging, week-long camping tours passing through the Wild Horse Creek area. One company provides a pick up service for canoeists utilising the Wentworth River.

Agriculture

Most of the block has low capability for agriculture, including forest grazing, other than in the small intermontane basin at Marthavale and the river flats on the Wentworth River where it is moderate. There are no current grazing licences within the block.

Apiculture

A range of eucalypt honey flora grow on the block and it is used by a small number of beekeepers to whom it is an important source of income. Good access through the block facilitates such use. There are no permanent bee sites, however, on the public land within the block, although temporary sites are occasionally issued for the area around Marthavale.

Timber Production

The headwaters of the Nicholson and Wentworth Rivers contain substantial timber resources. The regrowth and mature stands of mountain ash and messmate have a high capability for hardwood production. Some of the more accessible foothill forests of more moderate capability are also utilised, with yellow stringybark being the main species of commercial interest.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 1787 ha of ash species forest and 8255 ha of mixed species forest.

The descriptive block lies within the Central Gippsland Forest Management Area. The block's contribution to the regional sustainable yield, of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

While the whole of the Nicholson River valley is a former goldfield, the only current mining operation is a goldmine on Yahoo Creek. This has been operated for many years and associated works include a battery (under two mining leases).

Minor gravel pits occur on the edge of some of the block's forest roads. They provide material for road maintenance.

Exploration interest for minerals (gold, lead, zinc and copper) is currently high. Three exploration licences cover much of the southern half of the block, and two miners-right claims have recently been applied for at the top of the Woolly Butt Spur (see Table 77).

Under existing tenure the whole of the block is potentially available for mineral exploration or mining.

Water Production

The Nicholson River has a mean annual discharge at Deptford of 44 000 ML and supplies town water for Lakes Entrance and Metung. This water is drawn from an offtake weir below a 636 ML reservoir on the river, south of the block, near Sarsfield from which it is pumped to a service storage for reticulation. The river provides reasonably high quality water although bacteriological and turbidity levels may rise above accepted guidelines. The Nicholson provides comparatively regular flows throughout the year.

Table 77

MINES ACT TENEMENTS (As at August 1989)

Tenement type and ref. no.	Lessee	Location
Exploration licence		
EL 2244 (part only)	CRA Exploration P/L Northbridge Gold Resources NL Goldrill Pty Ltd	Haunted Stream
EL 1722 (part only)		Lower Nicholson River & Barmouth Creek
EL 2410 (part only)		Mt Sugarloaf
Mining Lease		
ML 494	Yahoo Creek Goldmines - R.McL. Small	Yahoo Creek
ML 149	R. McL. Small	Yahoo Creek
Miners Right Claim		
MLC 3050 (application)	Aust. Pacific Mineral Exploration	Wooly Butt Spur
MLC 3051 (application)	Aust. Pacific Mineral Exploration	Wooly Butt Spur

Table 75

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Distances (km)		Vehicle track	Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road					
1	Mount Steve Track			*	CFL	FR, R	Nil	(Provides access to helipad (to west of block.
2	Waynes Track			*	CFL	FP, R	Nil	(Boundary only
3	Jones Road		*		CFL	F/h, FP R, L	Nil	Boundary only (Provides access to (freehold blocks on (Wentworth River
4	Pheasant Creek		*	*	CFL	L, FR, R	Nil	
5	Wildhorse Creek Road			*	CFL	FP, R	Nil	Boundary only
6	McDonald Road		*		CFL	L, FP, R	Nil	Boundary only
7	Bullunmaal--Baldhead Road		*		CFL	PA, L, FP, R	Nil	Part boundary
8	Baldhead--Bruthen Road		*		CFL	PA, L, FP, R	Nil	Boundary only
9	Quarry Creek Road			*	CFL	L, FP, R	Seasonal closure	
10	Binnican Track			*	CFL	L, FP	Nil	
11	Barmouth Spur Track			*	CFL	L, FP, R	Nil	
12	Grays Road			*	CFL	L, FP, R	Nil	
13	Sugarloaf No 1. Track			*	CFL	L, FP, R	Nil	
14	Deptford--Sugarloaf Road		*		CFL	L, FP, R	Nil	Boundary only
15	Sugarloaf No 2. Track			*	CFL	FP, R	Nil	
16	McDonald Road		*		CFL	L, FP, R	Nil	Boundary only
17	Nicholson River Track			*	CFL	FP, R	Nil	
18	Bennett Track			*	CFL	FP, R	Nil	
19	Yahoo Road		*		CFL	FP, MA	Nil	
20	Wooly Butt Spur Track			*	CFL	FP	Nil	
21	Purtell Spur Track			*	CFL	FR, R	Nil	
22	Camms Track			*	CFL	FP, R	Nil	(Recently cleared for fire (protection access and (possible logging
23	Marthavale Road		*		CFL	FP, R	Nil	

KEY:

F/h - Freehold Access	MA - Mine Access
FP - Fire Protection	PA - Primary Access
L - Logging	R - Recreation

BLOCK 14 : WABBA--DARTMOUTH

Location and Boundaries

The block is in the north-east of the State and extends from Lake Dartmouth northward towards Corryong (see Map 10). Part of its eastern boundary abuts the Murray Headwaters descriptive block (Block 15), from which it is separated by the Benambra--Corryong Road. It covers some 72 230 ha.

The northern half of the block lies within the Shire of Upper Murray, and the southern half in the Shire of Tallangatta. A small area at the southern extremity of the block is within the Shire of Omeo.

The block boundary follows the Benambra--Corryong Road in the east and Lake Dartmouth in the west. Remaining boundaries generally follow vehicular tracks on catchment boundaries.

Tenure and Land Use

Nearly two-thirds of the block is within State forest, most of which is in the north. The Dartmouth extension to the Alpine National Park covers the major remaining part of the block. One reference area is also included, as are small areas of freehold land on its northern and north-eastern margins.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 78 and the boundaries of the separate areas are shown on Map 11.

Relevant Present Planning Policies, Strategies, and Management Plans

All of the national park areas of the block are within the Dartmouth planning unit of the Alpine Planning Project. A draft management plan for this unit has just been released.

The Victorian Tourism Commission's Wine and High Mountain Country Tourism Development Program encompasses that part of the block in and around Lake Dartmouth. It proposes amongst other things, that Dartmouth be developed as a major holiday destination centre, and that there is scope for the introduction of jet-boat or hydrofoil outings on the Lake. It also notes the opportunity of a 'wilderness historic tour' taking in a boat trip on the lake, a four-wheel-drive tour of the Dart River Goldfield and an overnight stay in a wilderness setting.

The State forests of the block are within the Wodonga Forest Management Area. A forest management plan is being prepared for this area. A revised regional fire protection plan is being prepared for the Department of Conservation, Forests and Lands' Wodonga region which will cover the block.

The whole of the block is included within the Lake Hume proclaimed water supply catchment and is virtually all (with the exception of the south-east corner of the block) within an area for which a land-use notice applies. The notice places restrictions on clearing in sensitive areas.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

Much of the block consists of moderate to deeply dissected foothill terrain, most of which occurs on Palaeozoic sediments. Broader river valleys with Quaternary alluvium sediments occur in lower areas to the east, along Nariel Creek, and to the west and north along Cudgewa Creek.

The hilly terrain to the north of the block consists of metamorphic rocks with the less dissected areas of the Wabba Creek being on Silurian granite. Metamorphic rocks also surround an area of Devonian granite towards Nariel and are associated with a small elevated basin in the upper Dart River catchment. Elevated plateaux around Shady Creek have formed on a band of Silurian volcanics.

The highest area in the block occurs in the Log Bridge Creek headwaters (1100 m to 1300 m) and along the Lake Dartmouth catchment divide which rises from about 1100 m to 1370 m at Wheeler Gibbo.

The block is totally within the Upper Murray Basin and encompasses parts of the Cudgewa Creek and Corryong Creek catchments, which flow to the north, and parts of the Mitta Mitta River catchment which includes a large part of the Lake Dartmouth catchment. A small sector of the Gibbo River catchment lies in the south-east of the block.

Biological Setting

The vegetation of the block is dominated by open sclerophyll forests. The dry montane slopes usually support an open forest of broad-leaf peppermint with an understorey generally of either tussock grass or bracken. Heathy and shrubby understoreys may also occur. On moister sites, for example, broad ridge tops, gullies and southerly aspects, narrow-leaf peppermint dominates the overstorey, with the understorey usually of shrubby species. Blanket leaf and hazel pomaderris may occur in understoreys in the wetter gullies.

In the north of the block at lower elevations the drier slopes usually carry open forests of red stringybark and long-leaf box, with sparse or tussock-grass dominated understoreys.

Montane open forests, with mountain gum - snow gum overstoreys and heathy to grassy understoreys, grow on plateau or ridge tops at elevations between 1000 and 1300 m, notably in the headwaters of Shady and Murtagh Creeks, and along Kings Spur.

Alpine ash stands are associated with these areas at generally lower elevations (between 850 m to 1250 m). Stands of logging and fire regrowth occur as well as small areas of mature forest.

Table 78

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference	Approx. area (ha) within block	Planning scheme control	Special provisions ⁶
National park	A20 ¹ (Dartmouth extension to Alpine National Park)	21 920	Balance of shire blanket control ³ Rural zone	Deer hunting with hounds not permitted, deer hunting by stalking permitted subject to conditions and apiculture permitted ¹ ; logging not permitted other than 980 ha of the Brown and Sheehan Ck catchments for once only logging (to the end of 1989) and mining exploration permitted in defined areas until 1989 and grazing permitted subject to conditions (government variation to LCC 1983)
Reference area	C15 ¹ (Lightwood)	550	Rural zone ⁴	Nil
Natural features and scenic reserve	D18 ¹ (Mount Cravensville - part only)	80	Rural zone ⁴	Nil
Water production	E2 ¹ (Dartmouth Reservoir - part only)	245	Rural zone ⁴	Nil
State forest	I1 ¹ , E1 ²	45 860	Balance of shire blanket control ³ Rural zone balance of shire blanket control ⁵	Defined special values to be protected ^{1,2}
Public land water frontage reserves	K1 ² (Log Bridge Creek and Nariel Creek)	-	-	Nil
Agriculture (Nariel, Nariel Creek Beetoomba, Cudgewa)	Not applicable	3 570	Balance of shire blanket control ³	

Notes:

1. Refers to LCC Alpine Area Special Investigation Final Recommendations 1983.
2. Refers to the LCC North-Eastern Area (Benalla-Upper Murray) Review Final Recommendations 1986.
3. Refers to Upper Murray Planning Scheme.
4. Refers to Tallangatta Planning Scheme.
5. Refers to Omeo Planning Scheme.
6. Specific provisions relevant to area in addition to the standard land-use provisions of LCC recommendations (as outlined in Appendix 11).

The open forests of the block provide habitat for a variety of fauna. Native mammals include a number of gliders, the long-nosed bandicoot, broad-toothed rat, brown antechinus, Tasmanian pipistrelle and dingo. Tiger quolls were recorded in the Wabba Creek area in the 1930s. Many bird species are also recorded, ranging from emus to quail-thrushes. There is less knowledge of reptile and amphibian species, but a number have been noted, including tree dragons. Thirteen species of fish have been recorded, seven of which are native species including the Murray cod and the Macquarie perch.

Cultural Setting

It is likely that Aborigines lived in the area since about 10 000 years ago. Little evidence of Aboriginal occupation remains (other than a fish trap found on the Gibbo River on the south-eastern edge of the block - the only site recorded by the Victorian Archaeological Society). The area has not, however, been subject to detailed survey.

Squatters established grazing runs centred on the Cudgewa River and its tributaries in the north of the block (with

licensed runs including Nariel, Adjie, Wabba and Reedy Creek) from the late 1830s. The river flats of these runs have been grazed ever since and the present-day freehold lands largely correspond to the better agricultural sectors of these runs. Much of the block, however, was not included in these early licensed runs - one of the few such areas in the State. The 'Gibbo' run which covered much of the southern half of the block appears not to have been taken up.

Both alluvial and reef gold have been worked, mainly in and around the Dart River and its tributaries. Gold was also worked along the Gibbo River on the southern edge of the block. Two main areas were worked - one on the upper reaches of the Dart River (an extension of the Zulu Creek goldfields of Block 15) and on its lower reaches, centred on Green Creek. The areas were worked between 1877 until the early 1900s. Forty-seven mine sites have been documented in the upper reaches of the Dart River and 25 around Green Creek.

Such mining activities had a considerable impact resulting from the mine workings themselves, the by-products of

processing (cyanide, chlorination) and the cutting of timber (for dwellings, mine construction and firewood). Small towns were developed, the most renowned being the township of Glendale on the Dart River which, by 1895, included a hotel, shops, orchards and gardens, police compound, cemetery and dwellings. Little evidence of the township remains, however.

Mining tracks cut by the then Department of Mines linked Glendale with Cravensville, and Larsen Creek and Dart River with other goldfield areas at Glen Wills and Sunnyside, and those at Saltpetre and Zulu Creek, as well as those sections of the Benambra-Nariel Road that were then constructed. Another track was located along Bridge Creek.

Many relics remain, the most significant being those on Green Creek, on the Dart River, and on tributaries of Brown Creek (itself a tributary of the Dart River).

Other than for some reworking of the Dart River goldfields in the late 1930s, forest grazing remained the only subsequent utilisation activity until some of the alpine ash stands were cut in the 1940s. The old mill site on Stacey Creek (Gibbs Sawmill) is thought to date from this time. A large sawdust dump is the main remaining evidence of the site. In the post-war period, and continuing till the present, the ash stands of the plateau areas in the centre of the block and the ridge areas in the south-west have been harvested.

The largest change in land use was the completion of the Lake Dartmouth storage on the Mitta Mitta River in 1979 in the west.

WILDERNESS QUALITY

The descriptive block includes a number of areas of relatively high wilderness quality. Areas of the highest quality, are centred in the upper reaches of Log Bridge Creek where Class 5 values were recorded in the Preece and Lesslie survey (see Map 15). The remainder of the block recorded moderate values.

The Preece and Lesslie survey (as published) indicated another Class 5 area - on the Dart River in the south of the block. This also contributed to the delineation of the block boundaries. Remapping of the survey's original data, however, indicated that this area is, in fact, only Class 4.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The major influences on remoteness from settlement values are, in the north, the cleared agricultural grazing lands of the Beetoomba, Cudgewa and Nariel River valleys and, in the south, the Lake Dartmouth water storage.

These cleared areas are grazing lands used predominantly to raise beef cattle on improved pastures. A small pine plantation has recently been established on the lower reaches of the Wabba Creek valley. This and other nearby areas are the only freehold that have been cleared since 1972. Areas of uncleared freehold, however, remain on the margins of the public lands of the block and thus the present boundaries of settled land and consequently remoteness from settlement values, may change in the future.

The present influences have resulted in the highest remoteness from settlement values being recorded in the centre of the block to the north-east of Lake Dartmouth and along its south-eastern boundary (where higher values continue into descriptive Block 15). The remainder of the block has moderate values.

Remoteness from Access

The major influence on recorded remoteness from access values was the Benambra-Corryong Road in the east. It is a declared Forest Road and is an important north-south link between Corryong and Omeo. As a result of its influence, the only high value areas recorded in the Preece and Lesslie survey are in the western half of the block.

The only other tracks recorded in the Preece and Lesslie survey were four-wheel-drive tracks, although the Gibb Range Road (which bisects the block), and the recently upgraded Eustace Gap Track are accessible by two-wheel-drive vehicles. As these roads were under-classified in the Preece and Lesslie survey, the recorded values of remoteness from access in their vicinity are inflated.

Most of the vehicular tracks follow ridgelines and those at higher elevations are subject to seasonal snowfall, although there are presently no seasonal closures. The density of tracks is relatively low, particularly in the southern half of the block, and they are mainly used for fire protection purposes, as well as for recreation and timber-harvesting access.

All tracks and roads are listed in Table 79 (see page 233) and their locations shown on Map 15. Currently there are 25 km of trafficable roads within the block boundaries. Only three small areas in the south of the block were more than 3 km from a road or track.

No walking tracks have been constructed. The nearest licensed aerodrome is at Corryong.

Aesthetic Naturalness

Aesthetic naturalness values are influenced by the presence of permanent structures, including roads and tracks. The track network was the main influence on values recorded in the Preece and Lesslie survey, with most of the block recording only low to moderate values. Few other structures occur and most are on the eastern edge of the block (see Map 15 and Table 80). In addition, a number of structures remain from goldmining activities at Green Creek, Dart River and Brown Creek.

A firetower is located at Mount Benambra to the immediate west of the block (a radio station and transmitting tower is also sited here, with the tower incorporating a public lookout) and a 330 kV electricity supply transmission line interconnection between the Snowy Mountain Scheme and Victoria crosses the northern edge of the block on cleared freehold lands.

Biophysical Naturalness

Two substantial areas were allocated high biophysical naturalness values. They cover the middle of the northern and southern parts of the block.

Land-use Indicators of Naturalness

The major influences on naturalness values, as recorded in the Preece and Lesslie survey, were grazing and timber harvesting. Former goldmining sites also influence values.

Most timber harvesting has been associated with alpine ash stands along the Gibb Range Road in the centre of the block and along the Eustace Gap Track in the south of the block. Alpine ash has also been harvested north of Sassafras Gap, including in the headwaters of Brown Creek. Some small areas of narrow-leaf peppermint and candlebark stands in the headwaters of Wabba Creek have also been logged.

Most of the block has not been grazed for many years, if at all, with the only licensed grazing now on the north-western edge along the Reedy Creek watercourse near Lucyvale. Minor forest grazing may also occur on the forest margins of Rawe Creek.

Most of the alpine ash stands of the block are within State forest and thus presently available for ongoing utilisation. Grazing, is nominally permitted throughout most of the block (other than in the Lightwood Reference Area).

Areas known to be grazed or having been logged are shown on Map 15.

Other Indicators of Biophysical Naturalness

The block was covered by a report on the Ecological Values of Victorian Rivers and Streams (BIOSIS 1988). This study assessed the catchment of Log Bridge Creek as being an essentially unmodified catchment.

About 42% of the ash species forest and virtually all of the mixed species consist of mature stands.

There has been no detailed survey work on the quality of the vegetation communities nor have detailed fauna surveys been undertaken. A survey of the rabbit problem in Victoria (Nolan 1981) indicated that most of the area was considered to be essentially rabbit free, with another State-wide survey (DCLS 1984) indicating that wild dogs and deer (probably Sambar), goats (around Lake Dartmouth), and feral pigs and feral cattle (around the Nariel valley) occurred. Populations of all of these introduced species appear low, however. Foxes are common on the fringes of farmland and feral cats are probably widespread. Trout occur in Corryong and Nariel Creeks, the Dart and Gibbo Rivers and Lake Dartmouth and appear to have self-sustaining populations. Lake Dartmouth was last stocked in 1981.

Introduced plant species also appear to be low in number within the block (see also Map 7). However, the blackberry is common on previously disturbed logging and mining areas, particularly along gullies.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the component size attributes of the block.

The public land of the descriptive block encompasses an area of about 72 230 ha, and it is about 50 km long and 18 km

wide. A little over 10% of the block was classified in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) as Class 4 or above for total wilderness quality, with very little (less than 10%) within its three highest classes (Class 5 or above). The largest area presently without any vehicular tracks is approximately 16 200 ha (including part of Lake Dartmouth). Essentially unmodified catchments cover 7587 ha.

Ecological Viability

The dissected topography, the relatively low density of tracks (particularly in the south), the low level of resource utilisation (particularly in the north) and the apparently low level of introduced species over much of the block would all contribute to a relatively high level of ecological viability. A diverse range of major plant communities is present.

Virtually the whole block was burnt in the 1939 bushfires. Since then, the only major fire occurred in the south in March 1980 and covered 7000 ha. Fire is a threat in particular to farmland along Nariel Creek and to the commercial ash stands within the block and those further east. As a result, a number of fire protection techniques are used in the area. These are based primarily on the maintenance of the vehicular track network, firetower and aerial surveillance during the summer months. Periodic fuel-reduction burning is practised. (A boat equipped for fire fighting is also available for use from Lake Dartmouth.)

Blackberry control in some of the more disturbed areas and farmland margins is an ongoing requirement. Dingo and wild dog populations are controlled to reduce problems for farmers on the northern edge of the block.

LAND-USE CAPABILITIES

Nature Conservation

The block has a high capability for nature conservation. It includes a range of vegetation communities which have been little disturbed. Few significant plant species have, however, been recorded to date and the fauna has not been surveyed in detail. Given the large consolidated area of relatively undisturbed land it is likely to have a high capability for fauna conservation. A wide variety of ground and arboreal mammals are thought to occur, as well as representative assemblages of other foothill and mountain forest fauna. The seldom observed great pipistrelle has been recorded near Lake Dartmouth.

Lake Dartmouth also contains Victoria's largest population of the vulnerable Macquarie perch and a number of watercourses, including the Dart River are, or could be, important spawning areas for this vulnerable fish. Nariel Creek has a high diversity of native fish including the vulnerable Murray cod.

The extensive tracts of deeply dissected foothill country, the vegetation sequence and the associated flora and faunal habitats are characteristic of much of the alpine region, and thus of high nature conservation value.

Recreation

The block has a high capability for remote walking, including overnight bushwalking, for nature study, and for those

Table 80

PUBLIC LAND STRUCTURES

Ref. no. (Map 15)	Name	Description	Management responsibility	Purpose	Significance /comments
1	Remote	Radio repeater mast	CFL	U	
2	Unnamed	Picnic toilets, fireplaces	CFL	R	
3	Glendale Township	Minor foundations, relics	CFL	H	Old mining township
4	Dart River Mine	Battery, engine, and processing plant ruins	CFL/Dep. Industry Tech. & Res.	H	
5	Browns Creek Mining Sites	Battery, engine, processing plant ruins and mullock heaps	CFL/DITR	H	
6	Windfall Hut	Former forestry hut	CFL	(R)	Proposed to be removed
7	Green Creek Battery	Battery, boilers and steam engine	CFL/DITR	H	
8	Eustace Gap Creek Camping Area	Camping area, fireplaces	Rural Water Comm.	R	On Lk Dartmouth shoreline
-	Nariel Creek Gauging Station	River gauging station	RWC	U	

KEY:

H - Historic Interest U - Utilities
R - Recreation

Note:

1. Gauging Stations are shown on Map 15 by symbol.

seeking solitude. It also has a moderate to high capability for a range of boat and vehicle-based pursuits, for example, fossicking or fishing and for those seeking features of cultural interest. The arms of Lake Dartmouth have a high capability for canoeing, fishing and, to a lesser extent, swimming. Snow cover is unreliable for most of the block and so the potential for skiing is moderate to low.

Natural features of particular interest include the incised reaches of many of the block's rivers and creeks, the panoramic views from higher points and ridges with views of the Alps and Mount Kosciusko, the wildflowers of the drier peppermint forests' understorey, and its wide range of mammals and birds.

While capability is high for walking, present use appears relatively low. The Alpine Walking Track previously traversed the southern part of the block along a ridge between Wheeler Gibbo and Sassafras Gap following the Eustace Gap (vehicular) Track. It has since been realigned and passes to the south of the block.

The open understoreys of much of the forest and the large number of untracked spurs and minor ridges provide many opportunities for off-track access, while the lower reaches of some of the rivers and streams also provide such opportunities. Other obvious traverse routes along the major ridgelines are generally associated with vehicular tracks.

The waters of Lake Dartmouth provide a focus for recreational activities, as well as providing access to long stretches of remote and unmodified shorelines. Facilities are concentrated at the Six Mile Creek recreation area to the west of the block. They include boat-launching facilities. The lake is also a significant scenic element that can be seen from many elevated vantage points. Boating is restricted to craft without sleeping or toilet facilities, and water skiing is prohibited. A number of camp sites have been defined on its lakeshore including one within the block - at Eustace Gap Creek.

The Benambra--Corryong Road on the eastern boundary provides a scenic two-wheel-drive sightseeing route from the Gibbo River up to Sassafras Gap and down to the Nariel Creek flats. It also provides access to camp sites and picnic sites on the Gibbo River. The recently upgraded Eustace Gap Track provides dry weather two-wheel-drive access along the ridge from Sassafras Gap to Wheeler Gibbo through attractive open forests of mountain gum and snow gum and provides distance views of Lake Dartmouth.

Other vehicular tracks in the area provide opportunities for four-wheel-driving and vehicle-based camping, sightseeing and fossicking. Some of the tracks provide challenging four-wheel-driving and trail-bike riding, although usage is presently low to moderate. Some of the cultural features associated with former mining are readily accessible by four-wheel-drive and are popular destination points.

Some gold fossicking is undertaken along the Dart and Gibbo Rivers. Recreational horse riding is not common, although capability in areas such as Kings Spur is high. There is some use of the area by deer hunters and many of the streams are popular for (brown and rainbow trout) fishing, with Lake Dartmouth being of high value for sport fishing. Brown and rainbow trout and the native Macquarie perch are sought here. Limited canoeing and rafting occurs on the Gibbo River. A shire-run camping ground is at Nariel.

Agriculture

Most of the public land in the block is too steep or too cold for intensive agricultural usage - the higher quality river flats having already been alienated and cleared for agriculture. As a result, capability for agriculture on public lands is low.

Capability for bush grazing is low to moderate, being highest in the alpine ash forests. Only one area is presently grazed, however - the peppermint forests of the Reedy Creek valley on the western edge of the block (grazing block L27) where one licensee (Laverty, licence number 940/130) runs 30 head of cattle).

While grazing is nominally permitted throughout most of the block, virtually all is currently ungrazed. It is not economically attractive to graziers due to its poor access from the south-west limited water supply, difficulties of stock control (with stock required to be excluded from the Lightwood Reference Area), and more particularly due to the undulating to steep forests of the block lacking the grazing potential of alpine and subalpine vegetation types found elsewhere in the high country.

Apiculture

The block is used at its northern end by beekeepers and provides a limited number of sites of high value. Though honey flora occurs elsewhere, the lack of access is a major limiting factor. There are no defined apiary sites on the public lands of the block, although it is permitted throughout most of the block.

Timber Production

The capability for hardwood production is high in the alpine ash stands scattered throughout the block. These include 1939 fire regrowth, with most of the mature stands of alpine ash having been selectively logged. Some narrow-leaf peppermint and candlebark gum stands have been logged. However, these, together with timber in moist gullies would be only of moderate capability.

Some ash stands within the Dartmouth extension to the Alpine National Park in the south of the block (Brown and Sheehan Creek catchments) were available for once-only logging. This has now been completed.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 1868 ha of ash species forest and 502 ha of mixed species forest.

The descriptive block lies within the Wodonga Forest Management Area. The block's contribution to the regional sustainable yield of this management area is being calculated

by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

Gold was produced from the Dart River area. Recent mineral exploration has indicated highly prospective areas for the discovery of base metal mineralisation in Ordovician sediments and Silurian volcanics and sediments to the east of Lake Dartmouth. Lead, zinc, silver and copper are sought.

Two exploration licences cover parts of the block within the national park. These are available for mineral exploration until the end of 1989 when any mining proposals will be considered by the government.

Elsewhere, covering about 69% of the block, exploration and mining is permitted subject to the provisions of the Mines Act 1958. Three exploration licence applications are current, covering the central and remaining southern areas of the block. There is no current mining (or gravel extraction) within the block. Details of existing tenements are included in Table 81.

Table 81

MINES ACT TENEMENTS (As at August 1989)

Tenement type and ref. no.	Lessee	Location
Exploration licence		
EL 1957	Village Mines NL	McKay Ck
EL 2492	Border Resources NL	Dart River
ELA 2047 (also Block 15)	Village Mines NL	Donnovan Ck
ELA 2133 (also Block 15)	CRA Exploration Pty Ltd	Simpson Ck headwaters
ELA 2538	CRA Exploration Pty Ltd	Stacey Ck
ELA 2047 (part only)	Village Mines Pty Ltd	Wheeler Gibbo
EL 2132	CRA Exploration Pty Ltd	Covers all north half of block

Water Production

The entire block is located in the Hume water supply catchment. The essentially complete vegetation cover of the block is important in maintaining both water quality and water yields.

The capability for water production is moderate in the north, while much of the southern section forms portion of the catchment of the Lake Dartmouth storage. This storage supplies water to the Murray River water supply system for use in downstream irrigation, stock watering and domestic purposes.

Table 79

ROADS AND TRACKS

Ref. no. (Map 15)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Beetoomba Spur Tk			*	CFL	FP	Nil	Boundary only
2	Log Bridge Tk			*	CFL	FP, PSC	Nil	
3	Murray Valley Hwy	*			Roads Corp	PA	Nil	Boundary only
4	Price Hills Tk		*	*	CFL	FP, PSC	Nil	Part boundary
5	Wabba Tk			*	CFL	FP	Nil	Part boundary
6	Simpsons Tk			*	CFL	FP	Nil	Boundary only
7	Rawes Tk			*	CFL	FP	Nil	
8	Unnamed			*	Private	F/h		In private property
9	Benambra Corryong Rd	*			Roads Corp	PA	Nil	A 7 m wide gravel road in good condition (widening proposed south of Nariel); a declared forest road
10	Carmody's Tk			*	CFL	FP, U	Nil	
11	Graptolite Gully Tk			*	CFL	FP	Nil	
12	Remote Ck			*	CFL	FP, R		
13	Gibb Range Rd		*	*	CFL	FP, R, L	Nil	
14	Benambra Spur Tk			*	CFL	FP, R	Nil	Boundary only
15	Dart Tk			*	CFL	FP, R	Nil	Boundary only
16	Murtagh Ck Tk			*	CFL	FP, R	Nil	
17	Glamour Hill Tk			*	CFL	FP, R, L	Nil	
18	Unnamed			*	CFL			
19	Glendart Rd			*	CFL	FR, R	Nil	
20	Sipthorpe Tk			*	CFL	FP, R	Nil	
21	Dartmouth Tk			*	CFL	FP, R	Nil	
22	Eustace Gap Tk		*	*	CFL	FP, R	Nil	Part boundary
23	Kings Ck Tk			*	CFL	FP, R	Nil	Boundary only

KEY:

F/h - Freehold Access L - Logging PSC - Pest Species Control
 FP - Fire Protection PA - Primary Access R - Recreation

BLOCK 15 : MURRAY HEADWATERS

Location and Boundaries

The block lies to the north-east of Benambra (see Map 10) and straddles the Great Dividing Range in the upper reaches of the Murray River. Part extends into New South Wales. The entire block covers 224 500 ha, of which 134 440 ha, or about 60%, is in Victoria.

The Victorian sector forms part of four municipalities - Omeo, Tallangatta, Tambo and Upper Murray.

The block boundary generally follows the alignment of major roads surrounding the areas of higher wilderness quality; the Benambra-Corryong Road, the Alpine Way (New South Wales), Barry Way (New South Wales), the Buchan-Jindabyne Road and the Benambra-Black Mountain Road. These are linked by forest tracks following river divides, small sections of watercourses (Wheeler Creek and Buenba Creek), and in the north-east, in New South Wales, the boundary of the Kosciusko National Park.

Tenure and Land Use

The Victorian sector of the block is mainly within the Alpine National Park (formerly the Cobberas-Tingaringy National Park) or within State forest. A number of smaller reserves are also included within the block boundaries - two reference areas, two natural feature and scenic reserves, and an historic area.

All of the New South Wales sector of the block is within the Kosciusko National Park.

The block boundaries encompass five areas of freehold land. Three are on the edge of the block - in the north, the Tom Groggin station on the Murray River, and areas at Suggan Buggan and Black Mountain in the east. The other two areas are small inlier blocks - one on Limestone Creek and the other on the Ingeegoodbee River.

Details of previous Land Conservation Council recommendations are outlined in Table 82 (see page 244) and the boundaries of the separate areas are shown in Map 11.

Relevant Planning Policies, Strategies and Management Plans

Over half of the Victorian sector of the block is within one of the planning units of the Alpine Planning Project. A proposed management plan covering all of the national park area within the block - the Cobberas-Tingaringy Unit Proposed Management Plan, has just been released.

The State forests of the Victorian sector of the block are mainly within the Wodonga Forest Management Area. A forest management plan is presently being prepared for this area.

A Plan of Management has been adopted for the Kosciusko National Park (NP&WS 1989). The plan defines wilderness

management areas with additional objectives and management procedures. Protection of natural values is a major management objective for all of the eight management units covering the area of the national park within the descriptive block. Most of the area is also included within the declared Pilot Wilderness Area. Management practices give emphasis to protecting natural features and processes from disturbance, limiting use of vehicles, and providing low intensity picnicking and camping facilities along the Barry Way and near Croagalah.

All of the Victorian sector of the block north of the Cobberas Range is included within the Lake Hume proclaimed water supply catchment. The northern half of this catchment, including part of Davies Plain and land north of the Buenba Creek catchment, are within an area for which a land-use notice applies which restricts clearing in sensitive areas.

Revised regional fire protection plans are being prepared for the two Department of Conservation, Forests and Lands regions covering this block. The draft Bairnsdale fire protection plan is proposed to go on public exhibition in the near future.

Physical Setting

The block consists of rugged mountainous country with prominent peaks, incised valleys and complex geology.

Much of the western sector of the block has moderately to deeply dissected mountainous terrain. High points on ridges such as Mount Pinnibar (1771 m), Mount Sassafras (1588 m), Mount Gibbo (1757 m) and Mount Anderson (1650 m) rise between 400 m and 800 m above the adjacent valley floors.

More subdued topography occurs on areas of granite, for example, the Pinnibar plateau (1000 to 1500 m), Mount Misery and the Suggan Buggan valley.

At the western edge of the block, deeply dissected valleys descend more than 900 m from a ridge on the edge of the Wulgulmerang Tablelands (Rocky Plains plateau, Mount Stradbroke (1280 m), Mount Hamilton). These tablelands and the Cobberas Range (Cobberas: No 1 - 1838 m) are formed from Lower Devonian volcanics.

A number of small intermontane basins occur at Tom Groggin, on Buenba Creek, Mount Murphy, Davies Plain Creek, Cowombat Flat, and Berrima River and MacFarlane Flat. These are generally associated with Quaternary alluvial sediments. Limestone and marble deposits occur along Limestone Creek and exhibit a range of karst landforms including cave development.

The rivers of the block are strongly influenced by a series of influenced parallel faults - notably Omeo and Buenba Creeks, the Murray River (Indi River), and Limestone Creek, and in New South Wales, the Thredbo, Snowy, Jacobs, Moyangul and Ingeegoodbee Rivers.

Those watercourses forming part of the Mitta Mitta River catchment flow into the Dartmouth Dam. The remaining watercourses, north of Limestone Creek and the Great Divide, flow into the Murray River. All other watercourses are within the Snowy River basin, including the complete catchments of the Moyangul, Ingeegoodbee and Suggan Buggan Rivers.

Biological Setting

Vegetation includes alpine and subalpine herbfields and heathlands, with extensive areas of snow gum woodland on the higher ridges and plateaux. Montane forests of alpine ash occur on the higher sheltered valley slopes. Wet and dry sclerophyll forests also occur. Rain-shadow woodlands and rocky outcrop open shrublands occur in the Snowy and Suggan Buggan catchments.

This variety of vegetation provides a wide range of habitats for wildlife. A large number of species are recorded, including small ground-dwelling and arboreal mammals, and many birds. A number of reptiles and amphibians have also been recorded. Trout are recorded in major rivers and creeks of the block, with a range of native fish found in the Suggan Buggan River.

Cultural Setting

The dividing ranges appear to have been a boundary between major Aboriginal language groups. A number of artefact sites have been recorded within the block. Most have been found along the Snowy River. A site of particular interest occurs in the Limestone Creek area.

By the 1860s, pastoral runs covered much of the block. As the better lands were selected around the homesteads, the pastoralists continued to use the surrounding public lands, mainly for summer grazing on the higher tablelands and plateaux or montane basins under licence. The use of these areas for seasonal grazing has continued throughout this century although no longer permitted in New South Wales.

As in much of the Alps, a phase of occupation in remote, isolated areas followed the discovery of gold. In the early 1850s gold was discovered at Shady Creek (near Mount Pinnibar) and, within the Victorian sector of the block the main goldfields were at Limestone Creek and Zulu Creek (see Map 15). Alluvial gold was also sought from other more isolated streams of the block, such as Tom Groggin Creek. The alluvial goldfields were generally short-lived and no large reef mines were worked within the block. Most activity was from the 1860s to the turn of the century. Little evidence remains of this phase of occupation.

Other minerals were also sought. Wolfram, a tungsten-bearing ore, was mined at Mount Murphy on the edge of the block in the early 20th century up until 1920, and re-opened between 1942 and 1943. In the New South Wales sector of the block, tin was mined about 6 km north-east of Mount Pilot in the 1930s. Some marble quarrying has been carried out on Limestone Creek. These were significant changes in land use, but appear to have localised impact.

While the original tracks of the area would have been bridle paths associated with pastoral uses or mining tracks, most of the present track network became established since the Second World War, mainly for fire protection access. Access

in the (New South Wales) area also increased at this time with the construction of the Snowy Mountain's Hydro-electric Scheme.

Bushwalkers have visited the area since the 1930s, but it was only with the increase in access that it became more heavily used. The provision of vehicular access has also, in Victoria, led to increasing usage by four-wheel-driving and horse-riding groups.

The New South Wales sector has been included within parks since 1943, with the Pilot Wilderness Area declared in 1974.

WILDERNESS QUALITY

The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) indicated that much of the Victorian sector of the block had relatively high wilderness quality. Much of the higher value areas abutted the State border, notably the western fall of the Murray upstream of Tom Groggin. The New South Wales sector of the block, although not covered in the survey, has similar high wilderness quality values. The other major area of higher value recorded in Victoria was centred on the middle reaches of Buckwong Creek.

A large part of the block was included in an area of wilderness (Indi-Pilot) identified in the Feller et al. (1979) inventory. This area extends into New South Wales and corresponds to an area of wilderness identified in the Helman et al. (1976) inventory of wilderness. These values were confirmed in a New South Wales review in 1986 (Wilderness Working Group 1986).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

Much of the block is surrounded by natural lands and this has contributed to the high values recorded for the remoteness from settlement attribute throughout the block.

Areas of settled (cleared) land influencing recorded values were mainly external to the block boundaries or on its edge. They included properties at Tom Groggin, Nariel, Beloka, Marengo, Suggan Buggan and Black Mountain. Lake Dartmouth to the west of the block also influenced values as it was classified in the survey as a cultural landscape.

Although not included in the survey, the major influence on values in the New South Wales sector of the block would include the Thredbo ski resort on Alpine Way and pastoral properties around Ingebyrah.

The boundaries of settled land have been relatively stable, with the construction of Lake Dartmouth in 1979 being the major change in the last 15 years. Some areas of freehold land at the edges of the block are uncleared.

The present influences have resulted in a band of very high value remoteness from settlement, classified in the highest class, Class 4, recorded in the Preece and Lesslie survey, extending across the block, (and further north into the Thowgla Creek catchment). The most extensive areas are centred on the area around the headwaters of the Murray River (and Mount Pilot). The Buenba Creek catchment was (incorrectly) classified as part of the settled area, and

remoteness, and thus total wilderness quality values to the north are subsequently artificially low.

Remoteness from Access

The major roads on or near the block boundaries were the major influence on recorded remoteness from access values. These are the Barry and Alpine Ways in New South Wales, the Buchan–Jindabyne Road, Limestone–Black Mountain Road, Buloka Road and the Benambra–Corryong Road.

A number of logging roads have been constructed relatively recently within the block. These include the Wheelers Creek Logging Road, the Mount Anderson Logging Road, Macs Creek Road, Mount Hope Road, and the most recent Buenba Road. These were not recorded, or recorded as vehicular tracks in the Preece and Lesslie survey. (The only minor road recorded in the survey was Dunstons Logging Road in the north of the block.) As a result of this network of minor roads, remoteness from access values would be significantly reduced in the west of the block, and consequently so would total wilderness quality values.

A relatively dense network of vehicular tracks occurs along ridge tops and adjacent to watercourses. Most are used for fire protection or recreation purposes, as well as for cattle management and logging. Many are subject to seasonal closures, mainly due to snow; most are of four-wheel-drive standard and include sections with very steep gradients.

The only vehicular tracks maintained in the New South Wales sector of the block are used for fire protection purposes and are not available for public vehicular access. The maintained track network is very sparse. Others have been overgrown.

There are few vehicular tracks through the more rugged valleys of the block. Until recently Davies Plain Ridge was one of only two areas in eastern Victoria (the other being Wilsons Promontory) greater than 15 km from a road.

Currently there are 75 km of trafficable roads within the descriptive block, all of which are within the Victorian sector of the block. All roads and tracks are listed in Table 83 (see page 245) and their locations shown on Map 15.

The route of the Alpine Walking Track previously traversed the northern half of the block along the Mount Pinnibar track between Sassafras Gap and Tom Groggin. It has, however, been recently re-aligned from the Lake Dartmouth reservoir and now traverses the Beloka Range, Johnnies Top and within the block along the Buenba Creek to Mount Murphy and on to Cowombat Flat. There are no other defined walking tracks in the block.

The recently defined Bicentennial National Trail also traverses the block. It is designed primarily as a horse-riding route. It extends from Tom Groggin along the Beloka–Tom Groggin track to Mount Murphy and then heads south-west to Limestone Creek and follows the Limestone Creek track to the edge of the block on the Limestone–Black Mountain Road.

Aesthetic Naturalness

The aesthetic naturalness values recorded in the Preece and Lesslie (1987) survey were mainly influenced by the track

network. As a result, generally higher values occur in the more dissected areas where the track network is not as dense. The highest values recorded were at Tom Groggin Creek, one of the few areas in eastern Victoria which were identified as Class 3 – the second highest class used by Preece and Lesslie.

In addition to the track network, the block also included a number of structures, most of which are cattlemen's huts or minor utility structures. They are listed in Table 84 and their locations shown on Map 15.

A number of structures are of particular historic interest, for example, those associated with the Pilot Tin Mines in New South Wales, the Davies Plain hut, and the former wolfram mine at Mount Murphy. The remains of one of the original State border survey cairns are also of historic interest.

Evidence of former alluvial gold workings, such as water races may still remain along the goldfield watercourses, and yards and fencing are maintained in association with some areas of licensed grazing. A number of helipads are also maintained.

Biophysical Naturalness

The Preece and Lesslie survey rated most of the Victorian sector of the block as low in biophysical naturalness as a result of continuing timber harvesting and livestock grazing. The only area rated highly was south of Mount Sassafras in the Saltpetre and Straight Running Creek catchments.

The New South Wales sector of the block, while not covered by the survey, is no longer subject to grazing and has had little timber harvesting. It would have considerably higher biophysical naturalness values.

Land-use Indicators of Biophysical Naturalness

Timber production has been predominantly based on alpine ash regrowth and mature forests. The main areas that have been utilised are at the southern end of the Davies Plain Ridge (Mac Creek) and the slopes of Mount Misery, extending northwards to Mounts Hope, Anderson, Gibbo, and north of Mount Pinnibar. Small areas have also been utilised towards the Benambra–Corryong Road on the block's western boundary. Most timber has been extracted from these areas in the 1970s and 1980s. No timber extraction has been recorded south of Limestone Creek.

Large areas of mature alpine ash in the Victorian sector of the block, notably in the headwaters of Wheelers Creek, are available for continuing timber extraction and under present tenure biophysical naturalness values in these areas will be reduced.

All areas known to have been logged are shown on Map 15.

Other than steep dissected country surrounding Mount Gibbo and Mount Anderson, much of the Victorian sector of the block is covered by grazing licences. Most grazing, however, is focused on the grassy snow gum woodlands on the more elevated and less dissected areas. These areas are used mainly are for summer grazing. Some stream flats on the Murray River and Dinner Creek south of Tom Groggin, Buenba Creek catchment, Limestone Creek and the Berrima

Table 84

PUBLIC LAND STRUCTURES

Ref. no. (Map 15)	Name	Description	Management responsibility	Purpose	Comments
1	Wheeler's Creek Hut	Hut	CFL	R	
2	Tom Groggin Hut	Hut	CFL	MP	
3	Davies Plain Hut	Hut and yards	Licensee	CM,H,R	
4	Charlie Creek Hut (Davies Plain)	Hut & yards	Licensee	CM	
5	Mt Murphy Wolfram Mine	Hut remains, building founda- tions, adds, tunnels, tram tracks, stamping battery remains	CFL	H	
6	(Upper) Buckwong Creek Hut	Hut and yards	Licensee	CM	
7	Limestone Ck Hut	Hut	Roads Corp	Possibly H	Previously use for road maintenance staff
8	Rocky Plains Hut	Hut and yards	Licensee	CM	
9	McFarlanes Flat Hut	Hut, fencing	Licensee	CM	
-	Border Cairns	Timber and rock structures	Dept Property and Services/ CFL	H	
-	Mt Pendergast, Mt Sassafras, Mt Pinnibar, Mt Gibbo, & Mt Cobberas No. 1, Mt Menaak Trigs	Trigonometric Stations	Dept Property and Services	U	
-	Murray River and Buckwong Ck Gauging Stations	River-gauging station	Rural Water Commission	U	
10	Tom Groggin Picnic Area	Picnic area, fireplaces	National Parks & Wildlife Service (NSW)	R	
11	Barry Way Picnic and Rest Areas (9)	Picnic areas, fireplaces, toilet blocks, picnic tables	NP&WS	R	On block boundary
12	Ingeegoodbee	Hut	-	-	Illegal structure to be removed
13	Charlie Carters Hut and Tin Mine Barn	Ruins	NP&WS	H	Of outstanding historic significance, associated with Mt Pilot tin mine
13	Tin Mine Hut	Hut in poor condition	-	-	To be removed
14	Stockwhip Hut	Hut	Unknown	-	Part of former gauging station - to be removed
15	Cascade Hut	Hut	NP&WS	H	Of outstanding historic significance
16	Teddies Hut	Ruin	NP&WS	H	
17	Number 1 Creek Picnic Area	Picnic area, fireplaces	NP&WS	R	On block boundary
18	Friday Flat Depot	Plant, storage buildings, fuel tanks	Dept. of Main Roads (NSW)	U	On block boundary (adjacent to Thredbo Ski Resort)
19	Grassy Flat Picnic Area	Picnic area, fireplaces	NP&WS	R	On block boundary
-	Murray, Ingeegoodbee and Moyangul River Gauging Stations (4)	River-gauging station	Snowy Mountains Hydro-electric Authority	U	
-	The Pilot, Round Mountain, The Chimneys, and Drift Hill Trigs.	Trigonometric Stations	(NSW)	U	

KEY: CM - Cattle Management MP - Management Purposes U - Utility
H - Historic Interest R - Recreation

Notes:

1. Trigonometric and river gauging stations are shown on Map 15 by symbol.
2. A hut has been constructed on a small freehold block on Limestone Creek.

River and MacFarlane Flat are also important. The intensity of grazing is variable.

The main areas used for licenced grazing are shown on Map 15. Under present tenure and management such grazing is a permitted ongoing use within much of the Victorian sector.

The former alluvial goldfields at the turn of the century, early marble mines, the more recent Mount Murphy mine and, in New South Wales the Pilot tin mines, all have localised influences on biophysical naturalness value.

Other Indications of Biophysical Naturalness

The Victorian sector of the block was covered in two studies of the nature conservation values of rivers and streams (BIOSIS and Ecological Horticulture 1988 and BIOSIS 1989). River and a large number of stream catchments were identified in the studies as being essentially unmodified. They were, in the north, Sassafras and the Hardies Creek catchments and a number associated with Davies Plain - Serpentine, Davies Plain and Rough Creeks, a number of the tributaries of the Suggan Buggan River - Rocky Plains, Freestone, and Moscow Creeks and the Berrima and Ingeegoodbee Rivers, part of the headwaters of the Buchan River and a number of small catchments on the block's southern edge - Meenak, Tomcat, Sandy and Bridle Creeks. The status of Sassafras, Bridle and Sandy Creeks, and the Ingeegoodbee River are being reviewed, however.

Timber resource information indicates that about 70% of the ash-type forests and virtually all of the mixed species forests consist of mature stands.

The upper Murray River has been identified as a site of botanical significance (Forbes et al. 1981) and covers the Cobberas Range, much of the Limestone Creek catchment and the upper reaches of Buckwong Creek. The site was considered to include many of the best areas of alpine wet heathlands, (for example, Long Plain, Charlies Creek, and along Mount Misery Trail, montane riparian forest, snow gum woodlands and mountain sclerophyll woodland in East Gippsland. A number of rare, biogeographically unusual or historically significant species were also recorded.

Another site of botanical significance includes the Suggan Buggan River and its tributaries because of significant stands of rain-shadow woodland and open scrubland on rocky outcrops. A large number of rare species were also recorded.

A more detailed survey was undertaken by Walsh, Barley & Gullan (1984) which covered the Cobberas and Davies Plain areas of the block. It showed that mean weed composition of all subcommunities represented in the block was less than 10%. Mount Cobberas No. 1 and Moscow Peak were included in a site of significance, based on the presence of several rare species. A number of significant isolated quadrat sites were also recorded within the block at Cowombat Flat, near the junction of the Murray River and Limestone Creeks, and on Charlies Creek on the Davies Plain Ridge.

The southern half of the block was also included within the Sites of Zoological Significance in East Gippsland study (Norris & Mansergh 1981). All of the Limestone Creek area was included in a site of State zoological significance - the Upper Snowy River valley. The particular significance of this

area is based on records of the alpine water skink and the broad-toothed rat around the Cobberas area, and for the tiger quoll, hooded robin and brush-tailed rock wallaby found around Mount Stradbroke (the last more recently also confirmed in the Rocky Plains Creek area) and for the red-capped robin around Willis.

The extent of non-indigenous faunal species is not known, although no major vermin problem has been identified. Wild dogs, foxes, rabbits, deer, and feral horses are, however, present in the block. Trout have been introduced into the Suggan Buggan River and Limestone Creek and carry self-supporting populations.

A number of noxious weeds have been recorded, for example, blackberries and sweet briar, but no detailed survey of exotic species has been undertaken. Available survey data indicate, however, that weed composition is less than 10%.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 224 500 ha, and is about 30 km by 60 km wide. Within the of the block about 30% was identified in the Preece and Lesslie (1987) survey as at least Class 4 wilderness quality. Less than 10% was included in Class 5 or higher wilderness quality. Essentially unmodified catchments, excluding those under review, comprise 26 297 ha of the descriptive block's Victorian sector. The largest area presently without roads or vehicular tracks is about 25 550 ha, most of which is in the New South Wales sector of the block. The largest such area in Victoria being about 9700 ha, on the Murray River abutting a similar sized roadless area within New South Wales.

Ecological Viability

The presence of numerous whole river catchments, many of which have been classified as essentially unmodified, and the relatively low number of exotic plant species, contribute to the potential ecological viability of the block. The block also includes a range of vegetation communities, (at least eight in the Victorian sector).

The present grazing of much of the block by both feral horses (brumbies) and domestic cattle, particularly in the alpine and subalpine plant communities, and continuing timber harvesting in the north-western sector are limiting factors.

Fire protection is the main form of active management of the natural systems of the block. Prescribed burning of large blocks to reduce fire hazard is carried out in plant communities other than in fire-sensitive communities, such as alpine heathland, snow gum woodlands and riparian forests. Regeneration burning is undertaken in alpine ash areas following timber harvesting. No firebreaks are maintained.

No major fires (>1000 ha) have been recorded in the Victorian sector since before 1939, with the notable exception of a large bushfire in 1952 which burnt most of the block south and east of Buckwong Creek and extended into New

South Wales. Frequent fires are, however, started by lightning strikes and areas are burnt in autumn and spring to promote species palatable to cattle. Rain-shadow woodlands are particularly fire sensitive.

LAND-USE CAPABILITIES

Nature Conservation

The area has a high value for nature conservation as it contains a wide range of geological formations and vegetation types, including rocky escarpments, rock rivers, fossiliferous sedimentary rocks, limestone caves, dry woodland environments, snow gum woodlands, alpine ash forests and a number of rare species. The Suggan Buggan River includes a diverse range of native fish, including the grayling, a species of vulnerable status.

Such values are largely compatible with the maintenance of the area's wilderness quality.

Recreation

The block provides a range of recreational environments and thus has a high capability for bushwalking, cross-country skiing, camping, horse riding, and canoeing and rafting (on the Snowy River), and moderate capability for canoeing (on the Murray River), caving and, to a limited extent, rock climbing. Much of the block is relatively remote and inaccessible, and this, together with its highly dissected terrain and peaks, means the block has a high capability for solitude and inspiration. The block also has a high capability for four-wheel-drive touring, fishing and a moderate capability for fossicking.

A wide range of natural features of interest occur in the block. These include: the Cobberas Range - the second highest mountain range in Victoria; ridge-top peaks such as Mounts Sassafras, Gibbo and Pinnibar, and other peaks such as Rams Head; montane basins at McFarlanes, and Cowombat Flat; the caves of Limestone Creek, and the nearby Stony Creek; the rugged Suggan Buggan, Snowy and Buckwong River valleys; snow gum woodlands and alpine heathlands and snow grass plains on Pinnibar plateau and Davies Plain and at the Playgrounds; the rock outcrops and rock rivers of the Cobberas, Rams Head Range and Big Hill; the escarpments and cliffs of Mount Stradbroke and the Rocky Range; the deep gorge of the Murray River, the gorge on Buenba Creek and the Stradbroke chasm.

Popular walking routes include along the former Alpine Walking Track across Mount Sassafras, Mount Gibbo, and Mount Pinnibar, all of which (notably Mount Pinnibar) provide expansive views, with the Cobberas-Cowombat flat area perhaps the one used most by bushwalkers. The Pilot is one of the major destinations of those walkers into New South Wales. Much walking in the area is, however, carried out along vehicular tracks, with the notable exception of the untracked Cobberas Range. The block includes: other untracked walking opportunities along ridges in the New South Wales sector and the Rams Head and Rocky Ranges, and a number of river valleys - both in New South Wales and Victoria - including the Suggan Buggan and Buckwong Rivers and sections of Buenba Creek and its tributaries.

The Snowy River at the eastern edge of the block provides an important extended trip route for experienced canoeists.

That part of the Snowy within the block is also canoed as a one-day trip of moderate difficulty, with access from the Barry Way. The headwaters of the Murray River (Indi River) provides one of the best white-water canoe trips for experienced canoeists - including the very difficult 'Murray Gates'. Most trips, however, start at the edge of the block at Tom Groggin. Use is greatest in summer.

Many of the high ridge systems and plateaux such as the Pinnibar plateau and Davies Plain Ridge have potential for cross-country skiing. Access to such areas is often limiting and snow cover may be marginal. They do, however, provide opportunities for remote skiing experiences.

Four-wheel driving is also another significant recreational activity. Most of the forestry tracks are used by four-wheel-drive vehicles - both for pleasure driving and for gaining access to sites for other recreational activities. Most tracks within the Victorian national park areas are also available for four-wheel-drive use. The Mount Pinnibar Track, Davies Plain and Limestone Creek Track and McFarlanes Track and, to the New South Wales border, the Cowombat Track are all used extensively. Many of those using these tracks are from New South Wales. Limestone Creek and Cowombat Flat are popular camping areas for four-wheel drivers. An increasing number of horse riders also use the area (also permitted throughout the New South Wales sector of the block), as do a number of trail-bike riders. Horse-riding trips are generally based around Cowombat Flat and Native Dog Flat and some use is also made of the Bicentennial Trail. There is little hunting.

Two-wheel-drive based camping and pleasure driving is also popular. It occurs generally on the edges of the block - along the Snowy River on the scenic Barry Way, along the Murray River on the Alpine Way and along the Benambra-Black Mountain Road, where car-based camping is concentrated at Native Dog Flat. Some cyclists use the roads on the edges of the block.

