National Estate Report

LIST OF MAPS AND TABLES

Preface

This assessment report of the national estate values of Victoria's East Gippsland forests is based on work which began in 1992. The project has been undertaken jointly by the Australian Heritage Commission (AHC) and the Department of Natural Resources and Environment, Victoria (NRE).

Since this study commenced, there have been many developments in forest policy in Australia. The Commonwealth and Victorian governments have jointly undertaken a Deferred Forest Assessment (DFA), resulting in an Interim Forest Agreement (IFA). This agreement ensures that options for the development of a national reserve system are not foreclosed while more detailed Comprehensive Regional Assessment (CRA) studies are undertaken. These CRA studies will provide the basis for an East Gippsland Regional Forest Agreement (RFA) between the two Governments. Both Governments are committed to ensuring the RFA for East Gippsland is signed before the end of 1996.

The National Estate assessment is an essential part of the Environment and Heritage component of the CRA. Reports on the full range of studies undertaken in the CRA will be available for public comment from July 1996. The National Estate analyses undertaken which will contribute to the CRA are described in Chapter One of this report. In addition to this Assessment Report, conservation principles, or guidelines, are being developed for each of the national estate values identified in the joint study. These will provide the basis both for the enhanced management of the national estate, and more targeted advice under section 30 of the *Australian Heritage Commission Act (1975)*. Most importantly, these conservation principles will also ensure that the protection of the national estate is maximised in the development of the final RFA.

A number of additional documents together provide the full documentation of this assessment. Those reports are;

- the reports of the technical workshops as outlined in Appendix F
- the plots of the GIS coverages which are available for viewing by arrangement with either the NRE (Gary Featherston NRE Orbost 051 611 222 & Bruce Kilgour 03 9651 3464 NRE Melbourne) or AHC's East Gippsland Team Canberra (1 800 020 652)
- the two methods papers that supplement this report; *Methods Papers: East Gippsland National Estate Assessment. Volume One - Natural Values*, and *Methods Papers: East Gippsland and Central Highlands Joint Forests Projects. Volume Two - Cultural Values* (1994).

For an introduction to the wider CRA/RFA process, including opportunities for involvement in the process and an explanation of the role of these reports, see:

- Background Paper - Regional Forest Agreement, East Gippsland Victoria (1996).

Summary

The Register of the National Estate is a national register of places in Australia with cultural or natural significance to the community as defined in the *Australian Heritage Commission Act 1975.* The role of the Australian Heritage Commission (AHC) is to identify the National Estate and (under section 30 of that Act) to advise the Commonwealth Government about its conservation.

The Victorian Department of Natural Resources and Environment (NRE) is responsible for the ecologically sustainable management of most of the public land in Victoria and its associated resources and values.

The Commonwealth, State and Territory governments have agreed on a national approach to the sustainable management and use of Australia's forests, the National Forest Policy Statement (NFPS). One of the aims of the NFPS is to establish a Comprehensive, Adequate and Representative (CAR) forest reserve system. To achieve this it is essential to assess the conservation values of forests, including areas of National Estate significance.

Since the commencement of this study, there have been many developments in forest policy. During 1995, the Commonwealth and Victorian Governments jointly undertook a Deferred Forest Assessment (DFA) which resulted in the signature of an Interim Forests Agreement (IFA). The aim of the IFA is to ensure that options for the development of a CAR reserve system are not foreclosed while a Comprehensive Regional Assessment (CRA) is being undertaken. The CRA will provide the basis for an East Gippsland Regional Forest Agreement (RFA) between the two Governments. Both Governments are committed to ensuring that the RFA for East Gippsland is negotiated before the end of 1996. A more detailed understanding of the current policy framework behind this report, as well as the ongoing joint Government approach to forests assessments and agreements, is provided in the *Background Paper - Regional Forest Agreement, East Gippsland Victoria* (1996).

The Study Area

The East Gippsland study area coincides with the East Gippsland Forest Management Area (EGFMA), which occupies 1.2 million hectares in far eastern Victoria, approximately 320 km east of Melbourne and 200 km south of Canberra. Almost 90 percent of the land in the study area is public land, and over 80 percent of the area is native forest, managed by NRE as state forest or national park. The remaining private property is used mostly for agriculture.

How the study was carried out

The study involved a broad range of technical expertise, as well as public input, and covered both natural and cultural values. Key sources of information were the NRE flora, fauna and historic databases, the Register of the National Estate, *A Study of the Old-Growth Forests of East Gippsland*, (Woodgate et al 1994), ecological survey reports, NRE's pre-logging surveys and previous studies by experts, including the Land Conservation Council reports. A large amount of new data on cultural heritage was also collected. Assessment was based on the national estate criteria as specified in the *Australian Heritage Commission Act 1975.*

The joint assessment process consisted of:

- data compilation from a range of existing sources and survey work undertaken within the study;
- identification and assessment of national estate values; and
- analysis of current levels of protection.

Community involvement was a key component of the study. Community heritage workshops were held to draw on the knowledge of local people about heritage