Within the New South Wales sector of the block the deep gorge of the Murray River and the valleys of the Snowy River, Jacobs and Ingeegoodbee Rivers are of particular interest, together with the Pilot, the Berrima Range, waterfalls such as the spectacular Tin Mine Falls and those on Cascade Creek, the Indi caves, as well as the area's rugged scenery and broad range of subalpine and mountain environments.

The Murray, Snowy and Suggan Buggan Rivers, and Buenba, Wheelers, Buckwong and Limestone Creeks provide for trout fishing.

Some gold fossicking is carried out on Wheeler, Zulu and Buenba Creeks, and on Limestone, Smoke Oh, Dead Horse, Mac and Charlie Creeks.

Some of the cliffs around the Rams Head and Rocky Ranges are used by rock climbers and the caves of the Limestone Creek area have high aesthetic and recreational value in addition to their scientific interest.

Few commercial tours are known to operate in the block, although one vehicle-based bush tour includes areas around Cobberas and Mount Misery in its itineraries and one company offers horse riding tours into the Cobberas. Another firm offers transport for bushwalkers.

Agriculture

Areas of land have been cleared for grazing at Tom Groggin and around the Suggan Buggan River, with the majority consisting of undeveloped pasture which is used largely in conjunction with public land grazing licences. This lack of development of freehold land in the area can be attributed to its isolation, steepness and susceptibility to erosion. The capability of the public land for further agricultural development is low and is not permitted under existing tenure.

The southern end of the block is important for summer range grazing at the high elevations and for winter grazing at lower elevations. Average capability for bush grazing is low to moderate.

The north-western third of the block, west of Omeo Creek, is vacant and has not been grazed under licence for many years. A few areas of good grazing potential, however, occur at Mount Pinnibar, Mount Gibbo and Mount Sassafras.

Currently there are eight graziers holding five licences over public land in the block. Home properties are located at Tom Groggin, Benambra, Black Mountain and Mount Leinster. Details of current licenced grazing are included in Table 85 (see page 244) and the main areas of licenced grazing shown in Map 15.

Apiculture

The most southern section of the block around Suggan Buggan has white and yellow box which produce honey heavily on a sporadic basis. There is also useful subalpine honey flora in the block.

There is poor access into much of the block, but it has potential for production. There are presently no licenced bee sites.

Timber Production

Capability for hardwood production is very high in the alpine ash regrowth and mature forests, moderate in moist foothill forests and low elsewhere.

The net available area of timber resources in the block, given current tenure and operational standards, consists of approximately 14 876 ha of ash species forest (including 443 ha in once-only logging areas), and 13 902 ha of mixed species forest. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands but was not available prior to publication.

Mineral Production

Alluvial gold was mined at Limestone Creek and Zulu Creek areas, as were copper, silver and lead deposits found associated with these goldfields. Tungsten has been mined on Mount Murphy. Large beds of (high quality) marble and limestones occur along the tributaries of Limestone Creek

(including Painters and Stoney Creeks). There are no active mines in the block. Minor gravel extraction sites have been worked on the Benambra-Black Mountain Road and the Benambra-Corryong Road at the edge of the block.

Mineral exploration in the block has expanded since the discovery of base metal mineralization in the Benambra area.

Mineral exploration licences have covered most of the block since 1972, other than the areas around Mount Pinnibar and Gibbo. Presently three mineral exploration licences cover parts of the block.

Details of current mining tenements within the block are included in Table 86.

Table 86

MINES ACT TENEMENTS (As at August 1989)

Tenement type and ref. no.	Lessee	Location
Exploration licence		
EL 1784	Martin Exploration Pty Ltd	Mt Sassafras
EL 1958	Village Mines NL	Straight Running Creek
EL 1957	Village Mines NL	Sassafras Gap
EL 2047	Village Mines NL	Wheeler Gibbo
EL 1233-5	Macquarie Resources	Mt Pendergast (part only)

Under existing tenure about 42% of the Victorian sector of the block is potentially available for mineral exploration or mining.

Water Production

The capability of the block for surface water production is high. The block generally has high rainfall and the relatively unmodified nature of much of it contributes to the overall high water quality. Most water resources west of the main divide are committed. These drain to the Dartmouth Dam or to the Murray River.

Some of the tributaries of the Snowy River within the block are in rain-shadow areas, and nearly half of the headwater flow is diverted by the Snowy Mountains Hydro-electric Scheme. However, a considerable surface water resource remains - some of which is utilised downstream for domestic and agricultural purposes.

Table 82

LCC RECOMMENDATIONS & PLANNING SCHEME CONTROL¹

Land Use	LCC Reference ²	Approximate area (ha) within block	Planning scheme control	Special provisions ³
National park	A3 (part), A21 (part), A23 (part), A24, A25, A26 (part) - (Alpine)	76 770	Rural 'A' Zone ⁴ , balance of shire ^{5,6} blanket control	Particular attention be given to the protection of the brush-tailed rock wallaby ⁷ . Use of firearms and hunting other than deer hunting by stalking in the Buenba Creek area are not permitted ^{2,7} . No logging other than in defined once-only logging areas ^{2,7} . Grazing permitted subject to conditions (Government amendment to LCC 1983), and apiculture permitted in defined areas ²
Reference area	C17, C18 (Tom Groggin and Forest Hill)	1 300	Rural 'A' Zone ⁴	Nil
Natural features and scenic reserves	D22, D23 (Wild Boar Range and Mount Gibbo)	1 960	Balance of shire ⁶ blanket control	Grazing permitted subject to conditions, apiculture be permitted, new roading constructed only where essential, and where present a strip of alpine ash at least 40 m on the edges of reserves not be harvested
Historic area	G7 (Mount Murphy)	660	Balance of shire ⁵ blanket control	Exploration and extraction for gold, minerals and petroleum, plus timber harvesting and deer stalking be permitted subject to conditions, grazing and honey production permitted
State forest including natural features zone	I1 M7 (Wheeler Creek and Dead Horse Creek)	49 120)))	Rural 'A' Zone ⁴ , balance of shire ⁵ blanket control	Defined special values to be protected No timber harvesting or gravel extraction, only essential new roading
Agriculture - (Ingeegoodbee R, Suggan Buggan, Black Mountain, Tom Groggin, and Limestone Ck)	Not applicable	4 630	Balance of shire ⁵ , blanket control ⁴ , Rural 'A' Zone ⁴	

Notes:

1. Excludes area of block within NSW.
2. Refers to the LCC Alpine Area Special Investigation, Final Recommendations 1983.
3. Specific provisions relevant to area in addition to the standard land use provision of LCC recommendations (as outlined in Appendix II).
4. Shire of Tambo Planning Scheme.
5. Shire of Omeo Planning Scheme.
6. Shire of Upper Murray Planning Scheme.
7. Refers to the LCC Alpine Area, Final Recommendations 1979.

Table 83

ROADS AND TRACKS

Ref. no. (Map 15)	Name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicular track				
1	Benambra--Corryong Rd	*			Roads Corp	PA	Nil	A declared forest road; a 7 m wide gravel road in good condition, being widened south of Nariel
2	Wheeler's Ck Logging Road		*		CFL	L, FP, R	Nil	Boundary only
3	Wheeler Ck Feeder Tk			*	CFL	FP, R	Nil	
4	Wild Boar Track			*	CFL	FP	Nil	
5	Mt Pinnibar Track			*	CFL	FP, R	Nil	
6	Paddy Joy Track			*	CFL	FP, R	Nil	Boundary Only
7	Shady Creek Track			*	CFL	FP, R	Nil	
8	Unnamed			*	CFL	FP, R	Nil	
9	Dunstons Logging Track		*		CFL	R, L, FP	Nil	
10	Pinnibar--Tom Groggin Tk			*	CFL	FP, R	Nil	
11	Tom Groggin Tk			*	CFL	L, FP, R	Nil	
12	Grassy Knob Track			*	CFL	FP	Nil	
12a	Mt Anderson Logging Road		*		CFL	L, FP, R	Nil	
13	Mt Anderson Track			*	CFL	FP, R	Nil	
14	Mt Gibbo Track			*	CFL	FP, R	Nil	
15	Buenba Road		*		CFL	L, FP, R	Nil	New logging road - part boundary
16	Straight Running Ck Tk			*	CFL	FP, R	Nil	
17	Pheasant Creek Track			*	CFL	FP, R	Nil	
18	Mount Hope Road		*		CFL	L, FP, R	Nil	Part boundary
19	Portas Road			*	CFL	FP	Nil	
20	Dinner Ck Track			*	CFL	FP	Nil	
21	Davies Plain Track			*	CFL	FP, R	Seasonal closure	
22	Dans Creek Track			*	CFL	FP		
23	Davies Plain Loop			*	CFL	FP, R		
24	Unnamed			*	CFL	FP		
25	Kings Plain Track			*	CFL	FP, R		
26	Buckwong Tk			*	CFL	FP, R	Nil	
27	Mt Murphy Track			*	CFL	H, R		
28	Gregs Track			*	CFL	FP		
29	Mt Misery Trail			*	CFL	FP, R		
30	Dapples Creek Road			*	CFL	FP		
31	Mt Misery Road		*		CFL	L, FP, R		
32	Smoke-On Creek Track			*	CFL	FP		
33	Macs Creek Road		*		CFL	FP, R		
34	McCarthy's Tk			*	CFL	FP, R		
35	Enano Track			*	CFL	FP		
36	Limestone Creek Track			*	CFL	FP, R, CM	Seasonal closure	
37	Middle Creek Track			*	CFL	FP, R, CM		
38	Benambra--Black Mt Rd	*			Shire	PA	Nil	
39	Cowombat Flat Track			*	CFL	FP, R	Seasonal closure	
40	Cobberas Track			*	CFL	FP, R	Seasonal closure	
41	Moscow Track			*	CFL	Nil		Proposed to be closed

42	Playgrounds Track		*	CFL	FP, R	Seasonal closure	
43	McFarlane Flat Track		*	CFL	FP, R, CM	Seasonal closure	
44	Berrima Track		*	CFL	FP, CM	Nil	
45	Honeysuckle Tk		*	CFL	FP, CM, R	Nil	
46	Ingeegoodbee Tk		*	CFL	F/h, FP, R	Nil	
47	No name		*	CFL	FP	Nil	
48	Stradbroke Tk		*	CFL	FP, CM, R	Nil	
49	Snowy River Road	*		Roads Corp	PA, R	Nil	
49	Barry Way	*		Department of Main Roads (NSW)	PA	Nil	Boundary only
50	Ingeegoodbee Fire-Trail		*	National Parks and Wildlife Service (NSW)	FP	MVO	
51	Cowombat Fire-Trail		*	NP&WS	FP	MVO	
52	Pilot Creek Fire-Trail		*	NP&WS	FP	MVO	
53	Snowgums Fire-Trail		*	NP&WS	FP	MVO	
54	Murray River Fire-Trail		*	NP&WS	FP	MVO	
55	Ash Fire-Trail		*	NP&WS	FP	MVO	
56	Tin Mines Fire-Trail		*	NP&WS	FP	MVO	
57	Native Dog Fire-Trail		*	NP&WS	FP	MVO	Boundary only
58	Barry Fire-Trail		*	NP&WS	FP	MVO	
59	Cascades Fire-Trail		*	NP&WS	FP	MVO	
60	Alpine Way	*		Department of Main Rds	PA		Boundary only
61	Unnamed		*	NP&WS	FP	MVO	
62	Unnamed		*	NP&WS	FP, R	Unknown	
63	Grass Flat Track		*	NP&WS	FP, R	Nil	Boundary only

KEY:

FP - Fire Protection
L - Logging
PA - Primary Access

R - Recreation
U - Utilities

Table 85

PUBLIC LAND GRAZING

Ref. no.	Licensee	Main Vegetation Type Grazed	Approximate no. of stock carried	Comments
L44 - 972/130	49th Bikar Nominees	Riparian forest	300 DSE ¹	
F44A - 6418	Tom Groggin Station	Riparian and montane forests	58 head	
L45 - 972/130	49th Bikar Nominees	Snow gum woodland, montane sclerophyll woodland	270 head	Summer grazing only
F44B - 6361	A.R. Frickleton	Snow gum woodland, montane forest	150 DSE	
L46 - 20/130	Conneley	Snow gum woodland, montane sclerophyll forest	332 head	Part only. Summer only
F3 - 5947	H.L. Pendergast	Snow gum woodland, montane sclerophyll forest	See Note 2	Summer only
F9 - 2092	E. McCallum	Snow gum woodland	See Note 3	Part only. Summer only,
F1 - 5052	H.L. Pendergast	Snow gum woodland	See Note 2	Part only, remainder in Block 17. Summer only
F2 - 67/3115	H.L. Pendergast	Montane sclerophyll woodland, alpine wet heathland	See Note 2	Summer only
L1 - 264/130	J.K. Rogers	Montane forest, snow gum woodland	See Note 4	Summer only
L2 - 265/130	D.C. & J.K. Rogers	Montane sclerophyll forest/montane forest	See Note 4	
L3 - 261/130	D.C. & J.K. Rogers	Rain-shadow woodland/montane sclerophyll forest	See Note 4	Part only, remainder in Block 16
L4 - 21/130	D.C. & J.K. Rogers	Snow gum woodland	See Note 4	Summer only. Minor part in Block 17
L5 - 21/130	J.K. Rogers	Snow gum woodland	205 head	Summer only. Part only, remainder in Block 17
L9 - 92/130	D.C. & J.K. Rogers	Snow gum woodland, montane sclerophyll forest	See Note 4	Summer only. Part only, remainder in Block 17

Notes:

1. Represents allocation in dry sheep equivalents.
2. These three licence areas combined carry 200 head of stock.
3. This block, although licensed, appears to have not been stocked for the past few seasons.
4. These six licence areas combined carry 205 head of stock.

BLOCK 16 : TINGARINGY

Location and Boundaries

The Tingaringy block straddles the New South Wales and Victorian border on the Snowy River. It extends over 143 720 ha, of which slightly under half (56 950 ha) is within Victoria. Its location is shown on Map 10.

The Victorian sector of the block falls within two municipalities: east of the Snowy River, it forms part of the Shire of Orbost, while to the west of the Snowy it is within the Shire of Tambo.

The southern and western boundaries of the block follow major roads - the Deddick River Road, the Jindabyne--Buchan Road (Victoria) and the Barry Way (New South Wales), with the remaining boundaries, other than small sections along roads in the Dellicknora Creek valley, following the perimeter of the Kosciusko National Park (New South Wales).

Tenure and Land Use

Most of the public lands of the Victorian sector of the block are within the Alpine National Park (formerly known as the Cobberas--Tingaringy National Park). The remainder of Victorian public land is included in small reserves along the edge of the block, a reference area within the boundaries of the national park, and two areas of State forest which abut freehold lands on the southern edge of the national park.

All of the New South Wales sector of the block is public land and included within the Kosciusko National Park. Much of the block is within the declared Byadbo Wilderness Area.

A large area of freehold land along the Deddick River is included in the southern sector of the block, with freehold land also located along the western boundary - around the settlements of Suggan Buggan and Wulgulmerang, and on its eastern boundary - along the Dellicknora Creek valley.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 87 (see page 251), and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

Part of the block falls within one of the five tourism planning units ('hubs') designated in the Far East Gippsland Tourism Strategy - the Buchan and Upper Snowy River 'hub'. The main tourism strengths include the splendour of the Snowy River and the Mackillop Bridge area with its wild, undeveloped nature, and rafting and canoeing. Relevant actions recommended included sensitively improving main road access, providing minor visitor facilities and giving consideration to cabin accommodation at Mackillop Bridge.

A major part of the block is within one of the planning units of the Alpine Area Planning Project. A draft management plan covering the block, the Cobberas--Tingaringy Unit

Proposed Management Plan 1989 has just been released for public comment.

The Victorian sector of the block is covered by two draft fire protection plans. The draft plan for the Department of Conservation, Forests and Lands' Bairnsdale region is to go on exhibition in the near future, and public submissions to the draft plan for the Orbost region are presently being considered by the Department. The main parts of the latter plan affecting the block are the proposed designation of a strategic fuel-reduction burning corridor (Priority 2) across the public lands of block (and along part of the Deddick River Road). For much of the remainder of the block, that is, the parts outside the environs of the Snowy River, the plan proposes a general fuel-reduction burning zone (Priority 3). Specific reference is also given to the proposed construction of two new roads and a water point within the block.

Protection of natural values is the primary objective for the area of the block encompassed by the adopted plan of management for the Kosciusko National Park (NP&WS 1988). Management practices under this plan are to emphasise protecting natural features and processes from disturbance, limiting use of vehicles and providing low key picnicking and camping facilities along the Barry Way. Most of the New South Wales sector is also included within the declared Byadbo Wilderness Area.

The provisions of the State Environment Protection policies for the Air Environment and for the Waters of Victoria also apply over the Victorian sector of the block.

Physical Setting

Much of the block comprises a complex pattern of steeply sloping dissected Ordovician sediments. These areas have high ridges, peaks and deep valleys.

Granitic rocks are also widespread, particularly along the Snowy River valley in the west of the block and the Deddick River and Dellicknora valleys in the south. These areas are also steep, but generally are less strongly dissected than the Ordovician sediments. Fault lines in the granite influence rivers, such as sections of the Snowy. Metamorphic rocks of contact zones surrounding the intruded Devonian granite outcrop at a number of sites, such as at Mount Taylor.

Major peaks include Black Jack Mountain (1174 m above sea level), Mount Alexander (1075 m), Mount Byadbo (1238 m), Mount Taylor (1110 m), and the highest mountain in East Gippsland, Mount Tingaringy (1449 m). Many of the peaks and ridges have cliffed escarpments and scree slopes. Elevations fall to below 200 m along the Snowy River valley floor. Part of the Tablelands occur at Wulgulmerang and near Suggan Buggan in the south-west.

All of the block is within the Snowy River basin. Major Snowy River tributaries are the north-flowing Byadbo Creek which drains a large area in the north-east of the block to the north of the elevated Byadbo Range, the south-flowing Tingaringy Creek (south of the Byadbo Ridge) which drains

to the Deddick River on the block's southern edge which is, in turn, a major tributary of the Snowy River, and in the south-west the Suggan Buggan River (whose headwaters lie outside the block). Most minor tributaries of these streams and the Snowy River fall steeply through the dissected sediments.

Most of the Snowy River within the block lies within a broad gorge and has a gentle gradient. Nearly half of its flow has been diverted in New South Wales, for use by the Snowy Mountains Hydro-electric scheme.

Biological Setting

Much of the block supports rain-shadow woodland. This occurs in dry, often steep, exposed slopes of the Snowy River and Deddick River valleys. Dominant overstorey species include white box and white cypress pine. On patches of rocky outcrop, open scrublands occur. Soils are often shallow and the understoreys are generally open.

Large areas of dry sclerophyll forest are also present with montane sclerophyll woodland at higher elevations and pockets of montane forest of alpine ash and brown barrel on more sheltered sites. Small areas of snow gum woodland also occur, as at Mount Tingaringy.

Faunal species of particular interest are the tiger quoll, the brush-tailed rock wallaby, the common wallaroo and the koala. Emus, wedge-tailed eagles, and peregrine falcons occur along the Snowy River valley. The major rivers of the block include a range of native fish including the vulnerable grayling.

Cultural Setting

It appears that groups of Aborigines of the Monaro Tablelands had associations with the area. They were nomadic and are thought to have utilised the high country areas in summer and the major river valleys in winter. Most evidence of this period of use has been found along the Snowy River valley, such as along the Barry Way near Willis.

By the 1830s, however, Europeans had established grazing runs over much of the Monaro Tablelands and soon extended into Victoria with runs licensed in the Tubbut area about 1838 and at Dellicknora a year or so later. These settlements were based on the river valleys. Linkages with the Omeo district were also soon established, with pastoral runs in the Little River and Suggan Buggan areas being established in the 1840s. Punts were operating across the Snowy River by the 1880s.



Looking south across the headwaters of Tingaringy Creek

The more dissected and drier areas of the central area of the block would have been of little value for pastoral use or settlement, and was only used for rough forest grazing or for summer grazing in the small areas of open woodlands near the snowline.

The discovery of reef gold in the area (following the alluvial rushes in the adjacent Bendoc area in the 1860s) pushed settlement into the more rugged interior of the block. Gold reefs were worked around Roaring Camp, to the south (Pioneer Reef Gold Mine) and to the north of Mount Tingaringy (in New South Wales). These mines operated in the late 1890s and early 1900s. Little visible evidence of this period remains, although minor surface workings and mullock heaps can still be discerned in parts of the block (in both Victoria and New South Wales).

Freehold blocks were purchased at Dellicknora and Tubbut in the 1880s and land was fenced and cultivated. The surrounding land remained under grazing licences until these areas were opened up for selection in the early 1900s (Dellicknora) and in the 1930s (The Amboyne Settlement). Where cleared, the freehold areas have been mainly used for cattle and sheep production. Small townships were surveyed and gazetted, but have not been developed. Licensed grazing is still permitted on some areas of public land.

Recreation has become an important use, although intensive use has been focused on relatively limited areas, mainly along the Snowy River. Facilities are low key. Much of the public land has been included in national parks since the late 1960s.

WILDERNESS QUALITY

The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) indicated that most of the Victorian portion of the block is of low to moderate (Class 2 and 3) total wilderness quality, with the highest values recorded on the State border across the catchments of Gattamurh and Tingaringy Creeks. As discussed below, the biophysical naturalness values (and accordingly total wilderness quality values) of the area may be higher than recorded in the survey. Most of the block in New South Wales (which were not included in the Survey of Wilderness Quality in Victoria), are essentially unmodified.

Much of the natural lands of the block were also included within a wilderness (Tingaringy-Byadbo) defined in the Feller et al. 1979 inventory. The area identified extended into New South Wales, and corresponded to an area of wilderness identified in the 1976 Helman et al. report. These values were confirmed in a New South Wales review in 1986 (Wilderness Working Group 1986).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The descriptive block is largely surrounded by settled (cleared) land. Its western edge, however, abuts large areas of natural land (Kosciusko National Park and the Alpine National Park), and it is contiguous with natural land along the Snowy valley.

The areas of highest value (Class 3) recorded in the Victorian portion of the block by the Preece and Lesslie

survey (1987) are along the State border, with two areas extending further south into the lower reaches of the Gattamurh Creek, and west of Mount Tingaringy.

Settled land within the Victorian sector of the block includes farming lands on the Little River towards Wulgulmerang, the Deddick River valley including the Amboyne settlement area, the Dellicknora valley and at Suggan Buggan. There are no townships or urban settlements. Within the New South Wales sector of the block the settled lands are also used for farming.

There are inliers of cleared settled land in New South Wales, north of the Byadbo Range on the edge of the block, on the Merumbago Creek.

Within Victoria sizeable areas of freehold have been cleared since 1972, particularly in the Amboyne settlement area. Large areas (some of the most extensive in the State) of freehold land still retain uncleared native vegetation however, notably at Suggan Buggan and in the Amboyne area. Consequently, there is potential for the boundary of the settled land and hence wilderness quality values to change in the future.

Remoteness from Access

The major roads influencing remoteness from access values within the block are the Barry Way, the Snowy River Road, the Amboyne Road, the Deddick Road, the Dellicknora Road and, to a lesser extent, a small section of the Bonang Highway. All of these are unsealed and, other than the Amboyne Road, all are on the edge of or beyond the boundary of the block.

The values recorded in the Preece and Lesslie survey are highest (Class 3) towards the New South Wales border and, given that there are no major roads for many kilometres beyond the block's northern and eastern boundaries in New South Wales, values would increase substantially to the north and north-east of the border.

The New South Wales sector of the block also has few vehicular tracks. Most of the tracks generally follow the catchment divides of the larger streams and are managed as fire trails. Other than the Little River Track, none are available for public vehicular access. In contrast, the Victorian sector of the block has a network of tracks and there are no restrictions on public vehicular use. Most of these are of four-wheel-drive standard. Sections are untrafficable during wet periods or where subject to snowfall. A number of tracks associated with former grazing activities are now overgrown.

Currently there are 14.6 km of trafficable roads traverse the descriptive block, all of which are in Victoria. All roads and tracks are listed in Table 88 (see page 252) and their locations shown on Map 15.

No walking tracks have been constructed within the block. There is an airstrip adjacent to the Amboyne Settlement Road in the south of the block.

Aesthetic Naturalness

The Victorian sector of the block recorded low values for aesthetic naturalness in Preece and Lesslie mainly due to the

track network, with higher value areas generally corresponding with trackless areas. Although not covered by the survey, the New South Wales sector, with a lower density of tracks, would have higher value.

Few structures occur in the block and apart from a defined camping ground at McKillop Bridge, consist mainly of minor huts and picnic areas. These are listed in Table 89 (see page 253), and their locations shown on Map 15. There are minor relics of former mining areas still discernible, and a number of constructed helipads are maintained.

Biophysical Naturalness

The Victorian sector of the block was allocated very low values (Class 0 and 1) of biophysical naturalness by Preece and Lesslie. The lowest values are towards the Suggan Buggan area. These low values appear to be based on the continuation of livestock grazing. Since the data was collected for the survey, grazing has been phased out of all of the area east of the Snowy River and, accordingly, this area is now, in terms of the survey methodology, more correctly allocated to Class 3. This adjustment to the level of biophysical naturalness classification would also result in the total wilderness quality of the area being increased. The New South Wales sector would have similar values as grazing no longer occurs.

Land-use Indicators of Biophysical Naturalness

While there may have been some localised utilisation of timber resources in association with early mining activities, no major utilisation has been recorded. Other than three small gravel pits on the edges of the block on the Snowy River Road, the Deddick River Road and Hobbs Road, and localised gold mining in the east of the block at the turn of the century, no utilisation of mineral or stone resources has been recorded.

Virtually all of the block has, however, been used, at least for some extent for grazing since the mid 19th century until recently. Grazing occurred over much of the block, although usage appears to have been of low intensity. The land south of Mount Tingaringy has not been grazed since 1960, with most of the area east of the Snowy River used only irregularly since at least the early 1970s (although permitted until 1988). Areas west of the Snowy River are still grazed, principally adjacent to Suggan Buggan, but this is generally of low intensity.

Much of the New South Wales sector of the block has probably also been grazed up to 1969, when it was no longer permitted. The area of most intensive use was in the Marambego Creek valley.

Other Indicators of Biophysical Naturalness

The block east of the Snowy River was covered by Macmillan's (1987) study of the conservation values of rivers and streams in East Gippsland. This study identified much of the Victorian and abutting sector in New South Wales, as being within essentially unmodified catchments. They included all of the headwaters of the Tingaringy Creek upstream of Wallaby Creek, Gattamurh Creek and Jamb Creek.

A similar study covering the area to the west of the Snowy River (BIOSIS 1989) identified many of the catchments of

the tributaries of the Suggan Buggan and Snowy Rivers as essentially unmodified. These being on the block's western margin as essentially unmodified. These were an unnamed creek off Black Mountain, World End, Buchan, Bridle, Yellow Waterhole and Sandy Creeks. The status of the last three is, however, being reviewed.

Timber resource information (Victoria only) indicates that the majority of ash type forest and mixed species forest consists of mature stands.

The regional surveys of Sites of Botanical Significance of East Gippsland (Forbes et al. 1981) indicated that, like most of the areas of native vegetation surveyed, quadrats in communities represented in the descriptive block had low to negligible levels of weeds, save for rain-shadow woodland communities (on the Snowy River) where 32% of recorded species were weeds.

Most of the Victorian sector of the block was included within two large sites of national botanical significance. The Suggan Buggan site is part of a site which covers all of the block west of the Snowy River, the outstanding vegetation being the rain-shadow woodland and rocky outcrop, open scrubland. A number of rare and significant species occur. The Mount Tingaringy site, covering most of the natural lands to the east of the Snowy River, was also significant due to the presence of rain-shadow communities and species of particular interest.

Much of the block along the Snowy River valley within Victoria was included in a site of State zoological significance as defined in Norris and Mansergh's (1981) study of East Gippsland. The particular significance of the Mountain Hut Peak area was the presence of the common wallaroo. The tiger quoll has been recorded in the Mount Bulla Bulla area.

Land adjacent to the border is considered largely free of rabbits, but they are a permanent problem in areas surrounding the settled lands. Rabbits are widespread, however, as are cats and wild dogs. Foxes occur on the margins of natural lands, and brumbies are common.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 143 720 ha and is 45 km by about 30 km. Of that part within Victoria, none was included in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) as within the highest three classes of wilderness quality (Class 5, 6 or 7), although as noted in section below this is conservative, and very little was included within Class 4. Essentially unmodified catchments, excluding those under review, comprise 23 570 ha of the descriptive block. The largest area presently without roads or vehicular tracks is about 25 200 ha, which is wholly within New South Wales. The largest roadless area in Victoria is 9050 ha.

Ecological Viability

The area's relatively high biophysical naturalness (given the present absence of grazing on most of the area), the apparent

low levels of introduced plant and animal species, and, other than along the Snowy River, the dissected topography, would all contribute to the ecological viability of the block. Cattle still graze the sensitive rain-shadow woodland areas west of the Snowy River.

Programs of manipulative management are limited to fire protection and vermin and weed control.

Lightning strikes occur frequently and fires can quickly reach a large size. Within Victoria recorded major bushfires have burnt the eastern half in 1939, an area in the south-west corner of the block in 1952 and a 9000-ha fire on the New South Wales border at Willis in 1988 (see also Map 8). Prescribed burning for fuel reduction is carried out in both the New South Wales and Victorian sectors, with the emphasis given to the protection of neighbouring freehold land. Subalpine and alpine area communities are generally not burnt.

Management of exotic species include trapping of wild dogs throughout the Victorian sector and electric fencing has also been used. Feral horses (brumbies) are presently controlled to some extent by brumby running. Control of foxes may be important to retain populations of the tiger quoll. However, traps and baits may threaten it.

LAND-USE CAPABILITIES

Nature Conservation

Capability for nature conservation is high because of the range of vegetation types, for example, the substantial areas of the restricted cypress pine and white box open forest and rain-shadow woodland, rocky outcrop open scrubland (as at the Mount Taylor and Mount Whittaker summits), a number of significant plant species and habitat for the rare tiger quoll, brush-tailed wallaby, smoky mouse and broad-toothed rat. The Deddick, Upper Snowy and Suggan Buggan Rivers all include a diverse range of native fish, with the vulnerable grayling found in the latter two rivers.

These nature conservation values are enhanced by the block's mainly undisturbed condition.

Recreation

The block has a high capability for walking, particularly for experienced overnight bushwalking, nature study, and the Snowy River has a high capability for canoeing and rafting. It has high capability for those seeking solitude or inspiration. The block also has capability for swimming, fossicking, fishing and those seeking features of cultural interest.

Natural features of particular interest include the orchids of the rain-shadow woodland understoreys, the patches of low rocky outcrop open shrubland, significant species such as the Tingaringy gum stands on Mount Tingaringy, the gorge, rapids and sandy beaches of the Snowy River, the many waterfalls of the area, (for example, those in the Bonang River, Wallaby Creek, and near the confluence of Tingaringy Creek with the Deddick River), the escarpments and peaks of Mount Tingaringy and, in New South Wales, the Byadbo and Black Jack Mountains, and the Amboyne Creek Gorge.

Many of the walking routes within the block follow ridge lines, virtually all of which are also associated with some form

of vehicular track, some sections of which are very steep. Mount Tingaringy and Byadbo Mountain are popular destination points in Victoria, and rock hopping along the Snowy River, particularly in the vicinity of McKillop Bridge are also popular. Off-track walking opportunities are high, given the open nature of the dry rain-shadow vegetation.

The section of the Snowy River within the block provides for canoe trips of up to a week's duration for experienced canoeists. Within Victoria the section between 'Willis' and McKillop Bridge provides for shorter, less challenging, trips. The spectacular scenery of the river valley and its remoteness are major contributors to the area's value for canoeing.

Most of the more intensively used areas for camping, pleasure driving and fishing are on the Snowy River at points of ready vehicular access - notably along the Barry Way (New South Wales), at Gattamurh Ford and McKillop Bridge. The Deddick River Road, although narrow and winding, is a popular scenic drive.

There is some four-wheel-driving in the Victorian sector of the block, although no tracks are open for such activity in the New South Wales sector. Some horse riding is undertaken west of the Snowy River, though this activity is not permitted in most of the New South Wales sector.

Agriculture

Capability for agriculture is low because of the steep and dissected nature of much of the block. Wild dogs are an ongoing problem, especially for sheep production.

Capability for forest grazing varies but is generally moderate. Present tenure precludes such use from most of the public land of the block, other than the Victorian sector to the west of the Snowy River. The Barry Way is used as a stock route from Ingebyrah into Victoria. Details of current grazing are in Table 90.

Apiculture

The block has extensive stands of white box, yellow box and red stringybark species which have heavy nectar production in sporadic years. Lack of access limits use and is precluded by management prescription in the New South Wales sector. There are few if any defined licensed apiary sites within the Victorian sector.

Timber Production

Capability for timber production within the block is low. Such use is excluded for most of the block under present tenure. The net available area of timber resources, given current tenure and operational standards, consists of about 87 ha of mixed species forest.

Mineral Production

The following information is restricted to the Victorian sector of the block. A copper lode occurs on the Snowy River near its confluence with the Suggan Buggan River and in other areas of lower Devonian sediments at Wallaby Creek. Gold has previously been exploited in the Mount Tingaringy area and south into the Big Murrumbidgee Creek.

Table 90
PUBLIC LAND GRAZING

Ref. no.	Licensee	Main vegetation type grazed	Approx. no. of stock carried	Comments
L3 - 261/130	D C and J.K. Rogers	Rain-shadow woodland	98 head	Part only, remainder in block 15.
L10 - 263/130	J K Rogers	Rain-shadow woodland	120 head	
La7 - 303/130	J K Rogers	Rain-shadow woodland	Not known	
La6 - 329/130	J K Rogers	Rain-shadow woodland	Not known	
L11 - 414/130	J K Rogers	Rain-shadow woodland	Not known	Part only, remainder in block 15.

Gravel has been extracted on the Snowy River Road, the Deddick River Road and Hobbs Road.

Much of the Victorian sector has not been encompassed (since 1972) by mineral exploration licences. Only two Victorian exploration licences are current covering parts of the Dellicknora Creek Valley. Details of these are included in Table 91.

Under existing tenure about 30% of the Victorian sector is potentially available for mineral exploration or mining.

Water Production

Runoff is limited given the rain-shadow effect of adjacent highlands, and the capability for harvesting water within the block low. The headwaters of the Snowy River are, however, external to the block and, although nearly half its mean annual flow is diverted by works of the Snowy Mountains Hydro-electric scheme, the residual flow could be regulated by storage works to provide a substantial divertible resource. Existing tenure would preclude such use.

Table 91
MINES ACT TENEMENTS
(As at August 1989)

Tenement type & reference no	Lessee	Location
Exploration licence		
EL 2129 (part only)	CRA Exploration Ltd	Dellicknora
ELA 2227	Australian Pacific Mining and Exploration NL	Dellicknora Creek

Table 87

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL¹

Land Use	LCC Reference ²	Approx. Area (ha) within block	Planning Scheme Control	Special Provisions ⁶
National park	A3 ² , A1 ³ (Alpine)	39 520	Balance of shire ⁵ , blanket control ⁴ , Rural 'A' Zone	Logging and hunting and use of fire arms not permitted, grazing be permitted subject to conditions west of the Snowy River and to the east, grazing be phased out by 1988, the area be managed in such a way as to maintain its wilderness values. Management plans to give particular attention to the protection of the brush-tailed rock wallaby.
Reference area	B1 ³ (Beehive Creek - formerly Gattamurh Creek)	590	Balance of shire ⁵ , blanket control	Nil
State forest	E1 ³	2 000	Balance of shire ⁵ , blanket control	Nil
Water frontage reserves	I1 ³	-	Balance of shire ⁵ , blanket control	Nil
Streamside reserves	I7 ³	34	Rural 'A' zone ⁴	
Township land	T4 ³	44	Rural 'A' zone ⁴	If required, land within the township of Suggan Buggan be made available for commercial development of overnight accommodation facilities.
Agriculture (Suggan Buggan, Wulgulmerang, Deddick R/Tubbut, Dellicknora Ck)	Not applicable	14 760	Rural 'A' Zone, balance of shire ⁵ , blanket control	

Notes :

1. Table excludes areas within NSW.
2. Refers to LCC Alpine Area Special Investigation Final Recommendations 1983
3. Refers to LCC East Gippsland Area Review Final Recommendations 1986.
4. Shire of Tambo Planning Scheme.
5. Shire of Orbost Planning Scheme.
6. Specific provisions relevant to area in addition to the standard land use provisions of LCC Recommendations (as outlined in Appendix II).

Table 88

ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	The Barry Way	*			Dept Main Roads (NSW)	PA		Maintained as Tourist Road
2	Willis Fire-trail			*	National Parks and wildlife Service (NSW)	FP	MVO	
3	Monument Fire-trail			*	NP&WS	FP	MVO	
4	Byadbo Fire-trail			*	NP&WS	FP	MVO	
5	Biddi Fire-trail			*	NP&WS	FP	MVO	
6	Bald Hill Fire-trail			*	NP&WS	FP	MVO	
7	Merambego Fire-trail			*	NP&WS	FP	MVO	
8	Link Fire-trail			*	NP&WS	FP	MVO	
9	Little River Track			*	NP&WS	Fh/FP		
10	Tingaringy Track			*	NP&WS	FP	MVO	
11	Karachi Fire-trail			*	NP&WS	FP	MVO	
12	Windmill Hill Fire-trail			*	NP&WS	FP	MVO	
13	Snowy Track			*	CFL	FP	MVO	
14	Armstrong Track			*	CFL	FP, R		
15	Turnback Track			*	CFL	FP		
16	Rocky Range Track			*	CFL	F/h, FP	Part private access only	
17	World End Spur Track			*	CFL	FP, R		
18	Milky Creek Track			*	CFL	FP		Part overgrown
19	Lookout Point Track			*	CFL	FP		
20	Jindabyne/Buchan Road	*			Roads Corp	PA		Boundary only
21	Deddick River Road	*			Roads Corp	PA		Boundary only
22	Amboyn Road		*		Shire	F/h, FP, R		
23	Black Guard Gully Track			*	CFL	FP, R		
24	Monumental Track			*	CFL	FP		
25	Clarke Creek Track			*	CFL	FP		
26	Laurie Track			*	CFL	FP, R		
27	Tingaringy Track			*	CFL	FP, R		
28	Ingram Track			*	CFL	F/h, FP	Part private access only	
29	Saw Pit Creek Track			*	CFL	FP		
30	Rosendale Track			*	CFL	FP		
31	Cameron Track			*	CFL	F/h, FP	Part private access only	
32	Alan Track			*	Private/CFL	F/h, FP	Part private access only	
33	Dellicknora Road	*			Shire	PA		Boundary only
34	Hobbs Road		*		Shire/CFL	F/h, FP, R		Boundary only
35	Buchan Creek Track			*	CFL	FP		
36	B.S. Divide Track			*	Private	F/h	Private access	
37	B.S. Link			*	CFL/private	F/h	Part private access	
38	Sandy Helipad Track			*	CFL	FP		
39	Creek Track			*	CFL	FP		

KEY:

F/h - Freehold Access
FP - Fire Protection

MVO - Management Vehicles only
PA - Primary Access

R - Recreation

Table 89
PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Management purpose	Comments
1	Walter's Hut	Hut	National Parks and Wildlife Survey (NSW)	-	Illegal structure, to be removed
2	Folk Hut	Ruin	NP&WS	H	
3	Merambego Hut	Huts, stockyards, pound	NP&WS	MP	
4	Sandy Creek Hut	Hut	NP&WS	-	Illegal structure, to be removed
5	Guttamuta Ventry Hut	Small shelter and yards	CFL	H	Illegal hut
6	McKillops Bridge Camping	Toilet block (3), Picnic tables, fireplaces	CFL	R	On block boundary
10	Willis Picnic Area	Pit toilet, fireplaces, picnic table	NP&WS	R	On block boundary
11	Barry Way lookouts and picnic areas (8)	Various picnic tables, fireplaces, pit toilets, day-use huts, lookouts	NP&WS	R	On block boundary
-	Border Cairns	Remnant of border survey cairns	Dept. Property and Services	H	Dates from border survey of 1870/72
-	McKillops Bridge + Deddick River Gauging Stations	Stream Gauging Stations (3)	Rural Water Commission	U	
-	Mt Tingaringy Trig Station	Trigonometric Station	DPS U		
-	Black Jack Mountain, Byadbo and Mt Alexander Trig Stations Ground	Trigonometric Stations	(NSW)	U	

KEY:

H - Historic Interest R - Recreation
MP - Management Purposes U - Utility

Notes:

1 Trigonometric stations and stream gauging stations are shown of Map 15 by symbol.

BLOCK 17 : BUCHAN HEADWATERS

Location and Boundaries

The Buchan headwaters block lies on the edge of Victoria's alpine area to the north-east of Omeo (see Map 10). It covers 52 310 ha in the Shires of Omeo and Tambo.

The northern boundary of the block is the Limestone-Black Mountain Road, the western and southern boundaries generally follow tracks and roads on the boundary of the Alpine National Park. It encompasses virtually all of the tributaries of the headwaters of the Buchan River.

Tenure and Land Use

Virtually all of the block is within the Alpine National Park with a small area of State forest on the eastern boundary.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 92, and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The greater portion of the block is within one of the planning units of the Alpine Planning Project. As part of this project a proposed management plan covering most of the descriptive block, the Cobberas-Tingaringy Unit Proposed Management Plan 1989 has just been released for public comment.

The small area of State forests in the block is within the East Gippsland Forest Management Area. A forest management plan is presently being prepared for this area with a draft management plan proposed for release in mid 1990. A draft fire protection plan for the Bairnsdale region of the

Department of Conservation, Forests and Lands encompasses the block. It is anticipated to go on public exhibition in the near future.

Most of the block is within the proclaimed water supply catchment of the Buchan River. This catchment is used to provide water to the township of Buchan. The water off-take is downstream of the block.

The provisions of the State Environment Protection Policy for the Air Environment and for the Waters of Victoria also apply.

Physical Setting

The topography of the block is extremely dissected and rugged and the geology complex.

The Native Cat Tablelands are the dominant landform with an average elevation of about 1400 m, with higher peaks at Brumby Hill and south of Native Cat Flat. The tablelands extend from Native Dog Creek through the western half of the block to Mount Nunniong, and are dissected by tributaries of the Buchan River. The Buchan River itself flows through deeply dissected topography which is bounded to the east by the edge of the Wulgulmerang Tablelands another high tableland. Highest points here are Mount Wombargo (1640 m) and Mount Seldom Seen (about 1320 m).

The Reedy Creek Chasm and other ravines have formed in relatively unmetamorphosed Silurian sediments with the edge of the large Nunniong granite pluton on the southern boundary and the Forlorn Hope granite pluton is also prominent in the centre of the block.

Table 92

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land use	LCC reference ¹	Area (ha) within block	Planning scheme control ²	Special provisions ⁴
National park	A3 and A27 (Alpine)	49 640	Rural A zone ² , balance of shire ³ , blanket control	Particular attention to be given to the protection of the brush-tailed rock wallaby, once-only logging (in Reedy Creek headwaters) up until 1988, no hunting or use of firearms ¹ , grazing permitted subject to review (government variation to LCC 1983), and apiculture permitted in area covered by A27 ¹
State forest	11	2 670	Balance of shire ³ , blanket control	Specified values to be protected ¹

Notes:

- Refers to LCC Alpine Area Special Investigation Final Recommendations 1983.
- Shire of Tambo Planning Scheme.
- Shire of Omeo Planning Scheme.
- Specific provisions relevant to area in addition to standard land use provisions of Land Conservation Council's recommendations (as outlined in Appendix II).
- Refers to LCC Alpine Area Final Recommendations 1979.

All of the rivers and streams of the block are strongly dissected, although small alluvial flats occur on the Buchan River and upstream of the Reedy Creek Gorge.

Limestone Creek in the north-west is part of the Murray River Basin and flows northward. All other streams are part of the Snowy River Basin, with most being part of the Buchan River catchment.

Biological Setting

Most of the Native Cat Tablelands, together with other elevated (generally above 1100 m) areas in the north of the block, carry snow gum woodlands and, on their more sheltered valleys and slopes, montane forests. The snow gum woodlands have grassy understoreys and scattered low shrubs. Montane forest areas such as at Mount Wombargo are dominated by alpine ash with generally a sparse shrub layer and dense herb layer.

The lower drier areas support montane sclerophyll woodlands with a mixed eucalypt overstorey and heathy or grassy understoreys.

Alpine wet heathlands, grasslands and herbfields occur in areas associated with peaty, poorly-drained soils, such as at Native Dog, Native Cat, Billy and Forlorn Hope Plains, Diggers Plains and on Limestone Creek.

Riparian forests of red stringybark and manna gum occur along the Buchan River and lower reaches of its major tributaries, with a montane riparian forest of dense mountain tea-tree occurring in the upper tributaries of Reedy Creek. Patches of wet sclerophyll forest also occur, notably on Reedy Creek upstream of the gorge.

Cultural Setting

The Tambo River appears to have been a route linking Aboriginal groups centred around the Lake Omeo Plain with those further south. A number of archaeological sites have been recorded along the Tambo River headwaters towards the northern boundary of the block.

The Wulgulmerang Tablelands to the east of the block, and further west in the basins of the Omeo and Benambra districts, were occupied by Europeans in the 1830s. The steep dissected nature of much of the block was less attractive for settlement, although the more elevated parts provided good summer grazing. Grazing has been the only major land use of the area ever since.

Roads and settlements have remained centred on the basins of the Omeo and Benambra districts and on the Wulgulmerang Tablelands. No gold and few other minerals were found in the block and none exploited.

Timber utilisation developed in the region, mainly since World War II, but has focused on extensive areas of higher quality montane and wet sclerophyll forests to the south of the block, although stands of alpine ash were recently logged in the headwaters of Reedy Creek. Forestry tracks were developed in the 1950s and 1960s to provide better access into the general area and their recreational use by bushwalkers and more recently, four-wheel-drive groups, has increased.

WILDERNESS QUALITY

The block includes large areas of high wilderness quality with two small areas classified as Class 5 in the Preece and Lesslie survey. These are surrounded by more extensive areas classified as Class 4 quality. The Forlorn Hope Track separates the two areas of highest quality. The remainder of the block recorded low to moderate values. The block also corresponds closely with a wilderness (Reedy Creek) identified in the 1979 Feller et al. survey.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The descriptive block is virtually surrounded by natural lands, with the major influences on remoteness from settlement values being the agricultural lands of the Wulgulmerang Tablelands on the eastern edge of the block. Other isolated, cleared areas occur along the Limestone Road, at Bindi in the west, and on the south-eastern boundary at Mount Stratham (Bald Hills). These areas are mainly cattle properties, with sheep also raised in the Bindi area.

Areas of native vegetation still remain on the margins of all the surrounding settled (freehold) lands, with the largest uncleared freehold areas being in the Limestone Road vicinity. Clearing in these areas in the future could change the remoteness from settlement values of the block. Values on the western boundary will also be influenced by the recently approved Benambra Area Base Metal Mining Project.

The present influences have resulted in high remoteness from settlement values being recorded for much of the block, with the highest values (Class 4 - the highest class of the Preece and Lesslie survey) towards the south-west of the block, centred on Reedy Creek.

Remoteness from Access

Remoteness from access values were highest towards the south of the block with two major roads (the Black Mountain-Benambra Road and the Buchan-Jindabyne Road) having the most important influence on values recorded. Both roads are unsealed.

Minor roads influencing values were the Nunniong Road (part of which was only classified as a vehicular track in the Preece and Lesslie survey) and, in the west, a small section of the Bald Hill Road. Jam Tin Flat Track and Diggers Hole Road, while recorded by Preece and Lesslie as vehicular tracks, are now also of minor road standard, and thus values in the south-west of the block are lower.

Within the block itself a number of vehicular tracks link snow grass plains and follow ridges. Three, Forlorn Hope, Reedy and Sugarloaf Tracks, follow spurs into the river valleys. All are of four-wheel-drive standard and most are subject to seasonal closure. Most were constructed in the 1960s for fire protection purposes and are now also used for recreational access.

All tracks and roads of the block are listed in Table 93 (see page 259), and their location shown on Map 15. No roads traverse the block itself.



Native Cat Creek Track

The recently defined Bicentennial National Trail traverses the block's north-western edge (along Native Cat Track) and follows the block's boundary along the Nunniong Road towards the Black Range.

The construction of a major sealed haulage road for the recently approved Benambra Area Base Metal Mining Project to the west of the block will affect remoteness from access values on that margin.

Aesthetic Naturalness

The block has virtually no structures, but the influence of its vehicular tracks reduced the aesthetic naturalness values recorded by Preece and Lesslie to moderate levels throughout. The highest values were in areas without tracks, such as along sections of Reedy Creek, with the Buchan River valley north of the Reedy Track being one of the few areas in eastern Victoria recording Class 3 value aesthetic naturalness, the highest class recorded in eastern Victoria.

The only structures identified in the block were the fire tower and spotters' hut (managed by the Department of Conservation, Forests and Lands) on Mount Seldom Seen on the eastern edge of the block. This is shown on Map 15 as Structure 1.

A number of helipads have been constructed in the block and minor fencing maintained around prime grazing areas at Nunniong Plain and Forlorn Hope Plain.

Biophysical Naturalness

The Preece and Lesslie (1987) survey allocated low biophysical naturalness values over the whole of the

descriptive block. These values reflected the grazing activity within the block.

Land-use Indicators of Biophysical Naturalness

The only logging recorded in the block is at two small ('once-only logging') areas in the upper reaches of the Reedy Creek, and no mining activity has been recorded.

Current grazing licences cover virtually the whole area. The main areas grazed are, however, restricted to the river valley areas around Forlorn Hope Plain, and the tableland areas on the edge of the block. Grazing is seasonal, with most stock grazed on the public land in summer. Only parts of the Buchan River valley are grazed in winter. The grazed areas are shown on Map 15.

Other Indicators of Biophysical Naturalness

The block was covered by a study of the nature conservation values of rivers and streams (BIOSIS 1989) and this identified a number of the river and stream catchments as being essentially unmodified: Reedy Creek headwaters, Rough, Wombargo, Fish, Middle and Native Cat Creeks, and part of the Upper Buchan headwaters. The status of the Reedy Creek headwater catchment is being reviewed however.

Timber resource information indicates that about 82% of the ash type forests and virtually all of the mixed species forests consist of mature stands.

The regional surveys of the Sites of Botanical Significance Study of East Gippsland (Forbes et al. 1981), indicated that quadrats in communities represented within the descriptive block recorded low mean weed compositions except the

riparian forest communities which had mean weed compositions of 15%.

This study also included most of the block (excluding the Limestone Creek Catchment) within a large site of international botanical significance. Its high botanical significance was due to the diversity, uniqueness and low weed indices of much of the area. The largely undisturbed state of the alpine and subalpine communities, notably of alpine wet heathlands and tussock grasslands was important, and the extensive stands of well-developed montane forests are considered to be of special significance. A number of highly rated quadrats, were recorded in these and the montane woodland communities. Rare species, including those on Forlorn Hope Plain and in Reedy Creek gorge, contributed to the significance.

The northern half of the block was included in a site of State zoological significance as defined in Norris and Mansergh's (1981) study of East Gippsland. This site, Upper Snowy River Valley, was not based on any specific species identified as being within the block, other than a record of smoky mouse, but included as being part of an area with suitable habitat for significant species, such as the common wallaroo and tiger quoll, identified in adjacent areas.

A broad survey by Nolan (1981) indicates that the centre of the block was considered largely free of rabbits which were an infrequent problem in surrounding areas.

Brumbies range throughout the block, goats have previously been a problem and Sambar deer are occasionally sighted in the area.

The Buchan River has been stocked with trout (most recently in 1978) and a self-supporting population of brown trout exists.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The block, of 52 310 ha, is about 20 km by 20 km. Of this, about 20% was classed in the survey of wilderness quality in Victoria (Preece and Lesslie) as being of Class 4 or higher wilderness quality. Very little was included in Class 5 or higher wilderness quality. Essentially unmodified catchments, excluding the one under review, comprise 8190 ha of the descriptive block. The largest area presently without roads or vehicular tracks is approximately 9000 ha.

Ecological Viability

The area's apparent low level of introduced species, its dissected topography, the history of scant modification or disturbance other than low intensity grazing, and the existence of several whole catchments that are essentially unmodified, all contribute the block's level of ecological viability. The relatively high remoteness from settlement and access values for much of the block would also contribute to its ecological viability. A number of major plant communities (six) occur.

The area has a high fire hazard, with one major bushfire (> 1000 ha) recorded since 1939 burning much of the block in 1952. Prescribed burning for fuel reduction, with emphasis

on protection of freehold lands to the east of the block, is carried out within the block. It is not conducted in alpine, subalpine, or riparian vegetation communities.

There are no specific control programs undertaken, other than occasional brumby running.

LAND-USE CAPABILITIES

Nature Conservation

The block has a high capability for nature conservation. It has a range of environments which have been little disturbed. These range from subalpine woodland and wet heaths to wet sclerophyll and riverine forests. They include a number of rare and significant plant and animal species such as the uncommon smoky mouse, the copper-tailed skink and undescribed plant species. The brush-tailed rock wallaby may also occur in the area. Grayling has been recorded in the Buchan River.

Significant geological and geomorphological features of the block are its contact exposures, fault-controlled scarps, stream channels, the river gorge at Reedy Creek chasm, exposures of Silurian and Ordovician sediments, faulted contacts, fossil sites, a complex entrenched meander on the upper Buchan River, exposures of a localised formation at Mount Seldom Seen, limestone and shale exposures at Native Dog Plain, and the nationally significant periglacial rock rivers at Mount Wombargo.

Recreation

The block has a high capability for bushwalking, inspiration and solitude. It also has a high to moderate capability for

other recreational pursuits, such as four-wheel-driving, sightseeing, fishing, horse riding and camping.

Natural features of particular interest include the undulating subalpine ridges, the steep rugged terrain falling into the Buchan River and, in particular, the steep escarpments, waterfalls, rapids and minor gorges on streams draining the plateau surrounding Reedy Creek, the Reedy Creek chasm, snow grass plains such as Forlorn Hope Plain, the rock rivers of Mount Wombargo and adjacent areas. The extensive Native Cat Tablelands, Mount Wombargo area and Mount Nunniong Plains have potential for cross-country skiing.

Some walkers use the block for both day trips and overnight trips. Mount Seldom Seen is a popular destination point, providing views into the Buchan River catchment. The Reedy Creek chasm, which is accessed by traversing untracked spurs from adjacent vehicular tracks and the untracked Mount Wombargo are also of special interest to walkers. High points on the Forlorn Hope and Native Cat Flat Tracks provide extensive views and together with the block's dissected topography and steep ridges and spurs contribute to the area's high capability for solitude and inspiration.

The Benambra-Black Mountain Road and the Nunniong Road on the block's boundaries are used for recreational driving (and by at least one commercial tour operator) and the steep vehicular tracks within the block provide challenging four-wheel-driving. Some vehicle- and horse-

based camping occurs on the edge of the block, with Native Dog Creek in the north being the most heavily used site. Mount Seldom Seen is accessible by two-wheel-drive vehicles and provides views across the Buchan valley.

The Bicentennial National Trail, which is a recently defined intra-state route linking Healesville to Cooktown (Queensland), traverses the block along the Native Cat Track. It is used primarily as a horse-riding route.

The headwaters of the Buchan River provide trout angling. Trout are also found in Limestone Creek.

Agriculture

The capability for development of public land for agriculture is generally low.

Altogether, five licence holders hold 9 licences over the public land of the block, with the whole of the block encompassed by current licences. Details of these licenced areas are included in Table 94, and the main areas grazed are shown on Map 15.

The block is important for grazing as summer range at the higher elevations and as winter range at the lower elevations. Average capability for bush grazing is moderate. Stock are moved into the area along vehicular tracks and roads on the block boundaries, as well as across the upper Buchan into the Forlorn Hope Plain area.

Apiculture

There is good subalpine honey flora on the Black Mountain Road and this country has good potential for honey production, but is little used because of its remoteness.

There are no licensed bee sites in the block.

Timber Production

Capability for hardwood production is high in the alpine ash and mountain ash stands. Alpine ash occurs around Mount Wombargo, at Mount Statham and the headwaters of Reedy Creek. The latter stands have been logged recently. Only limited areas on block's eastern margin are available for utilisation.

Mineral Production

There has been no recorded mineral or stone extraction in the area other than minor road gravel quarries near roads bounding the block. The block does, however, include a large area of Mitta Mitta volcanics, which contain good prospects for large-scale disseminated copper or lead deposits. Minor deposits of copper, chromium and marble have been identified on Limestone Creek.

Base metal mineralisation was identified in the Benambra area in the late 1970s and since then mineral exploration activity has increased considerably. The whole block has been encompassed by mineral exploration licences. Lead, zinc, silver and copper are the main minerals sought.

As at August 1989, one mineral exploration licence application covered the areas of State forest on the eastern edge of the block but has since been withdrawn. There are no other Mines Act tenements in the block.

Under existing tenure about 5% of the block is potentially available for mineral exploration or mining.

Water Production

The Buchan River has a high capability for water production, with reliable flows and high water quality. An off-take near Buchan provides township water supplies.

Table 94

PUBLIC LAND GRAZING

Ref. No.	Licensee	Main vegetation type grazed	Approx no of stock carried	Comments
F1 - 5052	H.L. Pendergast	Snow gum woodland	250 head	Part only, remainder in block 15
L5 - 21/130	J.K. Rogers	Snow gum woodland	See note 1	Part only, remainder in block 15
L9 - 92/130	D.C. & J.K. Rogers	Snow gum woodland and montane sclerophyll forest	See note 1	Part only, remainder in block 15
L7 - 193/130	J.K. Rogers	Mainly snow gum woodland	50 head	
L6 - 58/130	J.E. Hollands & M.J. Pendergast	Snow gum woodland	20 head	Part only, main area outside block
L8 - 133/130	D.C. & J.K. Rogers	Montane sclerophyll woodland	See note 1	
L13 - 106/130	C.W.A. Moon	Montane sclerophyll woodland	200 head	
L14 - 217/130	Meringo Pty Ltd	Snow gum woodland	150 head	
L15 - 99/130	Meringo Pty Ltd	Snow gum woodland	210 head	Part only, main area outside block

Note:

1. These licences, including an additional licence area to north of the block, carry 350 head.

Table 93
ROADS AND TRACKS

Ref. no. (Map 15)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major road	Minor road	Vehicle track				
1	Black Mountain--Benambra Road	*			Shire	PA	Closed when snow	Boundary only
2	Native Cat Track			*	CFL	CM, FP, R	Seasonal closure	
3	Forlorn Hope Track			*	CFL	CM, FP, R	Seasonal closure	
4	Wombargo Track			*	CFL	FP, R	Seasonal closure	Boundary only
5	Sugarloaf Track			*	CFL	FP, R	Seasonal closure	
6	Seldom Seen Lookout Tk			*	CFL	FP, R	Nil	
7	Seldom Seen Track			*	CFL	FP, R	Nil	Boundary only
8	Bald Hill Road		*		CFL, Shire	F/h, FP, L, R	Seasonal closure	Boundary only
9	Mundy Plain Track			*	CFL	FP, R	Seasonal closure	
10	Diggers Hole Track			*	CFL	FP, R	Seasonal closure	Boundary only
11	Reedy Track			*	CFL	FP, R	Seasonal closure	
12	Diggers Hole Road		*		CFL	L, FP, R	Seasonal closure	Boundary only
13	Brumby Point Track			*	CFL	CM, FP	Seasonal closure	
14	Jam Tin Flat Track		*		CFL	FP, R, L	Seasonal closure	Boundary only
15	Nunniong Road		*		CFL	R, MA, L	Part subject to seasonal closure	Boundary only

KEY:

CM - Cattle Management	MA - Mine Access
F/h - Freehold Access	PA - Primary Access
FP - Fire Protection	R - Recreation
L - Logging	

BLOCK 18 : RODGER RIVER -- BOWEN

Location and Boundaries

This block covers 175 020 ha of the Snowy River catchment to the north-east of Buchan (see Map 10). It is within two municipalities - the Shires of Orbost and Tambo, east and west of the Snowy River respectively.

The northern and eastern boundaries follow major roads - part of the Buchan-Jindabyne Road, the Deddick River Road and the Bonang Highway. Tulloch Ard Road, along the Snowy River's western catchment divide, forms the block's western boundary, and forestry tracks on minor catchment divides delineate its southern boundary.

Tenure and Land Use

Most of the block is either included within the Snowy River National Park or is State forest. Three reference areas also occur within the boundaries of the national park and there are a number of other minor reserves.

Freehold lands are mainly on the margins of the block, but two are freehold inliers (at Jackson's Crossing and another near Wulgulmerang).

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 95 (see page 267) and the boundaries of the different land uses are shown in Map 11.

Relevant Planning Policies, Strategies and Management Plans

The Minister for Conservation, Forests and Lands has stated in Parliament that there will be no logging in the Good Hope and Swamp Creek catchments pending the outcome of the Land Conservation Council wilderness investigation and the government's World Heritage studies and any subsequent nomination.

The Victorian Rainforest Conservation Policy, as described in 'Victoria's Rainforests: An Overview' (DCFL undated) is applicable to the protection of rainforest within the block. Management guidelines for these areas comprise features such as exclusion of resource utilisation activities and fuel-reduction burning, restriction of recreation, and minimisation of roads. Additionally, the State Conservation Strategy (Vict Govt 1987) states that all rainforest will be protected from logging and other disturbances.

Much of the area was included in two of the five tourism planning units ('hubs') designated in the Far East Gippsland Tourism Strategy. The main competitive tourism strengths of the Buchan and the Upper Snowy River 'hub' included the splendour of the Snowy River and the Mackillop Bridge area, along with the wild, undeveloped nature of the river valley, Little River Gorge and Little River Falls, plus rafting and canoeing. The second, part of the Errinundra Plateau and Tall Forests 'hub', was based on competitive tourism strengths which took into account their sense of remoteness and the tallness of their forests. Relevant actions included

upgrading selected access and providing some additional facilities.

A management planning exercise has been initiated for the Snowy River National Park with a draft management plan due to be released in late 1990.

The State forests of the descriptive block are mainly within the East Gippsland Forest Management Area. A forest management plan is presently being prepared for this area. A draft management plan is scheduled for release in July 1990.

Part of the block is covered by the Bairnsdale fire protection plan. This is proposed to be placed on public exhibition in the near future. The draft fire protection plan for the Orbost region of the Department of Conservation, Forests and Lands also covers this block. Public submissions to this plan are presently being considered by the department. The main elements of the draft plan affecting the block are a strategic fuel-reduction burning corridor (Priority 2 burning zone) which has been proposed along the Rodger River and Mountain Creek to Mount Bowen and another which extends into the south-east corner of the block. Other than fire-sensitive areas of vegetation and reference areas, the remainder of the block is within general burning zones (Gelantipy Plateau - Priority 3, elsewhere - Priority 4). A number of new roads, helipads and water points are to be constructed, mainly within the Mountain Creek catchment or on its divide.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Victoria also apply.

Physical Setting

The whole of the block is part of the dissected uplands geomorphic unit of the East Victorian Uplands. Major geomorphic features are isolated remnants of the Monaro Tablelands (the Bowen Ranges and the Gelantipy Plateau) and eastern fall of the Wulgulmerang Tablelands. These elevated areas are generally between 600 to 900 m above sea level, with small areas in the north at Mounts Gelantipy, Tower, Bowen and Monkeytop rising above 1200 m.

Much of the land east of the Snowy River is on Ordovician sediments and is highly dissected with steep slopes. Land on granitic rocks such as Campbells Knob, Mount McLeod and around Gattamurgh Creek also tends to be steep but is less dissected.

Snowy River volcanics occur along the western margin of the block from Murrindal to Wulgulmerang and on the eastern side in the Rodger River and Mountain Creek catchments.

Limestones and calcareous mudstones, including the Buchan Caves Limestone, occur along the Snowy River at New Guinea (New Guinea Ridge and Jackson Crossing) and at the Basin. Groundwater solution has formed caves in these areas, with subsidence and surface drainage forming sink holes of various sizes.

The block is entirely within the Snowy River drainage basin. The major stream systems of Mountain Creek, Rodger River, Yalmy River and Serpentine Creek are all controlled by local geology and flow westward to the Snowy River. These watercourses have steep gradients and waterfalls, cascades and gorges. Smaller streams north of the Gelantipy plateau are north-flowing tributaries of the Deddick River, which, in turn, is a major tributary of the Snowy River.

The Snowy River occupies the dominant valley and is deeply incised. It has formed a long deep gorge that cuts into the bedrock, particularly in Snowy River volcanics such as the Tulloch Ard Gorge north of the River's confluence with Mountain Creek.

Biological Setting

Sclerophyll forests, both dry and wet, occupy the largest proportion of the block. The dry sclerophyll forests have an overstorey of red and white stringybark, broad-leaved peppermint, silvertop, mountain grey gum and, in areas such as the Gelantipy plateau, blue gum. Wet sclerophyll forests and patches of montane forest occupy more protected areas of higher rainfall and deeper soils. These tall open forests occur throughout the Rodger and Yalmy catchments, in the Bowen Range and on the margins of the Gelantipy Plateau. The overstorey is dominated by messmate and alpine ash respectively and in the Rodger catchment there are mature multi-aged stands of mountain ash. The understoreys typically have a well-developed tall shrub layer.

A wide range of other plant communities are also found in the block. They include rain-shadow woodland in the Deddick Valley and along the Snowy River, and small patches of rocky outcrop open scrubland on the dry slopes of New Country Creek and the Snowy River. Snow gum woodlands occur on the higher peaks, such as Mount Bowen.

Impressive riparian forests border the Rodger, Yalmy and Snowy Rivers, with isolated patches of warm and cool temperate rainforest. Areas of lowland sclerophyll forest occur on the block's southern margin, with silvertop and white stringybark being the common overstorey species. Understoreys are mainly heathy.

The wide range of vegetation communities provides a diversity of habitat for a wide variety of fauna, including many species of ground-dwelling and arboreal mammals, and a large number of bird and reptile species. Several rare or otherwise significant species of fauna such as large predators, that apparently depend on large natural areas, have persisted in the Block. Each of the major rivers of the block includes a range of nature fish.

Cultural Setting

At least two distinct Aboriginal groups, one based on the coast and the other on the Monaro region of New South Wales, occupied the area. Recorded archaeological evidence of Aboriginal occupation is restricted to sites on the Snowy River near its confluence with major tributaries, and an important site at the New Guinea Caves. Further survey work, in the Snowy River and Rodger-Bowen areas, is presently being undertaken by the Victoria Archaeological Survey.

The early pastoral runs (of the late 1830s and 1840s) were large and it was only after the goldfields were discovered near Bonang, Goongerah Creek and, in particular, around Bendoc in the 1860s, that settlements began to take shape. Silver-lead deposits were found and worked in the Mount Deddick area. Agricultural development gradually followed the pastoralists and gold miners, but was concentrated along the major river valleys, such as at Goongerah or on the tablelands around Bonang and Gelantipy.

Most of the original transport routes were to the north of the block and linked Omeo and the Deddick Valley with the Monaro Tablelands and Eden. In 1868 a track was cut between Bonang and Goongerah and extended to Orbost in 1878. From the 1890s until the 1920s, a government punt provided access across the Snowy River at what is now known as McKillop Bridge. Other crossings were at Campbell's Knob and Jackson's Crossing.

It was not until the late 1890s that land was selected in the block when families settled on the lower reaches of the Rodger and Yalmy Rivers, including Jackson's Crossing, and further south along Raymond Creek. These areas were cleared and used for cattle and sheep production. A school was built at Jackson's Crossing in 1911 and honey was produced on the property on the Rodger River near Mount Tabby in the early 1900s. Most of the properties were, however, largely unsuccessful due to the rugged inhospitable nature of the country, its remoteness and lack of finance to support the farming enterprises.

The Bonang Highway was constructed by the Country Roads Board in the 1920s, and the railway line was extended to Orbost.

Most of the block, however, was used mainly for forest grazing and parts were burnt to promote feed until after the 1939 bushfires and the Second World War. After the war the track network was expanded, firing practices restricted and logging activities extended into the block.

More recently, recreation has become increasingly popular, with most activity focusing on the Snowy River which is used for camping, canoeing, rafting and fishing.

WILDERNESS QUALITY

Substantial areas of the block are of high wilderness quality. Indeed, it contains one of the largest areas of high wilderness quality in eastern Victoria, and the largest in East Gippsland. Much of the catchments of Mountain Creek, New Country Creek, Rodger River, Yalmy River and Raymond Creek were classified as Class 4 or higher total wilderness quality in the Preece and Lesslie survey (1987) with the areas of highest wilderness quality identified the centre of the block near Mount Joan and further south in the vicinity of the Rodger River Track.

The Feller et al. (1979) inventory identified a wilderness ('Snowy River') which covered the Mountain Creek and the Rodger River catchments and parts of the Snowy River valley.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The block is bounded by settled (cleared) land on its northern, and much of its western margins, with small, permanently occupied, inlier blocks on the Little River ('The Farm') and at Jackson's Crossing.

The settled land of the Wulgulmerang tablelands, Bonang, Deddick River (Tubbut) districts, and along the Brodribb River at Goongerah, are the main influences on values within the block. Farming properties at Jackson's Crossing, the Basin, 'Mooreford's Land', at Sardine Creek, ('Feltis Farm') and 'Malinns' are the main influences on values in the south. These areas are mainly cattle properties, other than in the Deddick River valley where sheep for meat and wool are raised as well.

These influences have resulted in the highest value areas as recorded by Preece and Lesslie being found in a large consolidated block centred on Mount Joan. The descriptive block includes one of the five areas within East Gippsland that were recognised by Preece & Lesslie (1987) as being in the highest class of remoteness from settlement.

Many of the freehold properties still retain uncleared native bush. In particular, substantial areas of freehold land remain naturally vegetated in the Deddick River valley. There is thus potential for the boundary of the cleared land to change in the future, with a consequent lowering of remoteness from settlement values.

Remoteness from Access

Remoteness from access values are high - as there are large distances between the roads bordering the block and relatively few internal tracks. Values are lowest south of Yalmy Road and around the edges of the block.

The roads forming the block's western, northern and eastern boundaries - the Tulloch Ard Road, Buchan-Jindabyne Road, Deddick River Road and the Bonang Highway - are major influences on values. A number of minor, mainly forestry, roads within the block are also a significant influence on values, particularly the Yalmy Road which traverses the centre of the block. A number of minor roads in the south-west of the block (Paradise Ridge Road, Malinns Track, 36-mile Road, and Aberdeen Road) were recorded as lesser (four-wheel-drive) tracks by Preece and Lesslie and accordingly the values recorded in their vicinity are over-rated.

Vehicular tracks within the block are generally of four-wheel-drive standard and usually follow ridgelines. Many were established during the 1950s for fire protection, with more recent tracks in the eastern half of the block made for timber harvesting. Most have no restrictions on use, although some are subject to seasonal closure. The Deddick Trail bisects the northern half of the block.

Currently there are 150 km of trafficable roads within the descriptive block. The middle reaches of Mountain Creek are the largest of only two areas in East Gippsland more than 10 km from a major or minor road, with the Tulloch Ard gorge area of the Snowy River one of the few in East Gippsland more than 3 km from any vehicular access. All tracks and roads of the block are listed in Table 96 (see page 268), and their locations shown on Map 16.

The only walking tracks that have been constructed are in the McKillop Bridge and Raymond Falls areas.

Aesthetic Naturalness

Very few structures exist within the natural lands of the block and most are on the block boundaries. These are listed in Table 97 and their locations shown on Map 16. They include a number of minor relics of historic interest.

Nevertheless, Preece and Lesslie (1987) generally recorded low values for aesthetic naturalness, largely as a consequence of the road and track network. Values were generally highest along the major creek and river valleys, with the highest values recorded in the lower Mountain Creek and New Country Creek catchments. These were among the few areas in East Gippsland to record moderately high aesthetic naturalness values in the survey.

A number of helicopter pads have been constructed and are maintained, mainly in the north of the block, and a number of fire dams have been built in the upper reaches of Minchin Creek on the Bowen Track.

Biophysical Naturalness

Most of the block has very high biophysical values, and the area east of the Snowy River was allocated to the highest class (Class 4) of biophysical naturalness in the Preece and Lesslie survey. This section comprises one of the largest single areas of very high biophysical naturalness they recorded in Victoria.

Values were, however, significantly lower on the block's south and south-eastern margins. This is because of timber production in these areas. Recent logging south of the Yalmy Road would further extend these areas of lower value.

Land-use Indicators of Biophysical Naturalness

Large grazing leases and licences covered much of the descriptive block from the 1880s until the 1970s. Much of the licenced area was, however, only marginally suitable for such use and grazing intensity is likely to have been low. Licences were still current over areas on the Gelantipy Plateau and on the southern edge of the block south of Raymond Creek until recently, with a small area presently grazed in north-west around Little River in 1991.

The major intensive use within the block is timber production. Most logging to date has been along the Tulloch Ard Road on the western edge of the block and along its eastern edge around Mounts Pinnak and Sardine, along the Little Yalmy River and south of Bonang. More recently, small blocks have been logged in the catchment of the Yalmy River. All areas known to have been logged are shown on Map 16.

Mineralised zones bearing silver, lead, zinc and copper have been worked near Mount Deddick, at Accommodation Creek (south of Tubbutt) and in the Snowy River Gorge near Campbell Knob. Small copper lodes have also been worked at Sardine Creek. Minor alluvial field and reef mines were worked south of Cabanandra and around Bonang. There are a few road gravel quarries, most being near the major roads bordering the block.

Table 97
PUBLIC LAND STRUCTURES

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
1	Deddick Silver Mine	Hut ruins Shafts	CFL	H	
2	Waratah Flat Campsite	Toilet	CFL	R	
3	Logging Depot	Hut	CFL	MP	
4	Hicks Camp	Tin hut, caravan toilet	CFL	MP	
5	Rodger River Homestead	Ruins, stockyard	CFL	H	Established by Hicks family 1890s.
6	Raymond Falls Picnic Ground	Fireplaces, tables	CFL	R	Also walking access to waterfalls
7	Balley Hooley Camp	Picnic tables, toilets	CFL	R	
8	-	Electricity supply distribution line	SEC	U	
9	Mt McLeod Tower	Fire tower	CFL		
-	Deddick River, Rodger River, Snowy River and Brodribb River gauges	River gauging stations (7)	Rural Water Commission	U	
-	Mt McLeod and Mt Joan Trig. Points	Trigonometric station	Dept. Property and Services	U	

KEY:

- H - Historic Interest
- MP - Management Purposes
- R - Recreation
- U - Utility

Notes:

1. Trig. and river gauging stations are shown on Map 16 by symbol.

Other Indicators of Biophysical Naturalness

The block was covered by a study of nature conservation values of rivers and streams (Macmillan 1987) and large areas were identified as being essentially unmodified catchments. They were Mountain Creek, New Country Creek, the upper Rodger River, Serpentine Creek (since re-classified to a lower value) and Riddle Creek and the smaller catchments of, in the north, Stony Creek, (since re-classified to a lower value) the headwaters of Munchin, Accommodation, Running, Home and Swamp Creeks, and, further south, Cattle Creek, Wrong Creek, two unnamed tributaries near the mouth of the Rodger River, and Musk and Cavender Creeks, and upper Raymond Creek. The status of the Serpentine, Stony and Brown Creek catchments are being reviewed however.

Timber resource information indicates that about 77% of the ash type forest, 93% of the mixed species forest and all of the durable species forest consist of mature stands.

Forbes et al. (1981) included much of the block within two large sites of national botanical significance. The Upper Snowy River site includes all of the block north of the Mountain and New Country Creek divide. Its significance was based on the rich variety of montane forest, wet sclerophyll forest and associated forest types in an

undisturbed state in its eastern section, and excellent examples of dry vegetation types in its western section, together with the presence of endemic and rare species and important biogeographic records. The Central Snowy River site included the Yalmy and Rodger River catchments and the Snowy River to its confluence with the Buchan River. Its significance was based on its unusual development of wet forests, the peculiar flora associated with the Snowy River, and the close association of dry woodlands and forests. Most communities sampled had a low weed content.

The Little River Gorge area, in the north-west of the block, together with the northern fall of the Gelantipy Plateau, was included in a site of State zoological significance, covering the Upper Snowy River Valley as defined in Norris and Mansergh's (1981) study of East Gippsland. The Little River Gorge area was particularly significant due to the presence of the brush-tailed rock wallaby.

A parish-based survey (Nolan 1981) indicated that the central part of the block was considered to be more or less rabbit free. Sections west of the Snowy River, in the south-east, and north, however, have frequent or permanent rabbit problems.

Detailed surveys of fauna and flora have been undertaken for a small part of the block encompassing the upper Rodger River (Chesterfield et al. 1983) and the Yalmy River

catchment (Opie et al. 1984). These studies indicated the presence of numerous significant species of fauna, including a diverse bat fauna, the long-footed potoroo, five arboreal gliders and the tiger quoll, (all of which are particularly sensitive to habitat disturbance). The studies also indicated little evidence of disturbance and recorded the presence of a number of bird species that are known to be sensitive to disturbance, all of which require tree hollows in mature trees and large home ranges. The bird species include the powerful and sooty owls, gang-gang cockatoo, yellow-tailed black cockatoo and the Australian king parrot. Cats, dogs or dingos, rabbits and foxes were all recorded, however. Waratah Flat was the only site which recorded introduced species of birds (starlings and blackbirds).

The plant communities recorded in the surveys of the Yalmy catchment all had low to negligible levels of weeds. The riparian plant communities had only 6% weeds although a higher number of exotic species were found in the Rodger survey area. The Yalmy survey report also designated a number of sites of significance totalling 925 ha. These sites included representative stands of vegetation communities of particular significance and rain forest areas.

Infestations of blackberry occur on the Snowy River and along Mountain Creek. Sambar Deer have also been noted within the block. No introduced fish have been recorded in the Rodger, Yalmy or Deddick Rivers or in Serpentine Creek, although brown trout are in the other major watercourses.

OTHER ATTRIBUTES

Size

Block 18 is of 175 020 ha in area (about 40 km by 50 km). Of this, over 40% was classed in the survey of wilderness quality in Victoria (Preece and Lesslie 1987) as being of Class 4 or above wilderness quality, and approximately 20% of Class 5 or higher wilderness quality. Essentially unmodified catchments, excluding those under review comprise 40 465 ha of the descriptive block. The Mountain Creek catchment is the largest essentially unmodified catchment in the State. The largest area presently without roads or vehicular tracks, the lower Mountain Creek catchment, covers an area of about 10 500 ha.

Ecological Viability

The extensive areas of high biophysical naturalness, the low levels of exotic plant and animal species recorded, and the many essentially unmodified river catchments all contribute to the ecological viability of the block. The block also has a range of plant communities, 12 in all.

Lightning strikes occur frequently in the drier western parts of the block and fires started there can threaten settled areas, such as in the Tubbutt and Bonang valleys. Fire hazard is lower in the wetter areas further south, but increases again towards Orbost where lowland sclerophyll forest predominates. Only one major (greater than 1000 ha) bushfire has been recorded in the block since a major fire burnt the north-eastern corner of the block in 1939. It burnt more than 50 000 ha of the block in 1952 (see also Map 8).

Fire protection measures include prescribed burning which is carried out in the areas of higher fire hazard and to the west

of Goongerah. Wet forest communities are not covered by prescribed burning. The rugged terrain and limited access reduces the effectiveness of fighting wildfires and, as previously noted, a number of helipads have been constructed and maintained. No firebreaks have been constructed or maintained.

Blackberries are regularly controlled and wild dogs are trapped throughout the block. It may be necessary to reduce fox numbers to retain populations of the tiger quoll, brush-tailed wallaby, and the long-footed Potoroo. However, use of poison baits and traps may threaten all species. Phytophthora fungus has caused extensive dieback of eucalypts in the south of the block in the Mooresford Road area.

LAND-USE CAPABILITIES

Nature Conservation

The block's nature conservation values are high because of the diversity of vegetation and habitats. The essentially undisturbed nature of much of the land is an integral part of its conservation value as well as an enhancement for the other values.

Special values include the mature and multi-aged mountain ash stands in the Rodger catchment and other mature wet sclerophyll forests on the Gelantipy Plateau and Rodger catchment (with stands up to 350 years old), rare plants such as spinning gum on Mounts Bowen and Tower and others particularly in Snowy River Gorge, rare animals such as the brush-tailed rock wallaby and tiger quoll, and geological and geomorphological formations including the karst landforms of the Basin and the New Guinea area, and the whole of the Snowy Gorge.

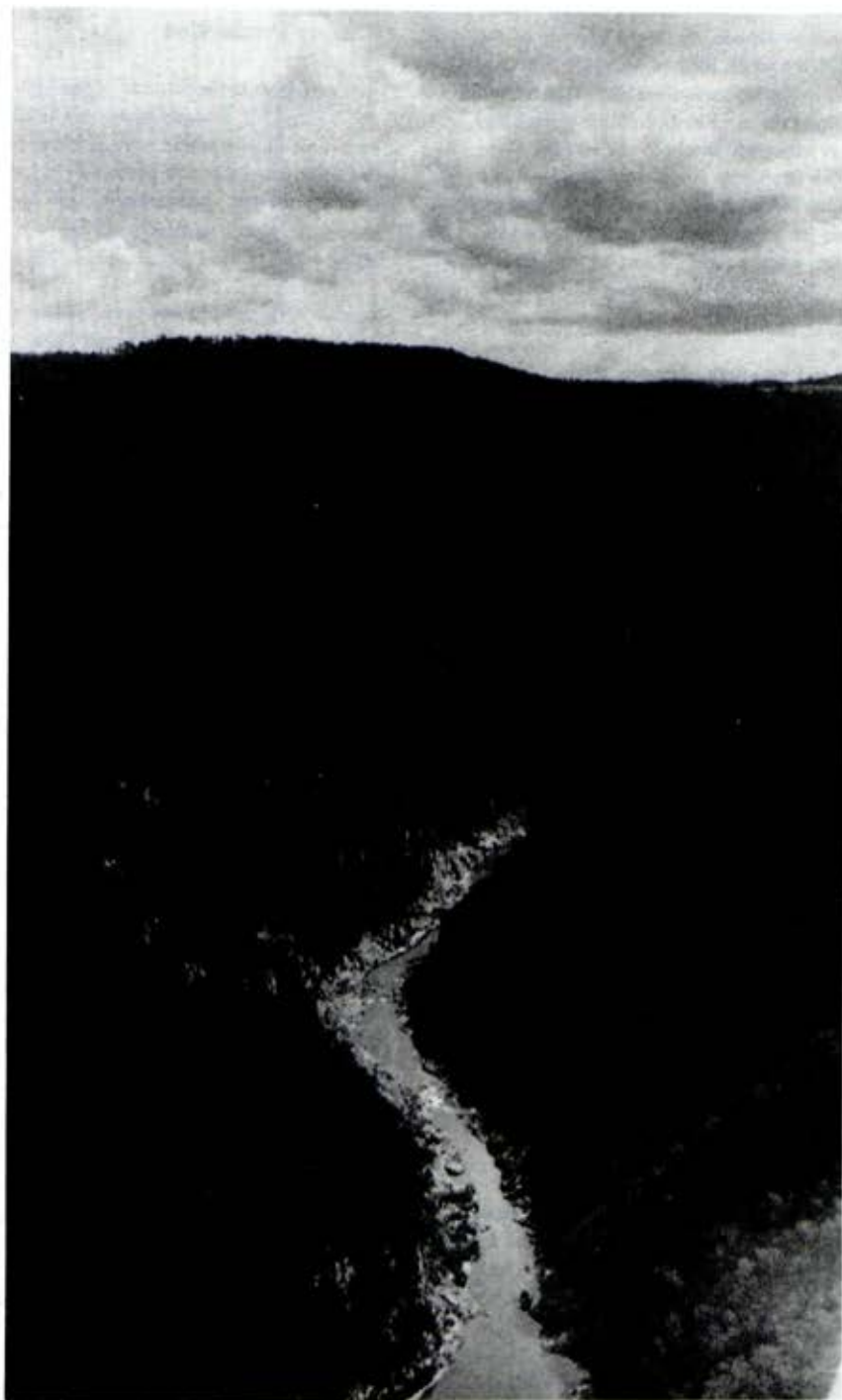
The Deddick, Yalmy, Rodger and Snowy Rivers include a diverse range of native fish. The Snowy River contains the vulnerable grayling.

Recreation

The block has a very high capability for walking (particularly overnight bushwalking), swimming, canoeing, rafting, kayaking, caving, pleasure driving, four-wheel-driving and nature study. It has a very high capability for those seeking solitude and inspiration.

The block also has some capability for fossicking, rock climbing, fishing, cross-country skiing, and for those seeking features of cultural interest. The Snowy River valley is presently the focus of most recreational activity.

Natural features of particular interest include: the area's diverse vegetation communities, especially the tall mature forests of the Gelantipy Plateau and the Rodger and Yalmy Rivers; the warm temperate rainforests on Riddle, Scanlon and Martin Creeks, as well as rarer communities and species such as the rocky outcrop open shrublands on the Snowy River, the Waratah Flat grassland; spinning gum on the Bowen Range, and the gorges and associated rapids and waterfalls of the Snowy (notably the Tulloch Ard gorge section), Little, and Rodger Rivers, Boundary and Currie Creek, and the smaller cascades and gorges of Mountain Creek; the waterfalls on Raymond Creek, Minchin Creek, Basin Creek, Running Creek, and the 300 m high falls on Wulgulmerang Creek.



Tulloch Ard Gorge on the Snowy River

Major peaks and ridges include the conical Campbell Knob, Mount Tower (1280 m high), the flat-topped Mount Bowen (1260 m) and Monkey Top, the Moonkan Divide, Bowen Range, and the isolated Gelantipy Plateau. Karst landforms occur in the south-west of the block and cave formations of special interest occur in the New Guinea Ridge area, Jacksons Crossing and the Basin.

The section of the Snowy River within the block has outstanding scenic values and wild river recreation opportunities providing probably the most popular canoe trip

in Victoria for experienced canoeists. It has four major gorge sections, rapids, and sandy beach camp sites. River levels fluctuate throughout the year and, although usually always canoeable, it is most often used in summer. Some of the rapids are very difficult (Grade 4 and 5). Canoes are usually put in at McKillop Bridge to the north of the block, with the major egress point at Balley Hooley camp in the south of the block.

Many of the walking routes within the block are along vehicular tracks and include those following the Bowen

Range, along the Moonkan Divide, the lower reaches of the Rodger River, and shorter walks around Waratah Flat and McKillop Bridge. Walking opportunities for experienced people occur mainly along the river beds and into gorges and waterfalls such as occur along Mountain Creek and the lower Rodger River, or rock hopping along the Snowy River. Walkers also traverse untracked spurs to gain views along the Snowy Valley or enter its gorges, or to gain access into the Little River Gorge. Off-track walking in the wet sclerophyll forests is limited by dense understoreys and the sensitive riparian understoreys are susceptible to trampling.

The Deddick River Road, although narrow and winding, is a popular scenic road and provides access to camp sites on the Snowy River at McKillop Bridge. It also leads to the spectacular Little River Gorge whose walls rise more than 500 m. The Buchan–Murrindal Road and the Bonang Highway also offer very scenic drives. The recently upgraded Yalmy Road now gives good dry-weather access to many of the short walking routes into the Rodger River forests. It is a pleasantly scenic forest drive in its own right. (Paradise Ridge and Pinnak Road are essentially logging roads, but also provide access for recreation.) The vehicular track access to Raymonds Falls is experiencing increasing use. A number of the minor roads in the south-east are, however, used by logging trucks which limits recreational enjoyment.

There is some four-wheel-drive use of the area, notably along the Deddick Trail and the Waratah Flat track, and this appears to be increasing. Little horse riding is undertaken in the block. The Snowy River Gorge is popular with gemstone prospectors and anglers.

A number of commercial tours operate within the block, most of which focus on rafting and canoeing expeditions on the Snowy River downstream from McKillop Bridge. Trail riding is also offered by commercial operators in the south. Bushwalker and canoeist transport is also provided by some companies.

Agriculture

Capability for agriculture is low because of steepness, although areas of gentler slopes have moderate potential for agriculture. Wild dogs are an ongoing problem particularly adjacent to the Deddick Valley. Capability for grazing stock within the forest varies widely but is usually only moderate. This use is precluded from those sections within the Snowy River National Park east of the Snowy River and with the small area presently grazed to the west of the Snowy (reference grazing block 11-414/130 to Rogers) is to be phased out by 1991.

Apiculture

There are useful honey flora species within the block, but fires and phytophthora have reduced the productivity of the area. While parts have road access, they are not used. A number of licensed bee sites are thought to occur.

Timber Production

The extensive timber stands of the Gelantipy Plateau, and in the Yalmy and Rodger River catchments, have high to very high timber production values; they are more moderate in the drier forests in the south. Principal commercial species are alpine ash, brown-barrel, mountain ash, messmate, mountain gum, silvertop, white stringybark and yellow stringybark.

Timber extraction is not permitted in that part of the block within the Snowy River National Park.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 176 ha of ash species forest, 30 ha of durable species and 34 611 ha of mixed species forest (including 7 ha in once-only logging areas).

The descriptive block lies within the East Gippsland Forest Management Area. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands but was not available for publication.

Mineral production

Silver, lead, zinc and copper occur near Mount Deddick, south of Tubbut, in the Snowy River Gorge near Campbell Knob, at Raymond Creek and towards Buchan. Gold has been found south-west of Cabanandra, manganese near Jackson Crossing and zinc, lead and limestone in the Basin. A number of minor road-gravel and limestone quarries operate including those on Mount Pinnak, the large Malinns Gravel Pit and minor pits on the Yalmy Road. Copper was mined at Accommodation Creek between 1959 and 1971.

In recent years there has been much exploration activity throughout the block, including extensive exploration around Accommodation Creek. No commercial mining, however, has resulted. As at August 1989, one exploration licence (EL 2129) to CRA Exploration Ltd. at Wulgulmerang is within the block. An exploration licence application current in August has subsequently been withdrawn.

Under existing tenure, about 44% of the block is potentially available for mineral exploration or mining.

Water Production

Much of the block receives high rainfall, with most runoff flowing into the Snowy River. There is, however, a significant decline in rainfall towards the west of the block. Water production potential from the Snowy's tributaries within the block is moderate. Much of the water flow from the Snowy River's headwaters (in New South Wales) is diverted into the Snowy Mountains Hydro-electric scheme and from there, into the Murray River, thereby reducing downstream flows and altering streamflow patterns.

Table 95

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL

Land Use	LCC Reference	Approx. area (ha) within block	Planning scheme control	Special Provisions ⁸
National park	A3, A4, A5, ⁴ A4, A12 (Snowy River)	94 990 ⁵	Rural 'A' Zone, ⁷ balance of shire ⁶ blanket control	All logging, except in indicated once-only logging areas, no hunting or use of firearms, and grazing to be phased out by 1988 east of the Snowy River and by May 1991 west of the Snowy River. Management plans are to give particular attention to the protection of the brush-tailed rock wallaby and honey production and legal access to freehold within park to continue to be available. ³
Reference area	B2, B3, B44 (Gelantipy Plateau, Mountain Creek, and Zig Zag Creek)	2 550	Balance of shire ⁶ blanket control	Nil
State forest	E1 ⁴ E15 ⁴ I ⁵ , I1 ⁵	5 615 Minor	Balance of shire ⁶ blanket control Rural 'A' Zone ⁷	Specified recreation, landscape and nature conservation values to be protected. To be used to conserve rainforests. Specified recreation and landscape, nature conservation and historic sites to be protected.
Hardwood production ⁹	F6 ² (Black Satin Ck)	2 680	Rural 'A' Zone ⁷	Environs of the Basin Creek waterfalls should be protected.
Uncommitted ⁹	U1 ²	460	Rural 'A' Zone ⁷	Nil
Scenic reserves	M1, M4, ⁴ (The Gap and Martins Creek)	260	Balance of shire ⁶ blanket control	Recommendation M4 subject to review by investigation of rainforest.
Water frontage reserves	I1 ⁴	-	Balance of shire ⁶ blanket control	Nil.
Cave reserve	M2 ²	4	Rural 'A' Zone ³	Nil
Agriculture - (Deddick R/Bonang, Lucas Pt, Goongerah, Sardine Ck, Wulgul- merang, Basin Ck, Gelantipy, Tulloch Ard, Jackson Crossing)	Not applicable	17 930	Balance of shire ⁶ blanket control ⁷ rural 'A' zone	

Notes:

1. LCC Alpine Area Review Final Recommendations 1979
2. LCC Gippsland Lakes Hinterland Area Final Recommendations 1983
3. LCC Alpine Area Special Investigation Final Recommendations 1983
4. LCC East Gippsland Area Review Final Recommendations 1986
5. Includes 3340 ha added by Governor-in-Council (15/12/87) in addition to LCC recommendations, and a small area at Lucas Point external to block.
6. Shire of Orbost Planning Scheme.
7. Shire of Tambo Planning Scheme.
8. Specific provisions relevant to area in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).
9. The hardwood production and uncommitted categories have been included within State forest in more recent LCC publications, and are managed as one unit.

Table 96

ROADS AND TRACKS

Ref. no. (Map 16)	Road or track name	Distances (km)		Vehicle track	Management response	Management purpose	Present restriction ¹	Comments
		Major road	Minor road					
1	Buchan--Jindabyne Road	*			CFL/Roads Corp	PA, FP		Boundary only
2	St Helena Track			*	Shire/CFL	F/h, FP, PSC		
3	Round Hill Track			*	Shire	F/h		
4	Deddick River Road	*			Roads Corp	PA		Boundary only
5	Unnamed							
6	Deddick Trail			*	CFL	FP, R		
7	Musk Creek Track			*	CFL	FP	Part regenerated	
8	Mackinsons Spur Track			*	CFL	FP		
9	Waratah Flat Road		*	*	CFL	FP, R		
10	Postman's Spur Track			*	CFL	FP		
11	Bowen Waratah Link Track			*	CFL	FP		
12	Bowen Track			*	CFL	FP		
13	Colling Road		*	*	Private/CFL	F/h, FP, PSC	Part private	
14	Fire Trail			*	CFL	FP	MVO	
15	Willis Road/Reeds Tk		*	*	CFL	F/h, FP, PSC, P	MVO	
16	Basalt Hill Track			*	Private	F/h		
17	Clem Track			*	Private/CFL	F/h, PSC	Private/MVO	
18	Warm Corners Track			*	Private/CFL	F/L, FP	Private	
19	Mountain Creek Dead End			*	CFL			
20	Warbisco Track			*	CFL	F/h, FP	Private/MVO	
21	Bowen Link Track			*	CFL	FP, PS		Also important for search and rescue
22	Monkey Top Track			*	CFL	FP, R, PSC		
23	Minchin Trail			*	Private/CFL	F/h, FP, PSC		
24	Rising Sun Road		*		CFL			
25	Bonang Highway	*			Roads Corp			Boundary only; a mainly 7 m wide gravel declared highway; minor curve improvements proposed
26	Story Creek Track			*	CFL			
27, 28	Old Bonang Hwy (north)			*	CFL			
29	Sun Track			*	CFL			
30	Aberdeen Rd		*		CFL			
31	Mt Jersey Rd		*		CFL			
32	Toad Track			*	CFL			
33	36 Mile Rd		*		CFL			
34	40 Mile Track			*	CFL			
35	Ironbark Track (part)			*	CFL			
36	Martins Creek Track			*	CFL			
37	Old Mill Track			*	CFL			
38	River Track			*	CFL			
39	Little Yalmy Sideout			*	CFL			

40	Yalmy Trail		*	CFL			
41	Little Yalmy Trail		*	CFL			
42	Serpentine Track		*	CFL			
43	Serpentine Link Tk		*	CFL			
44	Malinns Track	*		CFL			
45	Scanlon Creek Road		*	CFL			
46	Paradise Ridge Rd	*		CFL			
47	Old Bonang Hway (south)	*		CFL			Boundary only - sealed at Bonang
48	Mt Watt Track		*	CFL			Boundary only
49	Pinnacle Road	*		CFL			
50	Yalmy Road	*		CFL	R,L,FP		Part Boundary
51	Lightning Track		*	CFL			Formerly mine access
52	Varneys Track						
53	West Track		*	CFL	FP		
54	Zig Zag Track						
55	Joe Creek Track		*	CFL	L		
56	Garnett Track		*	CFL	PSC		Boundary only, proposed logging access
57	Moresford Road	*	*	CFL	F/h,R		Boundary only
58	Old Basin Road		*	CFL	F/h		
59	Balley Hooley Road	*		CFL	R		Boundary only
60	Basin Road	*	*	Shire	F/h		
61	Mt McLeod Tower Road	*					
62	Tulloch Ard Road	*		CFL	F/h,FP		Boundary only, former logging access
63	Jacksons Crossing Track		*	CFL	F/h,R		
64	Running Creek Track		*	CFL			
65	New Guinea Track		*	CFL	R,FP	Seasonal closure	Four-wheel-drive
66	Betts Creek Track		*	CFL	R,FP	Seasonal closure	Four-wheel-drive
67	Howitt Track		*	CFL	R,		Search & rescue, dry weather, former logging access
68	Bengal Track		*	CFL	R,		Cave access, former logging access
69	Museum Spur Track		*	CFL	FP		
70	Snowy Divide Track		*	CFL			Former logging access
71	Fork Track		*	CFL	R		(Four-wheel-drive) dry weather, search and rescue
72	Rodger River Track		*	CFL	FP	MVO	
73	Upper & Lower Moonkan Tk		*	CFL	FP,R		
74	Rich Knob Track		*	CFL	FP,R		
75	Dingo Hill Track		*	CFL	R		
76	Campbell Knob Track (West)		*	CFL	F/h, FP	MVO	Important for search and rescue

KEY:

B - Beesite Access	FP - Fire Protection	MVO - Management Vehicles Only	R - Recreation
CM - Cattle Management	L - Logging	PA - Primary Access	RA - Research activities
F/h- Freehold access	MA - Mine Access	PSC - Pest Species Control	U - Utility Access

Note:

1. Detailed data for a number of these tracks was not available prior to publication.

BLOCK 19 : ERRINUNDRA

Location and Boundaries

The Errinundra block lies to the north-east of Orbost and is located between the Bonang and Cann Valley Highways (see map 10). It covers an area of 118 200 ha, 1000 of which are in New South Wales, and (within Victoria) is entirely within the Shire of Orbost.

It includes the southern fall of the Errinundra Plateau, including most of the Brodribb, Goolengook and Errinundra River's upper catchments, the plateau itself, and the Coast Range. It is bounded by the Bonang Highway in the west, the Combienbar and Buldah Roads to the east, with the northern and southern boundaries generally defined by forest roads.

Tenure and Land Use

Most of the block is State forest, although a significant part (approximately 21%) is included in the Errinundra National Park. The block also includes two reference areas which are within the boundaries of the Errinundra National Park. Areas of rainforest within the State forest are specifically protected from logging and grazing, and natural features zones encompass a number of the major watercourses. A number of smaller reserves are within the block, but are generally located on its boundaries.

Most of the adjoining public land in New South Wales is included in the Tennyson Creek Flora Reserve, with the remainder being part of the surrounding State forest.

A number of blocks of freehold land occur along the edges of the block, notably at Goongerah, Combienbar, Buldah, and towards Bendock. A small area of freehold, at Errinundra, is located in the centre of the block.

Details of previous Land Conservation Council recommendations and planning scheme controls covering the block are outlined in Table 98 (see page 276) and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The Minister for Conservation Forests and Lands has stated in Parliament that there will be no logging in the Ellery Creek catchment and Misery Range pending the outcome of the Land Conservation Council's wilderness investigation and the government's World Heritage studies and any subsequent nomination:

The Victorian Rainforest Conservation Policy, as described in 'Victoria's Rainforests: An Overview' (DCFL, undated), is applicable to the protection of rainforest within the block. Management guidelines for these areas are to include elements such as exclusion of resource utilisation and fuel-reduction burning, restriction of recreation, and limiting road construction. The State Conservation Strategy (Vict. Govt. 1987) also states that all rainforest will be protected from logging and other disturbances.

The Far East Gippsland Tourism Strategy is also relevant to the descriptive block. Much of the area is included in the Errinundra Plateau and Tall Forests 'hub'. The main competitive tourism strengths of this 'hub' were stated as being a sense of remoteness, tall forests and rainforest, and the Errinundra National Park. The Strategy recommended an upgrading of information and access for recreation.

A management plan (FCV, 1983) has been prepared for the Musket Creek Reference Area (note: this covers the 1977 Land Conservation Council boundaries which were amended slightly in the Land Conservation Council 1986 recommendations). The plan provides for the protection and, where necessary, restoration of the area, and does not propose any development works.

A proposed management plan for the Errinundra National Park has just been released for public comment. It emphasises protection of undisturbed catchments, enhancement of natural values, and providing for day visitor use.

The working plan for the Tennyson Creek Flora Reserve defines the aims of management of this area as permanently preserving the flora and associated fauna in a natural condition, in order to preserve stands of the indigenous forest types which occur in Bondi State Forest (in New South Wales), and to provide for recreation. A small car park, picnic facilities and an interpretive nature trail are proposed.

A draft fire protection plan has been prepared which covers this block - Regional Fire Protection Plan: Orbost Region (DCFL 1989). Public submissions to this plan are presently being considered by the department. Key elements of the proposed plan affecting the block are the designation of strategic fuel-reduction burning corridors (Priority 2 burning zone) along the Brodribb River in the west of the block, as well as along its northern boundary. Much of the remainder of the block, excluding areas of fire-sensitive vegetation and reference areas, are included within general (Priority 3) burning zones. No specific roads, helipads, or water points are proposed for construction.

The State forest area is within the East Gippsland Forest Management Area. A forest management plan is presently being prepared. Most of the small area of New South Wales State forest (part of the Bondi State Forest) within the descriptive block is managed as pine plantation, with smaller areas either allocated for logging or reserved from logging, or subject to special prescription.

Much of the block is within a number of proclaimed water supply catchments. These are the Cann River catchment (proclaimed 1976), the Bemm River catchment (proclaimed 1986) and the Brodribb River catchment (proclaimed 1986). These, respectively, service the townships of Cann River, Bemm River and Orbost. No land-use determinations have been made over any of these proclaimed catchments to date. Water offtakes are all outside the boundaries of the block.

The provisions of the State Environment Protection Policies for the Air Environment, and for the east and north, the

Waters of Far East Gippsland, and elsewhere the Waters of Victoria, also apply.

Physical Setting

The whole of the block is part of the East Victorian dissected uplands. The northern part comprises the elevated (generally above 900 m) plateau that forms the southern extension of the Monaro Tablelands. These areas are generally undulating but rise gradually to the south. The southern edge of the tablelands is dominated by rugged mountainous terrain. Steep escarpments are particularly well developed in the headwaters of the Brodribb, Errinundra and Goolengook Rivers.

Ordovician sedimentary rocks underlie much of the area. Younger granitic rocks outcrop at Mount Ellery (1291 m above sea level), Goongerah and Goonmirk Rocks. A band of metamorphic rocks outcrops at Mount Murrungower and on parts of the Errinundra Plateau.

The block comprises two main river basins. The streams of the eastern fall of the plateau flow into the Bemm and Cann River catchments of the East Gippsland basin, whereas the western and northern fall streams form part of the Snowy River basin. Major north-flowing streams draining into the Snowy are the Delegate, Bendoc and Queensborough Rivers.

The south-flowing streams have steep gradients and are characterised by numerous cascades and waterfalls, whereas the northern streams have much lower gradients and extensive stream flats and bogs.

Biological Setting

The most common vegetation community of the block is wet sclerophyll forest. Shining gum and cut-tail are the dominant overstorey species on the Errinundra Plateau and Coast Range. The eucalypt overstorey is thought to be generally between 200 and 250 years old. Under this, cool temperate rainforest species such as southern sassafras and black olive berry often form a secondary stratum, with a well-developed shrub layer. On the more exposed north-facing slopes, narrow-leaf peppermint is the common overstorey species, along with messmate and blackwood.

Cool temperate rainforest is common on the Errinundra Plateau and occurs along most of the streams flowing off the plateau, both to the north and the south. Southern sassafras is dominant with black olive berry a subsidiary canopy element. Ferns dominate the understorey. Many of the stands are very old, with mountain plum pines at Goonmirk Rocks thought to be about 400 years old.

Riparian forests, and some areas of warm temperate rainforest, are found on the lower river and streams, generally in the south of the block.

Tall open montane forest grows around Mount Ellery and at scattered locations on the Errinundra Plateau. The dominant species is alpine ash. Alpine wet heathland occurs on poorly drained soils on the Delegate River and is fringed by snow gum woodland and montane sclerophyll woodland. Montane sclerophyll woodland also occurs in the lower rainfall areas in the Craigie Bog Creek catchment in the north of the block.

Dry sclerophyll forests are widespread, particularly in the southern part of the block and on north-facing slopes.

The wet forests contain an impressive range of fauna, as do the drier forests at lower altitudes, including the long-footed potoroo. A wide range of native fish are found in many of the blocks watercourses, as are the introduced trout.

Cultural Setting

Little is known of the activities of early Aborigines within the block. It appears that area was on the boundary between two major cultural groups - the Kurnai of the Gippsland area and Aborigines of the Monaro Tablelands. While no archaeological sites have been recorded on the block, they have been identified on the Monaro Tablelands around Bendoc, to the immediate north.

Settlement by Europeans began in the 1830s when pastoralists from the Monaro Tablelands took up runs. Bendoc was first licensed in 1842, with areas around Goongerah taken up for grazing in 1868. Few areas were taken up when made officially available for selection.

Large areas of public land continued to be used for forest grazing through much of the 20th century, with most freehold areas used for cattle production. Dairy farms were established at Combiobar and 'Burtons' (on the southern edge).

Gold also played a part in opening up the area for settlement. Alluvial gold was sought in the Bendoc district in the 1850s and 60s. A number of reef mines operated there between 1869 and 1910, and tracks were cut linking Orbost to the Bonong and Bendoc goldfields. Victoria Star Mine, immediately to the north of the block, operated from 1911 and worked the highest yielding reef in East Gippsland. Alluvial gold was worked on the Combiobar River in the early 1870s and 1890s, and a small mine was opened up during the Depression in the 1930s. A clearing and a few fruit trees are all that remain of the mining settlement of Clarkeville. Pit sawing took place around Bendoc when gold mining was at its peak in the 19th century, but extensive logging in the block only occurred after World War II.

WILDERNESS QUALITY

Areas of relatively high wilderness quality occur throughout the descriptive block. These areas, classified in the Preece and Lesslie survey (1987) as Class 4 or higher total wilderness quality, are centred around the Brodribb River towards its confluence with the Rich River, around Mount Ellery and the upper Brodribb, around the Goonmirk Rocks area, and a number of areas along the Coast Range.

The areas of highest wilderness quality identified in the survey were centred around Mount Ellery (the upper Goolengook River), the south branch of the Brodribb River, and the east branch of the Errinundra River.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

A number of small areas of settled (cleared) land occur on the edges of the block along the river valleys of the east branch of the Delegate River, Brodribb River (Goongerah),

Combienbar River, Errinundra River ('Burtons') and Buldah Creek. Settled areas of the Bendoc district in the north and around Glen Art in the south-east are the main external influences on values. A small cleared area of freehold land at Errinundra also influences values. Most of these areas of settled land are farming land used for cattle production.

Large pine plantations have been established by the New South Wales Forestry Commission on the northern boundary, and a small private plantation has been established on Gap Road.

These influences have resulted in the highest value areas recorded in the Preece and Lesslie survey being in a band from the lower Brodribb to Mount Ellery, and a smaller area around Goonmirk Rocks.

The settled areas are generally part of freehold properties, many of which include large areas of uncleared native vegetation. Areas of freehold land have been cleared on the edges of public land in the north since 1972 and there is potential for the boundary of the settled land to change further, here.

A major forestry camp in the centre of the block on the Errinundra Plateau was not recorded in the Preece and Lesslie data base. Being a point of occupation, it would have a serious impact on remoteness from settlement values which would be reduced in its vicinity (including those in parts of the upper Brodribb).

Remoteness from Access

Remoteness from access values are generally moderate due to the influence of surrounding major roads and the internal

network of forestry roads and tracks. Highest values extended more or less continuously in a band along the centre of the block.

The major roads influencing remoteness from access values are those on the block boundaries such as the Bonang Highway, the Gap Road and Combienbar Road, or external to it. In contrast, a large number of minor roads bisect the block. These have been mainly constructed in association with timber harvesting.

The block also includes a large number of vehicular tracks. These are generally of four-wheel-drive standard and are associated with fire protection or timber utilisation. Many are untrafficable during wet periods, as are some of the minor roads. Some are also subject to seasonal closure due to snowfall. A private landing ground is maintained adjacent to the eastern boundary of the block at Combienbar.

All roads and tracks are listed in Table 99 (see page 277), and their location shown on Map 16. Currently there are 236 km of trafficable roads within the block. No areas are greater than 3 km from an existing road or track.

Aesthetic Naturalness

There are very few structures within the natural lands of the block, mostly minor utility facilities. They are listed in Table 100 and their locations shown on Map 16.

The relatively dense road and track network forms the major influence on aesthetic naturalness values. As a result, these values are generally low. The areas of highest value are in the upper reaches of the Brodribb River and around the east branch of the Errinundra River.

Table 100

PUBLIC LAND STRUCTURES

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
1	Mt Ellery Trig.	Trigonometric station, radio solar panels communications antennae	Dept. Property & Services, Telecom, CFL, Victoria Police, Shire of Orbost, and East Gippsland Timber Contractors Association	U	
2	Mt Tennyson Trigonometric and tower	Trigonometric station and fire tower	Forests Commission of New South Wales	U	
-	Errinundra Forestry Camp ₁	Work depot, dormitories, and associated structures	CFL	L, MP	
-	Ellery Camp	Hut Ruin	CFL	ex L	Proposed to be removed
-	Brodribb Errinundra and Combienbar River gauging stations ₂	River gauging stations	Rural Water Commission	U	

KEY:

- L - Logging
- MP - Management purposes
- U - Utility

Notes:

1. Errinundra Forestry camp has not been included on Map 16. It is located near the northern junction of Errinundra and Crows Camp in the centre of the block.
2. River gauging stations are shown on Map 16 by symbol.

Some minor artefacts from early gold mining remain. They include small vertical shafts, water races and channelling in the beds of Swede, and particularly, Little Bog Creeks, a mine shaft which is still evident on the Aspens Battery Track, and dams and machinery on Back Creek (off Flue Track). A number of helipads are also maintained in the block.

Biophysical Naturalness

Large areas of very high biophysical naturalness occur throughout the block. These were allocated to the highest class (Class 4) of biophysical naturalness by Preece and Lesslie. Very low values were, however, recorded in the south of the block around Mount Murrungowar and 'Burtons', west of the Combienbar valley, and a major area in the centre of the block between the settlement of Errinundra and the Gunmark Range.

Land-Use Indicators of Biophysical Naturalness

The only intensive land use of the block is timber production. The areas logged are equivalent to the areas of low biophysical naturalness referred to above. However, since the Preece and Lesslie survey new areas have been logged around B.A. and Ferntree Creeks to the west of Mount Ellery, along the Ada River, and along the Coast Range Road near Granite Mountain. Such activity would reduce biophysical naturalness values, and thus total wilderness quality value in these areas. All areas known to have been logged are shown on Map 16.

Those sectors of the block within State forests, other than the no-logging areas of the Ellery Creek catchment and Misery Range referred to earlier, are available for timber production.

Many large areas, particularly in the south of the block, have been leased and licensed for grazing. The intensity of grazing is not known, but much of the block has poor grazing capability. There has been no grazing on public land over most of the block for a number of years.

Minor alluvial goldfields were worked south of Mount Ellery, south of Errinundra, north of Combienbar, and around Goonmirk Rocks. The Bendoc district along the northern edge of the block, extending from Clarkeville to Mount Tennyson, was the area of greatest activity with the beds of Craigie Bog Creek, Swede Creek and Little Bog Creek having been worked. Reef mines were also worked, such as the Gippsland Boulder Reef Gold Mine ('Bola Mine') on Bola Creek near 'Burtons'. Most were worked in the 19th century, although some were opened up during the 1930s Depression. A large quarry, the Brunt Pit, on Gunmark Road, and other minor gravel pits reduce biophysical naturalness values in localised areas adjacent to roads within the block.

Other Indicators of Biophysical Naturalness

The block was covered by Macmillan's (1987) study of the nature conservation values of East Gippsland rivers and streams. Her study revealed eight essentially unmodified catchments within the block. These are the upper reaches of the Goolengook River, Ellery Creek, the north and south branches of the Brodribb River, the north branch of the Bonang River, the east branch of the Errinundra River, and the Craigie Bog Creek and the headwaters of the

Queensborough River. The status of the Craigie Bog Creek catchment is being reviewed however.

Timber resource information indicates that about 66% of the ash type forests and 84% of the mixed species forests consist of mature stands.

Forbes et al. (1981) indicated that like most of the areas of native vegetation surveyed in East Gippsland, quadrats in communities represented in the block had low to negligible levels of weed abundance (see also Map 7). This study also included much of the northern half of the block within a large site of international botanical significance. The site extended from Mount Ellery across the Errinundra Plateau to Mount Tennyson. The basis of significance was the presence of outstanding examples of cool and warm temperate rainforest, wet sclerophyll forest and alpine wet heathlands, and in particular the unique, ancient vegetation of Goonmirk Rocks. It also made particular reference to the undisturbed shining gum forests, and a number of rare and interesting species.

The sites of zoological significance in East Gippsland study (Norris and Mansergh 1981) included much of the southern part of the block within a site of global zoological significance. This assessment was based on the presence of the long-footed potoroo, Blue Mountains tree frog, the Jervis Bay tree frog, and other species.

Much of the block has been included within more detailed flora and fauna surveys undertaken in areas proposed for logging. They cover the Tennyson Creek catchment, areas on the Coast Range, and much of the Brodribb River catchment including the B.A. Creek and Big River catchments. (Henry et al. 1988; Brown et al. 1986; Carr et al. 1984; Chesterfield et al. 1988; Horrocks et al. 1984; and Earl et al. 1989). These studies indicated the presence of numerous significant species of flora and fauna and, in most areas, comparatively little evidence of disturbance.

Species such as the long-footed potoroo, tiger quoll, bats, and other arboreal mammal species and large owls including the sooty and powerful owls were all recorded. Their presence, together with species such as the platypus and Australian king-parrot, are all indicative of large areas of high quality biophysical naturalness.

Most areas also recorded low mean weed compositions, especially in the south of the block where weeds were quite sparse, as was also the case in the riparian communities. Areas in the north had higher weed levels, notably in swamp and riparian communities. Foothill communities around Goongerah also had high weed levels. Introduced animals recorded were horses, cattle, sambar deer, house mice, cats, rabbits, foxes, dogs and goats. Most of these were uncommon and, like the few introduced bird species, they were generally found around farmland areas.

The studies also identified a number of small sites of ecological significance throughout the area. Larger areas included those in the headwaters of Tennyson Creek and adjacent to Buldah, parts of Little Bog Creek, Bonang River environs, and areas around Goongerah, an area in the lower reaches of Ferntree Creek and on and along the Big River.

Introduced fish have not been recorded in the Buldah or Upper Cann Rivers, nor B.A. Creek.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 118 200 ha, is between 15 and 35 km wide and about 65 km in length. Of this, about a quarter was classed in the Preece and Lesslie (1987) survey as at least Class 4 wilderness quality. Less than 10% was included in Class 5 or higher wilderness quality. Essentially unmodified catchments, excluding those under review, comprise 15 934 ha of the descriptive block. The largest area presently without roads or vehicular tracks is 5000 ha.

Ecological Viability

Represented in the block are 10 plant communities. While wet sclerophyll forest predominates, most of the other communities are widespread throughout the block. Such diversity of vegetation, together with the associated diversity of habitat generate high ecological values. Large areas of essentially unmodified catchments and the low numbers of introduced species contribute to the block's ecological viability.

Other than the East Errinundra River and the Brodribb River headwaters, most of the major catchments have, however, been subjected to at least some logging.

Fire is a hazard in the drier parts of the block and poses a threat to the settled areas of Combienbar, Buldah, and the Cann valley, and to the pine plantations of the Bondi State Forest (New South Wales). The wet forests rarely become sufficiently dry to create a fire hazard. These communities are, however, very sensitive to fire damage. Parts of the block along its eastern boundary were burnt in major bushfires in 1939 and again in 1967, with the largest recorded fire occurring in the headwaters of the Cann River in the north-east of the block in January 1983. This fire burnt 127 000 ha, although most of this area was to the north and south of the descriptive block. An approximate outline of the areas affected is shown in Map 8.

Active management for fire protection includes periodic fuel-reduction burning which is mainly carried out on its southern and eastern margins to protect areas of settled land.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of the block are very high. It incorporates virtually the only remnant of the Monaro Tablelands environments left in Victoria. The occurrences of mountain plum-pine, cool temperate rainforest, mature shining gum, and 'mixed forests' on the Errinundra Plateau have great scientific value. Features of particular value include the mountain plum-pine trees near Goonmirk Rocks, which are some of the oldest, reliably dated, living plants in the State and are thought to be at least 400 years old, and the forests around Cobb Hill, which are probably the oldest of any on the plateau, and contain the most extensive remaining undisturbed example of mature 'mixed forest'.

The relatively undisturbed catchments of the block are of particular scientific and conservation value. The block is also thought to be very important for the protection of the rare long-footed potoroo and other significant animals, such as the sooty and powerful owls, a newly described subspecies of pink robin, the Jervis Bay and Blue Mountains tree frogs, and a newly discovered species of giant earthworm. The upper Cann, Bonang, upper Brodribb, Combienbar, Goolengook and Rich Rivers all include a diverse range of native fish, with the first four mentioned rivers also containing the vulnerable grayling.

Recreation

Bushwalking, nature study, pleasure driving and fishing are the most popular pursuits undertaken in the area at present. It also has capability, such as in the headwaters of the Brodribb River, for those seeking solitude or inspiration.

Natural features of particular interest include: the mature tall mountain ash, shining gum, and cut-tail forests which are some of the oldest forests remaining in Victoria; the areas of tall mountain plum-pine trees; areas of cool temperate rainforest; granite outcrops such as at Goonmirk Rocks, Granite Mountain, and particularly the tor fields around Mount Ellery. Water-related features include waterfalls and cascades on a Rich River tributary near Murrungower, off Brown Mountain, Result Creek, First Creek, other tributaries of the Errinundra River, such as the West Errinundra Falls, Fourteen Mile Creek, and tributaries of the Queensborough and Brodribb Rivers. Faunal species of special interest include the long-footed potoroo and a great diversity of bats.

Walking routes through the area are generally limited to those along old vehicular tracks. Walking tracks include those to the Result Creek falls (off the Gap Road), Mount Ellery, and along the Rooty Break Trail (Goonmirk Rocks). Understorey vegetation, particularly in and around the Errinundra Plateau, is very dense and off-track walking is difficult. Ground flora such as ferns and mosses along rivers and streams and in the more limited areas of wet heath, are particularly susceptible to trampling.

The network of forest roads provides access for picnicking, sightseeing, short walking trips, four-wheel-driving and pleasure driving within the block, and access to scenic views such as at Ocean View lookout near Ellery Saddle, along the Green Road, particularly near Mount Ellery, and from the B.A. Road. Many of the roads are, however, slippery in wet weather and they are also used by logging trucks. Mount Ellery provides outstanding panoramic views. Horse riding at present is minimal.

Agriculture

Much of the block is too steep for agriculture. The gentler slopes of the northern areas of the block and on the plateau have moderate potential for agriculture, although cold winters severely reduce pasture growth.

Capability for forest grazing is limited by dense understorey and steepness over much of the block, although some areas have moderate to high capability. No areas are presently used for such a purpose.

Apiculture

There is limited use of this block by beekeepers. Logging and access reduce the utility of this area for honey production. It is understood that there are no licensed apiary sites on public land within the block.

Timber Production

The block includes extensive stands of high to very high quality timber which are capable of supplying wood suitable for most purposes. They provide an important supply of mature sawlogs for local mills. The main timber-producing species are cut-tail, alpine ash, shining gum, mountain grey gum and messmate.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 2278 ha of ash species forest and 52 101 ha of mixed species forest.

The descriptive block lies within the East Gippsland Forest Management Area. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands, but this was not available prior to publication.

Mineral Production

Zinc, lead, silver and barite occur in the block and minor goldfields have been worked at a number of places throughout the block. A large body of limestone has been worked near 'Burtons' and a small quantity of silver-lead ore extracted there. A road material quarry is located on Gummark Road (Bruns Pit), other minor gravel pits occur elsewhere, mainly on road verges.

Most of the northern half of the block has been covered by at least one mineral exploration licence since 1970, as have areas on the western edge of the block south of Goongerah. Recent exploration has included geochemical sampling to ascertain the gold potential of Ordovician bedrock and tin and base metal mineralisation, comprehensive exploration of lower Devonian Errinundra beds which proved persistent lead-zinc (and silver) mineralisation within limestone, and subsequently, geochemical stream sediment analysis and geophysical surveys in areas along the south-eastern edge of the block.

Exploration licences presently cover much of the block, these involving three different operators. The only active mining tenements are to the immediate north of the block, in the vicinity of the former Victoria Star Mine. Details of current tenements under the Mines Act are included in Table 101.

Table 101

MINES ACT TENEMENTS (As at August 1989)

Tenement type & reference number	Lessee	Location
Exploration licence		
EL 2145 (part only)	CRA Exploration Pty Ltd	Little Goolengook River
EL 2142 (" ")	CRA Exploration Pty Ltd	Clarkeville
EL 2062 (" ")	Village Mines NL	Upper Big and Little
(" ")		Goolengook Rivers
EL 2141 (" ")	CRA Exploration Pty Ltd	Combienbar River
EL 1898 (" ")	R.J. Fraser	Swede Creek
EL 2060 (" ")	Village Mines NL	Upper Cam River
EL 1821 (" ")	R.J. Fraser	Camp River, Tennyson Ck
EL 2129 (" ")	CRA Exploration Pty Ltd	Bonang River

Under existing tenure about 79% of the block is potentially available for mineral exploration or mining.

Water Production

Capability for surface water production is high on the Bemm and Brodribb Rivers.

The block has a high capability for water production as it includes substantial areas which receive very high rainfall.

The streams flowing north generally have small catchments but may be important for future water supply for Bendoc. South-flowing streams have larger catchments and within the block the headwaters of the Bemm and most of the upper catchments of the Brodribb and Cann Rivers have a high capability for surface water production. They are already utilised for township water supply.

The presence of large areas of undisturbed forest in these catchments protects the quality of the water received.

Table 98

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL¹

Land use	LCC reference ²	Approx. area (ha) within block	Planning scheme control ³	Special provisions ⁴
National park	A8 - (also E16 ₅ and part E1) (Errinundra)	24 050 ₅	Balance of shire blanket control	No logging, grazing, hunting or use of firearms. The environs of the Errinundra Rd, Greens Rd and Gunmark Rd, where they abut the park, be preserved
Reference area	B6, B7 (Big River and Musket Ck)	1045	As above	Nil
State forest	E1	85 040	As above	Nil
including Natural features zone	I6 (Errinundra, Combiobar, Goolengook and Brodribb Rivers)		As above	No timber harvesting or gravel extraction, new roads only where essential
	E8	1850	As above	To be used for education and research associated with forestry management operations
	E15	Not available	As above	To be used to conserve rainforest
Flora and fauna reserve	F12 (Little Bog Ck)	345	As above	Passive recreation be permitted, grazing be phased out, no hunting or firearms
Public land water frontage reserve	I1	Not available	As above	Nil
Education area	K2 (Sardine Ck)	250	As above	Nil
Scenic reserve	M1, M4 (the Gap and Martins Ck)	200	As above	Martins Ck Reserve is subject to investigations of rainforest
Agriculture - (Bidwell Ck, Goongerah, Errinundra, Combiobar, Buldah, and Craigie Bog Ck)	Not applicable	5420	As above	

Notes:

1. Excludes area of block within NSW.
2. Refers to recommendations published in the LCC East Gippsland Area Review, Final Recommendations 1986.
3. Refers to the Shire of Orbost Planning Scheme.
4. Specific provisions relevant to areas in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).
5. Includes area added by Governor-in-Council (17 December, 1987) in addition to LCC recommendations.

Table 99

ROADS AND TRACKS

Ref. no. (Map 16)	Road or track name	Standard of access			Management responsibility	Management purpose,	Present restrictions ¹	Comments
		Major road	Minor road	Vehicle track				
1	Bonang Highway	*			Roads Corp.	PA		Boundary only; a gravel declared highway; generally about 7 m wide; minor curve improvements proposed
2	Sardine Ck Rd		*		CFL	L, FP, R		
3	Rich River Rd		*		CFL	L		
4	Mills Rd			*	CFL	L		
5	The Strand			*	CFL	L		
6	Old Kent Rd			*	CFL	L		
7	Jack Rd		*		CFL	L		
8	Rocky River Rd		*		CFL	L		Boundary only
9	Jack Rick Divide Tk			*	CFL			Boundary only
10	Greens Rd		*		CFL	L, R		Part boundary, access to national park
11	Cattleyard Tk			*	CFL			
12	Roses Ck Rd			*	CFL	L		
13	Winter Rd			*	CFL	L		
14	Park Lane			*	CFL	L		
15	Little Rich Rd			*	CFL	L		
16	Pumpkin Hill Tk			*	CFL	L		
17	32 Mile Rd		*		CFL	L		
18	Priestly Rd		*		CFL	L		
19	34 Mile Tk			*	CFL	L		
20	Ironbark Tk			*	CFL			
21	Big River Rd		*		CFL	L		
22	Ferntree Tk			*	CFL			Walking Track
23	Yabby Tk			*	CFL			
24	Ellery Camp Tk			*	CFL			
25	Big River Tk			*	CFL	L		Proposed to be closed
26	Bee Tree Tk			*	CFL			
27	Goolengook Rd		*		CFL	L		
28	Goolengook River Tk			*	CFL	L		
29	Houston Rd			*	CFL	L		
30	Ada Divide Tk			*	CFL	FP		
31	Helmis Tk		*					
32	Gay Rd			*				
33	Barrs Rd		*		CFL	L		Boundary only
34	Barlings Rd		*		CFL	L		
35	Billy Buster Tk			*	CFL	L		
36	Errinundra Valley Rd		*			PA		
37	Christians Rd		*		CFL	L		
38	Errinundra Rd		*		CFL	R, L		Major access to national park
39	Crows Rd			*				
40	Hammonds Rd		*		CFL	L		

Table 99 (continued)

Ref. no. (Map 16)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major road	Minor road	Vehicle track				
41	Spotmill Tk			*	CFL	FP		Proposed MVO
42	Gunmark Rd		*		CFL	L, R		Access to national park
43	Alstergrens Rd			*	CFL	L		
44	Gap Rd (Bendoc--Orbost Forest Road)	*			Roads Corp/ Shire			Boundary only; declared forest road; a 7 m wide forest road) gravel road in good condition; minor curve improvements proposed Access to national park
45	B.A. Rd		*		CFL	L, R		
46	Ellery Ck Tk			*	CFL	FP		Proposed MVO
47	Unnamed			*	CFL			
48	Postmans Tk			*	CFL	FP		Proposed MVO
49	Brown Mountain Tk			*				
50	Goonmirk Rocks Rd		*		CFL	FP, MP		Part boundary, proposed MVO
51	Aspens Battery Tk			*	CFL			Proposed MVO
52	Clarkeville Rd		*					Boundary only
53	Mustard Rd		*					Boundary only
54	Unnamed			*	CFL			
55	Coast Range Rd		*	*	CFL	FP		Part proposed MVO
56	Misery Spur Tk			*	CFL	L, MP		
57	Teachers Tk			*	CFL	FP		Proposed MVO
58	Combienbar Rd	*	*		Shire	PA		Boundary only
59	Cobon Rd			*	CFL	FP		
60	Centre Rd			*	CFL	L		
61	Hensleigh Ck Rd		*		CFL	F/h, R		Major access to national park
62	Buldah Tk			*	CFL			Boundary only
63	Golden Gully Tk			*	CFL			
64	Buldah River Tk			*	CFL			
65	Lower Granite Mountain Tk			*	CFL			
66	Far Creek Tk			*	CFL	FP		Part boundary, proposed MVO
67	Curley Tk			*	CFL			Proposed MVO
68	Queensborough Rd			*	CFL			
69	Craigie Bog Ck Rd		*					Boundary only
70	Hepburns Road		*					
71	Upper Granite Mountain Tk			*	CFL			
72	Tennyson Tk			*	CFL			
73	Buldah Rd	*			Shire	PA		Boundary only
74	North Buldah Tk			*	CFL			Boundary only
75	Possum Tk			*	CFL	L		
76	Little Bog Tk			*	CFL	L		
77	Quinburra Rd (NSW)		*			PA		Boundary only
78	Flora Reserve TK			*	Forest. Comm. of NSW	L		Boundary only
79	Buldah Rd (NSW)		*					Boundary only

KEY:

F/h - Freehold Access	MVO - Management Vehicles Only
FP - Fire Protection	PA - Primary Access
L - Logging	R - Recreation
MP - Management Purposes	U - Utility Access

Notes:

1. Detailed data on purpose/s and restrictions for many of the roads and tracks in this block was not available prior to publication.

BLOCK 20 : UPPER GENOA

Location and Boundaries

This block is located to the north-east of Cann River. It extends into New South Wales and encompasses the Nungatta National Park - an area of essentially natural land. In total the descriptive block covers about 74 700 ha, of which 59 050 ha is within Victoria (see Map 10). The Victorian portion is entirely within the Shire of Orbost.

The block encompasses most of the Genoa River catchment upstream of Wangarabell, and the upper reaches of the Thurra River catchment. It is bounded by the Cann Valley Highway in the west, Wangarabell and Nungatta Roads to the east, and forestry roads to the north (north of the Genoa Divide).

Tenure and Land Use

About two-thirds of the descriptive block is included within national parks - the Nungatta National park (6100 ha) in New South Wales and the Coopracambra-Kaye National Park (32 600 ha) in Victoria. The area also includes four reference areas, all inside the Coopracambra-Kaye National Park.

The remainder of the public land within the block, with the exception of some small areas of leasehold land in New South Wales along Nungatta Road on the edge of the descriptive block, is State forest.

Small areas of freehold occur along the edges of the descriptive block, in the Cann River valley, along the Nungatta and Yambulla Creek valleys in New South Wales, and at Wangarabell and Genoa.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 102, and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The Minister for Conservation, Forests and Lands has stated in Parliament that there will be no logging in the west Thurra area pending the outcome of the Land Conservation Council's Wilderness Investigation and the government's World Heritage studies and any subsequent nomination.

Table 102

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL¹

Land-use	LCC reference ²	Approx. area (ha) within block	Planning scheme control ³	Special provisions ⁴
National park	A13 (Coopracambra--Kaye)	32 600	Balance of shire blanket control	Logging, hunting and use of firearms not permitted
Reference areas	B9, 10, 11 and 15 (Yambulla, Merragunegin, Jones and Winnet Creeks)	2 750	Balance of shire blanket control	Nil
State forest	E1	21 600	Balance of shire blanket control	Nil
	E15	-	Balance of shire blanket control	Rainforest protection - no logging or grazing, only approved new roads and road improvements
Including Natural features zone	I6 (East and West branches of the Thurra River, Cann and Genoa Rivers)		Balance of shire blanket control	No timber harvesting or gravel extraction, and only essential new roading between 20 and 300 m from river
Agriculture (Cann River valley, Wangarabella, and Genoa freehold)	Not applicable	2 098	Balance of shire blanket control	

Notes:

1. Excludes area of block within New South Wales.
2. Refers to recommendations published in the LCC East Gippsland Area Review, Final Recommendations, 1986.
3. Refers to the Shire of Orbost Planning Scheme.
4. Specific provisions relevant to area in addition to the standard land-use provisions of LCC recommendations (as outlined in Appendix II).

The east branch of the Cann River on the western edge of the block is within a proclaimed water supply catchment. The offtake from this catchment (at Noorinbee) services the township of Cann River.

The Victorian Rainforest Conservation Policy, as described in Victoria's Rainforests: An Overview (DCFL undated), is applicable to the protection of rainforest within the block. Management guidelines for those areas are to include elements such as exclusion of resource utilisation activities, fuel-reduction burning, restriction of recreation and minimisation of roads. The State Conservation Strategy (Victorian Government 1987) also states that all rainforest will be protected from logging and other disturbances.

The Jones Creek Reference Area management plan, like most reference area management plans, provides for the protection and, where necessary, restoration of the area, and does not propose any development works.

The State forest portion of the descriptive block is within the East Gippsland Forest Management Area. A forest management plan is being prepared.

A draft fire-protection plan has been prepared by the Department of Conservation, Forests and Lands, Orbost region, which encompasses this block. Public submissions to this plan are being considered by the Department. Its main relevant elements are the inclusion of most of the block in general fuel reduction burning zones (Mount Kaye - Priority 3, elsewhere Priority 4), other than areas of fire-sensitive vegetation and reference areas. A number of new roads (adjacent to the Wangarabell valley) and helipads are proposed. A strategic fuel reduction burning corridor (Priority 2) is proposed along the lower Genoa River valley.

The New South Wales government has recently announced its intention to pursue the declaration of a wilderness area over the Nungatta National Park.

The provisions of the State Environment Protection Policies for the Air Environment and the Waters of Far East Gippsland also apply.

Physical Setting

Most of the descriptive block consists of steep mountainous terrain between 300 and 600 m, with the highest peaks rising over 900 m. Gently sloping country extends from Wangarabell along the Genoa River to the Princes Highway, with small alluvial flats at Wangarabell, Genoa and Noorinbee North. These plains, together with the valleys of the Cann and Genoa Rivers, are at less than 150 m.

Much of the surface and basement rock of the block is lower Devonian granite, overlain by unconsolidated Tertiary segments on the plain west of the Genoa River. Many of the prominent peaks and associated ridges, including Mount Coopracambra and Pint Pot, Mounts Kaye and Denmarsh, Coagalah Hill and Maramingo Hill (on the eastern edge of the descriptive block) are granitic. Soils derived from these rocks are highly erodible.

A broad band of Ordovician sediments extends across the descriptive block between Mount Merragunegin south towards Mount Future. This area, together with the area of Upper Devonian sediments further north along the Genoa

River, are more strongly dissected than the more undulating hilly granitic areas. They have rugged, steep slopes, with narrow ridges and deeply incised stream systems. Large-scale faulting is prevalent and a prominent scarp has formed extending about 15 km from near Mount Merragunegin to Nungatta Mountain. A number of gorges and ravines occur, notably along the Genoa River itself.

Much of the New South Wales sector of the descriptive block consists of Upper Devonian sediments, with granitic rocks occurring in the surrounding areas.

The block is within three main river catchments - the Genoa, the Thurra and the Cann Rivers.

Biological Setting

North of the WB Line (an east-west track north of Mount Kaye) the block is dominated by dry sclerophyll forests, with patches of wet sclerophyll forest in more sheltered areas, e.g., east of Pint Pot and Mount Coopracambra and north of Mealing Hill. Major tree species are messmate, mountain grey gum, silvertop and white stringybark. Understoreys of the dry sclerophyll forests are usually sparse with a range of grasses and low shrubs. Riparian forest grows along the Genoa River and Black Jack Gully and Murmuring Creeks.

The southern half of the descriptive block is dominated by lowland sclerophyll forest. Silvertop and white stringybark are the dominant overstorey species. Gippsland grey box occurs near Wangarabell. Wet sclerophyll forest occurs in the more sheltered areas south and east of Mount Kaye and south of the WB Line towards Mealing Hill, with riparian forest growing along the western and eastern upper reaches of the Thurra River. Small areas of dry sclerophyll forest also appear in the southern half of the block, including an area at Mount Kaye.

Other vegetation communities include two areas of rainforest, one in the upper reaches of the east branch of the Thurra River, and a larger stand on Jones Creek. The Jones Creek stand was severely burnt in 1983. Areas of coastal heathland may be seen at Wangarabell near the confluence of Jones and Three Mile Creeks with the Genoa River, and larger areas on Genoa Creek to the west of the township of Genoa.

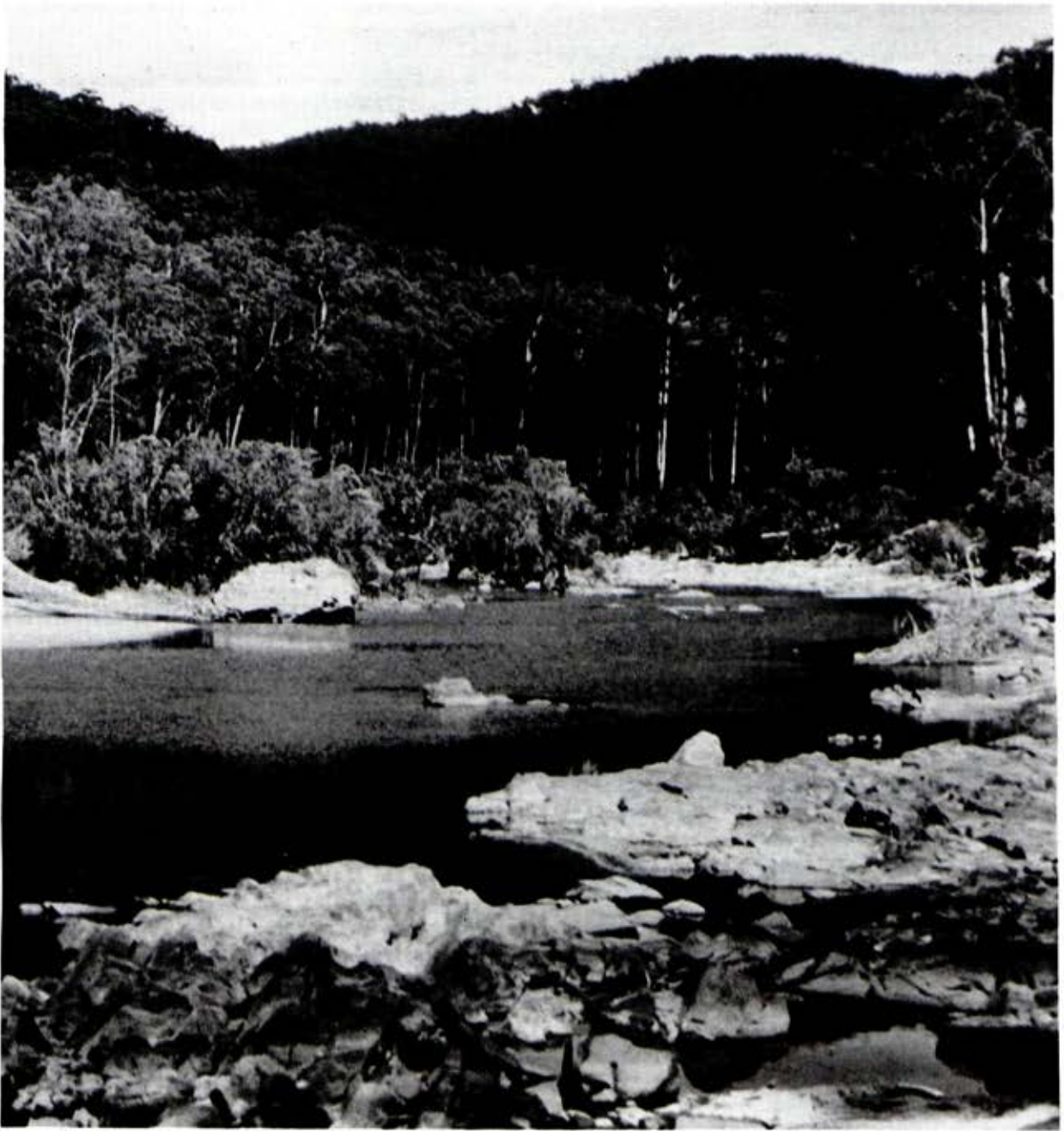
Faunal species present include a large number of widespread distribution, while the small rainforest and heathland communities provide habitat for a different range of species. Each of the major rivers of the block include a range of native fish.

Cultural Setting

Little is known of early Aboriginal activity within the block and very few archaeological sites are recorded. The first grazing licence in far East Gippsland was issued to John Stevenson for the Wangarabell run in 1839.

The river flats at Wangarabell, together with other areas of early European settlement at Genoa and along the Nungatta Creek and Cann River valleys, have remained the centres intensive use with cattle being grazed to the present day.

Some gold mining occurred along the Genoa River and a former goldfield lies near Mount Merragunegin. Much of



The Genoa River

the block, however, appears to have been little used other than for low intensity forest grazing and probably selective logging until after World War II when the timber resources

in the southern sectors of the block were utilised more extensively.

WILDERNESS QUALITY

Much of the descriptive block is of at least relatively high wilderness quality. The 'Survey of Wilderness Quality in Victoria' (Preece and Lesslie 1987) classified large areas of the block as Class 4 total wilderness quality, with a relatively substantial area included as Class 5 or above - the latter area being one of the largest areas so classified in East Gippsland.

Areas of highest wilderness quality were identified around the southern edges of Coogalah Hill and Mount Coopracambra, with the largest area centred on the Genoa River east of the Yambulla Park Creek. The area of relatively high wilderness quality extends into Nungatta National Park in New South Wales. Virtually all of the block, north of the WB Line, was included within a wilderness (Genoa) identified in the Feller et al. 1979 inventory. The area identified extended into New South Wales. These values were confirmed in a New South Wales review in 1986 (Wilderness Working Group 1986).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

Small areas of settled (cleared) land occur on the edges of the block. They include cattle properties along the eastern branch of the Cann River (including Chandlers Creek, Weeragua and Noorinbee North), on the Nungatta Creek valley (including Nungatta Station) and at Wangarabell and Wroxham, as well as a private pine plantation at Rockton in New South Wales.

The highway settlement of Genoa and small farming properties south of the descriptive block on the Drummer Road and on the Wingan River also influence wilderness quality values. Most of these cleared areas are associated with permanently occupied buildings.

Much of the freehold land that is presently cleared is surrounded by areas still carrying native vegetation, and there is potential for the boundary of the settled land to change in the future. Such changes will generally be limited to areas on the edge of the block.

All of these influences have resulted in the highest remoteness from settlement values being in the middle of the descriptive block centred on the upper reaches of the Thurra River and extending from Coogalah Hill to Mealing Hill north into the Murmuring Creek catchment.

Remoteness from Access

The major roads which influence remoteness from access values within the descriptive block are the Cann Valley Highway, the Princes Highway and, in New South Wales, the Imlay Road. These are all sealed. Minor roads influencing the block are Laings and Nungatta Roads in New South Wales, the Wangarabell Road on the east of the block, and Stockyard and Drummer Roads and Jones Creek Track in the south. The WB Line, which is a minor road for much of its length, bisects the descriptive block and has a notable influence on wilderness quality values.

The density of vehicular tracks within the descriptive block is very low. North of the WB Line there is only one vehicular track - the Yambulla Peak Track (which is trafficable by four-wheel-drive to the Genoa River). This area, which extends into the totally unroaded Nungatta National Park in New South Wales, contains one of the largest untracked areas in East Gippsland.

South of the WB Line, particularly between the east branch of the Thurra River and Jones Creek Road, the density of tracks is much higher. Most of these are associated with timber harvesting and fire protection. Some are of relatively high standard, although classified as only vehicular tracks by Preece and Lesslie. If classified to reflect their minor road status, remoteness from access values of these areas would be further reduced. Conversely, a number of former tracks recorded in the survey, notably those previously used for timber harvesting or as fire trails, have not been maintained and are now overgrown, resulting in an increase in remoteness from access values.

Most of tracks are open throughout the year, though some are subject to seasonal closure.

All roads and tracks are listed in Table 103 (see page 286) and their locations shown on Map 16. There are 85 km of

trafficable roads within the block, 72 km of which are in the Victorian sector.

A small private airstrip is situated at Nungatta and another adjacent to the block boundary at Noorinbee.

Aesthetic Naturalness

There are very few structures within the natural lands of the block, with those present being limited to minor utilities generally in boundary areas. These features are listed in Table 104. See Map 16 for their locations.

The major influence on aesthetic naturalness values is the track network. As previously indicated, the density of tracks is relatively low, particularly north of the WB Line, and as a result this area is one of the few areas in East Gippsland with moderately high aesthetic naturalness values.

A helicopter pad is maintained on Mealing Hill.

Biophysical Naturalness

A significant area of the block has very high biophysical naturalness value. The Victorian sector was mainly allocated to the highest class (Class 4) of biophysical naturalness in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987). The New South Wales sector of the block has a similar level of biophysical naturalness.

Areas adjacent to the east branch of the Thurra River, at Log Bridge Creek (in the south-west corner of the block) and south of the Wangarabell Road, however, were allocated in the Preece and Lesslie survey to the lowest class of biophysical naturalness. The major influencing factor on these areas of low value is timber production.

Land-use Indicators of Biophysical Naturalness

The majority of the descriptive block has not been subject to intensive land uses, with timber production the only such land use.

Most timber production has been undertaken in the southern section of the block around Mount Future, along the tributaries of the east branch of the Thurra River and, more recently, near the confluence of the eastern and western branches of the Thurra. Salvage logging has been carried out in the Jones Creek and Three Mile Creek catchments following the 1983 bushfires. Those sectors of the block within State forests, other than the moratorium area previously referred to, are presently available for timber production.

Within New South Wales, part of the State forest north of Nungatta National Park has been logged, as has a small area adjacent to the Cann Valley Highway north of Mount Cooperacambra.

All areas known to have been logged are shown on Map 16.

Molybdenum was produced at Wangarabell, at the edge of the descriptive block, and a minor goldfield was worked near Mount Merragunegin. Little evidence of these activities remains.

Table 104
PUBLIC LAND STRUCTURES

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
1	-	Cann Valley (22 kV) transmission line	SEC	Utility	
2	-	Cann River to Mallacoota (22 kV) transmission line	SEC	Utility	Main distribution line to Genoa and Mallacoota
-	Mt Kaye Trig.	Trigonometric station	Dept. of Property and Services	Utility	
-	Genoa and Cann River gauging stations	River gauging stations (4)	Rural Water Commission	Utility	

Notes:

1. The location of trig. and river gauging stations are shown on Map 16 by symbol.

Parts of the block have been licensed and used for grazing in the past. Such use was, however, of low intensity. More recently, there has been intermittent grazing under agistment. No areas of public land are currently licenced or used for grazing.

Other Indicators of Biophysical Naturalness

Macmillan in her study of East Gippsland (1987) identified nine essentially unmodified catchments in the block. These are an unnamed tributary of the upper Genoa in Nungatta National Park, Winnot Creek, Black Jack Gully, Beehive Creek, Back Creek, the western branch of the Thurra River, Murmuring Creek, an unnamed tributary of the Genoa River north of Mealing Hill and, in the east, Genoa Creek. The status of the Beehive Creek and Thurra River catchments are being reviewed, however.

Timber resource information indicates that about 93% of the mixed species forests consists of mature stands. The sites of botanical significance study of Forbes et al. (1981) recorded that communities represented in the block had low to negligible levels of weed abundance. Riparian communities, such as those near Wangarabell, had higher levels of weeds, but no areas of native vegetation sampled averaged higher than 10% weeds (see also Map 7).

The descriptive block contains three major sites of botanical significance identified in the Forbes et al. study. One is of national significance, centred on Mount Kaye and much of the Back Creek catchment. It contains mature, tall, open forest of brown barrel, shining gum and messmate, with rich understoreys in both the wet and dry sclerophyll forests and a number of rare species. Another site, of international significance, is the upper Jones Creek catchment which is the largest stand of warm temperate rainforest in Victoria. A third national site, of botanical significance, covers much of the Genoa River upstream of Wangarabell. This is a floristically rich dry sclerophyll forest with sandstone flora.

A minor part of the western edge of the block along the Cann River was included in a site of State zoological

significance in the Norris and Mansergh (1987) study, on the basis of the presence of records of two rare frog species.

The statewide survey of Nolan (1981) indicated a sparsity of rabbits throughout the area, though their numbers sometimes increased in the east of the block around and downstream of Wangarabell. Feral pigs have recently been seen in Nungatta National Park and on Nungatta Station. The extent of other non-indigenous faunal species is not known.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the component size attributes of the block.

The descriptive block covers an area of 74 700 ha, of which 59 050 ha is within Victoria. Over 40% of the Victorian sector was classed in the survey of wilderness quality in Victoria (Preece and Lesslie 1987) as being at least Class 4 wilderness quality, with nearly 15% of at least Class 5. Essentially unmodified catchments, excluding those under review, total approximately 15 790 ha. The largest area presently without roads or vehicular tracks is about 12 800 ha, of which about 7200 ha is within Victoria. The block is about 35 km by 25 km wide.

Ecological Viability

The block's high remoteness and naturalness values, the large areas of essentially unmodified catchments, its range of vegetation communities and, apparently, low levels of alien species, all contribute to the ecological viability of the block.

Fire is the major hazard. Serious bushfires occurred within the descriptive block in 1939, 1967, 1980, 1983 and 1988 (at Mealing Hill). The 1983 fire encompassed 127 000 ha, though much of this area was outside the block. The locations of these fires appear on Map 8.

Effective fire control in the area is carried out to protect the townships of Cann River and Genoa, and part of the area includes a strategic burning corridor for these towns. Most of the Victorian sector of the block is subject to periodic protective burning. Fire-sensitive communities such as rainforest are protected, however.

While the complete headwaters of the Thurra River are included within the descriptive block, about half of the headwaters (the east branch) has been subject to widespread timber extraction. The block also includes most of the upper Genoa River, but part of its upper reaches extend beyond the block boundaries and are subject to grazing on improved pasture and both hardwood and softwood production.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of the descriptive block are very high. The block incorporates the internationally geologically and geomorphologically significant site of the Genoa River Gorge, apart from excellent examples of dry sclerophyll, wet sclerophyll and riparian forests. Fossils of great scientific interest also occur. Several rare plants have been identified in the area, notably on the Mount Kaye Range, and there are significant rainforest communities. Important fauna habitats are associated with lowland sclerophyll forest, the dry sclerophyll forest and the warm temperate rainforests. The Thurra and Cann Rivers have a diversity of native fish, including the vulnerable grayling.

Many of these nature conservation values result from, and are enhanced by, the block's wilderness quality values.

Recreation

Although not presently heavily used for recreation, the block has a high capability for recreation in remote settings and for solitude or inspiration. Spectacular scenery, permanent water, a range of environments and limited vehicular access are features that make the area suitable for these forms of recreation. The climate of the area allows use throughout most of the year.

Natural features of particular interest include the mountain peaks, the Genoa River, waterfalls and cascades, some plant communities and faunal species. Peaks with granite tors, for example, those in the Mount Kaye Range, Mount Denmarsh and Mount Coopracambra are also of special interest, and all offer spectacular views. The meandering gorge of the Genoa River holds much appeal due to its overhanging sandstone ledges, boulder fields, waterfalls, fossils, minor caves and speliothems (in the New South Wales sector), and escarpments. The Neenah Gorge, in Nungatta National Park, is another popular destination point. Waterfalls and cascades may be seen along Murmuring Creek, Beehive Creek, the Genoa River, and on a tributary of the Cann River near Weeragua. Vegetation communities of special interest are found on the sandstone areas along the Genoa River, on Mount Kaye, and in the rainforests.

The most popular walking route follows the Genoa River through the gorge. Other walking routes lead to Mount Kaye and various other peaks in the area such as Mount Denmarsh, Mount Coopracambra and Yambulla Peak in New South Wales. Nungatta Mountain (New South Wales)

is generally reached by walking up any of the many spurs on its western side. These and other peaks in the descriptive block are untracked. Most of these walks are very challenging. Much of the understorey vegetation is relatively open, particularly along spurs and ridges, and is suitable for off-track walking. The major creek and river beds are also walkable during low flow.

The WB Line, although little used, offers scope for pleasure driving and picnicking and ready access to the spectacular views of the Genoa Valley and Nungatta Mountain from Mealing Hill. The Wangarabell Road provides good two-wheel-drive access to the middle reaches of the Genoa River. The block also provides some scope for four-wheel-driving along the forestry tracks in the south of the block, such as those along the Thurra River west branch. Yambulla Peak Track is also used.

Agriculture

Most parts of the descriptive block are generally too rugged and steep for agriculture and the use of granitic soils on such slopes would be likely to result in serious erosion problems. The more gentle slopes in the Genoa-Wangarabell area and along the Cann Valley have a moderate to high capability for agriculture.

Forest grazing in areas of State forest during droughts has in the past offered some relief to local graziers. Such grazing was permitted on large blocks under annual licences. However, there are no current grazing licences.

Apiculture

Though some plant species important to the honey industry grow in this block, apiarists are few because of the difficulty of access. There are no licenced apiary sites on public land within the block.

Timber Production

Capability for timber production is high in the south, but is generally moderate in the north due to the more rugged terrain and the lower potential of the forests for sawlog production. The inclusion of these northern areas in the Coopracambra-Kaye National Park precludes the extraction of timber.

The most important species are silvertop, white stringybark, mountain grey gum, yellow stringybark, brown barrel and messmate. These are found throughout the southern sections of the descriptive block. Proximity to sawmills at Cann River increases the value of this block for timber production.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 12 830 ha of mixed species forest.

The block lies within the East Gippsland Forest Management Area. Its contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

Mineral deposits found so far are limited to a small goldfield near Mount Merragunegin and a deposit of molbydenum at Wangarabell. Material suitable for road construction occurs in various places and small gravel pits are located along the Wangarabell Road. The occurrence of a dark coloured dolerite near Wangarabell has attracted attention for use as dimension stone.

Within Victoria, most of the block has been covered by at least one mineral exploration licence since 1970, with the exception of the areas around Mount Coopracambra, south of Mount Merragunegin and the mid-reaches of the Genoa River towards Genoa. Two exploration licences are current within the descriptive block for areas surrounding Coaggalah Hill and Wangarabell Creek. Details of these appear in Table 105. No mining tenements are current. Equivalent data is unavailable for the New South Wales sector.

Under existing tenure about 40% of the Victorian sector is potentially open to exploration and mining.

Water Production

The descriptive block has a moderate capability for water production, although the two main rivers, the Cann and Genoa, have much of their upper reaches outside the block.

The Cann River supplies water to the township of Cann River. Part of the block, as noted previously, is within a proclaimed water supply catchment. The Cann River also provides water for irrigation on adjacent freehold land in the Cann Valley.

A water supply may be required for Genoa in the future. This could come from either the Genoa River or Genoa Creek.

Table 105
MINES ACT TENEMENTS
(As at August 1989)

Tenement type & ref. no.	Lessee	Location
Exploration licence		
EL2225 (part only)	Forty Fourth Toba Pty Ltd	Coaggalah and Mealing Hills
EL2063 (part only)	Village Mines NL	Wangarabell Creek

Note:

1. Victoria only.

Table 103
ROADS AND TRACKS

Ref. no. (Map 16)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major Road	Minor Road	Vehicle Track				
1	Saddle Flaps Road		*		Forest Comm. (NSW)	L	Nil	
2	Genoa River Road		*		FC of NSW	L,R	Nil	
3	Unnamed							
4	Imlay Road	*			FC of NSW	PA	Nil	Boundary only sealed
5	Reef Road			*	FC of NSW	L	Nil	Boundary only
6	Laings Road		*		FC of NSW	FP	Nil	Boundary only
7	Nungatta Road		*	*	Various	F/h, PA	(part through private leasehold)	Boundary only
8	Waalimma Road		*		FC of NSW		Nil	
9	Yambulla Peak Track			*	CFL	FP,R	Seasonal closure	Overgrown beyond Genoa R
10	WB Line		*	*	CFL	FP,R	Nil	
11	Cann Valley/ Monaro Highway	*			Roads Corp/Dept of Main Road (NSW)	PA	Nil	Boundary only; Vict section: 7.5m road in good condition, no planned upgrading. A declared main road.
12	Mt Kaye Track			*	CFL	FP, R	Seasonal closure	
13	Thurra River Road		*		CFL	L	Nil	
14	Kaye Thurra Link Track			*	CFL	FP	Nil	
15	Cooagalah Hill Track			*	CFL	(ex L)	Nil	
16	Camferber Road		*		CFL	FP	Nil	
17	Archie Hill Track			*	CFL	FP, (ex L)	Nil	Part through freehold
18	Stockyard Road		*		CFL	FP,L	Nil	Boundary only
19	Wombat Hills Track			*	CFL	FP,L	Nil	
20	Thurra Junction Road		*		CFL	FP,L	Nil	
21	Farm Track		*		CFL	FP,L	Nil	Boundary only
22	Clotter Logging Road			*	CFL	L	Nil	
23	Unnamed			*	CFL	FP,L	Nil	Old firetrail
24	Windy Ridge Track			*	CFL	FP	Nil	Part boundary
25	Thatchells Track			*		FP,L	Nil	
26	Koola Creek Road		*		CFL	FP,L	Nil	
27	Quartz Reef Road		*		CFL	FP,L	Nil	
28	Drummer Road		*			FP,L	Nil	Boundary only
29	Jang Track			*	CFL	FP	Nil	
30	Johnstons Track			*		FP	Nil	Follows transmission line
31	Offcut Track			*		FP, (ex L)	Nil	
32	Jones Creek Road		*		CFL	FP,L,R	Nil	Part boundary
33	Reserve Tree Track			*		FP, (ex L)	Nil	
34	Ivor Track			*	CFL	FP,PA,R	Nil	
35	Wangarabell Road		*		Roads Corp/Shire	FP,PA,R	Nil	Boundary only. A declared main road, 7.5m wide gravel road in good condition. Minor curve improvements proposed
36	Tasker Track			*	CFL	F/h,FP	Part in freehold	
37	Horse Hill Track			*	CFL	FP	Nil	
38	Three Mile Creek Track			*	CFL	F/h,FP	Nil	
39	Genoa Creek Track			*	CFL	F/h,FP	Nil	
40	Princes Highway	*			Roads Corp	PA	Nil	Boundary only
41	Flynn Creek Track			*	CFL	U	Nil	Access to transmission line
42	Jackson Creek Track			*	CFL	U	Nil	Access to transmission line

KEY: F/h - Freehold access
FP - Fire protection

L - Logging
PA - Primary access

R - Recreation
U - Utility access

BLOCK 21 : CAPE HOWE

Location and Boundaries

This block occupies the far east of the State, beyond Mallacoota Inlet. It includes a large abutting area of essentially undisturbed land within New South Wales, known as the Nadgee Nature Reserve (see Map 10). The block covers an area of 40 160 ha of which 16 820 ha are within Victoria.

The Victorian component is entirely within the Shire of Orbost.

The block boundary follows the alignment of roads and tracks which traverse or are inland of the catchment boundaries of the main creeks and rivers flowing into Mallacoota Inlet or the ocean, between Gypsy Point and Wonboyn. The boundary within Victoria coincides with the boundary of the Croajingolong National Park.

The offshore islands of Gabo and Tullaberga are considered separately in Chapter 13.

Tenure and Land Use

Most of the block is within the Croajingolong National Park or the 14 180 ha Nadgee Nature Reserve in New South Wales. The remainder of the public land within the block is State forest. This is entirely within the New South Wales portion.

Five small freehold areas within the block are surrounded by the Croajingolong National Park. All of the block within New South Wales is Crown land.

Details of previous Land Conservation Council recommendations and planning scheme controls relevant to these land uses are outlined in Table 106, and the boundaries of the separate areas appear on Map 16.

Relevant Planning Policies, Strategies and Management Plans

A draft management plan for the Croajingolong National Park was prepared in September 1985 (DCFL 1985) and though not yet approved it provides a guide of present management of the section within Victoria.

The draft management plan proposed that land in the descriptive block be placed into seven different zones. The two major zones are 'wilderness zone', and 'natural use zone'.

A number of smaller areas are included in 'scientific protection' zones and 'special management' zones, for example, those at Harrison Creek, Dowell Creek, Smellie Inlet and Lake Barracoota, where general public access may be restricted and experimental or manipulative research may be permitted, and at Howe Flat where active management is required to protect specific flora and fauna values.

Table 106

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROL¹

Land use	LCC reference ²	Area (ha) within block	Planning scheme control ³	Special provisions ⁴
National park	A6 and A7: (Croajingolong)	16 610	Balance of shire blanket control	Commercial fishing in the inlet be subject to special conditions. Logging, grazing, and hunting and use of firearms not permitted. Honey production permitted.
Agriculture (Lakeview, Harrison Creek, Dowell Creek, Fairhaven, Duke's freehold)	Not applicable	210	Rural 'C' zone	

Notes:

1. Table excludes areas within NSW.
2. Refers to the LCC East Gippsland Area Review, Final Recommendations, 1986.
3. Refers to the Shire of Orbost Planning Scheme.
4. Specific conditions relevant to area in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).

The Mallacoota Pioneers' Cemetery at Allans Head and the nearby Spotted Dog Mine are both included in 'historic use' zones. Lake View (and Brockwells) is designated as a 'development' zone, and a (private) dwelling at Bakers Bight is in a special use zone. An area of about 5800 ha to the east of the Barracoota Track was designated as wilderness zone.

Most of the remainder of the area is included in a natural use zone, where recreation, education and research are permitted providing they do not have a significant impact on the environment. Within this zone, facilities such as walking tracks, nature trails, informal picnic areas and lookouts will be established, and remote camping, both at defined camp sites and at undefined locations are permitted.

A management plan has not been prepared for the Nadgee Nature Reserve. However, it is managed to maintain its integrity as a natural area for scientific reference and education. Restricted recreational opportunities are provided, but recreation is deliberately kept in a subordinate role. Overnight camping in the reserve requires a permit and the number of people camping at any one time is limited.

Within the Nadgee State Forest, a buffer of about 500 m wide along the edge of most of the Nadgee Nature Reserve is reserved from logging or subject to special prescription, as are the environs of a number of streams in the area. The remaining area is managed as commercial forest and available for harvesting. Most timber harvested is used for pulpwood and chipped prior to export.

A draft fire-protection plan has been prepared for the Department of Conservation, Forests and Lands' Orbost region (DCFL 1989). Public submissions to this plan are presently being considered by the Department. The main elements of the plan affecting the block are a slashed fire break along the Barracoota Track, and the designated general fuel reduction burning zone (Priority 4) over most of the (Victorian) area.

The Howe Range has been identified as one of a number of recognised high-value wilderness areas in the Far East Gippsland Tourism Strategy (DCFL et al. 1988). The strategy noted that the wilderness values of this area should not be compromised by facility development. It also noted that 'even without development, these areas of wilderness can contribute to tourism by confirming and enhancing a sense of remoteness and naturalness which many tourists seek in Far East Gippsland', and that 'without protected wilderness areas, tourism opportunities will be significantly reduced'.

The strategy also identified Mallacoota and surrounding Croajingolong National Park as one of the specific 'hubs' and strengths of the Far East Gippsland area, with Mallacoota Inlet being the central attraction. Some upgrading of information and access in the national park has been recommended.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of East Gippsland also apply.

Physical Setting

The block covers a wide variety of landforms ranging from barrier complexes, extensive dune systems, swamps and high coastal cliffs to dissected uplands.

The dissected uplands are dominated by the late Devonian granite of the Howe Range and the late Devonian sediments and granites of the Table Hills in New South Wales. Late Devonian fossiliferous sediments also occur at Mount Carlisle and Cape Howe. The Howe Range extends inland from Howe Hill (391 m) on the coast to Mount Carlisle and to, in New South Wales, Mount Victoria (413 m above sea level). Howe Hill is a prominent peak, with minor tor development. While the other summits are subdued, they form the divide and catchments for Lakes Barracoota and Wau Wauka.

Within the New South Wales sector the Table Hills form the major catchment divide between the Nadgee and Merrica Rivers. Mount Nadgee is the highest peak at 542 m above sea level. These hills of late Devonian sediments fall steeply towards a narrow coastal plain.

The remaining dissected uplands surrounding Mallacoota Inlet consist of Ordovician marine sediments. They are undulating to hilly with a complex pattern of ridges and valleys.

The Victorian coastline consists of a barrier complex comprising Quaternary dune systems and, landward of these dunes, are Quaternary alluvial deposits.

Further east towards Cape Howe there are extensive and active transverse dune ridges, coalescing over older vegetated dunes. Reefs of the late Devonian sediments outcrop at Iron Prince Reef and along the coast towards and beyond Cape Howe and the New South Wales coastline.

Howe Flat is a large wetland and, together with the freshwater dune lake of Lake Barracoota, appears to have formed as a result of the silting up of a previous arm of Mallacoota Inlet. Another freshwater lake, Lake Wau Wauka, is a marginal dune lake created by the blocking of small drainage systems by dune encroachment.

The coastline of the New South Wales sector is generally cliffed with small beaches at stream outlets. These streams cross a narrow coastal plain before entering the sea through estuarine lagoons or lakes. Nadgee Inlet is the largest of these. The Merrica River enters the sea in the far north of the descriptive block through a narrow winding gorge. Sea caves are common.

Streams north of Mallacoota Inlet such as Harrison Creek, Dowell Creek, and Little River fall steeply through the dissected Ordovician sediments and enter the various arms of the inlet.

Biological Setting

Most of the block supports lowland sclerophyll forests dominated by silvertop and white stringybark. Rough-barked apple and red bloodwood also occur. Understoreys are generally heathy. Warm temperate rainforest is well developed in the small catchments flowing into Mallacoota Inlet, e.g. Teal, Dowell, David and Harrison Creeks, and in the upper Nadgee River/Battery Creek catchments. Lilly pilli predominates and forms a closed canopy with kanooka and blackwood, lignes and tree and ground ferns are also present.

Riparian forests grow along many of the streams and are dominated by mountain grey gum, yellow stringybark and river peppermint.

Tall open forest occurs in some of the upper reaches of the creeks along the Howe Range. Species in this community are messmate and mountain grey gum. Similar wet sclerophyll forest occurs in the main gullies and steeper south-easterly slopes on the Nadgee Reserve.

Isolated coastal heathlands are found at Mount Nadgee and along the coast itself particularly in New South Wales. Coastal dunes are bare or covered with a dune scrub of coast tea-tree, common boobialla and coast banksia. Coastal banksia woodland and coastal sclerophyll forest (dominated by southern mahogany) occur adjacent to Howe Flat, with banksia woodland (dominated by saw banksia) on deep coarse sands further inland.

The lowland sclerophyll forests, banksia woodlands and coastal heaths support a rich and diverse vertebrate fauna.

The coastal estuaries, lagoons, swamps and, within New South Wales, the extensive rock platforms are important as forage and breeding areas for a range of seabirds.

Species of particular interest seen within the descriptive block include diamond python, the Eastern bristlebird and the grey-headed fruitbat. A number of dingo families have been recorded in the Nadgee Fauna Reserve. Little terns nest in the New South Wales sector and have nested on the Victorian coastline. The Wallagarragh River, Mallacoota Inlet and Lakes Barracoota and Wau Wauka all include a range of native fish.

Cultural Setting

Archaeological evidence has confirmed that Aboriginal occupation focused on the coastal areas around inlets, estuaries and wetlands. The coast and wetlands of Howe Flat and Lake Barracoota appear to have been intensively occupied and more than 150 midden sites have been identified around Mallacoota Inlet.

The first European settlement of the area came with pastoralists from New South Wales seeking fresh pastures for their stock. Pastoral leases were occupied in the area in the early 1840s. These were forest runs with clearing limited to homestead paddocks.

The areas around Mallacoota were not as productive as those further west along the Cann and Snowy Rivers and in the Bendoc-Bonang area and being isolated from markets, agriculture never became widespread. Licenced forest grazing did, however, continue over much of the Victorian sector until the area was included in the national park in 1979.

The Princes Highway was fully trafficable between Melbourne and Sydney by about 1920. This, together with the Genoa-Mallacoota Road remain the only major roads in the vicinity of the descriptive block.

At the time of the early pastoral expansion boat traffic between Melbourne and Sydney increased and, with Cape Howe being a prominent turning point on the shipping lanes, many ships were wrecked on the coast, including the

'Monumental City' which was wrecked on Tullaberga Island in 1853.

A lighthouse was built on Gabo Island in 1860 and in 1862 a telegraph line was constructed through the block between the lighthouse and the Twofold Bay (Eden) settlement. The Victoria/New South Wales border was surveyed in 1870-71 and a number of permanent border markers established.

The block, like so much of Victoria, was the site of gold prospecting. The Spotted Dog Mine on the eastern shore of Mallacoota Inlet operated on a quartz reef between 1894 and 1897. Several other small mines were sunk in this area and around Kingfisher Point. Timber cutting probably occurred in association with the mine and sporadic timber cutting occurred around the Inlet for local use and export. Gypsy Point became a port and tourist accommodation site.

The first Mallacoota township was established at Lake View with a hotel, post office and cemetery in the early 1900s. The present township of Mallacoota was surveyed around 1918.

The inlet has been fished commercially since the 1880s. The fishing industry (dominated by abalone harvesting) and tourism have remained the most important commercial activities in the area. Timber production has, however, also been significant. Railway sleepers were cut east of Genoa and shipped out of Eden between 1940 and 1956, and the New South Wales forests north of Eden have been subjected to intensive logging over the past 15 years to service sawmills and the woodchip export industry based at Eden.

Much of the block has been used for nature conservation purposes for many years. Thus, the first parcels of the national park were reserved around Mallacoota Inlet in 1909 and much of the Nadgee Fauna (now Nature) Reserve was originally reserved in 1957.

WILDERNESS QUALITY

The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) identified much of the area east of Mallacoota Inlet as being of at least relatively high wilderness quality. An extensive area of highest quality is centred around Cape Howe and was classified as Class 5 or 6 in wilderness quality. The remainder of the block in Victoria is of low to moderate quality. The sector in New South Wales was not classified or mapped in the Survey of Wilderness Quality in Victoria but contains land of similar value, with the areas of highest quality also being towards Cape Howe.

Much of the block east of the Lake View Track was included in a wilderness identified in the 1979 inventory (Feller et al. 1979). The 1976 inventory (Helman et al. 1976) also included the Nadgee River catchment and part of the Merrica River catchment in New South Wales as wilderness. These values were confirmed in a New South Wales review in 1986 (Wilderness Working Group 1986).

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The descriptive block is virtually surrounded by State forests on its western boundary, and the waters of Mallacoota Inlet and the ocean on its remaining boundaries.

Small areas of settled (or cleared) land occur on the edges of the block. These include the small holiday settlement of Wonboyn at the northern extremity of the descriptive block in New South Wales, a small cleared farming block known as 'Fairhaven' at Leaser Bluff, and another near Lake View known as 'Coke's land'. Two inlier blocks of cleared farming land occur at Harrison Creek and Dowell Creek. All, with the exception of the Dowell Creek property, are associated with occupied dwellings. Ten holiday flats have been constructed on 'Coke's land'. Cattle and some sheep are grazed on these cleared lands.

There are also a number of points of permanent occupation within the natural lands of the block. These include a house on Baker Bight (Jenkin's P.O.), two dwellings on the edge of the top lake ('Duke's') within an area of revegetated bushland and the New South Wales National Parks and Wildlife Service's ranger station on the Merrica River to the far north of the descriptive block.

The township of Mallacoota, the village of Gypsy Point, together with their associated cleared farmlands, and the cleared farmlands along the Wallagarragh River (near Johnson Bridge), while outside the block, also influence the area's remoteness from settlement values.

The boundaries of settled land have extended since 1972 as native vegetation on freehold land has been cleared. Areas of native vegetation still remain on freehold land, notably to the west of the descriptive block on the Wallagarragh River. Thus the boundary of the settled land may continue to change. These changes will, however, be limited to the general vicinity of existing settled lands and are unlikely to have a major impact on remoteness from settlement values within the block.

All of these influences have resulted in the highest values of remoteness from settlement values being centred on Cape Howe.

Remoteness from Access

Remoteness from access values increase from the inland boundaries of the block towards the coast. The highest values were recorded around Cape Howe. This area around the Cape scored in the Preece and Lesslie survey's highest class for this value and, as such, has the highest values of remoteness from access recorded in East Gippsland.

Major sealed roads influencing remoteness from access values within the descriptive block are the Genoa-Mallacoota Road, the Gypsy Point Road and the Princes Highway. Major unsealed roads are the Wallagarragh Road to Johnson Bridge and the Wonboyn Road.

A relatively large number of minor (two-wheel-drive) roads also influence remoteness from access values. Most are forest roads within New South Wales which provide access to the edges of the descriptive block and form much of its boundary, though there are also a number of minor roads within the block itself including Mines Road, and Newtons Road which are important for recreational access, and Fairhaven and Bucklands Roads which primarily provide access to freehold land.

A network of vehicular (mainly four-wheel-drive) tracks extends and inter-connects with the two-wheel-drive road

network, mainly to the north of Mallacoota Inlet. Most are used for fire protection or recreational purposes. The Barracoota Track and Barracoota Link Track are associated with an important fire break bordering the Howe Range.

A number of vehicular tracks developed in conjunction with previous timber harvesting or previous periodic fire control are disused and now largely overgrown. Public four-wheel-drive tracks to Lake View and Lake Barracoota and management vehicle only tracks to Nadgee Inlet via the coast and Mount Nadgee are the major tracks which extend the network into the more remote sections of the block.

The Nadgee River Catchment and the eastern fall of the Howe Range are the only major areas of the descriptive block without roads or tracks.

Track and road standards vary over time according to use and maintenance. Many become less trafficable after heavy rain. Creek crossings on some of the tracks north of Mallacoota also reduce their trafficability. Some of the Victorian tracks are subject to seasonal closure.

Currently there are approximately 45 kms of trafficable roads within the descriptive block, of which 35 km are within New South Wales. All roads and tracks are listed in Table 107 (see page 293) and their locations shown on Map 16.

Access to most of the descriptive block boundary abutting Mallacoota Inlet can also be obtained by boat. Boat-launching facilities are provided at Mallacoota and Gypsy Point. A number of jetties are associated with the settled areas and picnic sites abutting the inlet.

Walking tracks have been defined between Cape Howe and Nadgee Inlet, around Newtons Beach, and to the Pioneers' Cemetery and Spotted Dog Gold Mine north of Lake View.

The nearest major airfield is south-west of Mallacoota.

Aesthetic Naturalness

This block, like much of Victoria, recorded low values for aesthetic naturalness.

The track network is a major adverse influence. A number of other structures and facilities also depressed aesthetic naturalness values. These ranged from houses to picnic areas to minor historic relics. They are listed in Table 108 (see page 294) and their locations shown on Map 16.

Biophysical Naturalness

Most of the descriptive block has very high biophysical naturalness values. The Victorian sector was mainly allocated to the highest class of biophysical naturalness in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) and, while not covered by this survey, most of the New South Wales sector has a similar level of biophysical naturalness.

Land-use Indicators of Biophysical Naturalness

Little of the descriptive block has been subject to intensive land uses. The major influencing factor is timber production.

Within the Victorian sector a number of small areas have been logged. Some timber was harvested in the 1970s, with most undertaken prior to the 1960s.

Areas west of the Nadgee Nature Reserve within the New South Wales sector have also been subject to timber harvesting. Areas along the Murrumbidgee River and some of the major streams are excluded, however. Limited timber harvesting occurred about 10 to 12 years ago in areas recently added to the Nadgee Nature Reserve.

All areas known to have been logged are shown on Map 16.

Such resource utilisation use will be curtailed since the small areas previously logged are now contained within the Croajingolong National Park and the Nadgee Nature Reserve. Areas within the Nadgee State Forest along the western boundary of the descriptive block in New South Wales are designated for continuing utilisation for timber production.

Some areas were subject to mining last century (see Map 16), with the main site surrounding the Spotted Dog Gold Mine. The impact of mining was localised, although it would have involved some timber cutting in adjacent areas. Little evidence of these activities persists.

Much of the Victorian sector was licenced for grazing prior to the establishment of the national park in 1979. The actual areas utilised are not known, but the very high biophysical naturalness values recorded in the Preece and Lesslie survey for much of the Victorian sector are likely to overstate the condition of at least part of the block. No areas are still being grazed in Victoria.

Other Indicators of Biophysical Naturalness

The descriptive block includes two essentially unmodified river catchments, as identified in Macmillan's (1987) study of East Gippsland rivers and streams. These are the catchments of Lake Barracoota and Lake Wau Wauka. While the New South Wales sector was not surveyed, the catchment of the Nadgee River and Table Creek would have similar values.

Virtually all of the mixed species forests of the Victorian sector of the block consist of mature stands.

All of the Victorian sector was assessed as a site of international botanical significance by Forbes et al. (1981) because it includes 'superb examples of Warm Temperate Rainforest and Coastal Heathland', with the Howe Range containing 'exceptionally well-developed Warm Temperate Rainforest'. Surveyed quadrats of communities represented in the block showed low to negligible levels of weeds.

The whole of the block within Victoria was also identified as a site of State zoological significance by Norris and Mansergh (1981). It includes areas 'suitable as habitat for the diamond python, the eastern bristlebird and includes the camp of the grey-headed fruitbat'. The area also includes closed-forest gullies on Howe Range and the freshwater wetlands of Lake Barracoota and Lake Wau Wauka'. The site incorporated the highest ranked block of the survey.

The extent of introduced faunal species is not known, but vermin are not a problem. Small numbers of rabbits have

been recorded in small formerly cleared areas. No introduced species of fish have been recorded in the lakes or watercourses of the block.

Areas of dieback, mainly in forests along the Lake View Track, were identified in an early 1970 survey and thought to be due to the presence of the root fungus *Phytophthora cinnamomi*. This appears, however, to have been localised and no affected areas are now evident.

OTHER ATTRIBUTES

Size

The following statistics indicate size attributes of the block.

The public land of the descriptive block encompasses an area of approximately 40 160 ha. Of this 42%, or 16 820 ha, is within Victoria. Of the Victorian sector nearly 40% was classed in the survey of wilderness quality in Victoria (Preece and Lesslie 1987) as of at least Class 4 or higher wilderness quality, with about 20% Class 5 or higher wilderness quality. Essentially unmodified catchments in Victoria amount to some 5010 ha, and the largest area presently without roads or vehicular tracks is roughly 11 250 ha, of which about 5300 ha are within Victoria.

The descriptive block is relatively narrow but its effective width is enhanced by its essentially unmodified coastal boundary. The block is about 15 km wide by 36 km long.

Ecological Viability

The block's wide range of vegetation communities (10 different communities are represented in the Victorian sector), its designation as a site of zoological significance, together with the relatively large areas of high biophysical naturalness, and the number of entire, essentially unmodified catchments enhance its potential ecological viability.

Fire hazard is generally high, although the 1971–72 fires are the only major (greater than 1000 ha) bushfires recorded. A number of smaller fires have occurred, however. To assist in reducing this hazard, unlike much of the Nadgee Nature Reserve, most of the Victorian sector is subject to periodic protective burning, although fire-sensitive communities such as rainforest are protected. Maintenance of firebreaks along the Barracoota Lake Track helps reduce the need for direct suppression of fires to the east. Fires are a very important influence on the heathland communities of the area and their future maintenance may require manipulation of fire regimes.

LAND-USE CAPABILITIES

Nature Conservation

The nature conservation values of the descriptive block are very high. The descriptive block contains very good examples of a range of vegetation communities and is important for fauna conservation. Many of the coastal streams are relatively undisturbed; the coastline and adjacent inlets and lakes have significant and diverse geological, geomorphic and landscape values. The stands of riparian and warm temperate rainforest and coastal heathlands have important conservation values, and all the streams and lakes are

significant as they contain no introduced fish species, and a diversity of native fish species. These nature conservation values considerably enhance the descriptive block's wilderness quality values.

Recreation

The waters of Mallacoota Inlet are heavily used by holiday-makers. Jetties along the shoreline provide access to the Spotted Dog Gold Mine, the Pioneers' Cemetery or to defined picnic sites. Most boating activity is allied with fishing on the inlet. Some of the land-locked lakes of the block are suitable for canoeing, although a lack of access limits such activity.

The descriptive block provides little scope for four-wheel vehicle driving, although some, such as the Barracoota Track are occasionally used, particularly as access for remote camping.

Holiday-makers walk, swim, fish, sightsee and are involved in nature study along the ocean beaches, rocky cliffs, headlands and inlets. The block has particularly high value for recreation which is not dependent on vehicular use or facilities.

The most popular walking routes are along the coast. Such walks include day trips to Lake Barracoota, longer trips of three or four days between Mallacoota and Cape Howe and into the Nadgee Nature Reserve, and trips along the Nadgee coastline - where remote camping areas have been developed. Inland walking routes include the Howe Range from Mount Victoria to Howe Hill. This is one of the few ridge-top walking routes available along Victoria's coast. In general, the block has outstanding value for solitude and inspiration in unmodified coastal and near-coastal environments.

Many of the vegetation communities physically limit such recreation because of the particularly dense understoreys of the warm temperate rainforest and riparian forests and the areas of salt marsh and coastal heathland. The large transverse dune systems between Telegraph Point and Cape Howe is not as susceptible to use by walkers. However, the vegetated dunes could suffer if intensively used.

Features of natural interest include inlets and lakes, notably Lakes Barracoota and Wau Wauka and Nadgee Inlet, vegetation communities of special interest such as the warm temperate rainforest, mature forests of Howe Hill, the wetlands of Howe Flat, the heathlands of Nadgee Nature Reserve, summits and lookout points such as Howe Hill and along the Nadgee coastline, landform features such as the cliffs and sea caves of the Nadgee coastline, the gorge of the Merrica River, and large dunes of Cape Howe. Fauna of special interest include the eastern bristlebird and ground parrot.

The climate permits recreational activity throughout the year and water availability is generally not limiting for camping activity. Structures, as listed in Table 108 may limit the

possible experiential value of the area. Such structures may, however, also be of cultural interest.

Agriculture

The public lands of the descriptive block contain some areas with a moderate capability for agricultural use as well as for forest grazing. Such uses are, however, not permitted under existing tenure.

Apiculture

The descriptive block is part of a major honey production area. Beekeepers utilise extensive stands of bloodwood to obtain much of the autumn honey-crop of East Gippsland. Part of the area is also used by beekeepers from New South Wales.

There are nine licensed apiary sites within the block, mostly located near Fairhaven Road to the east of Dowell Creek. The sites are used irregularly according to honey flows and are allocated subject to seasonal application.

Timber Production

The lowland sclerophyll forests, wet sclerophyll forests and riparian forests of the descriptive block have moderate to high capability for sawlog production. Such forests in New South Wales have been utilised for the production of sawlogs and woodchips.

Under present tenure, the timber resources in the Victorian sector of the block, is not available for logging.

Mineral Production

Several mineral deposits occur within the block, although none are currently exploited commercially. Gold has been worked around the shores of Mallacoota Inlet, minor uneconomic deposits of bismuth have been found at Fairhaven, and copper and tin found near Howe Hill. Minor occurrences of mineral sands have also been found under recent dunes along the shoreline. Road gravel has been quarried on the Fairhaven Road.

No exploration licences or other Mines Act tenements, as at August 1989, cover the Victorian sector of the block and under existing tenure exploration or mining is not permitted. Data is not available for the New South Wales sector.

Water Production

There are no proclaimed water supply catchments, gauging stations or reservoirs within the descriptive block. Limited amounts of water are piped from the Merrica River to service the National Parks and Wildlife Service (New South Wales) ranger depot complex in the Nadgee Nature Reserve.

The block has low capability for water production.

Table 107
ROADS AND TRACKS

Ref. no. (Map 16)	Road or track name	Distances (km)		Vehicle track	Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road					
1	Coleman Track			*	CFL	FP	Seasonal closure	Boundary only. Not maintained
2	Cape Horn Track			*	CFL	FP, R	Seasonal closure	
3	Fairhaven Link Track			*	CFL	B, FP, R		
4	Dukes Road			*	CFL	FP, F/h, R		
5	Fairhaven Road		*		CFL	F/h, FP		
6	Old Binns Road		*		CFL	FP, R		Boundary only
7	Ken Spur Track		*		CFL	FP, exL, R		Boundary only. Mainly revegetated
8	New Binns Road			*	CFL	FP, R (R)	Seasonal closure	Part boundary only
9	Lake Track			*	CFL	F/h, FP		Part closed and revegetated. Also known as Fern Tree Gully Track
10	David's Creek Track			*	CFL	Fh, FP, R	Seasonal closure	
11	Duncans Road			*	CFL	FP, exL		
12	Bucklands Road		*		CFL/Shire	F/h, FP, R		
13	Lake View Track			*	CFL	Fh, FP, R		
14	Barracoota Track			*	CFL	F/h, R	Seasonal closure	Part of Howe Range firebreak
15	Barracoota Link Track			*	CFL	F/h		Part of Howe Range firebreak, Part closed and revegetated.
16	Wau Wauka Track			*	CFL	F/h, R		Also known as Howe Range Track
17	Royds Creek Road		*		Forest Comm. of NSW	FP, R, L		Boundary only
18	Xmas Road			*	CFL/FC of NSW	L, exL	(MVO)	Part in Victoria now overgrown
19	Mines Road		*	*	FC of NSW	F/h, L, R		Part now closed and revegetated
20	Ireland Timms Road		*		FC of NSW	L, R		Boundary only
21	Unnamed			*	FC of NSW	L		
22	Merrica River Road		*		FC of NSW	L, R		
23	Loop Road		*		FC of NSW	L		
24	Mountain Road		*		FC of NSW	L, R		Boundary only
25	Old Bridge Road		*		FC of NSW	R		Boundary only
26	Wonboyn Extension			*	National Parks and Wildlife Service (NSW)	R		
27	Newtons Road		*		NP&WS	R		Major beach access
28	Merrica Entrance Firetrail			*	NP&WS	FP	MVO	
29	Nadgee Lake Track			*	NP&WS	FP, RA	MVO	
30	Tabletop Range Track			*	NP&WS	FP, RA	MVO	

KEY:

B - Beesite access
F/h - Freehold access
FP - Fire protection
L - Logging

MVO - Management vehicles only
R - Recreation
RA - Research activities

Note:

1. Management purposes of tracks in NSW indicative only.

Table 108

PUBLIC LAND STRUCTURES

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
1	Cape Horn Picnic Area	Picnic facilities	CFL	R	
2	Gravelly Point, The Narrows, Kingfish and Goanna Bay Picnic Areas	Picnic facilities, jetty	CFL	R	Mainly boat access
3	Jenkins (Baker Bright) P.O.	House	Licensee/CFL		Residence, subject to 20-year agreement
4	Mallacoota Reef (Kingfisher Point) Goldfield	Hut remains, steam boilers, mullock heaps, shafts	CFL	H	Minor relics related to mining in the 1890s
5	Lake View Guest House	Weatherboard house, exotic plantings, fencing, jetty	CFL	H	Erected about 1920 on site of former (1880s) hotel and post office. Former guest house
6	Allan Head Picnic and Cemetery Bight Picnic Area	Picnic facilities, jetty	CFL	R	Mainly boat access
6	Mau Mauka Cemetery	Minor fencing, two recent monuments, (grave sites)	CFL	H, R	Disused cemetery. Dates from 1800s and associated with old township and mines
7	Spotted Dog Gold Mine	Shafts, mullock heaps, machinery bases, water race, cyanide tank site	CFL	H, R	Battery erected 1896 and up to 26 men employed. Fourth largest yielding mine in region
8	Mallacoota (Mines Road) Lookout	Water tank, picnic tables, fireplace	National Parks & Wildlife Services of NSW	R	
9	Ranger Station	Staff residence, researchers lodge, depot (workshop, etc), helipad	NP&WS	MP	Main depot for Nadgee Nature Reserve
10	Newton's Flat Camping area	Ten site low key camping area, fireplaces, picnic tables, pit toilets, water supply	NP&WS	R	Main recreational site in Nadgee Nature Reserve
11	Little River Camp Site	Pit toilet, water tank, fireplace	NP&WS	R	Public access only by walking
12	Harry's Hut (Nadgee River) Camp Site	Research hut, pit toilet water supply	NP&WS	R, RA	Public access only by walking
13	Nadgee Lake Camp Site	Pit toilet and fireplace	NP&WS	R	Public access only by walking
-		Minor telephone lines and cables	Telecom	U	Telephone lines to dwellings on freehold inlier blocks, Jenkin's P.O. and Lake View Lines cross The Narrows, Little River Arm and Harrison Arm
-	Mt Nadgee, Mt Victoria, Howe Hill, Womboyn Hill and Cape Howe trig points	Trigonometric stations	Dept of Property and Services	U	Associated border Cairns at Cape Howe and Carlyle saddle are of historic significance
-	Gabo Island Telegraph Line	Remnant posts and wires	CFL	H	Relics of old telegraph line between Double Bay (Eden) and Gabo Island lighthouse

KEY:

H - Historic interest
R - Recreation

RA - Research Activities
U - Utility

Notes:

1. Trig. stations are shown on Map 16 by symbol.

BLOCK 22 : CROAJINGOLONG COAST

Location and Boundaries

The Croajingolong Coast block extends eastwards from Cape Conran to Mallacoota (Map 10). It covers an area of 112 550 ha and is entirely within the Shire of Orbost.

The public land of the block falls into three major parcels. The western parcel is centred on Dock Inlet and is separated from the central parcel by the township of Bemm River. The Wingan Road separates the central and eastern parcels, with the eastern parcel including most of the Betka River catchment.

Tenure and Land Use

Much of the descriptive block comprises the Croajingolong National Park and most of the remainder is the Sydenham Inlet/Cape Conran Coastal Park or State forest.

The block also encompasses a number of smaller reserves including four reference areas (within the national park boundaries), an education area, and a small sector of coastal reserve. With the exception of the reference areas, these are mainly on the edges of the descriptive block.

The block also has several areas of freehold land. The largest are at Bemm River township and on the eastern-most boundary of the block along the Mallacoota Road. Smaller areas occur at O'Meara Lagoon on the Cann River and at two small isolated sites on Tamboon Inlet. The lighthouse reserve at Point Hicks is owned by the Commonwealth Government.

Details of previous Land Conservation Council recommendations and planning scheme controls covering the block are outlined in Table 109 (see page 302); boundaries of the separate areas appear on Map 11.

Relevant Planning Policies, Strategies and Management Plans

Much of the eastern parcel and the edge of the western parcel at Cape Conran are specifically referred to in the Far East Gippsland Tourism Strategy (DCFL et al. 1988). These areas form part of the specific 'hubs' of tourism for the region. One such hub is centred on Mallacoota and extends into the Croajingolong National Park westward to the Benedore River. Relevant key issues and actions identified for this area include maintaining the experience of relative or apparent isolation in a high quality natural landscape, and promoting interpretive tours and activities. Relevant key issues and actions identified for the Marlo and Cape Conran hub, which cover part of the western portion of the block, include highlighting the distinctive aspects, such as the general peacefulness of the area, providing additional day-visitor facilities at Yeerung River, upgrading the Cape Conran-Cabbage Tree Road to encourage tourist use, and continuing to develop the camping facilities at Cape Conran. The feasibility of developing a major tourist resort on freehold (to the immediate west of the descriptive block) at

Cape Conran or on another site near Marlo is also to be investigated.

The descriptive block includes the majority of the area encompassed by the Croajingolong National Park Draft Management Plan (DCFL 1985). Under this plan most of the block was included in a general natural zone, with smaller areas zoned with more specific objectives, such as development zones (at Wingan Inlet, Thurra River mouth, and Tamboon Inlet).

Relevant management prescriptions proposed include restricting vehicular access at Lake Elusive, management of fire regimes in heaths for botanical diversity and ground parrot habitat, providing camping and picnic areas at Tamboon South, along the western shore of Tamboon Inlet, on Thurra River and on Wingan Inlet, and a number of remote camp sites (on the Red River, Seal Creek and Shipwreck Creek), restrictions on horse riding and motor boating, and implementation of *Phytophthora* hygiene practices.

Management plans have also been prepared for the Benedore River and Seal Creek Reference Area (NPS 1982). Like most reference area management plans, they aim to permit the ecosystem to develop free from human interference, but provide for the protection (primarily in buffer areas) and, where necessary, restoration of the area. They do not propose any development works.

State forest within the block is part of the East Gippsland Forest Management Area. While no management plans have been adopted for this management area, a forest management plan and a wood utilisation plan are in preparation.

The proposed Marlo-Bemm River Strategy Plan (Shire of Orbost, MPE 1987), encompasses the freehold lands in and around the western end of the block. The plan supports the promotion and development within, and adjacent to, the town of Bemm and the retention of rural land uses around Cape Conran.

A draft fire-protection plan has been prepared for the Department of Conservation, Forests and Lands' Orbost region. Public submissions on this plan are presently being considered by the Department. Two strategic fuel reduction burning zones (Priority 2) are proposed across the block - to the east of the Cann River and to the east of the Wingan River. Priority 1 burning zones about the Cape Conran camping area, the Bemm River township and Mallacoota. Other than reference areas and localised areas of fire-sensitive vegetation, the remainder of the block is included in general fuel reduction zones (Priority 3 and 4). Slashed fire breaks follow the alignment of a number of the block's tracks, and new road sections are proposed in association with the Wingan River strategic corridor.

The Betka River catchment, upstream of a pumping station near the Mallacoota aerodrome, is within a proclaimed water supply catchment. This catchment lies mainly within the

block and supplies the water to the township of Mallacoota. It is not presently subject to a land-use determination.

The proclaimed water supply catchment of Bemm River borders the block boundary north of the township of Bemm River and an offtake provides the town with water. No land-use determination covers this proclaimed catchment either.

The provisions of the State Environment Protection Policies for the Air Environment and for the Waters of Far East Gippsland also apply.

Physical Setting

The descriptive block contains land of three major geomorphic units - remnants of the dissected uplands, high terraces and fans of the coastal plains, and the barrier complexes of the coastal plains.

The dissected upland remnants contain areas of Ordovician marine sediments between Mount Everard and the Wigan River and south of Genoa Peak. Lower Devonian granites outcrop around Mount Everard, Genoa Peak, and minor areas in between and on the eastern edge of Tamboon Inlet (Tamboon Hill). Granite also outcrops at Point Hicks and Petrel Point. The dissected upland remnants are steep to hilly, with the steepest slopes on the Ordovician sediments, and are generally higher than 100 m, rising to 300 m above sea level. The prominent peaks of Mount Everard and Genoa Peak exceed 300 m in elevation.

Incised gullies have eroded into these uplands. Soils on the Ordovician sediments are grey clay and clay loams, while those on granite are sandy and highly erodible.

The broad terraces and fans of the coastal plains comprise of large areas of Tertiary non-marine sediments. They extend across the whole of the descriptive block surrounding the dissected upland remnants and landward of the barrier complexes. The largest area lies between Point Hicks and Mallacoota. Topography in these areas is gently undulating. Recent alluvial deposits occur along some of the river valleys, such as parts of the Thurra, Wigan and Betka Rivers, and around Sydenham and Mallacoota Inlets.

The coastal areas contain broad stretches of wind-blown sands. These have generally formed parabolic dunes aligned with the prevailing winds. The dunes are mostly low and vegetated in the west, while further east, e.g. north of Point Hicks, they are largely bare, reaching over 100 m in height. Sea cliffs up to 80 m high formed of strongly folded Ordovician slates, schists and sandstones, occur between Sandpatch Point and Mallacoota.

Estuarine lagoons occur at most of the river mouths, often being separated from the sea by a sand bar. Larger lagoons include Sydenham Inlet, a shallow (generally up to 2 m deep) reed and swamp-fringed lagoon, and Tamboon Inlet, a deeper (6 to 12 m deep) sandy-fringed lagoon. Sydenham Inlet is frequently opened artificially. Smaller estuarine lagoons occur at the Wigan Inlet, which is permanently open, and at the mouths of Yerung River, Thurra River, Mueller River, Easby Creek, Red River, Benedore River and the Betka River. Dock Inlet and Lake Elusive, in contrast, are freshwater coastal lagoons, where small drainage systems have been blocked by dune encroachment.

The descriptive block straddles three major water basins, as defined by the Australian Water Resources Council. It includes the complete catchments of the smaller coastal stream systems of Yerung River, Dock Inlet, Lake Elusive, Red River, Benedore River, Shipwreck Creek and the Betka River, as well as the lower reaches of the Bemm, Cann, Thurra, Mueller and Wigan Rivers.

Biological Setting

The most extensive vegetation community is lowland sclerophyll forest. The overstorey of this community is dominated by silvertop and white stringybark, but red bloodwood (east of Wigan Inlet), southern mahogany and saw banksia are also present. Understoreys are generally low and relatively open. The lowland sclerophyll forest grades into banksia woodland communities near the coast.

Extensive heathlands are found in low-lying areas and where drainage has been impeded along many of the streams. Primary dune scrub is well developed along most of the coastline, save for east of Little Rame Head where a cliff-top heathland subcommunity exists.

Riparian forest grows along many of the streams with its overstorey dominated by mountain grey gum, yellow stringybark and river peppermint. Understoreys are frequently multi-layered and dense. Small areas of well-developed warm temperate rainforest occur along the lower reaches of the Wigan River, some of the upper reaches of the Mueller River, Lake Elusive, the Benedore River and Shipwreck Creek.

The lowland sclerophyll forests, banksia woodlands and coastal heaths support a rich and diverse vertebrate fauna including the long-nosed potoroo, southern brown bandicoot, smoky mouse and eastern pygmy possum. The coastal beaches are important for birds such as the hooded plover, and the heathlands for the ground parrot and eastern bristlebird.

Cultural Setting

Occupation of the block by Aborigines focused on the areas around inlets, estuaries and wetlands. Archaeological surveys have identified a large number of shell middens between Tamboon Inlet and the Betka River. These contained chiefly the remains of rock-platform shellfish. They appear to represent transitory camps made by small groups moving along the coast from one inlet to another or making brief visits to the coast from inland camps.

Much of the block has been little settled or used by Europeans. Most activity, such as fishing, logging, agriculture and tourism is centred on the Genoa River and Mallacoota Inlet in the east. Shipwrecks along the coastline led to the construction of a lighthouse at Point Hicks in 1890. While of little agricultural interest (as is perhaps evidenced by the absence of freehold land), most of the block has been covered by grazing licences in the past and subjected to low intensity, intermittent, grazing since at least the turn of the century. Farms were, however, selected along the Genoa River and around Mallacoota in the early 1900s.

Timber cutting appears to have occurred mainly since World War 2, although there was selective cutting earlier. Commercial fishing has been an important industry in the

area for many years, with many of the estuarine inlets licensed for oyster farming since the early 1900s. Commercial activity is now focused on Mallacoota Inlet which in recent times has become a major base for the abalone industry.

Recreational interest in the area has also focused on the inlets. In 1909 a temporary reserve for a national park of 4560 ha (only part of which is within the block) was gazetted around Mallacoota Inlet and another of 1870 ha at Wigan Inlet. Township blocks were sold at Mallacoota, Bemm River and Tamboon in the 1920s, with large numbers of blocks released at Mallacoota in the late 1930s, and in the 1950s. Most are holiday homes.

Recreational use increased considerably in the 1970s and 1980s, especially in those areas now included (since 1979) in the Croajingolong National Park.

WILDERNESS QUALITY

Much of the descriptive block is of at least relatively high wilderness quality. The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) classified a number of areas within the block as Class 4 or higher total wilderness quality. These focused on the coastline areas such as around Dock Inlet, between Sydenham Inlet and Point Hicks, and Point Hicks to Little Rame Head, as well as areas within the Betka River catchment.

The areas of highest wilderness quality abutted the coastline, with the largest consolidated area identified being between Wigan Inlet and Little Rame Head. It has large areas identified as Class 5 or higher by the Preece and Lesslie. This area is one of the largest so classified areas in East Gippsland.

The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The main areas of settled (cleared) land influencing remoteness from settlement values are external to the block's boundaries. They are all on freehold land and include farm land on the Marlo Plains west of Cape Conran, the settlements and adjacent farming lands along the Princes Highway including those around Cabbage Tree Creek, Cann River and Genoa, and the township of Mallacoota. Such settled land only abuts the western (along the Cabbage Tree-Conran Road) and part of the eastern (along the Mallacoota Road) edges of the block.

Settled land also occurs within the boundaries of the block, again all being on freehold land, the most notable being the township of Bemm River. This small town has only a small resident population, although swollen during vacation periods. The settlement has few facilities but is serviced by power and reticulated water. It has a hotel and camping ground. Fishing on Sydenham Inlet is the major interest of the town. A large farm holding surrounds the urban settlement.

The Mallacoota aerodrome at the eastern edge of the block is the only other area of settled (cleared) land within the block.

While there has been some clearing of freehold land within the block since 1972, e.g. along the Mallacoota Road, the boundaries of the settled land have changed little since that time. There is, however, potential for change as uncleared freehold land remains in areas surrounding the block. These include areas west of the Cabbage Tree-Conran Road, Lomond Hill, and at Mallacoota and, within the block, at Bemm River, along the Mallacoota Road, e.g. at Double Creek, and notably the more isolated freeholdings at O'Meara Lagoon.

A number of points of occupation within the natural areas of the block also influence remoteness from settlement values. The Point Hicks lighthouse compound is permanently staffed, while the holiday shacks at Furnell's Landing, Tamboon, Tamboon South and the Cape Conran cabin complex are occupied on a permanent or semi-permanent basis. Points of occupation within the block are likely to remain relatively unchanged under present management and tenure.

All of the influences now operating have resulted in the highest remoteness from settlement values being around Dock Inlet and between Point Hicks and the Benedore River. Preece and Lesslie indicate that this latter area is the largest area of the highest class of remoteness from settlement value recorded in East Gippsland.

Remoteness from Access

Numerous roads and tracks influence the degree to which the block is remote from constructed vehicle access routes. Remoteness from access values are generally higher towards the coast where the presence of major roads and the density of tracks tends to be lower.

The western portion of the descriptive block is bounded on its landward edges by three major roads (the Cabbage Tree-Conran Road, the Princes Highway and the Sydenham Inlet Road) which have a major adverse influence on remoteness from access values, with the area of highest recorded value being effectively equidistant from them and centred on Dock Inlet. All three roads are major primary access roads, with the Sydenham Inlet Road providing the only all-weather access to the township of Bemm River. The Far East Gippsland Tourism Strategy has recommended the upgrading of the Cabbage Tree-Conran Road.

Two minor roads are within the block - Gravel Road and an unnamed minor road which follows the west branch of the Yerung River.

A number of vehicular tracks occur in this portion of the block, with the highest density of tracks being north of the old coast road. This track network is associated with former logging activities and some are no longer maintained. As logging continues, however, new tracks may be constructed. The Pearl Point track provides access to the SEC transmission line and is the only track within the catchment of Dock Inlet. Most other tracks are of recent origin and constructed for fire protection purposes, or for recreational access.

The major influence on remoteness from access values in the central portion of the block are the major and minor roads linking the Princes Highway with the important and well-established recreation sites at Tamboon and Wigan Inlet

and, to a lesser degree, the Thurra River mouth and Point Hicks.

The central portion of the block also includes a number of vehicular tracks associated with former logging activities, but many tracks provide for recreational access, mainly in and around Tamboon Inlet, and for fire access. The two largest untracked areas are between Sydenham Inlet and Tamboon Inlet, and the Clinton Rocks Track and the Point Hicks Road.

Most of the roads influencing values in the eastern portion of the block are distant from the coast and this, together with a relatively low density track network, has led to a large area of high value being recorded around Sandpatch Point. The identified area is probably conservative as the Betka Track was given a higher classification in the Preece and Lesslie survey than is its actual standard.

Access within the eastern portion includes short minor roads, one providing recreational access to Genoa Peak. All other access within this portion of the block are of vehicular track standard. Most of these tracks follow minor catchment divides and are mainly used for fire protection purposes or recreational access. The largest untracked areas are around Genoa Peak and the Benedore River.

Many of the tracks are untrafficable after heavy rain and are subject to closure during wet periods.

All of these roads and tracks are listed in Table 110 (see page 304) and their locations shown on Map 16. Currently there are approximately 74 km of trafficable roads within the descriptive block.

Constructed walking tracks include nature trails at Wigan Inlet and on Double Creek near Mallacoota; tracks into the Thurra dunes, to the Wigan River rapids, to Elusive Lake, the Yeerung River gorge, and for beach access at Dock Inlet and between Bemm River and Pearl Point.

There is a small aerodrome suitable for light aircraft (and used for general air-charter work), the Mallacoota Aerodrome, which is at the eastern edge of the block near the mouth of the Betka River. There is also another authorised landing area, the Marlo Aerodrome, about 10 km west of the descriptive block.

Aesthetic Naturalness

Like most other areas of Victoria, the track network was the major influence on recorded aesthetic naturalness values, and values were generally low throughout the block. The highest values recorded were to the west of Point Hicks.

A number of other structures also influence aesthetic naturalness values. These range from well-established camping grounds, as at Cape Conran (Banksia Bluff) and the Mallacoota aerodrome to isolated holiday shacks and trig stations. Several transmission lines also cross the block, the most notable being along the coastline between Cape Conran and the township of Bemm River. These structures are listed in Table 111 (see page 307) and their locations shown on Map 16.

Camp sites, without structures, have been defined at Red River, Benedore and Seal Creek.

Biophysical Naturalness

The majority of the descriptive block has very high biophysical naturalness values. The block was mainly allocated to the highest class (Class 4) of biophysical naturalness in the Preece and Lesslie survey (1987). Lower values were recorded towards the northern edge of the block, with the major influencing factor being timber production.

Land-use Indicators of Biophysical Naturalness

Extensive areas of the block have not been subject to intensive land uses. The only intensive use is timber production.

Most timber harvesting has been undertaken in the lowland sclerophyll forests including some areas now within the Croajingolong National Park. All areas known to have been logged are shown on Map 16. Selective logging also occurred in the 1960s in the Swan Lake and lower Mueller River catchments, as well as in earlier times, in the area adjacent to the settlement of Cabbage Tree Creek (including some areas south of the Old Coast Road) and around Mallacoota.

Those sectors of the descriptive block within State forest are available for timber production.

Much of the block has been licensed and used for grazing. Accordingly, the biophysical naturalness values recorded in the Preece and Lesslie survey may over classify parts of the block. Use appears to have been intermittent and of low intensity. Grazing areas were, however, frequently burnt. Many of the grazing blocks covering the area were vacant in 1974 and by 1985 none were licensed. There is presently no licensed grazing in the area.

There has been no recorded mining of minerals in the block, although gravel has been quarried adjacent to major roads.

Other Indicators of Biophysical Naturalness

The block was covered by Macmillan's (1987) study of East Gippsland rivers and streams which identified nine essentially unmodified catchments. These are, from west to east, Dock Inlet, an unnamed tributary of the Thurra River south of the Point Hicks Road, Elusive Lake, and a large number in the eastern portion - Little (Easby) River, Red River, Benedore River, Shipwreck Creek, and two unnamed tributaries of the Betka River south of Genoa Peak. The status of the Elusive Lake catchment is being reviewed however.

Little detailed information on the quality of the vegetation is available. The block was, however, within the area covered by (Forbes et al. 1981). Quadrats surveyed in communities represented in the block had low to negligible levels of weeds. Saltmarsh communities like those at Tamboon and Wigan Inlets had higher levels of weed composition, but no areas of native vegetation sampled averaged higher than 10% weeds (see Map 7). Only two exotic plant species were recorded in a more detailed survey covering the Benedore River and Seal Creek Reference Areas (NPS, 1982).

Forbes et al. also included virtually the whole of the descriptive block within sites of international botanical significance. Three large sites were identified. The 'coastal I' site encompassed most of the block north of Little Rame Head (as well as an area of equal size north of Mallacoota).

The significance of the site included its valuable representation of high quality coastal and lowland vegetation communities, notably the superb examples of warm temperate rainforest (these are, however, largely outside the block), the mainly dry coastal heathland (notably at Seal Creek), and the undisturbed lowland sclerophyll forest and coastal sclerophyll forest (Benedore River and Seal Creek), well-developed primary dune scrub, and a range of rare species.

The 'coastal II' site extends between Little Rame Head to Point Hicks inland to the boundary. The significant values of the site were similar to the 'coastal I' site and, in particular, related to stands of warm temperate rainforest, mainly wet coastal heathland, plus a range of communities of high quality including riparian forest about Lake Elusive and Mount Everard and well-developed and diverse primary dune scrub. Many interesting and rare species were also mentioned. The 'coastal III' site extended from Point Ricardo (to the east of Cape Conran) to Point Hicks and inland to the Old Coast Road and the Little River catchment (north of the block boundary). Significance was based on highly-rated examples of diverse communities, notably outstanding banksia woodland, lowland sclerophyll forest, and coastal heathland. The site also includes well-developed rainforest (north of the block and in an area subject to timber harvesting) and a number of rare species.

Timber resource information indicates that most (approximately 94%) of the mixed species forests of the block consists of mature stands.

Two areas in the block were identified as sites of (one State the other regional) zoological significance in the Sites of Zoological Significance in East Gippsland study (Norris and Mansergh 1981). The site of State significance is at the edge of the block centred near the junction of the West Wingan Road and the Wingan Link Road, and is based on records of the broad-nosed bat. This species has, however, subsequently been recorded from a number of additional sites.

A site of regional significance included the Seal and Shipwreck Creek catchments and extends from the Benedore River to the Betka River. Species of particular interest were the turquoise parrot, eastern mourning skink and ground parrot. The delineated area included a good example of the coastal heath and open forest areas of coastal East Gippsland and their associated animal communities.

Information about the extent of non-indigenous faunal species in the block is limited. Nolan (1981) recorded that most of the block was virtually rabbit free, with areas at the edges of the block and around Point Hicks having some rabbits or occasional build-up of numbers.

Numerous areas within the block were identified in a 1975 survey (DCFL 1985) as being affected by dieback, presumably caused by *Phytophthora cinnamomi*. Worst affected areas at that time were west of the Mallacoota Aerodrome and west of the West Wingan Road. Dieback is now less evident.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the descriptive block encompasses an area of 112 550 ha. Of this, about 45% was classed in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) as of at least Class 4 wilderness quality with about 15% of Class 5 and above wilderness quality.

Essentially unmodified catchments, other than those being reviewed, comprise approximately 20 020 ha of the block and the largest area presently without roads, vehicular tracks or other major structures covers about 5500 ha.

The descriptive block is relatively long and narrow with major roads or settlement areas effectively dividing it into three parts. Its width is, however, enhanced by its essentially unmodified coastal boundary. The block is 90 km long and between 5 and 22 km wide.

Ecological Viability

Most of the essentially unmodified catchments in the block consist of the entire river or lake catchments. The block also includes a large number of different vegetation communities (nine in all) and a larger number of subcommunities. These factors, as well as the block's apparent low number of exotic species, plus its high values for remoteness from settlement and access, and naturalness would all contribute to its potential ecological viability.

The block has a very high fire hazard. Much of the block has been burnt since 1939, including virtually all of the centre and eastern portions in the extensive 1983 East Gippsland fires. Major bushfires (> 1000 ha) have been recorded in 1952, 1959, 1967, 1980 (Cape Conran area), 1983 (126 100 ha), 1987 and 1988 at Sydenham Inlet. Many have been started by lightning, but some were deliberately lit or escaped from burn-offs.

Fire control programs are undertaken to protect Mallacoota, as well as the township of Bemm River. The block is subject to periodic protective burning, with the designated protective burn corridor being along the Stony Peak Road and the Betka Track to form a major protective line for the township of Mallacoota. Blocks to the west of Bemm River are regularly burnt.

Fire is also an important natural process on which a number of species in the block, notably those of the heathland communities, are dependent. The fire regimes are actively manipulated in areas inhabited by the ground parrot.

LAND USE CAPABILITIES

Nature conservation

The nature conservation values of the block are very high and this has been recognised by previous Land Conservation Council recommendations which have included much of the block within the Croajingolong National Park.

The block contains very good examples of a range of vegetation communities, including small stands of warm temperate rainforest and extensive areas of coastal heathland. Associated fauna are the rare smoky mouse and ground parrot. Many of the streams are undisturbed, contain no introduced fish species, and support good populations of native fish. The coastline and adjacent inlets have significant

and diverse geological, geomorphic and landscape values, including the only cliffed part of the East Gippsland coastline.

Many of these nature conservation values are enhanced by the wilderness quality value of the block and, other than the possible need to manipulate fire regimes in heathland areas for the benefit of the ground parrot, their maintenance is likely to be compatible with the maintenance or enhancement of wilderness quality.

Recreation

The area is used relatively heavily for recreation. Most use is, however, concentrated at the major coastal estuaries and inlets. Remote walking is a common activity and camping at most of the designated camp sites within the Croajingolong National Park is subject to quotas during popular (school holiday) seasons. The area, especially on the more remote sections of the coast, has a high capability for solitude and inspiration.

Other recreational use includes car-based camping, picnicking, swimming, canoeing, sightseeing, nature study and fishing, with boating and boat-based fishing occurring on Sydenham and Tamboon Inlets. The Old Coast Road between the Bemm River township and the Cann River is used for sightseeing and a number of the forest and park tracks are used for recreational monitoring. A number of four-wheel-drive tracks lead to some isolated points on the coast and are becoming increasingly popular destinations for motorists.

The most popular off-track walking route in the block is along the coastline of the Croajingolong National Park. Indeed, this is one of the most popular wilderness walks in Victoria. The route is often walked in sections, such as between the Thurra River mouth and Wingan Inlet, or from Wingan Inlet to Mallacoota. It is very challenging and inspiring. Other less demanding walking routes include those to the summit of Mount Everard along the Mount Everard Track, the Point Hicks dunes, the Wingan River rapids, and



Bushwalkers at the mouth of the Red River

those along the Old Coast Road near the Shipwreck Creek camp and Little Rame Head.

Off-track walking is possible in dry heathland areas, in the open understoreys of the lowland sclerophyll forests, along the beaches, and along some of the rocky coastline and steeper creek beds. However, the dense vegetation of much of the block physically limits such activity.

Natural features of particular interest include mountain peaks and rocky headlands, sandy ocean beaches, cliffs, coves, rock pools and sea caves, river inlets, estuaries and rapids, enclosed freshwater lakes, certain plant communities and a number of the species of wildlife.

The two prominent mountain peaks of the block, Mount Everard and Genoa Peak, both offer wide-ranging 360° panoramas. Pearl Point, Clinton Rocks, Point Hicks, Petrel Point, Rame Head, and Little Rame Head are all popular destination points. The Bemm, Thurra, Wingan and Benedore Rivers are canoeable, and rapids occur on the Bemm and Wingan Rivers. A gorge has formed on the east branch of the Yeerung River. Enclosed lakes and swamps of interest include Dock Inlet, Thurra Swamp and Elusive Lake. Pockets of warm temperate rainforest such as at Jungle Creek and Double Creek, are of interest, while the large diverse heathlands are perhaps of greatest natural interest. The birdlife, notably the ground and turquoise parrots, along with the waterbirds (cormorants and pelicans on the inlet waters) is another attractive feature.

The soils of the area are variously subject to water erosion, compaction, nutrient leaching, wind erosion, salting and waterlogging. However, only some of those areas subject to waterlogging and wind erosion would be limiting for dispersed recreational use. Constructed tracks and roads may pose serious soil erosion problems on steep slopes in the hilly areas or where they cross depressions and, more particularly, in dune areas. While the weather is not generally limiting for recreational use, most use occurs in the warmer months.

Agriculture

Though much of the near coastal dune areas has low capability for agriculture, parts of the remainder have a moderate capability. Existing tenure does not, however, permit such use.

Capability for forest grazing is moderate over most of the block, but none of the block is presently being grazed.

Apiculture

The descriptive block is part of a major honey production area. Beekeepers utilise extensive stands of red bloodwood which provide an autumn honey crop for East Gippsland apiarists. It is also part of the area used by beekeepers from New South Wales.

There are a number of licensed apiary sites within the descriptive block. Most are near Mallacoota and Genoa on the eastern edge of the block. Three are adjacent to the West Wingan Road.

Timber Production

Most of the forests of the block have moderate to high capability for sawlog production.

Valuable species include silvertop, white stringybark, yellow stringybark, messmate and mountain grey gum. The area's proximity to sawmills at Cann River and Cabbage Tree increase the value of the timber of the block. While regeneration following intensive logging and effective silvicultural treatment has been successful, large areas have been damaged by the 1982/83 fires.

The net available area of timber resources, given current tenure and operational standards, consists of approximately 25 918 ha of mixed species forest. The descriptive block lies within the East Gippsland Forest Management Area. The block's contribution to the regional sustainable yield of this management area is being calculated by the Department of Conservation, Forests and Lands, but was not available prior to publication.

Mineral Production

Several known mineral deposits occur in this block, although they are not currently exploited commercially. Mineral-bearing sands have been found at Cape Conran, Pearl Point, Thurra River and Betka River on the coast; copper ore occurs between Hard to Seek Creek and the Princes Highway, molybdenum has been found near Genoa Peak and tungsten recorded near Genoa.

Quarries for roading material and materials suitable for gravel and stone extraction are found scattered throughout the block.

Most of the block has not been subject to mineral exploration since at least 1970. One mineral exploration licence is, however, current, as at August 1989, in the block covering part of the Yeerung River catchment (El 1831). There are no active mining tenements in the block.

Under existing tenure about 49% of the block is potentially available for mineral exploration or mining.

Water Production

The block has a moderate capability for water production, although the headwaters of the major streams flowing through it, the Bemm, Cann, and Thurra, lie outside it.

It contains the proclaimed Betka River water supply catchment, and water is also drawn from the Bemm River near the block boundary to provide township supply.

Table 109

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROLS

Land use	LCC Reference ¹	Approx. area (ha) within block	Planning control scheme ²	Special provisions ³
National park	A6 (Croajingolong)	65 120	Part public purpose reserve - national park, and part public open space	Logging, grazing, hunting, and use of firearms not be permitted; car access be permitted to a number of points on the coast including the Point Hicks area and Wingen Inlet; that commercial fishing in Tamboon Inlet be phased out by December 1991; that honey production be permitted; that consideration be given to providing low-cost accommodation near Point Hicks
Reference areas	B8; B12; B13; B14 (Camp Creek; Barwang; Benedore River and Seal Creek)	3 870	Public open space	Nil
Education areas	K3 (Cape Conran)	780	Public open space	Nil
Coastal park	A16 (Sydenham Inlet- Cape Conran)	10 420	Public open space	That the essentially natural condition of the catchment and environs at Dock Inlet be conserved and protected, camping be continued to be permitted at approved sites, and the area be zoned to accommodate hunting in season
State forest	E1	18 380 ⁴	Balance of shire blanket control	See below
	E11, E12, E14	2 080	Balance of shire blanket control	These areas be available for recreation and township uses as appropriate, which fulfil aims of local and regional planning strategies
	E15	-	Balance of shire blanket control	Rainforest protection ⁵
	I6	-	Balance of shire blanket control	Natural features zone between 20 and 300 metres from river - no timber harvesting or gravel extraction, only essential new roading

Water production	D3, D5	(Subject to land use determination)	Public purposes reserve - Mallacoota Waterworks Trust	Nil
Stone reserve	P6	3	Balance of shire blanket control	Nil
Aerodrome reserve	Q12	160	Public purposes reserve Department of Civil Aviation - Aerodrome	(Under the control of the Federal Department of Transport and Communications)
Water frontage reserve	I1	100	-	Nil
Coastal reserve	H2	90	-	Nil
Agriculture (Bemm River)	Not applicable	515	Rural 'A' Zone, Rural Rural 'C' Zone and balance of shire blanket control	
O'Meara Lagoon		130		
Genoa River		590		
Double Creek,		30		
Cape Conran (freehold)		60		
Coastal settlement	Not applicable		(Tamboon Inlet)	
Lighthouse Reserve	Not applicable	190	Not applicable	(Under the direct control of the Federal Department of Transport and Communications)

Notes:

1. Refers to LCC East Gippsland Area Review, Final Recommendations, 1986.
2. Refers to the Shire of Orbost Planning Scheme.
3. Specific provisions relevant to area in addition to the standard land use provisions of LCC recommendations (as outlined in Appendix II).
4. Area includes LCC Recommendations E15 and I6.

Table 110

ROADS AND TRACKS

Ref. no. (Map 16)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major Road	Minor Road	Vehicle Track				
1	Cabbage Tree--Conran Road	*			Shire	FP,PA,R	Nil	Boundary (part only) (part sealed)
2	Princes Highway	*			Roads Corp	PA	Nil	Boundary only - bitumen
3	Gravel Road		*		CFL	FP (ex L), R		
4	Unnamed			*	CFL	FP		
5	Fred Track			*	CFL	FP (ex L)		
6	Olivers Track			*	CFL	FP		Part overgrown
7	Sydneham Inlet Road (Bemm River Road)	*			Roads Corp	PA		Part boundary, sealed road, 5.5 m wide, in good condition, no planned upgrading. A declared Tourist Road
8	Trial Track			*	CFL	FP		Part overgrown
9	Swampy Ridge Track			*	CFL	FP	Seasonal closure	
10	Hekarive Trail			*	CFL	FP	Seasonal closure	
11	Fletchers Stretch			*	CFL	FP	Seasonal closure	
12	Pearl Point Track			*	CFL/SEC	FP, U	Seasonal closure/ part MVO	Includes a number of substantial bridges
13	Yeerung River Road			*	CFL	FP, R	Nil	Access to Yeerung Gorge
14	East Yeerung Track			*	CFL	FP, R	Nil	
15	Old Coast Road			*	CFL	FP, R	Seasonal closure	
16	Cimati Track			*	Shire	F/h		
17	Old Coast Road		*		CFL			Boundary only
18	Swan Lake Track			*	CFL	FP,R		
19	Unnamed			*	CFL	FP		
20	61 Fire trail			*	CFL	FP	MVO	
21	61 Link Track			*	CFL	FP	MVO	
22	O'Meara Track			*	CFL	F/h,FP		
23	Unnamed			*	CFL			
24	Broome Track			*	CFL	F/h,FP		
25	Tamboon Road		*		Shire	F/h,G,FP,R		
26	Point Hicks Track		*		CFL	FP,R		Part boundary
27	Fishermen Track			*	Shire	F/h,FP,R		
28	Clinton Rocks Track			*	CFL	FP,R		

29	Lighthouse Track		*	CFL	R,U	Part MVO	
30	Bald Hills Track		*	CFL	R, FP		Access to Mueller River campsite
32	Mueller Jeep Track		*	CFL	FP		Boundary only
33	Mueller East Track		*	CFL	FP		
34	Mueller Link Track		*	CFL	FP,(R)		Boundary only
35	Humphrey Track		*	CFL	FP		
36	West Wingan Road	*	*	CFL	FP,R		
37	Gus Track		*	CFL	FP		
38	Cicada Trail		*	CFL	FP,R		
39	Camp Creek Track		*	CFL	(ex L)		
40	Unnamed		*	CFL	(ex L)		
41	All Day Track		*	CFL	FP	MVO	
42	Gale Hill Track		*	CFL	R, FP		
43	Elusive Lake Track		*	CFL			
44	Wingan Inlet Track		*	CFL	R, FP		
45	Boundary Track		*	CFL	R, FP	Seasonal closure	
46	South Road		*	CFL	L, FP	Seasonal closure	
47	Unnamed		*	CFL			
48	Broome Creek Track		*	CFL	L, FP	Seasonal closure	
49	Toby Track		*	CFL	L, FP	Seasonal closure	
50	Surprize Creek Track		*	CFL	L, FP	Seasonal closure	
51	Wingan Link Road		*	CFL	L, R, FP	Seasonal closure	Part boundary
52	East Wingan Track		*	CFL	R, FP, L	Seasonal closure	
53	Sandpatch Track		*	CFL	L, R, FP	Seasonal closure	
54	Hard to Seek Track		*	CFL	L, R, FP		
55	Boggy Creek Track		*	CFL	L, FP (R)	Seasonal closure	Part boundary
56	Stoney Peak Road		*	CFL	L, R, FP	Nil	
57	Roger Track		*	CFL	ex L	Seasonal closure	Disused, overgrown
58	Genoa Peak Road		*	CFL	R, FP	Nil	
59	Mallacoota Road	*		Roads Corp	PA	Nil	Sealed 5.5 m road in good condition. A declared Tourist Road. Curve improvements planned. Boundary only

Table 110 (continued)

Ref. no. (Map 16)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restrictions	Comments
		Major Road	Minor Road	Vehicle Track				
60	Unnamed			*	CFL			
61	Miners Track			*	CFL	FP	Seasonal closure	Ford crossing
62	Sheep Station Creek Track			*	CFL	FP, L		Firewood collection only
63	Pipeline Road		*		Shire	U	Closed to public	Access to pumping station and sewerage system
64	Aerodrome Track			*	CFL	R, FP	Seasonal closure	Part through aerodrome reserve
65	Centre Track			*	CFL	R, FP	Seasonal closure	Part through aerodrome reserve
66	Old Coast Road Track			*	CFL		Seasonal MVO	
67	Betka Track			*	CFL	R, FP	Seasonal closure	Part of main fire break for Mallacoota
68	Shipwreck Track			*	CFL	R, FP	Seasonal closure	
69	Rocky Ridge Track			*	CFL	L, R	Seasonal closure	
70	Red River Track			*	CFL	R, FP	Seasonal closure	
71	Unnamed			*	CFL			
72	Easby Track			*	CFL	R, FP	Seasonal closure	

KEY:

F/h - Freehold access
 FP - Fire protection
 L - Logging
 MVO - Management vehicles only

PA - Primary access
 R - Recreation
 U - Utility access

Table 111

PUBLIC LAND STRUCTURES

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
1	Banksia Bluff Camping Ground	Major 150 site camping ground, toilets, day visitor areas, fireplaces	CFL	R	At edge of block
2	Cape Conran Cabin Complex	Cabins, kitchen, halls, toilets, managers' residence, rangers office and workshops	CFL	R, MP	At edge of block
3	Yeerung River Car Park	Lookout platform	CFL	R	Toilet block to be constructed
4	-	Former cattleman's hut and stockyards	CFL	H	
5	-	22 kV electricity supply distribution line	SECV	U	Main transmission line serving Cann River and Mallacoota
6	Bemm River Transmission Line	22 kV electricity supply distribution line	SECV	U	
7	O'Meara Lagoon	Hut, house ruin, fencing	Freehold	P	
8	Furnell Landing	Holiday shacks, ramp, jetty	Freehold, CFL	P, R	
9	Tamboon township	12 holiday shacks, jetties	Private freehold, CFL	P, R	Toilet and camp site, BBQs are proposed
10	Tamboon South township	20 holiday shacks	Private freehold	P, R	
11	Tamboon Inlet POs	Fishing shacks (5)	CFL/Private	R,P	Under annual licence to be phased out by 1990
12	Pt Hicks Lighthouse	Lighthouse keepers cottages, associated buildings	Federal Department of Transport and Communication	H, U	Historic interest - built 1890
13	Thurra River Camp	Camp sites (25), toilet, fireplaces	CFL	R	
14	Mueller River Camp	Camp sites (13), toilet	CFL	R	
15	Wingan Inlet Camping Ground	Camping sites, toilet picnic facilities, BBQ water supply - piped from river, nature trail	CFL	R	

Table 111 (continued)

Ref. no. (Map 16)	Name	Description	Management responsibility	Purpose	Comments
16	Wingan Inlet Light	Navigation light, 22kV electricity supply distribution	Ministry of Transport	U	
17	Shipwreck Creek	Camping sites, picnic facilities, toilets, fireplaces, nature trail?	CFL	R	
18	Mallacoota Aerodrome	Aerodrome, buildings former RAAF operations centre	Federal Department of Transport & Communications	H, U	A small airport suitable for light aircraft used for general charter work including search and rescue and Gabo Island supply access. Former RAAF operations centre, of historic interest
		Air navigational aids (4)	Civil Aviation Authority	U	Part of the international route structure
	-	Transmission line, 22 kV	SEC	U	Main transmission line serving Mallacoota, boundary
19	-	Pumping station	Mallacoota Water Board	U	Pumping station for Mallacoota
20	Genoa Peak	Picnic table, fireplaces	CFL	R	
-	Genoa Peak, Little Rame Head, Sandpatch Point, Rame Head	Trigonometric station	Department of Property and Services	U	
-	Wingan River, Gauging Station	Gauging station		U	
-	-	22 kV electricity supply distribution line	SECV	U	Serves pumping station
-	Mt Everard and Ram Head Trigs	Trigonometric station	Department of Property and Services	U	

KEY:

H - Historic Interest
P - Private Use
MP - Management Purposes

R - Recreation
U - Utility

Notes:

1. Trig. stations and river gauging stations are shown on Map 16 by symbol.

BLOCK 23 : WILSONS PROMONTORY

Location and Boundaries

This block encompasses the majority of Wilsons Promontory and covers an area of approximately 39 440 ha (see Map 10). It forms part of the Shire of South Gippsland.

The boundary excludes Tidal River and land west of the Entrance Road. It does not include the Yanakie isthmus. The offshore islands are considered separately in Chapter 13.

Tenure and Land Use

The descriptive block is wholly public land within the Wilsons Promontory National Park, save for the small (40 ha) lighthouse reserve at South East Point which is owned by the Commonwealth of Australia. The national park includes two reference areas. It is surrounded by marine parks and reserves - see also Chapter 13 (which also includes discussion of the park's offshore islands).

Details of previous Land Conservation Council recommendations and planning scheme controls covering the block are outlined in Table 112, and the boundaries of the separate areas are shown on Map 11.

Relevant Planning Policies, Strategies and Management Plans

The whole of the block, with the exception of the lighthouse reserve, is covered by a management plan prepared by the Department of Conservation, Forests and Lands (1987).

The management plan maintains the existing emphasis on providing formal access and facilities towards the western end, to a lesser extent, the southern sections of the park. The north and central sections of the park are to be generally retained as the less developed areas, with large portions included under zoning where access, if permitted, is only by foot. No walking tracks or facilities will be provided. Tidal River, on the western edge of the descriptive block, remains the prime focus for recreational activity.

Physical Setting

The descriptive block is a dissected outlier of the southern Victorian Uplands, with small areas of barrier complexes along its coastline.

The promontory consists of a major granite pluton which forms a peninsula extending into Bass Strait. It is connected to the mainland by an isthmus of unconsolidated sands and dune structures. The granite hills are steep and rugged with boulder and tor landscapes developed through the weathering of the granite. The highest point is Mount Latrobe, about 755 m above sea level. Other high peaks include Mount Wilson, 705 m, and Mount Ramsay, 686 m.

Protruding headlands such as Cape Wellington and Oberon Point alternate with sandy embayments such as Sealers Cove and Oberon Bay. These contain coastal complexes of beaches and dunes, notably at Norman and Oberon Bays,

and may be backed by recent swamp deposits and extensive downwash slopes, as, for instance, at Chinaman Creek or in the country behind Five Mile Beach. The north-east corner of the block contains many remnant barrier systems.

The Promontory has a major semi-continuous north-south drainage divide along the Vereker, Wilson and Boulder Ranges. Drainage is characterised by short intermittent streams with steep gradients and small catchments, particularly in the south. Erosion along joints in the granite has produced many valleys such as Lilly Pilly Gully. A number of tidal estuaries also occur, for example, on Chinamans Creek, at Five Mile Beach, Sealers Creek and Tidal River.

Biological Setting

The most widespread vegetation community is eucalypt open forest. This occurs on the mountain slopes of the granite areas and varies in height according to location. The main overstorey species are messmate and yellow stringybark, with a dense shrubby understorey. Large areas of formerly open forest have reverted to a closed scrub of understorey species (such as Hazel pomaderris) following the extensive fires of 1951 (thought to be the second of two, successive, high intensity fires). Small areas of mountain ash and blue gum occur on the upper slopes of the Latrobe Range. Cool temperate rainforest of sassafras, myrtle beech, and ferns and tree ferns are found in the high moist sheltered gullies, with lilly pilly and blackwood closed forests in the sheltered lowland gullies.

Drier slopes carry woodlands of brown stringybark, shining peppermint, banksia and drooping sheoak, changing on poorer soils to low scrub and open heaths. Swamp paperbark grows in swamps, with wet heaths on infertile soils with restricted drainage.

Coastal dunes carry grasslands of spinifex (and the introduced marram grass and sea-wheat grass) and coastal scrub dominated by coast tea-tree. Drooping sheoak and coast banksia occur on older dunes. Mangroves and saltmarsh fringe Corner Inlet, and grasslands of exotic and pasture species occur north of Darby River on the coastal plain surrounding the landing ground.

A diverse range of native mammals are found in the block including species such as the white-footed dunnart, New Holland mouse and at least three bat species. A number of native mammals were introduced between 1900 and 1941. Few, however, appear to have survived and bred. A large number of bird species have been recorded - about half the total number of Victorian bird species. Fifteen species of lizards and snakes have been recorded and 19 species of native freshwater fish. There are no introduced species of fish other than English Perch, which has been recorded in Tidal River, and the lower reaches of Sealers Creek.

Cultural Setting

Aborigines appear to have lived on the promontory for at least 6500 years. Most remaining evidence of their activity is

Table 112

LCC RECOMMENDATIONS AND PLANNING SCHEME CONTROLS

Land use	LCC reference ¹	Approx area within block (ha)	Planning scheme control ²	Special provisions ³
National park	A1 (Wilsons Promontory)	37 880	-	Nil
Reference area	B2, B3 (Sealers Creek and Entrance Point)	1 520	-	The trig. station on Mt Latrobe is excluded from B2
Lighthouse reserve	Not applicable	40	-	Nil

Notes:

1. Refers to LCC Final Recommendations, South Gippsland Area, District 2, 1982.
2. Not presently included under planning scheme control.
3. Specific provisions relevant to area in addition to the standard land-use provisions of LCC recommendations (as outlined in Appendix II).

in the form of middens along the coast. Recorded sites are widespread along the shoreline particularly in the north-east and, beyond the boundaries of the block, on the west coast.

European sailing vessels have sheltered from storms in Sealers Cove and Refuge Cove since the earliest days of coastal navigation. The lighthouse on South-east Point was built in 1859, and around 1860 a pilot was stationed at Mount Singapore to conduct ships through Corner Inlet to Port Albert which was becoming important gateway to the goldfields further north.

A whaling station operated briefly at Refuge Cove early in the 1840s and remnants of this are still extant. Other early resource utilisation included a quarry, also at Refuge Cove, which was used briefly around 1859 to supply granite for road construction at Port Albert, and a short-lived goldfield on Mount Singapore leased in 1866 but soon abandoned.

In the 1850s and 60s a sawmill and associated tramways operated in the forests around Sealers Cove and substantial quantities of blackwood and eucalypt were cut. Remains of these structures and jetty piles (and at Waterloo Bay) are still discernible. Much of the Promontory was also covered by grazing licences by the 1850s and fishermen have exploited the surrounding waters since this time.

The area became popular with field naturalists and holiday makers and, in 1898, some 36 800 ha were temporarily reserved as a 'site for a National park'. Much of this area was permanently reserved as a national park in 1905 (30 000 ha) with another 10 500 ha reserved in 1908. It became a very popular summer holiday destination with a chalet at Darby River being the base for most activity. Access at this time was generally by boat to Millers Landing. By 1941, apart from a vehicle track along the present alignment of the Entrance Road as far south as Telegraph Saddle, the only tracks in the block were those linking rangers' huts on the north coast to the Darby River chalet, and one extending into the headwaters of Sealers Creek.

Primary industries continued, however, with further timber cutting around Sealers Cove between 1903 and 1906, a tin mine worked granite sands at Mount Hunter between 1920 and 1936, and grazing continued over much of the Promontory until 1959.

Between 1941 and 1946 the national park was closed to the public and a commando training base was established at Tidal River. Following the war, Tidal River became the main focus of intensive and rapidly expanding recreational activity. Most of the vehicle tracks, walking tracks and facilities date from this period. An additional area of 7500 ha was added to the national park in 1969 - mostly on the Yanakie itismus and is subject to grazing.

WILDERNESS QUALITY

Wilsons Promontory contains a substantial area of high wilderness quality. The Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) classified large areas as Class 5 or higher total wilderness quality. These areas are on the eastern side of the Promontory and extend from Mount Singapore to Waterloo Bay. Areas around Mount Norgate and Mount Boulder in the south of the Promontory also have relatively high wilderness quality and were classified as Class 4 total wilderness quality.

The areas of highest wilderness quality are near the coast around Mount Singapore and along the coast east of Mount Vereker.

The inventory of Feller et al. (1979) identified most of the block to the north of Sealers Creek as a wilderness. The influences affecting four major attributes of wilderness quality are outlined below.

Remoteness from Settlement

The biggest influences on remoteness from settlement values are the cleared land for an authorised landing area on the

Yanakie Isthmus and the Tidal River settlement and camping ground.

The permanently occupied lighthouse station at South-east Point was also a major influence on remoteness from settlement values.

These influences have resulted in the highest remoteness from settlement values being towards the northern and eastern edges of the block. The Preece and Lesslie survey (1987) identified a large area of their highest class of remoteness from settlement north of Chinaman Creek in the north-eastern corner of the block.

The settled area boundaries are unlikely to change under present management practices.

Remoteness from Access

The block has a low density of roads and tracks, with the major influences on remoteness from access values being the sealed Entrance Road together with its extension to Telegraph Saddle, and the minor roads providing access to Millers Landing and to South-east Point. There are approximately 11 km of trafficable roads within the descriptive block.

All of the roads and tracks of the block are listed in Table 113 (see page 315) and their locations shown on Map 14.

The influences of these roads and tracks have resulted in the highest remoteness from access values mirroring the remoteness from settlement values, with the highest values recorded in the Preece and Lesslie survey (1987) being towards the northern and eastern edges of the block, particularly towards its north-eastern corner. The Preece and Lesslie analysis included a number of now overgrown tracks in the northern part of the block as vehicular tracks; the short public section of Five Mile Road was, however, under-classified. Small sections of the road network have been proposed for upgrading (DCFL 1987) - see also Table 113.

The east coast of the block includes the largest of only two areas in eastern Victoria which are greater than five km from any vehicular track, and the only area greater than 15 km from a road.

A number of constructed walking tracks occur within the block, including two nature walks. (Another nature walk following a management vehicle only vehicular track up Mount Oberon.) Lengthy sections of board walks have been constructed where well-used tracks cross swampy areas, for example, at Sealers Cove and Little Waterloo Bay. A small number of additional walking tracks are proposed for construction (DCFL 1987), including a track to Tin Mile Cove which has now been constructed.

Parts of the block are readily accessible by boat, with popular landing sites being the (Tidal River and) Refuge Cove beaches and some of the Corner Inlet beaches. Boats are launched at Tidal River, Yanakie Landing and Sandy Point.

The aerodrome on Yanakie Isthmus is recognised as an emergency landing strip. It is not open for public use.

Aesthetic Naturalness

The descriptive block is one of the few areas in eastern Victoria to have recorded high (Class 4) aesthetic naturalness values in the Preece and Lesslie (1987) survey. In addition, the recorded values underestimate the actual value, as a number of vehicular tracks used in the analysis are not maintained and have become overgrown. The areas of high value are, nonetheless, small and restricted to those around Mount Singapore and Mount Vereker, and the Five Mile Beach.

Many structures affected aesthetic naturalness values and these include a diverse range of facilities - lighthouses, communication towers, outstation camping areas and aerodromes. These structures are listed in Table 114 and their locations shown on Map 14.

Helipads have been constructed and are maintained near Chinaman Long Beach, Mount Latrobe, Kersop Peak and the Cathedral.

Biophysical Naturalness

Most of this descriptive block has high biophysical naturalness value and was, with the exception of around the landing area, allocated to the second highest class (Class 3) of biophysical naturalness in the Preece and Lesslie (1987) survey. This reflected the block's previous history of resource utilisation including limited tin mining, grazing and timber harvesting. As most of this activity was localised, the values recorded in the survey are conservative.

Land-use Indicators of Biophysical Naturalness

In the 19th century grazing and timber harvesting were the main uses, with timber harvesting appearing to have been largely restricted to the Sealers Cove catchment. Since the turn of the century most of the block has not been subject to intensive land uses other than the mining of tin about 50 years ago and, until recently, cattle grazing. (This use will be phased out by 1992.) Grazing appears to have been concentrated on the coastal plains north of Darby River. The effects of grazing are also discernible at Oberon Bay.

Some areas would also have suffered localised damage as a result of their occupation by the armed forces during World War II.

Other Indicators of Biophysical Naturalness

The block was covered by a study of the nature conservation values of rivers and streams in the South-East Region (BIOSIS 1989). Virtually all of the river and stream catchments of the block were identified in this study as being essentially unmodified. Most of these cover entire river and stream catchments.

It is known, however, that the native flora and fauna composition of the block has changed.

Eight introduced species of mammal are present - the black rat, dog, fox, cat, hog deer, sambar deer, brown hare and European rabbit. Starlings are a problem around Tidal River and over 10% of the recorded vascular plant species are introduced. Introduced fish species are of limited distribution and absent from most of the block's watercourses. Broad surveys indicate that the highest

Table 114

PUBLIC LAND STRUCTURES

Ref. no. (Map 14)	Name	Description	Management responsibility	Purpose	Comments
1	Yanakie Isthmus landing area	Authorised landing area - minor associated structures	CFL	MP	Used solely for search and rescue and fire suppression purposes
2	Lilly Pilly Gully picnic area	Toilets, picnic tables	CFL	R	(Remains of army huts in Lilly Pilly Gully)
3	Tidal River Weir	Weir and dam	CFL	U	Provides water supply for Tidal River
4	Telegraph Saddle car park	Toilets	CFL	R	
5	Mt Oberon telecommunications installation	Radio - telephone and television repeater tower, and building	Telecom	U	
6	Sealers Cove, Refuge Cove, Little Waterloo Bay camp sites	Pit toilets, Rangers Hut	CFL	R	
7	Lighthouse Point, Refuge Cove, Sealers Cove and Waterloo Bay navigation lights	Small automatic navigation lights and beacons	Dept of Transport	U	
8	Lighthouse Reserve	Lighthouse, cottages, work shop, shop, landing ramp	Federal Dept. of Transport & Communications	H, U	Lighthouse built in 1859
9	Oberon Bay and Roaring Meg Creek outstation camping areas	Pit toilets	CFL	R	
10	Halfway Hut	Pit toilets, hut ruins	CFL	R	
-	Mt Oberon telegraph line	Remnant poles and insulators	CFL	H	Disused route roughly follows Entrance Road and Lighthouse Track
-	Mt Singapore, Mt Hunter, Mt Latrobe and Mt Oberon trigs	Trigonometric stations	Dept. of Property and Services	U	

KEY:

H - Historic interest
MP - Management Purposes

R - Recreation
U - Utility

Notes:

1. Trig. stations are shown on Map 14 by symbol.

numbers of rabbits and weed species are in the eastern and southern parts of the block, with lowest numbers in the northern half.

Stands of mature mountain ash and other tall open forest species have been significantly reduced by repeated fires and animal species particularly susceptible to changes in habitat, for example, the red-necked wallaby, are now rare.

OTHER ATTRIBUTES

Size

The following statistics provide an indication of some of the size attributes of the block.

The public land of the block encompasses an area of roughly 39 400 ha. Over 60% was classed in the Survey of Wilderness Quality in Victoria (Preece and Lesslie 1987) as at least Class 4 wilderness quality, with about 40% of Class 5 or higher wilderness quality. A substantial consolidated area is presently without roads or vehicular tracks. It covers an area of about 19 200 ha. Extensive sectors of the block are within essentially unmodified catchments.

The descriptive block is relatively long and narrow being about 40 km long and 15 km wide. Its effective width is enhanced by its essentially unmodified coastal boundary.

Ecological Viability

The large number of essentially unmodified river catchments within the block, notably those on the eastern fall of Mount Vereker and the southern fall of Mount Norgate, the block's wide range of vegetation communities, with a total of eight communities represented, together with its relatively high biophysical naturalness, enhance its potential ecological viability.

Fire is an ever-present hazard. Most of the block was severely burnt in 1951 and another major bushfire burnt much (10 000 ha) of the northern section of the block in 1962. Five Mile Beach and Mount Norgate are virtually the only two areas not affected by these fires. Substantial numbers of fires were previously deliberately lit, whereas now most are started by lightning.

A number of firebreaks are maintained to the north of the Five Mile Road. Protective burning is undertaken here to protect facilities and visitors to the national park from such fires.

Bushfires create a particular hazard to some of the plant communities such as rainforest, but they are an important ecological requirement for others. Fire has been a major element in determining the present vegetation of the Promontory and thus also its fauna.

Overnight bushwalking is rapidly increasing (31% increase in outstation camping recorded over the 1979/80 to 1984/85 period). Camp-site occupancy approaches saturation in the summer months but use is spread throughout the year. High usage has led to upgrading and defining walking tracks and camp sites, and outstation camping is regulated by a booking system. Off-track walking is, however, by permit only and campfires are banned in the south of the block.

LAND-USE CAPABILITIES

Nature Conservation

Wilsons Promontory is of national importance for nature conservation. It has a large variety of vegetation types ranging from tall open forests to coastal scrub that support a correspondingly diverse fauna. The 'Prom' is well protected geographically and is relatively unaffected by European settlement. It forms a boundary for the distribution of many plants and animals and provides evidence of links between Tasmanian and Victorian species. It also lies on the main pathway for migratory birds across Bass Strait.

Significant species recorded include the New Holland mouse, the long-nosed potoroo, orange-bellied parrot, king quail and the ground parrot, most of which are found in heathlands. The rivers and creeks of the block have a diversity of native fish, including the vulnerable grayling (Roaring Meg Creek) and Tasmanian mud fish (Freshwater Creek).

Rarer mammals recorded are the swamp antechinus and the broad-toothed rat. Many rare plants, including a number entirely or almost entirely restricted to Wilsons Promontory, are found in the block. The virtual absence of introduced fish species in the block's rivers and streams is of particular scientific significance.

The maintenance of these values is largely due to the area's long period of protection.

Recreation

Wilsons Promontory is one of Victoria's best known national parks and attracts the highest visitor numbers of any of Victoria's large national parks.

The superb rugged granite land and seascapes of the Promontory, beaches, and diversity of plant communities and environments ranging from mangrove swamps and coastal scrub and dunes to rainforest gullies, tall open forest and granitic outcrops and wind-pruned heaths all contribute to its capability for those seeking inspiration in natural environments.

Most recreational activities are, however, centred on Tidal River where low cost cabin and lodge accommodation and camping facilities have been developed. Tidal River also provides ready access to a number of beaches by short walking-tracks. Interpretive programs offered during holiday periods are generally based here. Within the boundaries of the block, car-based recreation is limited to a short section of the Five Mile Road and Telegraph Point, although Entrance Road itself is used as a major scenic route by sightseers. Nature walks have been provided at these sites, and scenic views can be obtained from car parks. Entrance Road also provides access to popular short walks such as those along Lilly Pilly Gully, Bishop Peak and Windy Saddle. Elsewhere, opportunities for bushwalking, fishing, surfing, boating, nature study, camping, sightseeing, photography, and simply relaxing are high. A number of sites are suitable for and used (under a permit system) for rock climbing. Horse riding, four-wheel driving and mountain-bike riding opportunities are limited and not permitted under existing management arrangements.

Walking, both day trips and trips of two or three days' duration, and camping, together with the associated activities such as nature study, swimming or 'just getting away from it all' are very popular in the block. The southern part provides opportunities for challenging walking for relatively inexperienced people, whereas areas to the north provide more experienced people with more remote walks.

Popular walking routes are generally along defined walking tracks. These may be constructed to a relatively high standard with board walks installed in the more sensitive locations.

Significant sections, however, appear defined only by usage. The loop walking track from Telegraph Saddle to Sealers Cove, Refuge Cove, Waterloo Bay and Oberon Bay forms the basis for most recreational use in the south, while Five Mile Road and Mount Margaret Track provide the major walking access in the north.

The block also includes a variety of off-track walking opportunities, such as along the Vereker Range, to Mount Wilson and across the Boulder Range. Many of the peaks of the Promontory can only be accessed by off-track walking and they provide expansive views. Opportunities for solitude and inspiration in such areas are high. Areas of skeletal granitic soils and peaty soils in poorly drained areas are especially prone to damage however as is the understorey of rainforest communities. Vegetation elsewhere is often dense and difficult to walk through.

Agriculture

Under existing tenure no land in the block is available for agriculture.

Grazing is currently permitted north of Darby River. All grazing is to cease by 31 December 1991. The area presently grazed is shown on Map 14.

Apiculture

While there are no defined licensed beekeeping sites within the block, the general area is very important for a number of Gippsland apiarists who utilise coastal banksia and tea-tree species for spring hive development. There is a waiting list of 32 apiarists who desire access to the area.

Timber Production

Commercial stands of timber occur on the east coast of the block, but the existing tenure precludes utilisation of these resources.

Mineral Production

Deposits of tin were worked near Mount Hunter but proved uneconomic, and limestone and granite have been quarried. The potential for discoveries of economic deposits within the descriptive block is considered low.

As at August 1989, there are no exploration licences or other tenements under the Mines Act and, under existing tenure, mineral exploration or mining is not permitted within the block.

Water Production

Wilsons Promontory is not important regionally for water production.

Table 113
ROADS AND TRACKS

Ref. no. (Map 14)	Road or track name	Standard of access			Management responsibility	Management purpose	Present restriction	Comments
		Major road	Minor road	Vehicle track				
1	Entrance Road	*			Roads Corp	PA, R	Nil	A 6.8 m wide sealed road in good condition which provides the major access into the national park and to Tidal River. A declared Tourist Road. Boundary only
2	Five Mile Road		*	*	CFL	FP, R	Part MVO	Proposal to extend high standard public access 1.5 km to vantage point. Part boundary
3	Mt Margaret Track			*	CFL	FP	MVO	
4	Tin Mine Track			*	CFL	FP	MVO	
5	Telegraph Saddle Road	*			CFL	R, U	Nil	Sealed
6	Mt Oberon Track		*		CFL	U	MVO	
7	Lighthouse Track		*	*	CFL	FP, U	MVO	Proposal to extend high standard access 3 km to lighthouse

KEY:

FP - Fire Protection
MVO - Management Vehicles Only
PA - Primary Access

R - Recreation
U - Utility Access

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13. SPECIAL AREAS

The methodology adopted by the Australian Heritage Commission for the national wilderness inventory (that used in the Preece and Lesslie Survey of Wilderness Quality in Victoria) is designed for application on an Australia-wide basis. Its use, however, is largely limited to terrestrial environments. Other specialised environments do, however, have the potential to meet the requirements of the first principles of an area of high wilderness quality. Thus they may include areas 'remote from and substantially undisturbed by the influence of modern technological society'. These special environments include marine systems, caves, islands, and large inland water bodies.

This chapter provides a general outline of the characteristics and capabilities of such special environments. It also contains brief comment on the potential values of the key wilderness attributes of remoteness and naturalness.

Mention is also made in the chapter of areas of very high individual wilderness quality indicator value which were not discussed in the last chapter which covered the descriptive blocks.

MARINE SYSTEMS

While the development of the wilderness concept has been derived from terrestrial experience, there is international interest (for example, at the Fourth World Wilderness Conference in 1987) in the applicability of the wilderness concept to marine environments. This interest, like terrestrial wilderness, appears to have developed from concern about the growing pressure being placed on what was traditionally considered as the 'boundless' ocean. Marine wilderness has generally been regarded as a contiguous extension of a terrestrial wilderness and usually focused on inshore environments. It is now being viewed in its own right.

The following overview is restricted to offshore areas, that is, it excludes Victoria's four major embayments: Port

Phillip Bay, Western Port, Corner Inlet and the Gippsland Lakes.

Status

Victoria has some 1200 km of ocean coast. The State's jurisdiction over coastal waters (and their seabeds) extends about 5.5 km offshore from Victoria's mainland and islands. All of this area, totalling about 8520 sq.km, is well within Australia's continental shelf.

Most of the seabed below low water mark is unreserved Crown land. There are also some unreserved areas on the coastline above high water mark still remaining (and about 5% of the coastline is freehold to high water mark).

Areas below low water which are reserved are those included in:

- * marine reserves
- * areas reserved for the protection of the coastline
- * areas vested in Port Authorities

Marine reserves are areas of offshore underwater terrain and the waters above it, together with the associated flora and fauna, set aside primarily to conserve and protect significant marine and/or estuarine habitats and ecosystems, and to provide opportunities for recreation and education.

The Land Conservation Council has made a number of recommendations about marine reserves. Those outside the major embayment are the Wilsons Promontory Marine Reserve (9700 ha) which abuts the Wilsons Promontory National Park - part of which has subsequently been incorporated into a marine park, and the Point Nepean sector (90 ha) of the Harold Holt Marine Reserve. The government has recently proposed another marine reserve near Inverloch.

All areas needed to protect the coastline are permanently reserved and extend mainly to 600 m beyond high water mark, although some extend only to low water

mark. They are multi-objective reserves equivalent to the Land Conservation Council's coastal reserve designation. These areas are set aside primarily for recreation, protection of coastal environments and for development of facilities associated with shipping, fishing and boating.

They cover 281 km of coastline, with those extending 600 m offshore covering 130 sq.km, or about 1.5%, of Victoria's coastal waters. They include areas of coastline in Western Victoria, the Otway coastline, in Western Port and in South Gippsland.

The only offshore area in Victoria vested in a Port Authority is at Portland. Here the Port of Portland Authority has responsibility over an area extending from Point Danger to Henty Bay, although its harbour works are limited to an area of 110 ha. Other 'proclaimed ports' only give the respective Port Authorities responsibilities for navigation and coastal protection. They are not a form of land tenure.

Natural Features

The nearshore marine systems are influenced by the nature of the coastal environment. Three general coastal types can be differentiated - cliffed coasts, sandy coasts, and marshy coasts. Each type provides distinct habitat for marine biota which is further influenced by differing rock types and wave energy regimes.

Many of the rocky shores associated with cliffed coastlines or isolated outcrops in sandy coastlines support extremely diverse communities of plants and animals. These various communities are associated with a particular tidal zone. The sandy beaches of the sandy coastlines support relatively scanty biota on account of their mobile substrate and low nutrient levels. Marshy coastlines provide a variety of habitats including seagrass beds, intertidal flats, mangroves, saltmarshes and estuaries and are generally highly productive. The water mass of the coastal waters sustains fish and plankton. Little is known of the seafloor of that section of the continental shelf within Victoria.

Use and Capabilities

The marine environment has been associated with some of the earliest uses in Victoria. Sealing along the coastline and in Bass Strait began around 1800, and was combined with whaling in the 1830s. Shipping occurred in conjunction with the settlements of Portland, Port Fairy and Melbourne in the 1830s and Port Albert in the 1840s, the exploitation of the Otway forests in the 1850s, and the settlements of the Gippsland Lakes after the construction of a permanent entrance in 1889. Commercial fisheries were established as industries in the major embayments in the 1850s and 1860s.

There are 27 fishing ports along Victoria's coast, with Lakes Entrance by far the largest, though Portland, Apollo Bay, San Remo, and Port Welshpool are quite important. The Victorian fishing industry is based on a fleet of generally small, owner-operated boats. Much of the catch is exported.

Major shipping routes into the Victorian ports and around Australia are generally at least 10 km offshore. The closest points being Cape Bridgewater and Cape Nelson, Cape Otway, Wilsons Promontory and Gabo Island/Cape Howe, as well as the harbour approaches at Portland Bay, Port Phillip Bay Heads, and the western entrance to Western Port.

The exploitation of the Bass Strait oil and gas fields is the only large industry involving the mining or quarrying of seabed resources. There has been recent interest in seabed sand deposits within some of the larger embayments. There has also been minor harvesting of sea grasses washed on to shorelines over the years, particularly in Western Port.

The coastline is the most heavily used recreational area in Victoria with most of the activity being inshore. It includes skin-diving, scuba diving, swimming and much of the boating. Offshore recreational boating is associated with intercity yacht races or recreational cruising of larger boats, but more commonly recreational fishing. Southern rock lobster and abalone are the main inshore species sought, with snapper,

flathead, and salmon the main offshore species.

Despite a long history of use, much of Victoria's marine environment is relatively unmodified and accordingly of high conservation value. However there has been little systematic survey. Few significant areas have yet been identified and even fewer reserved for nature conservation.

Impacts and Influences

Few of Victoria's coastline are remote from urban or rural development or not subject to the direct influence of recreational use, commercial utilisation or domestic and industrial runoff or effluent disposal. The notable exceptions are Wilsons Promontory and the Croajingolong coastline. However, most offshore areas are under little pressure and are thought to be relatively intact.

The only structures within the actual marine area, as distinct to the coastline, are the Bass Strait oil rigs. Offshore from the Ninety Mile Beach there are 12 platforms which produce oil and/or gas. All are connected to the mainland by pipelines that traverse the seabed, cross the Ninety Mile Beach and meet at the Longford Fractionalisation Plant.

Much of the area is well accessed by boat ramps, with all-weather and all tide ramps available at the major coastal towns. Access is limited west of Portland, between Warrnambool and Apollo Bay, along the Ninety Mile Beach and east of Lakes Entrance to Mallacoota.

Portland harbour is the only major constructed harbour on Bass Strait. Other harbour works include the Moyne River training walls at Port Fairy, the Warrnambool breakwater, Apollo Bay harbour, and the artificial entrance at Lakes Entrance. Dredging works are associated with each of these as well as at the other embayment entrances. All such works are associated with localised effects on coastal processes. There are 23 lighthouses along the coast, eight of which are still staffed.

Coastal towns are either unsewered, discharge sewerage to the ocean, or utilise land disposal methods. Sewerage ocean outfalls, include those at Portland, Port

Fairy, Warrnambool, Apollo Bay, Breamlea, Black Rock, Cape Schank, Cape Paterson, and Port Welshpool. Direct effects on biota appear to be relatively localised, as are discoloration plumes.

Other licensed waste water discharges to the sea include those from commercial premises, for example, the fertiliser works at Portland and the fish cooperative at Lakes Entrance. Stormwater discharge in rural and unsewered coastal settlements may also cause localised impacts. Indirect effects are largely unknown. The State Environmental Protection Policy (Waters of Victoria) requires all coastal discharges to be below the low water mark and meet minimum quality standards. It also limits the discharge of wastes in marine reserves and parks and other defined areas of significance to marine conservation.

Potential hazards and conflicts arise from exploitation of fish stocks, excessive sedimentation due to erosion in coastal catchment areas, nutrient enrichment, and other forms of pollution from the runoff or disposal of agricultural, urban, and industrial wastes and effluents, including those from marine vessels. Major oil spills from shipping and Bass Strait oilfields are an ongoing hazard.

Impacts from recreational activity include collection of shellfish in inter-tidal areas, and shoreline developments, all of which put pressure on marine areas.

Wilderness Attributes

The marine areas of Victoria may have high remoteness and naturalness values, and are extensive.

They have high potential for wilderness recreation and solitude opportunities, although access is limited to near-shore areas or reliant on boat-based access. Their ecological viability is largely dependent on water quality and, given the nature of water bodies and pelagic fauna, it is highly sensitive to external influences such as oil spills and chemical effluents.

CAVES

Caves are generally defined as a natural cavity in rock large enough to be entered by a human. They are formed by the

solution of bedrock (karst) or by other processes such as volcanism, weathering, piping or wave action (pseudokarst).

There are over 900 cave sites documented in Victoria. They contain a great variety of mineral deposits, rare plants and animals, fossils, archaeological sites and aesthetically attractive speleothems. They also provide recreational opportunities and may have historic associations. Solution caves and lava (volcanic) caves are the most numerous and many of Victoria's caves are of considerable national and international interest (Davey and White 1986).

Status

Caves on public land have been included under a number of land-use categories. Many significant caves are in conservation reserve categories such as national parks, State parks, coastal parks and wildlife reserves. A number of caves in the Buchan--Murrindal area are included in specific Cave Reserves (seven in all). Many caves also occur on freehold land.

More specific cave management categories have been identified in a report on the Management of Victorian Caves and Karst (Davey and White 1986), prepared for the Caves Classification Committee (an *ad hoc* committee which provides advice to the Minister for Conservation, Forests and Lands).

Three categories were identified. The public access caves category has as its objectives the provision of opportunities for aesthetic appreciation, education and recreation. The second category, Special Purpose Sites, includes sites subject to control on access and activities. Its subcategories were defined as reference sites, sites of special natural and/or cultural value, and dangerous sites.

The third category is wild (and unclassified) sites. Management of these caves will be low key with developments restricted to essential markers, paths, and anchors, plus some monitoring, restoration and maintenance. All known cave sites were catalogued in the report, and most (91%) were included in this category. The objectives for caves in this category are to protect cave values, provide opportunities

for research, and permit responsible cave exploration.

Natural Features

The most common type of caves in Victoria are those found in karst in Palaeozoic limestones, followed by pseudokarst volcanic (lava) caves.

South-western Victoria contains one of the most extensive basalt plains in the world and these include numerous lava caves and related land forms, with the Byaduk caves being the most extensive set of lava caves in Australia.

South-western Victoria also has broad areas of relatively flat-lying Tertiary limestones, a few of which exhibit extensive karst development. The main area is associated with the Glenelg River, near Nelson. In addition, near-coastal dune limestones exhibit karst.

In the Grampians, caves have been formed in sandstone by cavernous weathering. Caves of this type are, however, largely undocumented.

All the caves in north-western Victoria are pseudokarst caves, including boulder caves at Melville Caves.

Caves in north-eastern Victoria are generally karst caves in Palaeozoic limestone. There are several small limestone outcrops at Mitta Mitta with minor caves and a series of stream caves occur in isolated outcrops at Limestone Creek. Boulder caves are found at Mount Buffalo.

Buchan and Murrindal, with the surrounding areas of Gillingall, Jackson Crossing, Mooresford, New Guinea Ridge, W-Tree, and Wulgulmerang West, form the largest area of karst in Palaeozoic rock in Victoria. Most karst features are either close-packed doline (crater-like depressions) fields with potholes (vertical caves), or vadose stream and canyon caves. The area contains both the longest and deepest cave systems in the State.

Other karst areas in Gippsland are Bindi which has a few minor caves and dolines, Cave Creek near Mount Joan, and Errinundra (which has a few minor

dolines). *Non-karst caves in Gippsland* are the sea caves, boulder caves, and caves of unknown origin such as at Mount Cobberas, Mount Speculation, Sealers Cove, and the Genoa Bat Cave. A cave has also been recently located on Mount Bogong.

A detailed catalogue of all documented caves has been compiled and appears in the Davey and White (1986) report.

Use and Capabilities

An overview of the principal values of cave resources is also contained in Davey and White and provides a basis for the following summary of values.

The aesthetic values of caves arise from the sizes, shapes, spaces, colours, textures, sounds, silences, contrasts, and other perceptual sensations of the cave environment, combined with the abundance, distribution, diversity and/or simplicity of the assembled components. Every cave has different aesthetic appeal.

Caves are of considerable geological interest. Apart from featuring geological structure, they provide insights into a whole range of geomorphological, hydrological, and meteorological processes. The secondary mineralogy of cave environments is also often of great scientific interest, especially the speleotherm structures and guano.

Biological values relate to a range of biospeleological elements of microorganisms and lower plant adaptations to twilight areas, and refugia in dolines and cave entrances. Cave fauna include those species that spend part of their life cycle in caves, examples being bats and owls, or those that live totally in caves, as do certain spiders and beetles.

Palaeoenvironmental values derive from the use of fossil and subfossil material in the description of modern and fossil animal taxa, and in the analysis of past climatic and ecological conditions. Archaeological values derive from material evidence and art associated with Aboriginal prehistory.

Recreational values relate to aesthetic pleasure, sporting challenge, personal

adventure, satisfaction of curiosity and social interaction. Caves offer many interesting recreation opportunities which are in stark contrast to those of most other outdoor recreation pursuits.

The limestone of karst areas is often of high capability for industrial purposes and is utilised for cement manufacture, agricultural lime and in the manufacture of paper. High quality marble may also occur in them.

Impacts and Influences

Caves and related landforms may be subject to complete destruction, damage, or inappropriate use, all of which will reduce the wilderness quality of a cave.

Quarrying can affect caves by the physical removal of the feature, by affecting the surrounding landscape of the cave, or by direct or indirect damage from shock, siltation or pollution. They may also prevent safe public access.

Construction and maintenance of roads and their verges may damage significant landforms and total infilling and destruction are not uncommon. Land clearance often results in deliberate or inadvertent damage to caves, and constructions in or near dolines or caves can seriously compromise landscape values or pose a direct or indirect threat to cave ecosystems.

Dumping of rubbish into caves and dolines is a common problem with liquid waste disposal; disturbance and shooting of bats, blocking of cave entrances, and vandalism can also be significant problems.

Other forms of damage include that associated with 'show cave' development both from physical modifications to facilitate access and presentation, as well as more subtle but accumulative changes to cave temperatures and atmospheric carbon dioxide levels. Conflicts occurring through unsupervised cave exploration, especially where the cave is used regularly, include vandalism, littering, inadvertent damage to cave surfaces and habitat, and minor modifications to facilitate human use.

Wilderness Attributes

Caves may exhibit high aesthetic and biophysical naturalness qualities. They may not be remote in linear distance from roads and settlements. They do, however, offer remoteness from an experiential viewpoint and may provide very high capability for solitude and wilderness dependent recreation.

ISLANDS

Australian surveys of wilderness in the late 1970s (for example, Helman *et al.* 1976 and Feller *et al.* 1979) altered their inclusion criteria of terrestrial lands in coastal areas 'due to their linear characteristics and the types of ecosystems and recreation they support' and noted that 'the sea probably acts as a more efficient buffer than the land...'. Neither, however, reviewed potential island wilderness.

The United States of America's *Wilderness Act* 1964, in contrast, makes specific reference to islands and requires every roadless island to be reviewed for their suitability, regardless of size, for inclusion in the National Wilderness Preserve System.

Many of Victoria's offshore islands are also roadless, relatively unmodified, and often remote from access and settlements. While none met the 10 000 ha minimum land surface criteria used in the Preece and Lesslie survey (and were thus not assessed), nonetheless they do potentially contain areas of high wilderness quality.

Excluding islets (very small islands) such as minor rock stacks, tidally submerged reefs and sand or mud flats, Victoria has 32 offshore islands. These are listed in Table 115 and shown on Map 17.

All of these islands are described below. While most appear to have high wilderness-quality values, some have only low to moderate values owing to extensive modification or proximity to settlement or major access. These are not described in detail.

Lawrence Rocks

Lawrence Rocks is a group of two small islands about 2.5 km offshore from Point

Danger, to the south-east of Portland. Their combined area is about 8 ha, and they are managed as a wildlife reserve.

The islands are physically close to the Portland Aluminium Smelter and access, and thus would have low remoteness from settlement and access values. The islands would, however, have very high aesthetic and biophysical naturalness values as they are roadless and without any apparent evidence of human modification.

The unmodified and inaccessible nature of the islands considerably enhances their potential ecological viability and, in particular provides protection from introduced species of predators. The combined area of both islands is, however, small and its fauna is very sensitive to increases in storminess or sea level rise. Their ecological viability may need to be reviewed subject to monitoring of the effects of the emissions from the Portland Aluminium Smelter.

The islands have limited value for wilderness recreation, and given that the islands are visually obvious from much of the coastline of the adjacent mainland, of little experiential value.

Lady Julia Percy Island

Lady Julia Percy Island is a moderately sized island of 150 ha about 8 km off the mainland, to the west of Port Fairy. It is managed as a wildlife reserve.

Lady Julia Percy Island is the remains of a volcanic complex about 7000 years old and is composed mainly of tuff (volcanic ash). It has cliffs of up to 46 m high. The island has only shallow soil and no developed drainage system. Its vegetation consists mainly of native tussock grasslands and minor areas of shrubland.

A large number of bird species have been recorded on the island and breeding birds include large numbers of little penguins, short-tailed shearwaters or mutton birds (thought to have only nested on the island since the 1920s) and diving petrels. The Australian fur seal also breeds on the exposed barren rock slopes and ledges of the island. Usually the seals spend most of the year at sea, although the seal pups

LOCATION OF OFFSHORE ISLANDS

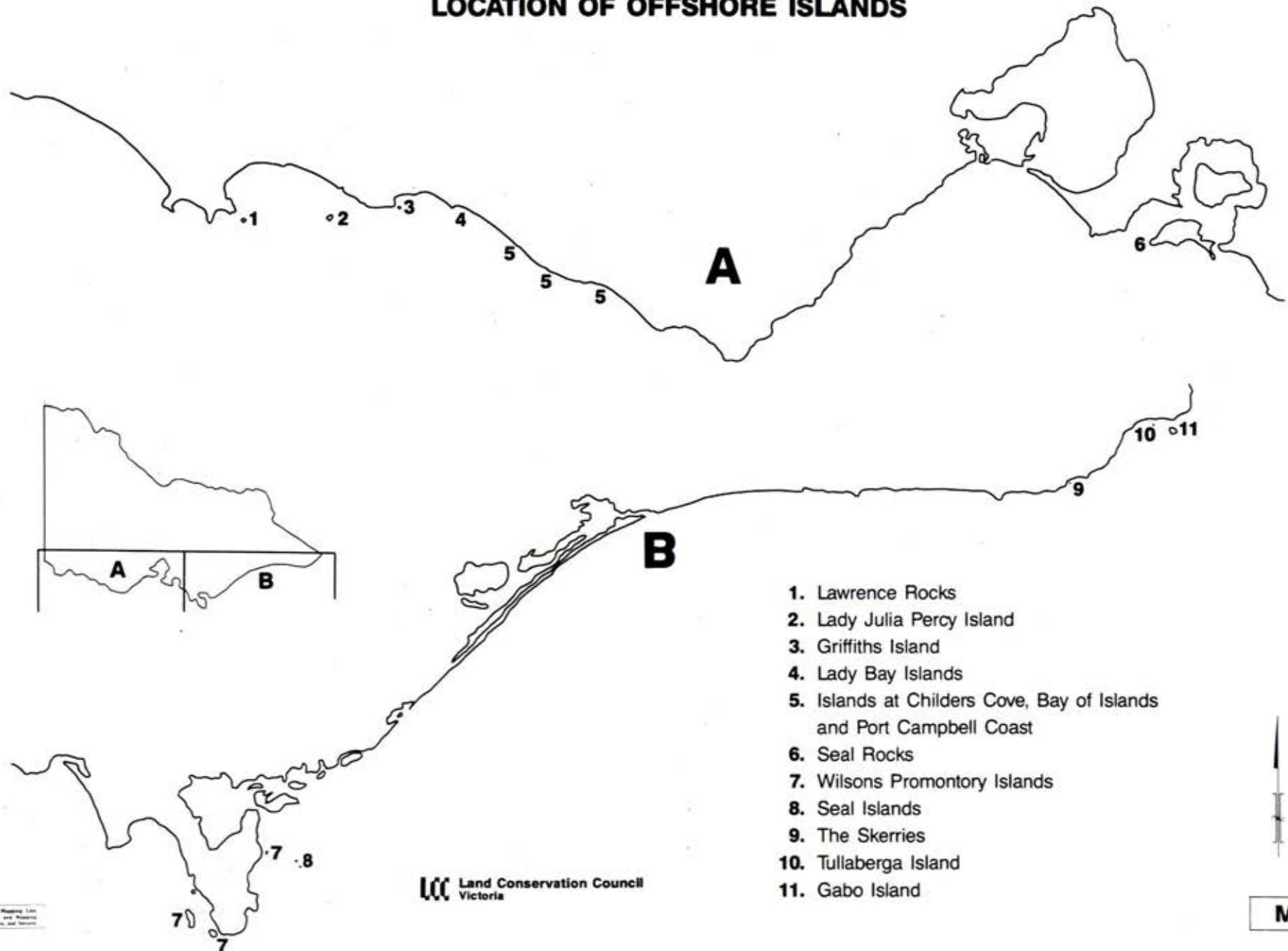


Table 115

LISTING OF OFFSHORE ISLANDS (FROM WEST TO EAST)

Lawrence Rocks
 Lady Julia Percy Island
 Griffiths Island
 Lady Bay Islands (2)
 Bay of Islands/Port Campbell coast islands (6)
 Seal Rocks
 Wilsons Promontory Islands -
 Shellback Island
 Norman Island
 The Glennie Group (4)
 The Anser Group (3)
 Wattle Island
 Rabbit Rock and Island (2)
 Seal Islands (5)
 The Skerries
 Tullaberga Island
 Gabo Island

generally stay in the vicinity of the breeding colony for about a year.

Lady Julia Percy Island has historical associations with Aboriginal and European cultures. The island is reported to have been of special interest to the Aboriginal people of the adjacent mainland. These Aborigines believed that the island was the totem centre to which the spirits of their dead returned.

Sealers were active in the area in the early 1800s. They probably established temporary camps on the island but no evidence remains, although two sealers graves are said to be extant. Whalers may have also used the island. Guano was extracted from Lady Julia Percy Island, probably from a deposit at Sealers Cove. This occurred some time prior to 1876, and possibly prior to 1861. No exploitative uses are current and none identified as having future potential.

The island has high capability for nature conservation as it includes the largest of only four breeding colonies of the Australian fur seal in Victoria. It is probably also the largest breeding site of fairy prions and diving petrels. The fairy prion is known to breed on only two other Victorian islands. A large number of plant species with limited distribution

have been recorded on the island. The steep cliffs, rocky coves, caves and boulder beaches are all of geological and/or geomorphological interest.

The existing management policy of restricting public access has resulted in there being little recreational use made of the island, although the surrounding waters are used for boat-based recreational fishing, and commercial tourist boat trips feature the island.

There are no tracks, facilities or utilities on the island. The nearest boat access is from Port Fairy about 20 km distant. Boat access on to the island itself is difficult under most weather conditions because of the island's steep cliffs and the exposed high wave energy environment. Landing is possible, however, in a relatively sheltered cove during the summer months.

Rabbits were introduced in 1868, but have since been eradicated. The island is not subject to manipulative management practices, other than for on-going monitoring of vermin control.

Wilderness attributes

The island is very remote from settlement (the mainland) and from access. It also

has very high remoteness, aesthetic naturalness, and biophysical naturalness values as it is roadless and little evidence of human modification is apparent.

The unaltered and inaccessible nature of the island considerably enhances its potential ecological viability and, as evidenced by the large number of breeding species, provides protection from introduced species of predators. The island has potentially high capability for wilderness recreation and for providing solitude and inspiration.

Griffiths Island

Griffiths Island is an island of 21.4 ha, at the mouth of the Moyne River at Port Fairy. It is part of a coastal reserve.

Griffith Island has low remoteness value given its close proximity to the mainland and a large urban settlement. It is readily accessible via a causeway and experiences high visitor usage during summer. It also has low aesthetic and biophysical naturalness values, as given the island's long history of modification, there is little evidence of the original vegetation communities, but it does contain a large viable short-tailed shearwater colony. Vehicular and formed pedestrian tracks are all evident along with a variety of structures and facilities, (including a sewerage communicator and outfall). The island offers little opportunity for wilderness recreation. Capability for solitude and inspiration is low.

Lady Bay Islands

Two small islands are at the western edge of Lady Bay at Warrnambool, namely Merri Island and Middle Island.

Being adjacent to a major recreation beach and access node (the Warrnambool breakwater) they would have low remoteness from settlement and access value. Their aesthetic naturalness and biophysical naturalness values would be higher - being roadless and with little apparent evidence of human modification.

The islands have little value for wilderness recreation, or for solitude (being highly visible) or inspiration. And given their small size and proximity to the mainland

their ongoing ecological viability is dependent on the continuance of active management.

Bay of Islands/Port Campbell Coast Islands

A large number of small islands, islets, rock stacks and reefs occur between Warrnambool and Cape Otway. The main ones are at Childers Cove, the Bay of Islands, Goffs Bay Loch and Gorge and the Twelve Apostles. Six small islands have been identified: an unnamed island at Dog Trap Bay (Childers Cove); three more in the Bay of Islands and Mutton Bird Island and Island Arch near Port Campbell. Together these form part of a coastal park (between Warrnambool and Peterborough) and a national park (between Peterborough and Princetown).

The islands face a narrow public land reserve which abuts open farmland. Major sealed roads pass within a kilometre of the coast, except near Childers Cove which is reached by an inland road that is sealed. As a result, all the islands would have low remoteness from settlement and access values. They are, however, physically very remote, given their steep cliffed edges and their location within areas of high wave energy. Being unroaded, lacking structures and essentially unmodified, the islands have high aesthetic and biophysical naturalness value.

Their inaccessibility enhances their ecological viability. They are, however, all small and subject to continuing erosion. Wilderness recreation value is slight.

Seal Rocks

Seal Rocks is a small (2 ha) rocky island at the mouth of the western passage to Western Port. They are a wildlife reserve only 1.6 km from the mainland, Phillip Island, which is a major focus for vehicle-based recreation. They are, however, relatively remote from physical access. Their aesthetic naturalness and biophysical naturalness values are high as they are uninhabited, roadless and human modification is scarcely evident.

The unmodified and inaccessible nature of the island considerably enhances its

ecological viability. Seal Rocks has limited value for wilderness recreation and, being within sight of a major tourist focus, provides little opportunity for solitude.

Offshore Islands at Wilsons Promontory

Twelve islands, offshore from Wilsons Promontory, include Shellback Island (37 ha, 2.5 km offshore from Darby River); Norman Island (48 ha, 4 km offshore from Whisky Bay); the Glennie Group (Great Glennie Island - 138 ha, Dannevig Island - 19 ha, McHugh Island - 9 ha and Citadel Island - 20 ha); the Anser Group (Anser Island - 74 ha, Kanowna Island - 21 ha, and Cleft Island - 7 ha); Wattle Island (22 ha, 0.5 km offshore from South Point); and Rabbit Rock and Rabbit Island (30 ha, 2 km offshore from Monkey Point on the east side of the promontory).

All, except for Citadel Island (which is Commonwealth land), are part of the Wilsons Promontory National Park. All are surrounded by at least 300 m of protected marine waters (see previous Marine Systems section). Anser Island is also a reference area, but is presently unproclaimed.

The islands within the national park are included in a general management zone (Department of Conservation, Forests and Lands 1987): Zone II which 'provides recreation opportunities in a predominantly unmodified environment' with the plan stating that 'the number of users entering the zone will be kept low, to protect both conservation values and opportunities for feelings of isolation ... access will be by foot or boat only ...'.

Most of the islands have expanses of weathered granite and sparse, low-growing vegetation which is mainly *Poa poiformis* grassland on shallow soil. The islands are important habitats for sea birds, notably the short-tailed shearwater, fairy prion, sooty oystercatcher, pacific gull, little penguin, Cape Barren goose, and diving petrel. Bush rats and the swamp antichinus live on Great Glennie Island and a small colony of seals occur on Norman Island and Kanowna Island.

The cultural significance and use of the island by Aborigines prior to recorded

history is unknown. Evidence of their activity has, however, been found on Norman Island (flint sites) and Great Glennie Island (occupation sites). Historical associations of the islands with European culture includes the sealing industry of the early 1800s and with communication facilities - notably the Citadel Island lighthouse. It was constructed in 1913.

Recreational use of the islands is low because of the difficulty of landing. The steep cliff faces are unsheltered from strong wave action. Picnicking and sightseeing, however, occur in summer on Great Glennie Island and Rabbit Island.

All the islands have high capability for nature conservation.

Little exploitative activity is undertaken other than occasional (illegal) poaching of short-tailed shearwater and Cape Barren geese.

All are within 10 km of the mainland and good, but remote, boat access is available at Port Welshpool, Yanakie Landing, Sandy Point and Walkerville.

Apart from a survey beacon on Rabbit Island, the Citadel Island lighthouse is the only facility constructed on any of the islands. It is an automatic light with a nominal range of 11 nautical miles. It is 8 metres high (although 117 m above sea level).

Most are little modified, though occasional visits by fishermen or recreationists may cause localised erosion. Rabbits were released on Rabbit Island in 1836, but these have now been eradicated and the vegetation is recovering. They were also introduced to Citadel Island in about 1860.

Wilderness attributes

All the islands are offshore from Wilsons Promontory which, save Tidal River, is essentially a non-cultural landscape, the nearest cultural landscape being on Yanakie isthmus. They are relatively remote from vehicular access (the nearest being the Tidal River road) and from boat ramp access points (at least one and a half hours' travel time). They are also all

unoccupied and without roads or tracks. As such they all have high remoteness from settlement and access value. With the exception of Citadel Island, little modification by humans is evident. All would have high aesthetic and biophysical naturalness values.

While most of the islands are small, five are larger than 30 ha, with the largest, Great Glennie Island being 138 ha. They would have high value for wilderness recreation (notably rock-climbing), for solitude, and inspiration.

Seal Islands

Seal Islands are a group of five islands and several rock stacks about 15 km off the east coast of Wilsons Promontory. Total area is approximately 60 ha. Cliffy Island is Commonwealth land. All the others are included in a wildlife reserve.

The islands collectively support colonies of seabirds, including the little penguin, short-tailed shearwater, fairy prion, pacific gull, crested tern, common diving petrel and black-faced shag. The tussock grasslands are breeding habitat for a small colony of Cape Barren geese.

Sealers in the early 1800s exploited the fur seal colony, but a small colony of Australian fur seal survives. The island has high capability for nature conservation due mainly to the presence of the sea-bird colonies and fur seals.

There is no recreational use or commercial utilisation.

The Cliffy Island lighthouse consists of a 14 m stone tower (55 m above sea level) and has a nominal range of 17 nautical miles. It was built in 1884. No other structures are known.

Wilderness attributes

All wilderness quality attribute values would be high given the high remoteness and unmodified nature of the islands. Value for wilderness recreation is low.

The Skerries

The Skerries is a small granite outcrop, about 750 m offshore from the mouth of

Wingan Inlet. It is part of Croajingolong National Park.

The draft park management plan (Department of Conservation, Forests and Lands 1985) includes it in a scientific protection zone requiring special protection or management because of other scientific or conservation significance'. In this zone general public access may be restricted and experimental or manipulative research may be permitted'. The features requiring protection are the 'Australian fur seal colony and seabird rookery'.

The Skerries are an outcrop of granite rock with little vegetation. A number of bird species nest on the island including silver gulls, little penguins, and crested and Caspian terns. A colony of the Australian fur seal also occurs on the island.

No exploitative use is known. Recreational use is limited mainly due to difficulty of access. Aboriginal sites are recorded on the abutting coastline but none on the island itself.

Occasional recreational use may disturb the wildlife. Poaching is a potential problem. A minor two-wheel-drive road gives access to Wingan Inlet, about 2 km from the island. This provides small motor boat access to the inlet. The Department of Conservation, Forests and Lands has developed a 25-site camping area at the inlet which is fully utilised in summer and during other school holidays. Abalone is fished commercially in the surrounding waters.

Wilderness attributes

The island, with its abutting coastline of National Park has high remoteness from settlement value, and relatively high remoteness from access value. As it is roadless and essentially unmodified it has high aesthetic and biophysical naturalness value.

It is of limited value for wilderness recreation because of proximity to a recreational node. the smallness of The Skerries limits its potential ecological viability and, moreover, its fauna could be threatened by increases in storminess or sea level rise.

Tullaberga Island

Tullaberga Island is a small low granite and sedimentary island about 1 km from the coastline and some 7 km east of the entrance to Mallacoota Inlet. It is about 10 to 15 metres above sea level. It is part of the Croajingolong National Park and is zoned in the same way as The Skerries (see previous section) to protect the breeding colonies of birds.

Tullaberga Island consists of granite which has intruded into overlying sandstone and shales. A number of basaltic dykes occur in the granite. Most of the island is covered by a thin veneer of beach and dune sands. It is surrounded by a rocky shore platform, with a small sand and gravel beach. There are six small islets on its eastern side. The island is vegetated with dense scrub and supports breeding colonies of the white-faced storm petrel and little penguins.

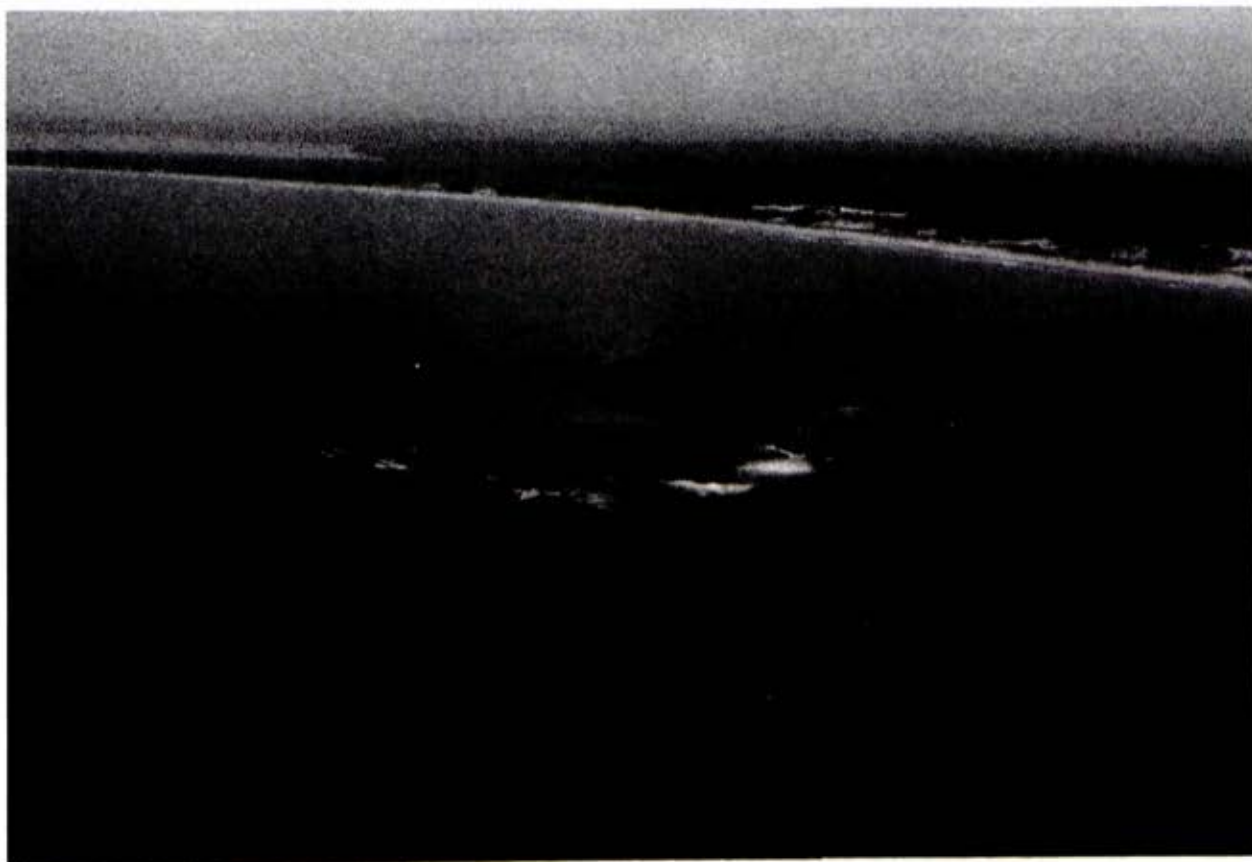
This island has historical associations with early European settlement; the ship

'Monumental City' was wrecked there in 1853. It is not known if *in situ* relics still occur. No exploitative uses are known to have occurred. There is little recreational use of the island, mainly due to the difficulty of boat landing under most weather conditions. The island is of geological interest and of high (State level) zoological significance as it contains the largest colony of the white-faced storm petrel in Victoria.

The nearest vehicular access is a four-wheel-drive track on the mainland about 2.5 km distant. The nearest boat-launching access is at Mallacoota, about 7 km distant.

Wilderness attributes

The island, abutting the unmodified national park coastline, has high remoteness from settlement value and high remoteness from access. Given its roadlessness and absence of human modification it has high aesthetic and biophysical naturalness value.



Many of Victoria's offshore islands are roadless, relatively unmodified, and often remote from access and settlement - Tullaberga Island

The islands' value for wilderness recreation is likely to be moderate, as would its experiential value.

Gabo Island

Gabo Island is a low, dune covered granitic island about 500 m off the mainland and roughly equidistant between Mallacoota and Cape Howe. It is Commonwealth land and therefore not public land nor subject to recommendations under this investigation.

The island has low remoteness from settlement and access value due to the permanent habitation of the island, the road network and airfield associated with the lighthouse. These also reduce its aesthetic naturalness value. Given that the modification of areas by humans is relatively localised, much of the island retains high biophysical naturalness.

Capability for wilderness recreation and value for solitude or inspiration would be low to moderate. Though the island is relatively large, its ecological viability is reduced by the presence of alien species and permanent settlement.

LARGE INLAND WATER BODIES

Small inland water bodies, where surrounded by natural lands were included in the Preece and Lesslie (1987) survey of wilderness quality in Victoria. A small number of large water bodies, while surrounded by areas of cleared and settled land, met the minimum inclusion criteria of the survey. That is, the water body itself was a natural area of at least 10 000 ha without two-wheel-drive roads.

These water bodies are Lake Corangamite (23 000 ha) in the Western District, Lake Tyrell (20 800 ha), and Lake Hindmarsh (15 600 ha) in the north-west, and Lake Wellington (14 600 ha) in the Gippsland Lakes.

Lake Corangamite

This saline lake lies in a large basin of internal drainage, having no natural outlet to the sea. It supports a number of species of native fish and is also an important waterbird area.

It is largely unaffected by drainage works, or land fill but is mostly surrounded by cleared farmland and the majority of the natural vegetation on the lake margins has been removed. Much of its shoreline is subject to low intensity grazing and a commercial eel fishery operates on the lake. It is little used for recreation, and, given that much of the foreshore is alienated, public access to the lake is limited.

While the shoreline is not remote from settlement or access, parts of the lake could be considered as relatively remote, especially given the absence of any formed boat access. It would have high aesthetic naturalness values because man-made structures do not occur within the body of the lake and only a few on its margins. The lake's biophysical naturalness would be relatively high since the only known direct human modification pertains to upstream flood control.

The whole lake is a reserve, specifically included in the Western District Lakes Wetland as nominated to the Ramsar Convention on account of its international importance.

Lake Tyrell

Lake Tyrell is a salt lake in north-west Victoria. The lake bed has transverse gypsum dunes and a lunette (mainly on freehold land) is associated with the lake. The islands and margins of the lake carry extensive saltbush grasslands and samphire shrublands which are subject to grazing by domestic stock and rabbits. However, they support a distinctive and significant fauna.

The southern end of the lake has been extensively developed for salt extraction over many years, but the remainder of the lake has high nature conservation values with species of note including a number of uncommon birds and two rare reptiles. Recreational use is low despite Lake Tyrell's outstanding scenic attractiveness. An annual 'Mallee Rally' is run around its perimeter. Surrounding freehold lands are mainly cleared.

The lake shoreline is not remote from settlement or access, but much of the lake is relatively remote since both vehicular

and motorised boat traffic is sparse. Few structures have been built within the lake, although the areas of salt extraction include constructed evaporative pans, access tracks, stack sites and processing facilities. Aesthetic naturalness value is low in such areas. Biophysical naturalness values would also be low in these areas and only moderate elsewhere due to the impacts of grazing. Total wilderness quality values, according to the Preece and Lesslie survey methodology, are likely to be low to moderate.

The eastern half of the lake (15 000 ha) has been recommended as a wildlife reserve, with the remainder of the lake (5860 ha) being used for the extraction of salt (Land Conservation Council 1989).

Lake Hindmarsh

Lake Hindmarsh, a lake reserve, is Victoria's largest freshwater lake and forms part of the Wimmera River system. Accordingly, its water levels fluctuate widely. The lake is fringed with remnant woodlands and it is important for water fowl and wading birds.

Lake Hindmarsh is very popular for a range of recreational activities and facilities include a large camping ground, picnic sites, and a boat ramp (immediately upstream of the lake). A number of professional fishermen operate on the Lake Hindmarsh, and amateur netting occurs. The natural water regime of the lake is affected by upstream storages and diversions. Water quality of the lake itself, however, is relatively high.

It is not remote from settlement or access and the lake itself is readily accessible to boats. Structures are limited to those on its margins and the biophysical naturalness values of the lake itself appear relatively high.

Lake Wellington

Lake Wellington is the western-most lake of the Gippsland Lakes. It is fringed largely with saltmarsh, reed swamps and melaleuca thickets, with more elevated areas carrying banksia and eucalypt woodlands. These margins are important for a range of water fowl and wading birds.

It is relatively popular for boating, both motorised and sail, and a yacht club house and small harbour have been constructed in the north-west of the lake. Other than minor navigation lights there are few other structures. Highly turbid, its salinity varies according to the waterflow inputs. It may become quite saline during droughts, particularly given the permanent breaching of the sand barrier (at Lakes Entrance) with the ocean. Aquatic fauna is thus relatively sparse.

While parts of the shoreline carry extensive areas of natural vegetation, most is not remote from settlement or access and the lake itself is readily accessible to boats. Structures are limited to those on its margins and the biophysical naturalness values of the lake itself appear moderate. Wilderness quality values are thus likely to be low.

The margins of the lake are within a proposed Gippsland Lakes reserve, with the remainder reserved for public purposes. It is listed on the Ramsar Convention as being a wetland of international importance.

AREAS OF VERY HIGH QUALITY INDIVIDUAL WILDERNESS QUALITY INDICATOR VALUE

Areas of identified very high individual wilderness quality indicator value (being those which the Preece and Lesslie survey included in indicator class 4) which fell outside the descriptive blocks were generally small and associated with areas of low total wilderness quality value.

They included four areas of very high biophysical naturalness value, being :

- (a) an area at Buldah Gap extending to the east and south of the Buldah Valley in East Gippsland
- (b) areas of heathland at Carlisle River in the Otways
- (c) the Wallaby Creek water-supply catchment area at Mount Disappointment; and
- (d) land around and to the north-east of Mount Drummer in East Gippsland;

and five areas of very high remoteness from settlement value being:

- (a) an area near the headwaters of the Big River (near Lake Eildon);
- (b) an area centred on the middle reaches of the Dargo River;
- (c) an area centred on Mount Skene;
- (d) a small area of the middle reaches of the Mueller River in East Gippsland; and
- (e) an area in the north-east on and to the east of Thowgla Creek, near Corryong.

This section briefly describes all of these areas.

(A) Areas of Very High Biophysical Naturalness

Buldah Gap

This mountainous area extending to the east and south of the Buldah Valley in the upper reaches of the Cann River was assessed as having very high biophysical naturalness values. It consists mainly of dry sclerophyll forests grading into lowland sclerophyll forest in the south, with riparian forest along the river and areas of wet sclerophyll forest at higher elevations.

Close proximity to the settlements along the Cann Valley, Buldah and Combienbar give the area low to moderate values for remoteness from settlement (mainly cattle production properties) with proximity to the major two-wheel-drive roads within and linking these settlements (including, in the east, the Cann Valley Highway) resulting in low values for remoteness from access. Aesthetic naturalness values, being strongly influenced by propinquity to settlement boundaries and roads, are also low.

Biophysical naturalness values are very high as the forests, despite their proximity to agricultural settlements and former goldfields (for example, Chandlers Creek) have not been extensively logged or intensively grazed. Total wilderness values are, however, mainly moderate due

to the predominantly low values for the other indicators.

The area has high to very high capability for timber production, given that much of the forest has not been harvested and that a number of commercial species occur. It also has high capability for water production, being the headwaters of the Cann River (west branch). Capability for agriculture is low, other than on the gentler slopes of the Combienbar and Buldah valleys. Apicultural capability is low to moderate, as is the capability for forest grazing (given the area's dense understorey and steepness). The rugged, little disturbed areas have moderate capability for wilderness recreation. The Three Sisters is an important landscape feature of interest.

The whole area is included in State forest.

Carlisle River

The two areas near Carlisle River that were allocated to the highest class of biophysical naturalness in the survey, carry extensive areas of heath and shining peppermint and brown stringybark woodland. The soils of these areas are leached sands with very low capability for agricultural purposes or timber production, and this, together with the absence of recreational facilities or particular scenic landscape features, has meant that the vegetation is still essentially intact.

Both areas are surrounded by farmland and small settlements associated with dairying. State forest abuts in the south. The northern edge of the areas is traversed by a scenic road that links Gellibrand (and Colac) to Moonlight Head (and the Port Campbell National Park). This is a major two-wheel-drive road which is sealed south of Carlisle River. Other boundaries are generally defined by minor two-wheel-drive roads, and both areas contain a number of four-wheel-drive tracks. As a result, values for remoteness from settlement and access, aesthetic naturalness and total wilderness quality are low.

The areas have high value for conservation and are extremely rich floristically. Several rare plant and animal species are found in the heathlands, notably the

endangered ground parrot in areas of wet heath. The heathy woodlands have high capability for activities that require solitude and for nature study. Together with other areas of the Wangerrip group of Tertiary sediments they form important intake areas for groundwater. The areas are not used intensively for recreation.

The area centred on Crinoline Creek, to the south of Carlisle River forms part of the Crinoline Creek Reference Area and Flora and Fauna Reserve. The area centred on Boggy Creek, to the north, is entirely within the Carlisle State Park.

Mount Disappointment

The area at Mount Disappointment allocated to the highest class of biophysical naturalness corresponds with the water supply catchments of the Toorourong Reservoir. The area has been used solely for water production uses and public access, with timber production and grazing prohibited. Consequently, the vegetation has remained relatively undisturbed.

The area forms the eastern half of the Mount Disappointment granitic massif. The undulating areas of the higher central area give way to steeply dissected slopes on the east and south. The elevated areas carry tall open forest of mature and regrowth mountain ash, including a 200 ha stand of mature mountain ash that is in an almost virgin condition, having escaped the logging and wildfires that have affected most other ash stands in the Central Highlands. Messmate and mountain grey gum open forests dominate the lower slopes.

Land to the south is cleared and used for agriculture, while to the north and west harvesting has occurred. Facilities such as aqueducts, weirs, and a network of management tracks and roads occur in the area. Accordingly, it has low remoteness from access and aesthetic naturalness values which, combined with the effects of the areas small size on the remoteness from settlement indicator, reduce total wilderness quality dramatically.

The area has high capability for water production, hardwood production, various forms of recreation, and possibly for apiculture, moderate capability for grazing

and softwood production, and high capability for nature conservation and maintenance of landscape values.

The greater majority of the area was recommended by the Land Conservation Council in 1977 to be uncommitted land. It also included a small area around the Toorourong Reservoir for water supply purposes and three reference areas - Stony Creek (420 ha), Disappointment (1090 ha), and Joey Creek (250 ha). Council is currently reviewing the use of public land in this area.

Mount Drummer

The area surrounding Mount Drummer and an abutting area to the north east centred on the Wigan River were allocated to the highest class of biophysical naturalness value in the Preece and Lesslie survey. The area surrounding Mount Drummer corresponds with the Alfred National Park which straddles the Princes Highway. The Princes Highway also forms the southern edge of the area centred on the Wigan River.

The Mount Drummer area consists of strongly dissected terrain with a number of peaks and ridges, the highest of which being Mount Drummer (approximately 480 m high). The topography of the area to the north-east becomes rapidly more subdued surrounding the Wigan River. Most of the vegetation is lowland sclerophyll forest with a large area of wet sclerophyll forest and warm temperate rainforest in the higher and more sheltered areas surrounding Mount Drummer. Areas of coastal heathland occur along some of the watercourses and lower lying areas in the east with small areas of riparian forest also occurring.

The presence of freehold cattle properties is the main influence on remoteness from settlement values, and given the area's network of logging roads, vehicular tracks, and particularly its proximity to the Princes Highway, low remoteness from access values were recorded. The settlement areas and roads and tracks depress aesthetic naturalness values which were assessed as low.

Biophysical naturalness values are very high as the forests have not been logged

or intensively grazed. Grazing licences have, however, covered much of the land around Scrubby Creek and the Wingan River. They are no longer current and these areas have not been grazed for many years, if at all. The surrounding areas are of very low biophysical naturalness value, largely reflecting timber utilization in these areas, other than to the east which abuts areas of very high biophysical naturalness included in the Upper Genoa descriptive block (see Block 20 chapter 12). Recorded total wilderness quality values are low to moderate.

Capability for timber production is high with the most important species including silvertop and stringybark species, and high for agriculture and forest grazing in less dissected areas. Capability for apiculture is moderate. Parts of the area have very high capability for nature conservation, with the areas of warm temperate rainforest around Mount Drummer of particular botanical significance. Recreation use is focused on the Alfred

National Park where a picnic area and walking tracks have been constructed.

That part of the high value area outside the National Park is mainly State forest with a natural feature zone over the Wingan River and Yoke-Up Creek.

(B) Areas of Very High Remoteness from Settlement Value

Big River

The area allocated the highest class of remoteness from settlement is centred around the Stockmans Reward area to the east of Lake Mountain. It is surrounded by an extensive area of high remoteness from settlement value which extends from Lake Mountain to Enoch Point, and south towards the upper reaches of the Yarra and Mount Whitelaw.

The area around Stockmans Reward consists of very steep strongly dissected mountainous terrain. The Big River and



Areas of very high value for remoteness from settlement are not necessarily of high naturalness value - Stockmans Reward on the Big River

its upper tributaries is the major watercourse. Much of the vegetation is messmate stringybark and narrow-leaf peppermint open forest, with mountain ash open forest in sheltered valleys. Alpine ash fire regrowth (1939) occurs on the higher plateau remnants to the south-east and west. Broad-leaf peppermint open forest with long-leaf and candlebark occurs toward the middle reaches of the Big River.

The whole area is surrounded by public land which has been subject to mining activity since the 1860s with early mining centres being at Stockmans Reward, on and near Frenchman Creek, and the north branch of the Torbreck River. Major mining activity occurred to the east of the Big River (and the block) in the Gaffneys Creek, A1 mine and Woods Point areas. The forests would have been extensively logged at about this time and with repeated wildfires, are in a generally degraded condition. Most of the area has been grazed for many years. The Big River area is also used intermittently for military training purposes. A number of picnic sites have been constructed along the Big River. Four-wheel-drive tracks follow the Big River and some of the larger tributary divides. A minor unsealed two-wheel-drive road links Stockmans Reward with Cambarville and Matlock.

Given the history of the land use and the track network, the area recorded generally low values of remoteness from access, and aesthetic and biophysical naturalness and, as a result, low total wilderness quality values.

The area has high capability for water production, with all waters flowing directly into Lake Eildon (it is included in a proclaimed water supply catchment) and in the alpine ash regrowth areas for hardwood production. The block is on the edge of a mineralised zone between Jamieson and Woods Point and as such may have future mineral extraction potential. Parts of the area contains segments of moderate capability for pines and apiculture but the difficulty of access and steepness of the slopes are limiting. Present uses are bushwalking, camping, four-wheel driving, and trail-bike riding, and deer hunting, with the Big River

itself being a popular fishing and canoeing stream.

Most of the area is within State forest. Council is currently reviewing the use of public land in this area.

Dargo River

An area of very high value for remoteness from settlement is centred on the Little Dargo River and Eighteen Mile Creek.

The predominant land forms of the area are the Dargo High Plains, along with steep mountainous valleys, ridges and spurs. Elevations on the tablelands are approximately 1200 to 1600 m, with the valley floors up to 800 m lower. The area is heavily dissected with a dense network of watercourses. On the Birregun Range, the relief is less steep. Vegetation communities vary across the area in response to soil, topography and climatic factors. At the highest elevations are alpine grasslands, heathlands and mosslands, giving way to subalpine snow gums and woodlands. Alpine ash forests and wet and dry open forests cover most of the area. Wet open forests are the most prevalent. As a result of timber harvesting and bushfire, much of the alpine ash forest is regrowth.

The Crooked River goldfields lie within the area, the site of significant mining earlier this century. There is a long history of cattle grazing on the Dargo High Plains and along the river flats of the Dargo and Crooked Rivers.

Because of the Dargo Road, which passes through the centre of the area, the area's track network, and land-use practices, remoteness from access, aesthetic naturalness and biophysical naturalness values are low. Wilderness quality values for the area are thus also low to moderate.

The area has a high capacity for water production, covering high rainfall catchments feeding the Wongungarra and Dargo Rivers. There is a low likelihood of future development. Although gold mining ceased in the 1920s, there may be potential for future extraction. Regrowth from the 1939 bushfires will become available, improving the capability for hardwood timber production from the

areas of alpine ash forests. There is high capability for wilderness recreation, including hunting, bushwalking and fossicking. Bushwalking, recreational driving along the Dargo Road and canoeing on the Dargo River are popular activities. The Dargo Road also provides the main access for apiarists.

The majority of the area is State forest, although portion is included in the Alpine National Park and the Shepherds Creek Reference Area.

Mount Skene

This area of very high remoteness from settlement value extends in a south-west to north-east band south of Mount Skene in the Great Divide. It is surrounded by an extensive area of high value.

The area is predominantly rugged mountainous terrain with many of the major ridges exceeding 900 m. Several large watercourses originate in the area, namely Goulburn River, Big River, Snake Creek, Skene Creek, and the Barkly River. Five vegetation communities cover this area in a complex pattern, with snow gum forests between 1200 and 1400 m, and subalpine woodlands, alpine ash, wet open forests and dry open forests at lower altitudes. A large proportion of the extensive alpine ash forests are regrowth from wildfire and the extensive timber harvesting in the area. Dry open forest is more prevalent in the south.

Gold mining has been undertaken at the Aberfeldy field along Champion Spur, in the south. Nature conservation values are moderate to high, covering subalpine woodlands to riverine forests, with five significant flora species, four of which occur on the Mount Skene summit. Recreation capabilities are moderate to high and currently include four-wheel driving, fishing, deer hunting, canoeing, bushwalking and fossicking. Cattle grazing has occurred in grassy alpine ash forests and snow gum woodlands on the higher ridges, in summer. The alpine ash forests have been extensively harvested with most of the stands with road access being harvested. The Jamieson to Licola Road crosses the centre of the area besides numerous forestry roads and other tracks.

Extensive timber harvesting, an intensive network of roads and tracks, and cattle grazing, give the area low values for remoteness from access, aesthetic and biophysical naturalness, and thus generally low total wilderness quality values.

There is high potential for continued timber production and high capability for water production from the area's large stream discharges. Future mineral production for gold is unlikely. There is, however, potential for other mineral occurrences in the Cambrian rocks to the north and south-east. The area is accessible to, and often used by, apiarists. The Jamieson--Licola tourist road is a tourist route and provides access to Mount Skene, which is a popular scenic attraction. The road and the numerous lesser roads and tracks, together with timber harvesting, reduce the attractions for bushwalking and other forms of wilderness recreation. The Alpine Walking Track does, however, pass through the area.

Most of the area is State forest, with Mount Skene, and the environs of the Jamieson--Licola tourist road included in a Natural Features and Scenic Reserve.

Mueller River

An area of very high values for remoteness from settlement is centred on the Mueller River, near the East Gippsland coast. This area is north of descriptive Block 22, and extends west to include the Thurra River, northwards to the Princes Highway and eastwards towards the Wingan River.

It consists of low coastal hills of moderate slope, with elevations rarely exceeding 200 m. Most is within the catchment of the Mueller River, with a small area of the Thurra River catchment in the west. Lowland sclerophyll forest covers most of the area, with riparian communities along the larger watercourses and coastal heathland in the north-east. Substantial areas of these forests are regrowth.

Exploration for minerals and stone extraction has occurred in the north of the area, but no commercial mineral extraction has taken place. Where permitted, most of

the area has been logged. Extensive bushfires in 1982--83 damaged mature forests and areas regenerating from harvesting. There are several tracks in the centre and east, the largest of which are the unsealed west Wingan Road and the Mueller Road.

While remoteness from settlement values are high, remoteness from access, aesthetic naturalness and biophysical naturalness values are low to medium as a result of past land-use practices and the track network and thus total wilderness quality values recorded were also low to moderate.

There is moderate capability for water production from the Thurra River, but presently no demand for development. Materials suitable for gravel and sand extraction and quarries for roading material are found in the north. There are no known mineral deposits suitable for commercial exploitation. Capability for forest grazing is moderate. Soil erosion hazard is low, except for the steeper slopes. Wilderness recreation activities are possible within the area as it consists of naturally vegetated lands and there are no structures other than tracks. Most recreation is centred in the Thurra River camping ground in the Croajingolong National Park to the south.

All of this land is in public tenure. The southern portion of the area is included in the Croajingolong National Park, with the northern areas designated as State Forest. A Natural Features Zone covers the Mueller and Thurra Rivers north of the National Park area.

Thowgla Creek

The area of very high value for remoteness from settlement occupies mountainous terrain in the far north-east of the State, centred on the West Branch of Thowgla Creek. It extends northwards from the boundary of Block 15.

The topography rises to over 1700 m towards Mount Pinnibar. Other high points are Mount Boebuck and Mount Barlow. Much of the area is above 900 m, with the Pinnibar plateau in the south being the dominant land form. Larger watercourses within the area include Wheeler Creek, Thowgla Creek (West

Branch), Surveyors and Hermit Creeks. Vegetation at the highest altitudes, above 1300 m, is snow gum open forest. Between 800 and 1500 m are extensive areas of Alpine ash forest. Wet sclerophyll forest stand on the more sheltered sites, while open dry forests occupy the steeper, exposed country.

There has been little mining activity across the area, with only one small gold-field (Zulu Creek). Cattle have grazed principally on the Pinnibar plateau, Buenba flats and the Surveyors Creek area in the grassy alpine ash or open wet forests. Many vehicular tracks are in the area, with the major, sealed, Benambra--Corryong Road skirting its western edge.

Remoteness from access values are high for the central portion and moderate for the remaining areas, due to the road and track network. Aesthetic naturalness and biophysical naturalness values are low to moderate, a consequence of land-use practices and the presence of structures within the area. Total wilderness quality values were also thus low to moderate.

Bushwalking and canoeing are the most popular recreation forms, with the Alpine Walking Track a focus for bushwalking. Recreation capabilities for bushwalking and fishing are high, and moderate for adventure driving, cross-country skiing and canoeing. Agricultural development has a low capability, with bush cattle grazing having a low to moderate capability. A large timber resource is available, notably the alpine ash forests of high value species. Under present tenure timber harvesting is a continuing use. Gold has been mined at Zulu Creek, but the operations were abandoned. While the capability for water production is high, the likelihood of large-scale harvesting is low.

Most of the area of high value is State Forest, with the Cabberas-Tingaringy National Park occupying an area adjacent to the Murray River.

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PART VI
PROTECTIVE MECHANISMS

14. POSSIBLE APPROACHES TO WILDERNESS PROTECTION

POSSIBLE PROTECTIVE CATEGORIES

Many approaches to the protection, use and management of wilderness areas have been adopted throughout Australia and across the world. Chapter 4 outlined the current ones being followed in Victoria. As mentioned in that chapter, Council's standard set of public land use categories includes a wilderness area category. While Council's present policy implies that wilderness is a large tract of public land relatively undisturbed by humans and characterised by its own natural wild conditions, its specific recommendations for wilderness areas, however, emphasise strongly that such areas be set aside primarily for recreation and used to 'provide opportunities for solitude and unconfined forms of recreation in substantially unmodified natural environments'.

Council has not previously detailed a category or categories specific to the requirement of protecting areas of high

wilderness quality. Furthermore, as indicated in Chapter 3, areas of high wilderness quality are important for a wide range of values including, but not at all exclusive to, recreation.

In broad terms, two possible approaches could be taken in the development of categories specifically providing for the protection of areas of high wilderness quality.

One approach could comprise a single category defined to include all land above a certain threshold value of wilderness quality. An alternative approach could involve a hierarchy of categories, with one category encompassing the largest areas of highest quality where natural processes can be undisturbed to the greatest extent possible, with other areas of high quality, which may be smaller, of lower quality or subject to particular management constraints, allocated to a second category. These are illustrated in Table 116.

Table 116

POSSIBLE APPROACHES TO PROTECTIVE CATEGORIES

Category	Description
(A) Approach based on hierarchy of categories	
Wilderness Area	A large area with landforms and native plant and animal communities relatively unaffected or altered by the influence of modern technological society, and of sufficient size to make practicable the long-term protection of its natural systems and primitive appearance; managed to conserve and enhance wilderness quality values
Wilderness Zone	Other areas of high or potentially high wilderness quality, which may be smaller, of lower quality or subject to particular management constraints; managed to conserve and enhance wilderness quality values
(B) Approach based on a single threshold	
Wilderness Area/Zone	An area of high or potentially high wilderness quality, managed to conserve and enhance these values

Note:

Category names and descriptions are indicative only.

In both of these approaches wilderness quality, rather than wilderness use, would be the key inclusion criterion. The Order-in-Council which established the Wilderness Special Investigation, also requires that consideration be given to other uses and values of these areas.

Recommendations for each category would emphasise the objective of maintaining or enhancing wilderness quality values, and include a list of permitted uses, together with management guidelines for such areas, and the most suitable method of protection. Recommendations may also need to reflect site-specific circumstances.

It may also be appropriate to consider protective mechanisms for areas with high value in a single wilderness attribute, as well as mechanisms to ensure that the wilderness values of other more special environments, such as islands, are protected.

The specific method of protecting areas of high wilderness quality could include a variety of existing mechanisms such as reservation, management planning (zoning), codes of practice, public land planning controls, or some combination of these. Each offers different levels of protection and security. Alternatively, protective mechanisms could be established by specific wilderness legislation.

Government-approved Council recommendations exist for virtually all public land in the State. The Wilderness Special Investigation recommendations will be framed to reflect these where appropriate, with existing recommendations modified if required.

It should be stressed that all such approaches are merely possibilities. Categories will be defined only when Council is formulating its proposed recommendations (see Chapter 1).

BOUNDARIES AND USES

The allocation of land to protective categories will be undertaken in accordance with the terms of reference of the investigation (Table 1), as well as comply with the Land Conservation Council's normal, and legislatively required,

process of providing recommendations for the balanced use of land in Victoria.

Boundaries could encompass only the lands specifically identified as being of high wilderness quality. Adjoining areas, while not of high wilderness quality, could be incorporated into a form of buffer zone as the uses on such land are likely to have a significant influence on the adjoining area of high wilderness quality.

Alternatively, the boundaries could encompass all those areas where significant control and restrictions may be required, in order to ensure the maintenance of high wilderness quality.

The size and shape of the areas enclosed by boundaries of defined areas will need to reflect the ecological viability of areas, as well as their capability for recreation, inspiration and solitude. The nature of adjacent land use may be more significant than specific minimum size criteria. In general, however, large consolidated areas correlating with catchment boundaries or perhaps, more particularly, extending beyond catchment boundaries would appear most likely to afford greatest protection to areas of high quality.

The main criteria in the definition of appropriate uses of land within designated protective categories will be their compatibility with an objective of maintaining or enhancing wilderness quality values. Council will need to assess the impact of particular activities and uses on wilderness quality (such as those identified in Table 23 and those described in Chapter 8).

Council is seeking comments on the compatibility of different uses with the maintenance of wilderness quality, as well as the dependence of uses on wilderness settings and the approaches that might be taken in regard to delimiting boundaries and, if appropriate, buffer areas.

RESTORATION POTENTIAL

The existence of vehicle tracks and structures may result in the reduction in wilderness quality values of an area that may otherwise have been of high wilderness quality - notably in those areas of high biophysical naturalness value. In

such cases, the closure of access tracks, particularly if the surface of the land is rehabilitated to its previous form and revegetated, and the removal of structures such as fences, tanks and huts can result in an increase in wilderness quality. Such management practices are established components of wilderness management operations in Victoria, elsewhere in Australia and overseas.

The concept of such restoration is accepted by wilderness analysts. For example, Hawes and Heatley (1985) define 'restoration zones' as 'areas (usually within primitive zones) managed primarily for the purpose of increasing their degree of primitiveness. Management measures in such areas may include the temporary use of machinery and restrictions on access'. Preece and Lesslie (1987) state: 'Among the many structures, land conditions and other features which govern wilderness quality, there is considerable variation in their degree of permanence or 'manageability'. Some factors are relatively permanent or irreversible, either as a result of the magnitude of the impact that they cause, or because the costs (social and/or financial) of their removal or abandonment exceeds the benefits that could result from wilderness enhancement. Conversely, other factors are more readily reversible, and for many of these the benefits of their removal, in terms of enhancement of wilderness quality, may exceed the benefits of retention.'

There is however a clear distinction between those areas that have never been subjected to such disturbances, and areas that have been disturbed and subsequently rehabilitated. The latter will not be equivalent in wilderness quality to the former.

Rehabilitation works are of particular relevance where reversible influences are located between two areas of high wilderness quality, and can lead to the enhancement the overall wilderness quality of the total area.

Such rehabilitation works are likely to be similar to those commonly used in soil conservation works, following the completion of logging operations in native forest, or as a normal part of management of national parks. The modification of land

management practices, such as reduction in the frequency of fuel-reduction burning, the cessation of grazing by domestic stock or the cessation of broombush harvesting, may also result in improvements to wilderness quality over time.

OTHER RELATED CATEGORIES

A number of land designations exist, for example, national parks, reference areas, wild rivers and National Estate places, while internationally there are World Heritage Sites and Biosphere Reserves. All these terms engender in the public mind the notion of protection of wilderness, even though such places are not specifically designated 'wilderness areas', nor specifically concerned with the protection of wilderness quality. They may, nonetheless, provide some protection of areas of high wilderness quality. The nature of these categories and their role and limitations in protecting areas of high wilderness quality is outlined below. Only the first two are covered by Victorian legislation. An illustration of their relationships is shown in Figure 6.

National Parks

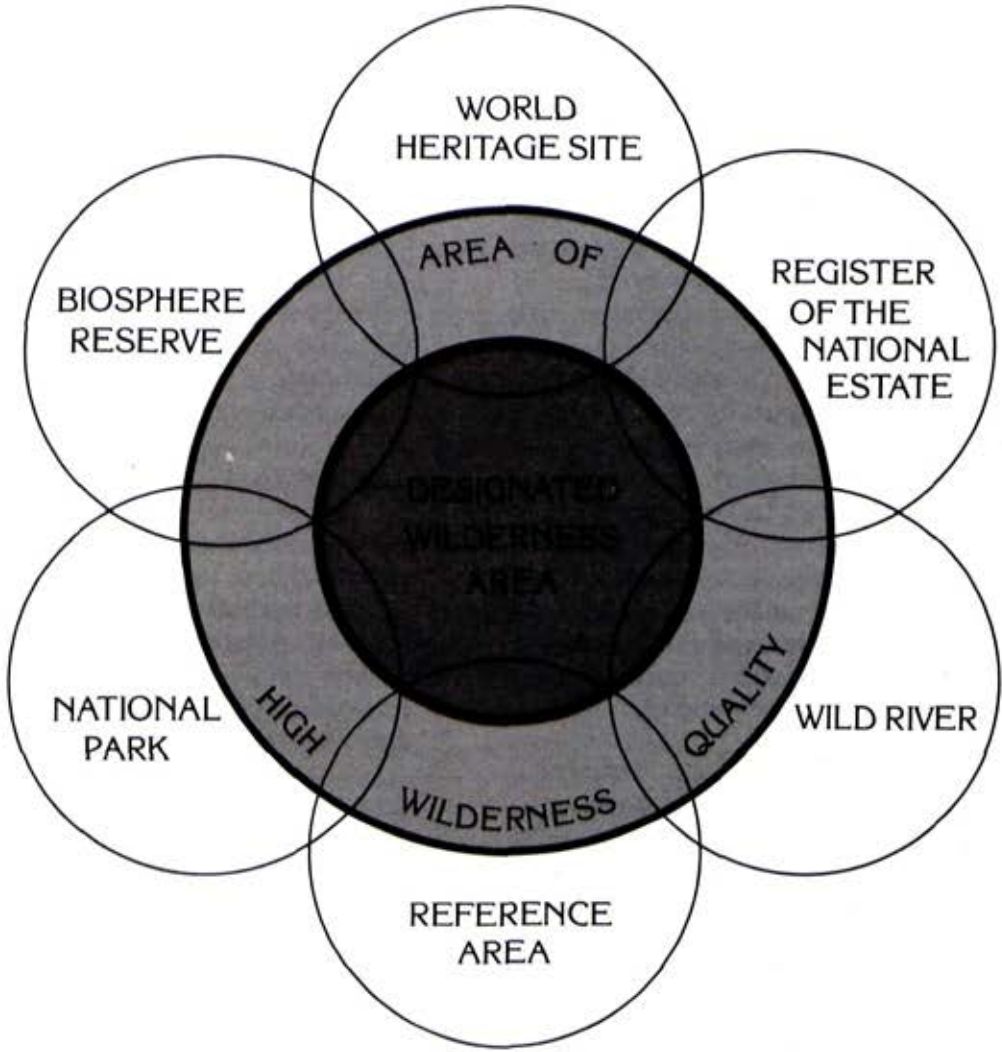
Within Victoria, national parks are considered to be extensive areas of public land of nation-wide significance because of their outstanding natural features and diverse land types, and are set aside primarily for public enjoyment, education and inspiration in natural environments.

Such areas are permanently protected under the provisions of the *National Parks Act 1975* and managed in accordance with management plans approved by the Director of the National Parks and Wildlife Division.

National parks are 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 geological, archaeological and historical importance; and
- (iv) supply water and protect catchments.

FIGURE 6:
CATEGORY RELATIONSHIPS



Hunting, use of firearms and harvesting of forest products are generally not permitted.

National parks can and do contain areas of high wilderness quality. In defining National parks, the Act provides that: 'certain Crown land characterised by its predominantly unspoilt landscape, and its flora, fauna or other features, should be reserved and preserved and protected permanently for the benefit of the public'. Some Land Conservation Council recommendations specify that particular National parks, for example, Wyperfeld National Park and the Murray-Sunset National Park be used, among other things, to 'protect areas of high wilderness quality', and that the Tingaringy National Park '... be managed in such a way as to maintain its wilderness values'.

Many permitted uses and management practices in national parks may, however, be incompatible with maintaining wilderness quality. These include provision for some resource utilisation and their access, as well as the development of facilities, ranging from huts and tracks to major accommodation centres. Parks also offer a wide range of recreational activity, which can include scenic driving and touring along tracks through rugged terrain and into isolated areas. Husbandry and other manipulative techniques may be used in national parks to maintain or enhance special values associated with flora and fauna. The recent amendments to the National Parks Act, referred to in Chapter 4, however, restrict such facilities and activities within declared wilderness zones.

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. They are used to maintain natural ecosystems which serve as a base reference for scientists and those concerned with the study of land.

Within Victoria, reference areas are identified through normal Land Conservation Council investigation processes and proclaimed by the Governor-in-Council following recommendation by the Minister

under the *Reference Areas Act* 1978. The Minister issues directives for their protection, control and management and is assisted by a statutory advisory committee.

Access to such areas is restricted and experimental manipulation is not permitted. Activities such as grazing, exploration for minerals and gold, mining, logging, bee-keeping, recreation and any other activity which conflicts with the purpose of the reference area are also prohibited, including educational use. Permanent scientific recording equipment may, however, be used within such areas.

Within the reference area natural processes should be allowed to continue undisturbed and are chosen so as to be areas sufficiently large to ensure ecological viability. They are surrounded by a buffer, the width of which varies according to the activity occurring on the adjacent land.

Reference areas are often of high wilderness quality, being generally roadless and of high biophysical naturalness value. Given that the object of the reference area system is to protect viable samples of the major land systems of the State, they cover only representative areas. Such representation may encompass only part of any given area identified as having high wilderness quality, or may cover land, while the least modified area of land remaining of a land system, may nonetheless have comparatively moderate wilderness quality.

Reference areas are also often small (ranging from 70 to 8400 ha) and may be in close proximity to cleared freehold land and vehicular access tracks. Recreation is not permitted.

Wild Rivers

Wild river, or heritage river classifications are used in the United States of America (*Wild and Scenic Rivers Act* 1968) and elsewhere (in Canada and proposed in New Zealand) to identify outstanding natural rivers and ensure their protection.

Within Australia the only major published study on wild and scenic rivers was prepared for the New South Wales National Parks and Wildlife Service by

Helman in 1981. The study classified rivers essentially on the level of development of the catchment and corridor. Wild rivers were considered as rivers that traverse, or whose catchments are within, essentially natural areas that have suffered only minimal disturbance; they do not have pondages or other water control structures; and vehicular access is precluded or strictly limited. (Other rivers were classified as Scenic or Recreational.)

Little work has been carried out in identifying wild rivers in Victoria, although a similar but smaller study to the New South Wales study was carried out on the Snowy River by Helman in 1979.

The Land Conservation Council's current special investigation into rivers and streams of Victoria will document the scenic, recreational, cultural and ecological values of rivers and streams and form the basis of the Victorian government's Heritage Rivers program as proposed in *Protecting the Environment: A Conservation Strategy for Victoria* (Government of Victoria 1987).

Victoria presently, however, like the rest of Australia, has no statutory basis for the protection or designation of wild or heritage rivers.

Wild rivers, in the sense that they are unmodified by structures and within natural corridors and especially within natural catchments, share many similar elements with wilderness. Likewise, while defined by naturalness, such watercourses are usually perceived as challenging recreational and aesthetically pleasing features. A wild river, while quite compatible with wilderness, is not synonymous with it.

The designation and protection of a wild river would enhance the protection of wilderness quality values in the immediate vicinity of the river, but depending on the nature of corridor protected may have little influence on the wilderness quality of the greater area through which it traverses.

The Register of the National Estate

Places listed on the Register of the National Estate are those that have aesthetic, historic, scientific or social

significance, or other special value for future generations, as well as for the present community. They may comprise components of either the natural or cultural environment of Australia.

The Australian Heritage Commission, which is a Commonwealth statutory authority established under the *Australian Heritage Commission Act 1975*, prepares and maintains the Register of National Estate places. Places for registration can be nominated by any person at any time and prior to registration are required to go through a public comment process and are professionally assessed. Wilderness quality is (since 1986) one of the criteria used by Australian Heritage Commission in its assessment of places proposed for listing on the Register.

Registration of a place formally recognises its National Estate values and, in turn, imposes constraints on the actions of Commonwealth Ministers and authorities. The Act states that Commonwealth states Ministers and their agencies must not take any action that would adversely affect any place on the Register - unless there is no feasible or prudent alternative, unless all action is taken to minimise damage where no such alternatives exist, and unless the Commission is informed and given time to comment.

Places listed on the Register of the National Estate may well include areas of high wilderness quality and a designated wilderness area could be listed in its own right. A National Estate place is, however, not required to have high wilderness quality or meet any ecological or size requirement criteria for registration. Designation as a National Estate place does not necessarily imply any particular attitude by the Australian Heritage Commission or the Commonwealth government to the ownership, or management, of a place listed in the Register, nor place any legal restrictions on the activities of State or Municipal governments or private land owners or institutions. Listing does not necessarily guarantee that any particular value will be conserved.

World Heritage Sites

World heritage sites are areas included on the World Heritage List established under

the Convention concerning the Protection of the World Cultural and Natural Heritage adopted by the member states of UNESCO in 1972. They include both cultural and natural sites.

The primary management objective of natural sites, and obligation of the relevant national government, is to protect the natural feature of world heritage quality, ensure the continuation of legal protection, and have its significance promoted to each country, its people, and the world.

Areas of high wilderness quality or a designated wilderness area could be included within a World Heritage Site. World heritage listing does not necessarily mean a cessation of resource utilisation. Access may be strictly controlled or limited, although generally recreation and on-site interpretation would be developed. World heritage sites can be owned by the government, or a non-profit organisation or trust.

Only the most exceptional natural areas of outstanding universal value are designated as world heritage sites, and only after a lengthy nomination and assessment process are they selected by the World Heritage Committee. There are 228 listed World Heritage Sites. Seven presently occur in Australia, none of which are within Victoria.

Biosphere Reserves

Biosphere reserves are protected areas of representative terrestrial and coastal environments which have been internationally recognised under a United Nations' Educational, Scientific and Cultural Organisation (UNESCO) program known as 'Man and the Biosphere' (MAB). The MAB is a program of land management research and training. The network of biosphere reserves across the world provide an integral part of the program.

The primary management objective of biosphere reserves 'is to conserve for present and future use the diversity and integrity of biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends'. In addition to

conserving a representative ecosystem, they are to provide for ecological and environmental research and monitoring and to provide facilities for education and training.

Biosphere reserves may well include areas that have high wilderness quality or have been designated as a wilderness area. However, there are many important differences. Biosphere reserves include areas of natural ecosystems where human influence is slight but also include modified ecosystems. (In a sense, their value as reserves is enhanced by the inclusion of modified areas juxtaposed with natural ecosystems.) Research, education, and training, including provision of laboratories, manipulative management, and measuring stations to determine long-term changes in the biosphere, are a central function of biosphere reserves, with particular emphasis on measuring human impact on them. They are selected as a representative sample of major ecosystems, rather than on the basis of encompassing areas of high value regardless of ecosystem type.

In addition, designation as a biosphere reserve is not a specific tenure or land-use category, but rather a protective mechanism, internationally recognised as forming part of a world-wide network of information sharing on natural and managed ecosystem management. They may, however, play an important complimentary role to a designated area of wilderness.

There has not been a systematic evaluation of Australian biogeographical provinces, with most of the designated biosphere reserves in Australia being existing National Parks. Those in, or adjacent to, Victoria which also include areas of high wilderness value are Kosciusko National Park, Croajingolong National Park, Wilsons Promontory National Park and the Hattah--Kulkyne National Park.

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APPENDICES

Appendix I

EXTRACT OF THE LAND CONSERVATION ACT 1970

Public Land

Section 2.

(1) 'Public land' means -

- (a) land which is not within a city town or borough and is -
 - (i) unalienated land of the Crown including land permanently or temporarily reserved under section 4 of the *Crown Land (Reserves) Act 1978* and State forest and parks within the meaning of the *National Parks Act 1975*;
 - (ii) vested in any public authority (other than a municipality or a sewerage authority within the meaning of the *Sewerage Districts Act 1958*); or
 - (iii) vested in the Melbourne and Metropolitan Board of Works; and
- (b) any other land which the Governor in Council declares under sub-section (2) to be public land for the purposes of this *Act*

'Reserved forest' and 'State forest' have the same meanings as in section 3 of the *Forests Act 1958*.

(2) The Governor in Council may on the recommendation of the Minister made after consultation with -

- (a) any Minister of the Crown in whom any land is vested; or
 - (b) the Minister responsible for a public authority in which any land is vested -
- by proclamation published in the *Government Gazette* declare any such land to be public land for the purposes of this *Act*.

Functions of the Council

Section 5.

(1) The Council shall -

- (a) carry out investigations and make recommendations to the Minister with respect to the use of public land in order to provide for the balanced use of land in Victoria;
- (b) make recommendations to the Governor in Council as to the constitution and definition of water supply catchment areas under the *Soil Conservation and Land Utilization Act 1958*; and

- (c) advise the Soil Conservation Authority concerning policy on the use of land (whether public land or any other land however vested) in any water supply catchment area.
- (2) In making any recommendation the Council shall have regard to the present and future needs of the people of Victoria in relation to -
- (a) the preservation of areas which are ecologically significant;
 - (b) the conservation of areas of natural interest beauty or of historical interest;
 - (c) the creation and preservation of areas of reserved forest;
 - (d) the creation and preservation of areas for national parks;
 - (e) the creation and preservation of areas for leisure and recreation, and in particular of areas close to cities and towns for bushland recreation reserves;
 - (f) the creation and preservation of reserves for the conservation of fish and wildlife;
 - (g) the preservation of species of native plants; and
 - (h) land required by government departments and public authorities in order to carry out their functions.
- (3) Where the Council recommends the alienation of any land the recommendation shall include the Council's opinion as to the best method of alienating the land to ensure the most satisfactory use and management of the land in the public interest.
- (4) Any person or body may make submissions to the Council as to how any public land can be better used to meet the needs of the people of Victoria and the Council shall consider any such submissions before making any recommendation under paragraph (a) of sub-section (1).

Section 8.

- (1) Where the Governor in Council is of the opinion that an investigation and recommendation of the Council in relation to any particular district or area of Victoria is necessary or expedient he may require the Council to make such investigation and recommendation within such time as is fixed by the Governor in Council.
- (2) The Governor in Council may extend the time fixed under sub-section (1) where in his opinion the investigation could not otherwise be properly carried out.

Investigations, Notices and Reports

Section 9.

- (1) The Council shall not make any recommendation under this *Act* in relation to any district or area without a prior investigation of the district or area.
- (2) Before commencing any investigation under paragraph (a) of sub-section (1) of section 5 the Council shall publish a notice in the *Government Gazette*, in a newspaper circulating throughout the State and in a newspaper circulating particularly in or in the vicinity of the area or district to be investigated stating that an investigation of that district or area described in the notice is to be carried out for the purposes of this *Act*.

- (3) On completing an investigation of a district or area under paragraph (a) of sub-section (1) of section 5 the Council shall -
- (a) publish a report of the investigation;
 - (b) give notice in the *Government Gazette* of the publication of the report, the address where copies of the report may be obtained or inspected and stating that any submissions to the Council in relation to such report will be considered by the Council if they are made within 60 days of such notice; and
 - (c) publish notice in a newspaper circulating throughout the State and in a newspaper circulating particularly in or in the vicinity of the area or district investigated of the publication of the report, the address where copies of the report may be obtained or inspected and stating that submissions may be made to the Council and the date before which they should be made.
- (4) The Council shall consider any submissions in relation to such report made by any person or body within 60 days of notice being given under paragraph (b) of sub-section (3).

Notice to be given to public departments and authorities in certain cases.

Section 10.

- (1) Not earlier than 60 days after notice being given under paragraph (b) of sub-section (3) of section 9, the Council shall send a copy of its proposed recommendation to -
- (a) the Council of any municipality in the municipal district of which any part of the area or district to which the recommendation relates is situated;
 - (b) any other public authority or government department that in the opinion of the Council has an interest in the area of the proposed recommendation; and
 - (c) any person or body who made a submission under section 9 -
- and shall consider any submissions received within 60 days of the sending of such copy to the council, authority, department, person or body or in the case of a public authority or government department within such longer period as may be agreed upon between the Minister and the Minister administering that department or responsible for that authority.
- (2) Where any recommendation is made to the Minister under this *Act* it shall be accompanied by a copy of any submissions received from any person body department authority or council pursuant to the provisions of sub-section (4) of section 9 or sub-section (1) of this section.
- (3) Where the Council has made a recommendation to the Minister under paragraph (a) of sub-section (1) of section 5 the Minister may, after he has given not less than fourteen days notice of his intention so to do to the Minister administering a government department or responsible for a public authority recommend to the Governor in Council that notice of the recommendation or that part of the recommendation that affects the government department or public authority be given to the government department or public authority concerned and where notice of that recommendation or part is so given by the Governor in Council it shall be the duty of the government department or public authority to use all diligence and dispatch to give effect to such recommendation so far as it affects any land vested in or controlled by it.

Copy of every recommendation and of proposals to be tabled in Parliament.

Section 11.

A copy of every recommendation of the Council made under sub-section (1) of section 5 and of the proposals of the Council submitted to the Minister pursuant to section 7 shall be laid before both Houses of Parliament within fourteen days of the making thereof if Parliament is then sitting and if Parliament is not then sitting within fourteen days after the meeting of Parliament.

A copy of the *Land Conservation Act 1970* can be obtained from the Information Victoria Centre, 318 Little Bourke Street, Melbourne, 3000.

Appendix II

PUBLIC LAND-USE CATEGORIES AND COUNCIL RECOMMENDATIONS

The following recommendations for use are general ones covering the main land-use categories used by Council.

All recommendations have the following beginning: 'That the area (shown on recommendation maps) be used to: ...'

Category	Recommendations
National park	Provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments Conserve and protect natural ecosystems Supply water and protect catchments¹
State park	Provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments Conserve and protect natural ecosystems
Wilderness	Provide opportunities for solitude and confined forms of recreation in substantially unmodified natural environments That its value for providing solitude be maintained by controlling the numbers of people using the wilderness at any one time That construction of roads or tracks and the entry of vehicles not be permitted, other than for management purposes
Multi-purpose park	Provide opportunities for recreation and education in natural environments Conserve and protect native animals and plants and landscape and produce hardwood timber
Coastal park	Provide opportunities for recreation and education associated with the enjoyment and understanding of natural environments Conserve and protect natural ecosystems, and That the management authority zone the park to accommodate the legal recreational activities traditionally associated with the area, such as surfing, fishing, gemstone collecting, camping, walking, and horse riding

Appendix II (continued)

Category	Recommendations
Reference area	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, and That activities, e.g. grazing, exploration for minerals and gold, mining, logging and beekeeping, that conflict with the purposes of a reference area not be permitted, and any such activities cease when these recommendations are adopted
Wildlife reserve	Conserve the habitat of native animals, particularly water birds (and for) Public recreation and education where this does not conflict with the primary aim
Flora reserve	Conserve particular species or associations of native plants
Flora and fauna reserve	Conserve native plants and animals
Natural features and scenic reserve	Maintain natural landscapes and features Provide opportunities for recreation and education Supply water and protect catchments and streams Conserve native plants and animals
Water production ²	(for) Water supply purposes Other activities permitted by the water-supply authority after consultation with the Land Protection Division and the Environment Protection Authority
Education area	Study the nature and functioning of reasonably natural ecosystems in a manner such that the integrity of these ecosystems is maintained as far as is practicable Compare the ecosystems within education areas with other nearby natural and modified systems Observe and practise methods of environmental analysis, and the field techniques of the natural sciences Conduct simple long-term experiments aimed at giving an understanding of the changes occurring in an area with time
Historic area	Protect specific sites that carry or contain relics of buildings, equipment, construction works, and artefacts associated with the history of the locality Provide opportunities for recreation and education associated with the history of the locality
Bushland reserve	Maintain the character and quality of the local landscape

Appendix II (continued)

Category	Recommendations
Scenic reserve	Permit passive recreation such as picnicking and walking
	Preserve scenic features and lookouts
Hardwood (timber) production	Produce hardwood timber in a manner having due regard for landscape values as seen from main roads outside the forest
	Major secondary uses be to:
	provide opportunities for open-space recreation and education
	conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques
	produce honey, forage, gravel, sand and other forest products as defined in the <i>Forests Act</i> 1958
State forest	Water production values be recognised and protected
	The special values located in portion of some areas be protected (by creation of reserves under section 50 of the <i>Forests Act</i> , or by the implementation of management prescriptions)
	Supply water and protect catchments and streams
	Produce hardwood timber
	Conserve native plants and animals, and provide opportunities for the development of wildlife conservation techniques
	Provide opportunities for open-space recreation and education
	Produce honey, forage, gravel, sand, road-making materials, and other forest products
	Provide opportunities for mineral exploration and mining
Hydroelectricity production	Protect the special values as described (by reservation or management prescriptions)
	Transport, store, and regulate water for the generation of electricity
	Operate, maintain and protect hydroelectric installations
Utilities and survey	Provide low-intensity recreation and protect nature conservation values in parts of the area, consistent with State Electricity Commission requirements
	Provide access and services (on) existing easements, and That new powerlines, pipelines, communications equipment and other utilities be planned to minimise disturbance to public land

Appendix II (continued)

Category	Recommendations
Uncommitted land	That existing legal use and tenure continue for areas reserved for utility purposes such as airports, public buildings, municipal depots, cemeteries, schools and garbage depots, and
	That the minimum area necessary for access to and maintenance of navigations aids, communication installations and trigonometrical stations be temporarily reserved
	Maintain the capability of the land to meet future demands Produce those goods and services required by the community that can be supplied without seriously reducing the long-term ability of the land to meet future demands
Other reserves and public land	That the land be Crown land withheld from sale
	Continue existing legal use and tenure (being small areas of public land not specifically mentioned in Council recommendations) Where the land is not reserved for a specific purpose at present, such areas to be used in a way that will not preclude their reservation in the future for as-yet-unknown public purposes

Notes:

1. This part-recommendation applies to all parks in the Council's system where these are within water-supply catchments.
2. These uses apply to water storage areas, diversion works, associated facilities and buffer zones where land-use determinations have been made.

Appendix III

SURVEY ON WILDERNESS AREAS IN VICTORIA QUESTIONNAIRE

Extract of Omnibus Survey

-5-

COT 982

→ IN VICTORIA, ASK: (Elsewhere, toss to Q25)

20a Next some questions about wilderness areas.

Looking at the next grey card which lists some descriptive words. (PAUSE) Which, if any, of those words generally apply to wilderness areas? Just say the number after each word.

Which others apply? CAN'T SAY...XX
Any others? NONE.....VV

.....

.....

20b. I'm now going to read out some things people have said about wilderness. Looking at the next white card. (PAUSE) As I read each statement I'd like you to tell me how much you agree or disagree with it. First, we should keep some undeveloped areas free from roads at all costs. Which line best describes how much you agree or disagree with that? Just say the number after the line.

ee	5				
----	---	--	--	--	--

CIRCLE ONLY ONCE IN
STATEMENT'S LINE
BELOW. \

Strongly agree
Tend to agree
No opinion
Tend to disagree
Strongly disagree
It depends

We should keep <u>some</u> undeveloped	Str	Ter	No	Ter	Str	Ter
areas free from roads at all costs....6	5	4	3	2	1	

There is no shortage of wilderness
areas in Australia, so we needn't
worry about their preservation. 6 5 4 3 2 1

We need occasionally to be
alone with nature.....6 5 4 3 2 1

We have a duty to our
grandchildren to preserve
some areas as nature created..... 6 5 4 3 2 1

There is no point in spending
public money to preserve the
wilderness character of an area
which is rarely visited. 6 5 4 3 2 1

Economic development is essential to
Australia: Wilderness areas are not.6 5 4 3 2 1

There is a spiritual quality in
true wilderness which cannot be
 experienced elsewhere..6 5 4 3 2 1

OFFICE USE (1)

20c. And how much do you agree or disagree that (READ NEXT STATEMENT ABOVE)? Just say the number after the line.

CIRCLE ONLY ONCE IN THAT STATEMENT'S LINE ABOVE.

→ Repeat 20c for each other statement above.

20d. Looking at the next blue card which lists some other statements. Which, if any, of those statements do you agree with? Just say the number after each. Which others? Any others?

CAN'T SAY...X
NOTE.....V

20 a. Looking at the next pink card. Which, if any, of those things do you believe intrude upon or spoil wilderness areas, or people's enjoyment of wilderness areas? Just say the number after each.

Which others? Any others?

CAN'T SAY...XX
NONE.....VV

CAN'T SAY..XX
NONE.....W

20f. On the next white card is a map of Victoria. To the best of your knowledge, which, if any, of those areas marked on the map have you ever been to? Just say each area's number.

Any others? CAN'T SAY...XX

CAN'T SAY..XX
NONE.....VV

20g. And which, if any, do you consider most important to protect as wilderness in Victoria? Just say the area's number.
Are there any other areas? CAN'T SAY..XX

CAN'T SAY..XX
NONE.....W

PRINT UNLISTED:.....00

20h. As you may know, many activities reduce the amount of wilderness in Victoria. Some people have said that we should preserve wilderness areas no matter what the costs. Others have said that some things are more important than preserving wilderness areas. Looking at the next pink card. (PAUSE) In your opinion, are any of those things more important than preserving a wilderness area in Victoria?

YES.....1 Ask 201
NO.....2) Toss to
CAN'T SAY....3) 025

YES.....1 Ask 201
NO.....2 } Toss to
CAN'T SAY....3 } Q25

→ IF YES, ASK:

20 1. Which of those things are more important than
preserving a wilderness area in
Victoria? Just say the
number after each. CAN'T SAY....XX
NONE.....V

CAN'T SAY....XX
NONE.....VV

(There are no 0's 21-24)

Toss over clip to Q25.

**'GREY CARD' REFERRED TO IN
QUESTION 20(a)**

Valuable	20
Good	21
Alive	22
Boring	23
Exciting	24
Noisy	25
Ugly	26
Bleak	27
Bad	28
Wild	29
Free	30
Friendly	31
Huge	32
Dead	33
Useless	34
Remote	35
Evil	36
Repulsive	1
Sacred	2
Dirty	3
Inspiring	4
Unique	5
Beautiful	6
Uninviting	7
Dull	8
Unspoiled	9
Restful	10
Challenging	11
Depressing	12
Roadless	13
Dangerous	14
Pure	15
Fragile	16
Happy	17
Natural	18

**'WHITE CARD' REFERRED TO IN
QUESTIONS 20(B) AND 20(C)**

Strongly agree	6
Tend to agree	5
No opinion	4
Tend to disagree	3
Strongly disagree	2
It depends	1

**'PINK CARD' REFERRED TO IN
QUESTION 20(e)**

Motor vehicles or trail bikes	10
Vehicle tracks	9
Constructed walking tracks	8
Director or information signs	7
Powerlines, pipelines, communications towers	6
Water storages	5
Bush toilets	4
Smog or air pollution	3
Sight or sound of aeroplanes	2
Large numbers of people	1
Undrinkable water in streams	20
Old huts or mining relics	19
Having to book a visit	18
Restricted access to sensitive areas	17
No scenic views	16
People hunting deer with bows and arrows	15
People with firearms	14
Cattle or sheep	13
People horseriding	12
Views of farmland or logged areas	11

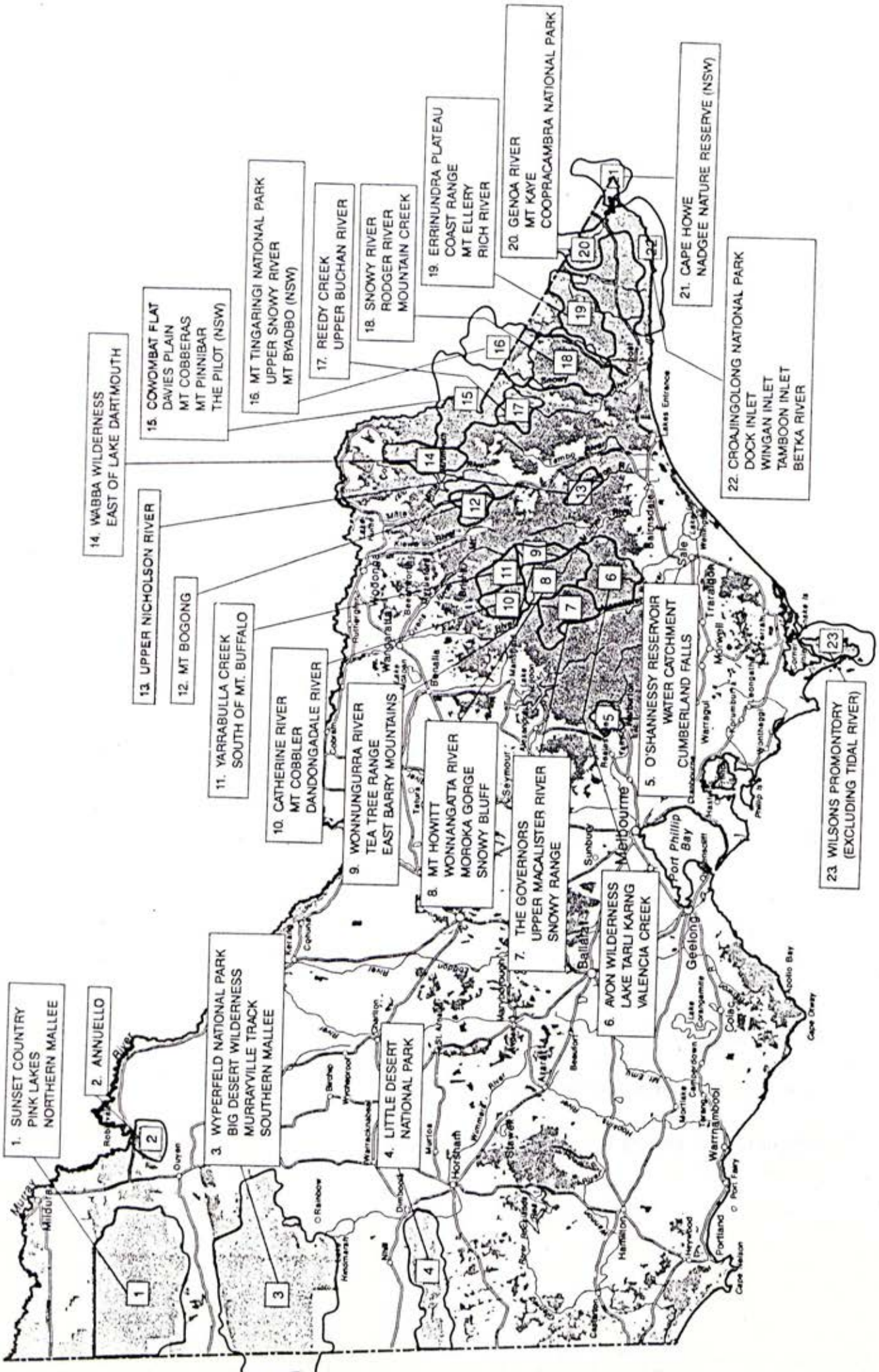
'BLUE CARD' REFERRED TO IN QUESTION 20(d)

- I enjoyed watching films set in wilderness areas, or
looking at magazines or books about wilderness areas 1
- You can appreciate wilderness from the side of the road 2
- Wilderness areas should be for the benefit of animals
and plants rather than for the benefit of people 3
- Bushfires should be controlled in all areas including
wilderness areas 4
- In Victoria, we should try to extend the area of land in
a wilderness condition 5
- Wilderness areas will become more valuable to society
over the next 50 years 6

'PINK CARD' REFERRED TO IN QUESTION 20(g)

- New tourist facilities in these areas 1
- New ski resorts in these areas 2
- Hunting in these areas 3
- Keeping all existing vehicle tracks open in these areas 4
- New roads and vehicle tracks in these areas 5
- New powerlines and water storages in these areas 6
- Prospecting for minerals in these areas 7
- Availability of brush fencing materials from these areas 8
- Timber harvesting in these areas 9
- Grazing in these areas 10
- New mining operations in these areas 11
- Jobs in timber, grazing or mining industries using
these areas 12

'WHITE CARD' REFERRED TO IN QUESTION 20(f) AND 20(g)



Appendix IV

SURVEY DATA BREAKUP

A. CROSS-TABULATED DATA

Cross-tabulated data were obtained for each question as follows:

Q25A Words Applying to Wilderness Areas

Q25A	Words applying to wilderness areas
Q25E	Things which intrude upon or spoil wilderness
Q25F	Areas visited

Q25B Attitudinal Statements (1)

Q25A	Words applying to wilderness areas
Q25E	Things which intrude upon or spoil wilderness
Q25F	Areas visited

Q25D Attitudinal Statements (2)

Q25A	Words applying to wilderness areas
Q25E	Things which intrude upon or spoil wilderness
Q25F	Areas visited
Q25H	Things more important than wilderness

Q25E Things which Intrude Upon or Spoil Wilderness

Q25A	Words applying to wilderness areas
Q25E	Things which intrude upon or spoil wilderness
Q25F	Areas visited
Q25H	Things more important than wilderness
Q25B	Attitudinal statements (1)

Q25F Areas Visited

Q25A	Words applying to wilderness areas
Q25E	Things which intrude or spoil wilderness
A25F	Areas visited
A25H	Areas most important to protect

Q25G Areas Most Important to Protect

Q25A	Words applying to wilderness areas
Q25E	Things which intrude or spoil wilderness
Q25F	Areas visited

Q25H Things More Important than Wilderness

Q25A	Words applying to wilderness areas
Q25E	Things which intrude or spoil wilderness
Q25F	Areas visited
Q25B	Attitudinal statements (1)

B. DEMOGRAPHIC AND SOCIO-ECONOMIC BREAKUPS

Area: Melbourne, Victoria outside Melbourne (the limits of Melbourne being as defined by the Australian Bureau of Statistics for the Melbourne Statistical Division)

Gender: Men and women

Age: 14 to 17, 18 to 24, 25 to 39, 40 to 59 and 60 years and over

Country of birth: Australia, United Kingdom, Europe, Asia, other

Occupation: Professional and managerial, clerks and sales, skilled tradesmen, semi- or unskilled workers, full-time work, part-time work, do not work

Income: Less than \$10 000, \$10 000 to \$14 999, \$15 000 to \$19 999, \$20 000 to \$24 999, \$25 000 to \$29 999, greater than or equal to \$30 000

Education: Primary, 1 to 3 years Secondary, fourth or fifth form, sixth form, tertiary, HSC or tertiary

Life cycle stage: single, 14 to 34 years; married, 14 to 34 years, no child; married, 14 to 34 years, children; married, 35 plus years, children; married, 35 plus years, no child; single, 35 plus years

Occupation of main family earner: Breakup as per respondent's occupation

Income of main family earner: Breakup as per respondent's occupation

Appendix V

DEFINITIONS OF WILDERNESS

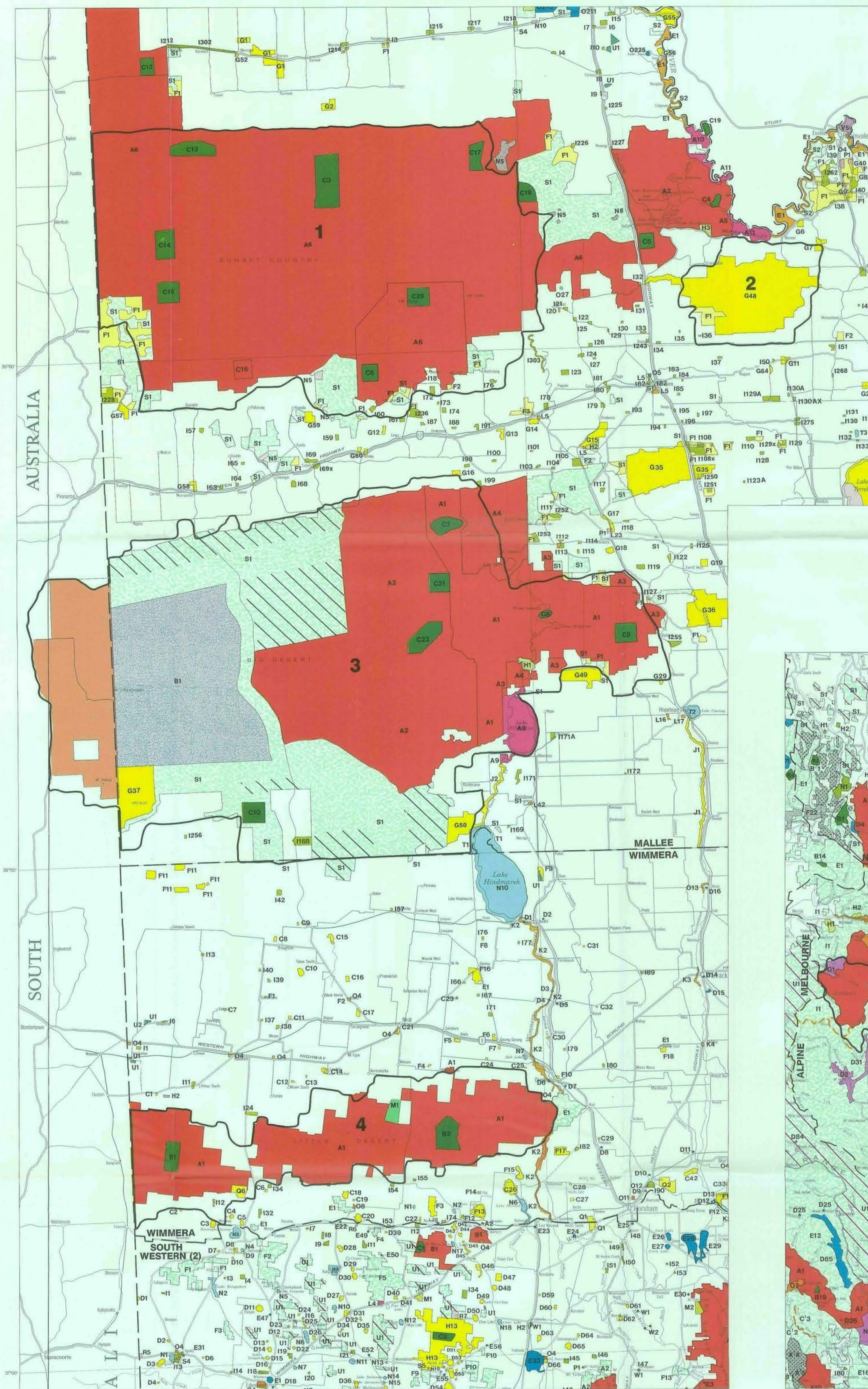
- * **Australian Conference of Nature Conservation Ministers (CONCOM) (1985)** - 'Wilderness area' is taken to mean a large natural area designated as 'wilderness area' under legislation and managed to maintain or restore its qualities of remoteness from roads and facilities, and lack of evidence of alteration by people.
- * **Australian Conservation Foundation (1975)** - 'a large tract of primitive country with its land and waters and its native plant and animal communities substantially unmodified by humans and their works. Large size and spaciousness are the essential characteristics of wilderness'.
- * **Canadian Parks Service (1989)** - 'wilderness zone - extensive areas which are good representations of a natural region and which offer significant opportunities for remoteness and solitude within their boundaries'.
- * **Environment and Land Use Act (British Columbia)** - 'a roadless tract of land in which natural systems are allowed to proceed without alienation and which is suitable for extensive primitive recreational use'.
- * **Hawes and Heatley (1985)** - defined wilderness to be land every part of which is: (i) largely free of, and largely free of evidence of, human artefacts, activity and disturbance; (ii) remote from substantial human artefacts and areas where there is substantial human activity or disturbance; and (iii) remote of access.
- * **Helman *et al.* (1976)** - 'a wilderness is a large area of land perceived to be natural, where genetic diversity and natural cycles remain essentially unaltered'. This definition was also used by Feller *et al.* (1979) in their Victorian survey.
- * **Institute of Foresters of Australia (1979)** - 'an area of wilderness is a large tract of primitive country with its land and waters and its natural plant and animal communities ideally unmodified by humans and their works. This tract must be large enough to survive as wilderness, and ideally must be extensive enough to require more than one day's walk to traverse'.
- * **International Union for the Conservation of Nature and Natural Resources (1988)** - 'wilderness is an enduring natural area legislatively protected and of sufficient size to provide the pristine natural environment which serves physical and spiritual well-being. Wilderness is an area where little or no persistent evidence of human intrusion is permitted, so that natural processes will take place unaffected by human intervention'.
- * **Kirkpatrick *et al.* (1979)** - 'an area of land remote from access by mechanized vehicles and without which there is little or no consciousness of the environmental disturbances of western man'.
- * **Macquarie Dictionary** - 'a wild region, as of forest or desert; a waste; a tract of land inhabited only by wild animals.' Also wilderness area: 'a wilderness in which the ecology is undisturbed'.
- * **National Parks Act (Victoria) (1975)** - 'Land forming part of a park may be declared to be wilderness zone if the land -
 - (a) together with the plant and animal community on the land, is in a state that has not been substantially modified by the influences of European settlement or is capable of being

restored to such a state; and

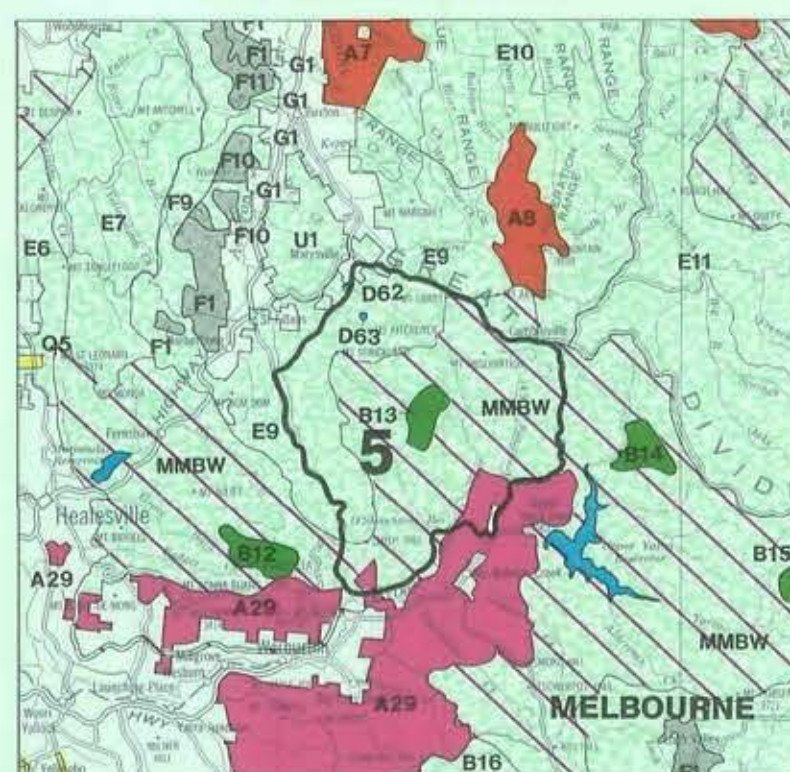
- (b) is of a sufficient size to make its maintenance in such a state feasible; and
 - (c) is capable of providing opportunities for solitude and appropriate self-reliant recreation'.
- * **New South Wales Government Wilderness Working Group (1986)** - 'wilderness area means a large tract of land with native plant and animal communities, not substantially modified by humans and their works, of sufficient area to make practicable its preservation and appropriate use in an unimpaired condition, and giving opportunities for solitude and recreation'.
 - * **New South Wales National Parks and Wildlife Service (1974)** - 'large tracts where man's disturbance has been minimal and the landscape is essentially in a natural condition supporting a harmonious balance of wildlife populations'.
 - * **New Zealand National Parks Authority** - 'a wilderness is an area of land of primeval character which is protected and managed so as to perpetuate its natural condition and which
 1. Generally appears to have been affected primarily by the forces of nature, with any imprint of man's interference substantially unnoticeable; and
 2. Is of sufficient size as to make practicable its preservation and use in an unimpaired condition and to give opportunities for solitude and for primitive and unconfined types of recreation'.
 - * **Oxford English Dictionary** - 'a wild or uncultivated region or tract of land, uninhabited or inhabited only by wild animals; a tract of solitude and savageness'.

- * **The Wilderness Society (Australia) (1989)** - 'a wilderness area is a large tract of land remote at its core from access and settlement and substantially unmodified by modern technological society, or capable of being restored to that state, and of sufficient size to make practicable the long-term protection of its natural systems.
- * **Victorian National Parks Association (1989)** - 'wilderness consists of extensive natural areas that are essentially unaltered by people and in which permanent structures or works are absent'.
- * **Wilderness Act (New South Wales) 1987** - 'an area of land shall not be identified as wilderness ... unless ...
 - (a) the area is, together with its plant and animal communities, in a state that has not been substantially modified by humans and their works or is capable of being restored to such a state;
 - (b) the area is of a sufficient size to make its maintenance in such a state feasible; and
 - (c) the area is capable of providing opportunities for solitude and appropriate self-reliant recreation'.
- * **Wilderness Act (United States of America) 1964** - 'a wilderness in contrast with those areas where man and his own works dominate the landscape, is hereby recognised as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor and does not remain'.
- * **Wilderness Advisory Group (New Zealand) (1981)** - 'wilderness areas are wild lands designated for their protection and managed to perpetuate their natural condition and which appear to have been affected only by the forces of nature, with any imprint of human interference substantially unnoticeable'.

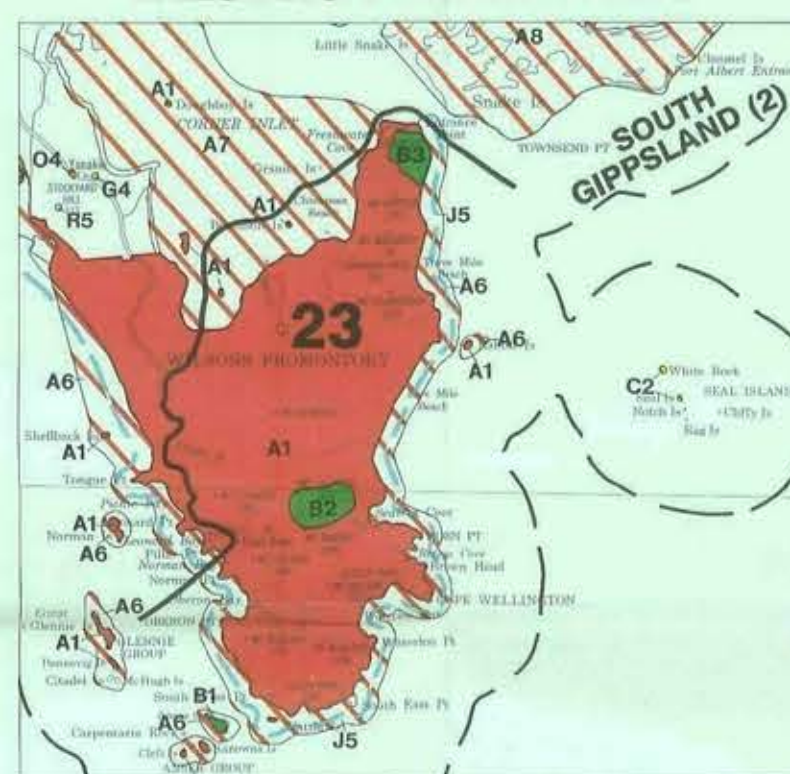
WESTERN VICTORIA



O'SHANNASSY



WILSONS PROMONTORY



LEGEND

NATIONAL PARKS	BUSHLAND RESERVES	SOFTWOOD PRODUCTION Subject to Government decision
STATE PARKS	SCENIC RESERVES	EDUCATION AREAS
COASTAL PARKS	STREAMSIDE RESERVES Natural Feature Reserves River Reserves	AGRICULTURE Alienation Other
REGIONAL PARKS Highway Parks	RECREATION Alpine Resorts	MINERAL AND STONE PRODUCTION Coal Production
MULTI - PURPOSE PARKS	WATER PRODUCTION Water Usage and Regulation Drainage	UTILITIES AND SURVEY Hydroelectricity Production
MARINE AND WILDLIFE RESERVES	COAST Gippsland Lakes Reserve Coastal Reserves Scenic Coasts	OTHER RESERVES AND PUBIC LAND Revegetation
WILDERNESS	LAKE RESERVES	CONSERVATION RESERVES New South Wales and South Australia
REFERENCE AREAS	STATE FOREST* Hardwood Timber Production Forest Area Uncommitted Land Available for Harvesting of Broombrash	STATE FOREST - New South Wales
WILDLIFE RESERVES Wildlife Management Co - operative Areas		L.C.C. Study Area Name and Boundary
FLORA RESERVES		ALPINE
FLORA AND FAUNA RESERVES		Wilderness Special Investigation Descriptive Block Boundaries and Block Number
NATURAL FEATURES, GEOLOGICAL AND CAVE RESERVES		
HISTORIC AREAS AND RESERVES		

PUBLIC LAND USE

Land Conservation Council Recommendations

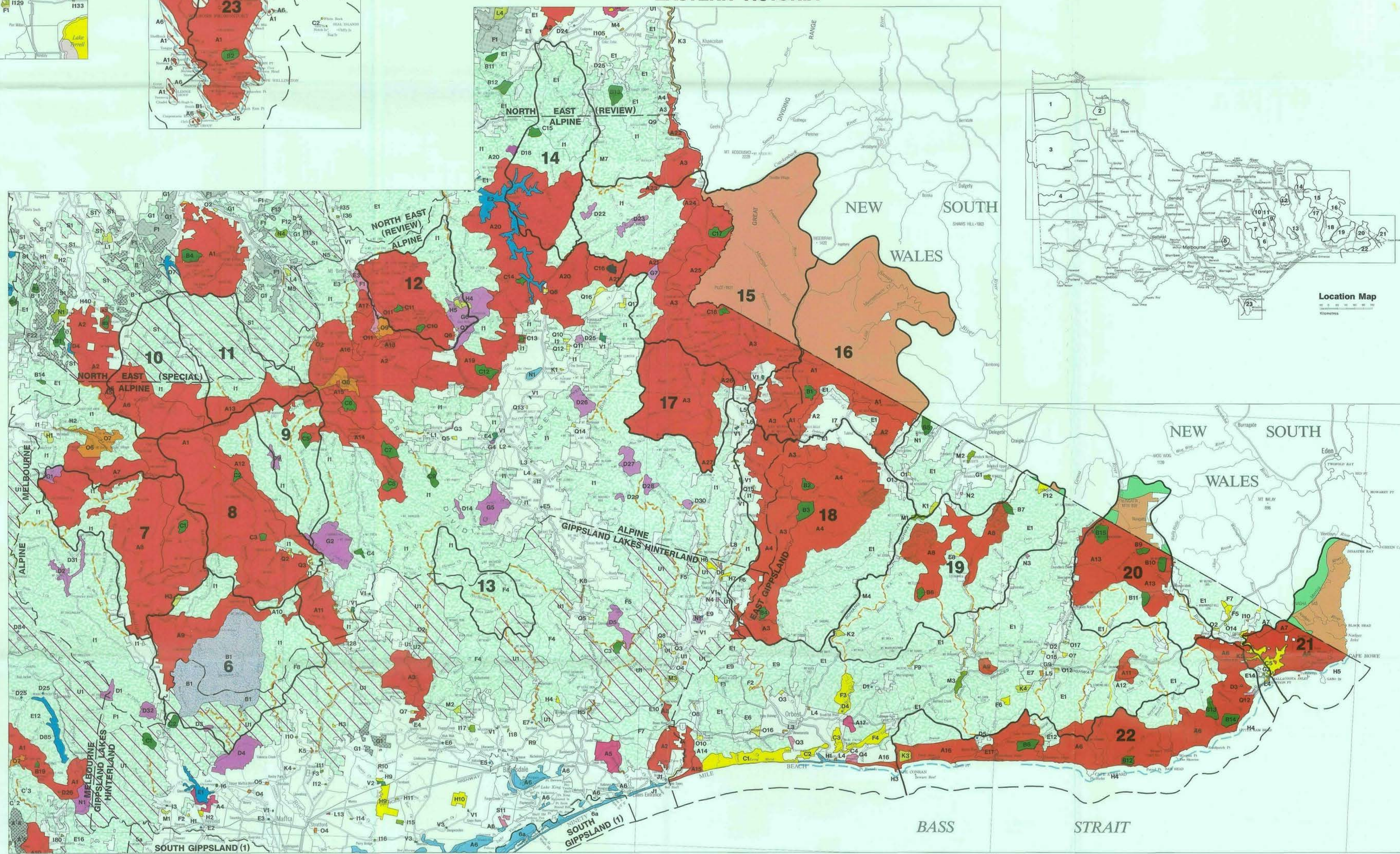
Wilderness Special Investigation



NOTES:

1. The recommendations shown are those of the most recent investigation, review or special investigation by Council for each study area. They are shown as recommended, or as accepted by the Government and include some variations.
2. Recommendations covering some small areas are not shown on the map.
3. Areas shown as 'State Forest' include areas of public land that in earlier recommendations were designated as hardwood production areas, uncommitted land or forest areas. They are identified by their original recommendation number. Uncommitted land is further identified by a purple hachure.
4. North East (Special) refers to Council's North East Area Owens Softwood Plantation Zone Special Investigation - covering districts 3 and 5, and North East Review refers to Council's North East Area (Benalla - Upper Murray) Review - covering districts 1, 2, and 4.

EASTERN VICTORIA



Location Map



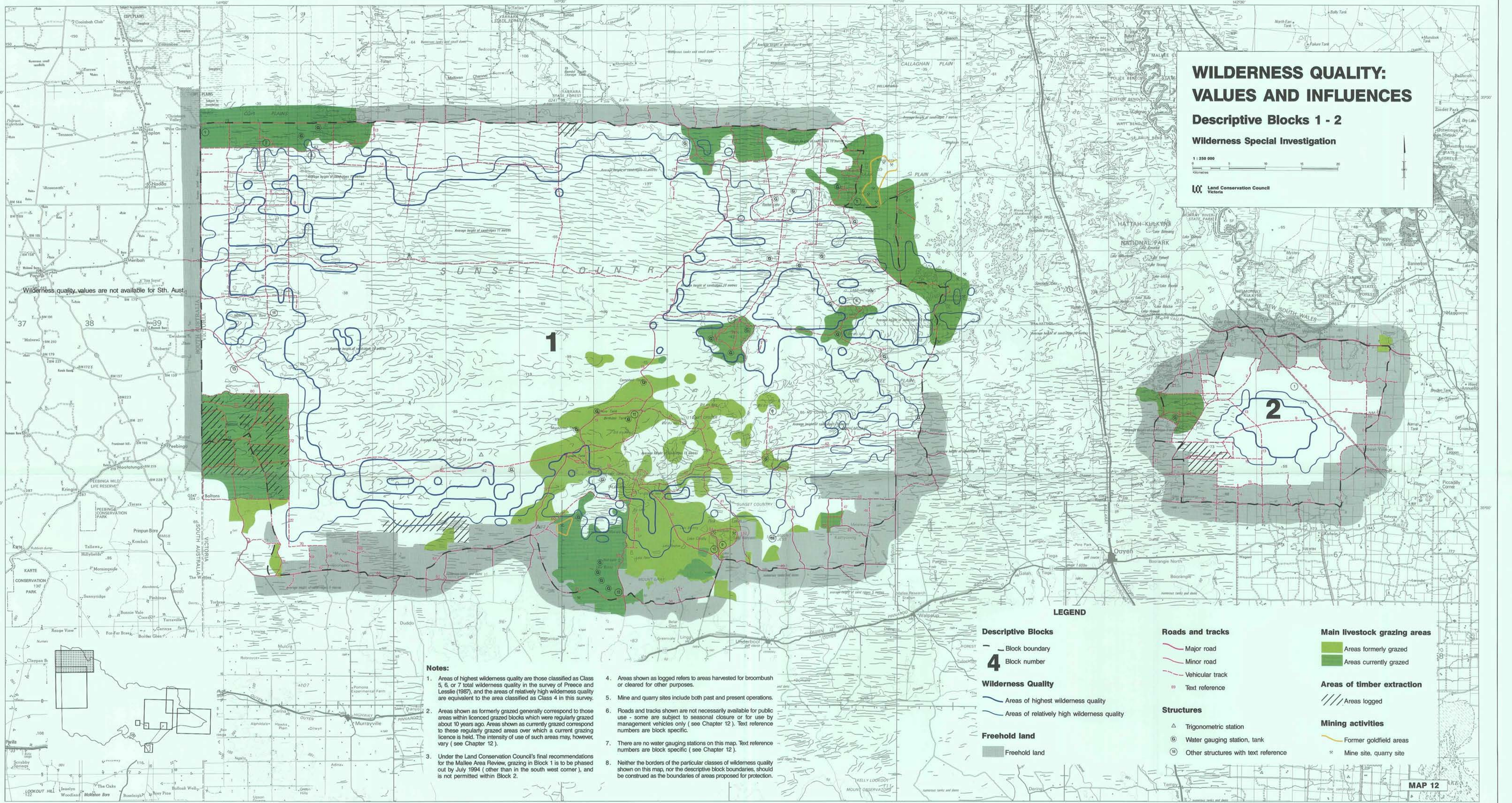
WILDERNESS QUALITY: VALUES AND INFLUENCES

Descriptive Blocks 1 - 2

Wilderness Special Investigation

1:250 000

Land Conservation Council
Victoria



Wilderness quality values are not available for Sth. Aust.

- Notes:**
1. Areas of highest wilderness quality are those classified as Class 5, 6, or 7 in the survey of Preece and Leslie (1987), and the areas of relatively high wilderness quality are equivalent to the area classified as Class 4 in this survey.
 2. Areas shown as formerly grazed generally correspond to those areas within licenced grazed blocks which were regularly grazed about 10 years ago. Areas shown as currently grazed correspond to those regularly grazed areas over which a current grazing licence is held. The intensity of use of such areas may, however, vary (see Chapter 12).
 3. Under the Land Conservation Council's final recommendations for the Mallee Area Review, grazing in Block 1 is to be phased out by July 1994 (other than in the south west corner), and is not permitted within Block 2.
 4. Areas shown as logged refers to areas harvested for broomrush or cleared for other purposes.
 5. Mine and quarry sites include both past and present operations.
 6. Roads and tracks shown are not necessarily available for public use - some are subject to seasonal closure or for use by management vehicles only (see Chapter 12). Text reference numbers are block specific.
 7. There are no water gauging stations on this map. Text reference numbers are block specific (see Chapter 12).
 8. Neither the borders of the particular classes of wilderness quality shown on this map, nor the descriptive block boundaries, should be construed as the boundaries of areas proposed for protection.

Descriptive Blocks

- Block boundary
- Block number

Wilderness Quality

- Areas of highest wilderness quality
- Areas of relatively high wilderness quality

Freehold land

- Freehold land

Roads and tracks

- Major road
- Minor road
- Vehicular track
- Text reference

Structures

- Trigonometric station
- Water gauging station, tank
- Other structures with text reference

Main livestock grazing areas

- Areas formerly grazed
- Areas currently grazed

Areas of timber extraction

- Areas logged

Mining activities

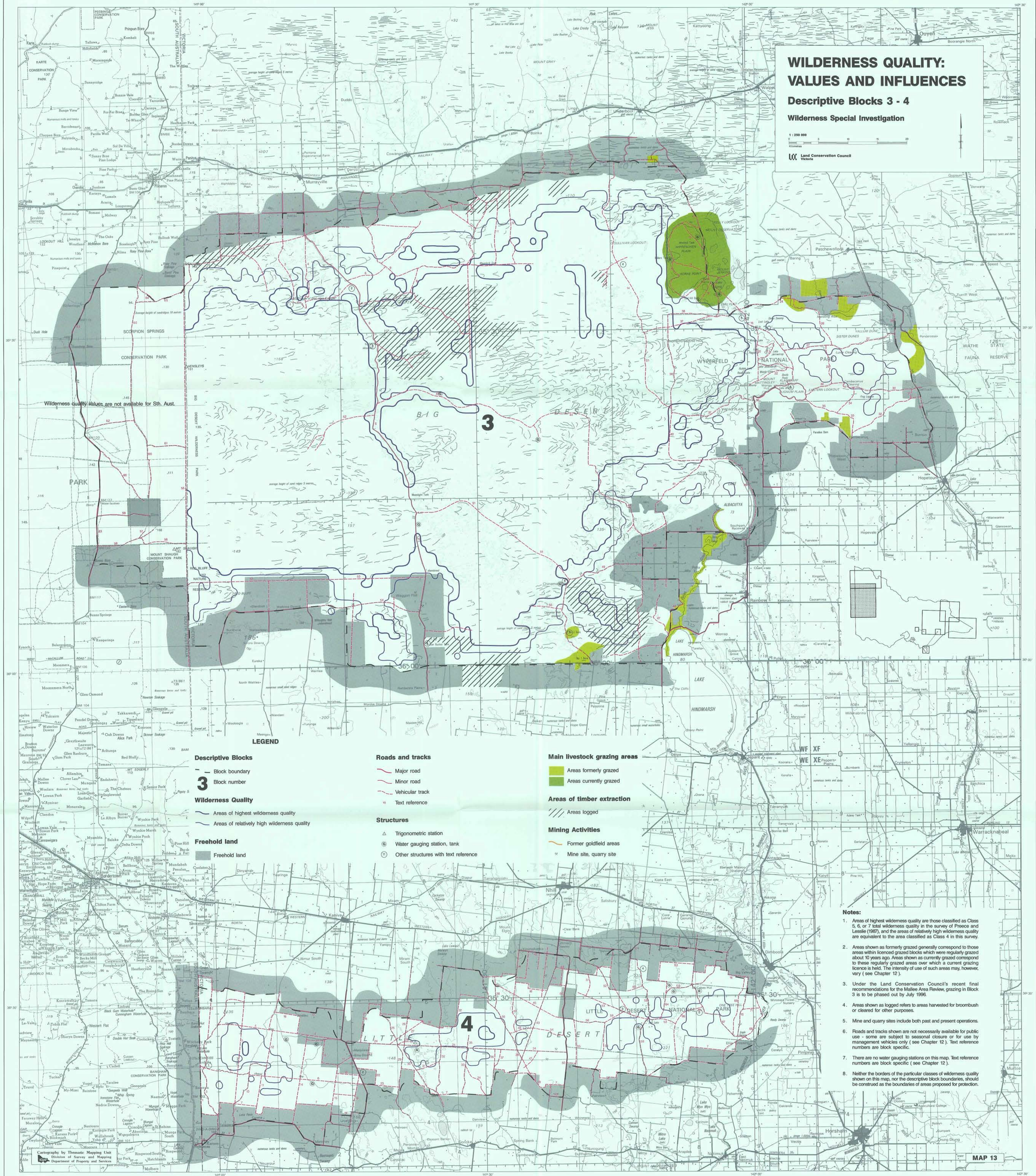
- Former goldfield areas
- Mine site, quarry site

WILDERNESS QUALITY: VALUES AND INFLUENCES

Descriptive Blocks 3 - 4

Wilderness Special Investigation

1:250 000
Land Conservation Council
Victoria



- Notes:**
1. Areas of highest wilderness quality are those classified as Class 5, 6, or 7 total wilderness quality in the survey of Proce and Lesslie (1987), and the areas of relatively high wilderness quality are equivalent to the area classified as Class 4 in this survey.
 2. Areas shown as formerly grazed generally correspond to those areas within licensed grazed blocks which were regularly grazed about 10 years ago. Areas shown as currently grazed correspond to these regularly grazed areas over which a current grazing licence is held. The intensity of use of such areas may, however, vary (see Chapter 12).
 3. Under the Land Conservation Council's recent final recommendations for the Mallee Area Review, grazing in Block 3 is to be phased out by July 1996.
 4. Areas shown as logged refers to areas harvested for broombush or cleared for other purposes.
 5. Mine and quarry sites include both past and present operations.
 6. Roads and tracks shown are not necessarily available for public use - some are subject to seasonal closure or for use by management vehicles only (see Chapter 12). Text reference numbers are block specific.
 7. There are no water gauging stations on this map. Text reference numbers are block specific (see Chapter 12).
 8. Neither the borders of the particular classes of wilderness quality shown on this map, nor the descriptive block boundaries, should be construed as the boundaries of areas proposed for protection.

WILDERNESS QUALITY: VALUES AND INFLUENCES

Descriptive Blocks 5 - 13, 23

Wilderness Special Investigation

1 : 250 000

Land Conservation Council
Victoria

LEGEND

Descriptive blocks

- Block boundary
- Block number

Wilderness quality

- Areas of highest wilderness quality
- Areas of relatively high wilderness quality

Freehold land

- Freehold land

Roads and tracks

- Major road
- Minor road
- Vehicular track
- Text reference

Structures

- Trigonometric station
- Water gauging station, tank
- Other structures with text reference

Main livestock grazing areas

- Areas formerly grazed
- Areas currently grazed

Areas of timber extraction

- Areas logged

Mining activities

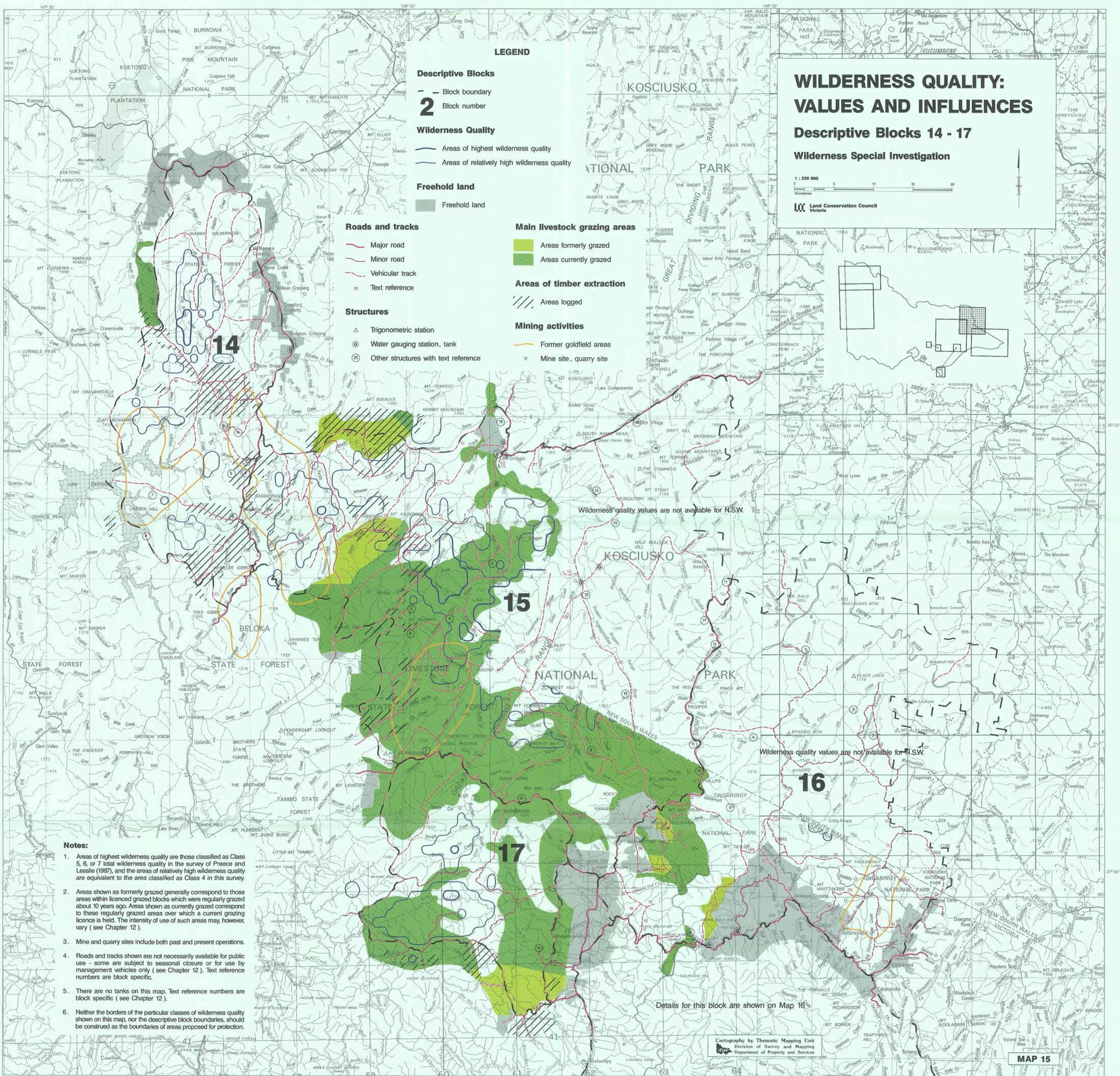
- Former goldfield areas
- Mine site, quarry site

Notes:

- Areas of highest wilderness quality are those classified as Class 5, 6 or 7 total wilderness quality in the survey of Preece and Lesslie (1987), and the areas of relatively high wilderness quality are equivalent to the area classified as Class 4 in this survey.
- Areas shown as formerly grazed generally correspond to those areas within licenced grazed blocks which were regularly grazed about 10 years ago. Areas shown as currently grazed correspond to those regularly grazed areas over which a current grazing licence is held. The intensity of use of such areas may, however, vary (see Chapter 12).
- Much of the area grazed in Block 6 is subject to phase out by 1991, with most grazing in Block 12 subject to phase out by May 1991. Areas shown within Block 7 as formerly grazed may be subject to grazing under agistment and are mainly subject to May 1991 phase out. Those shown as currently grazed in Block 23 as not licenced but grazed under agistment are subject to phase out by December 1991.
- Mine and quarry sites include both past and present operations.
- Roads and tracks shown are not necessarily available for public use - some are subject to seasonal closure or for use by management vehicles only (see Chapter 12). Text reference numbers are block specific.
- There are no tanks on this map. Text reference numbers are block specific (see Chapter 12).
- Neither the borders of the particular classes of wilderness quality shown on this map, nor the descriptive block boundaries, should be construed as the boundaries of areas proposed for protection.

MAP 14

Cartography by Thematic Mapping Unit
Division of Survey and Mapping
Department of Property and Services



WILDERNESS QUALITY: VALUES AND INFLUENCES

Descriptive Blocks 18 - 22

Wilderness Special Investigation

1 : 250 000
Kilometres

Land Conservation Council
Victoria

LEGEND

Descriptive Blocks

Block boundary

Block number

Wilderness Quality

Areas of highest wilderness quality

Areas of relatively high wilderness quality

Freehold land

Freehold land

Roads and tracks

Major road

Minor road

Vehicular track

Text reference

Structures

Trigonometric station

Water gauging station, tank

Other structures with text reference

Main livestock grazing areas

Areas formerly grazed

Areas currently grazed

Areas of timber extraction

Areas logged

Mining activities

Former goldfield areas

Mine site, quarry site

Notes:

1. Areas of highest wilderness quality are those classified as Class 5, 6, or 7 total wilderness quality in the survey of Preece and Lesslie (1987), and the areas of relatively high wilderness quality are equivalent to the area classified as Class 4 in this survey.
2. Areas shown as formerly grazed generally correspond to those areas within licensed grazed blocks which were regularly grazed about 10 years ago. Areas shown as currently grazed correspond to these regularly grazed areas over which a current grazing licence is held. The intensity of use of such areas may, however, vary (see Chapter 12).
3. Grazing in Block 18 is to be phased out by May 1991.
4. Mine and quarry sites include both past and present operations.
5. Roads and tracks shown are not necessarily available for public use - some are subject to seasonal closure or for use by management vehicles only (see Chapter 12). Text reference numbers are block specific.
6. There are no tanks on this map. Text reference numbers are block specific (see Chapter 12).
7. Neither the borders of the particular classes of wilderness quality shown on this map, nor the descriptive block boundaries, should be construed as the boundaries of areas proposed for protection.

Cartography by Thematic Mapping Unit
Division of Survey and Mapping
Department of Property and Services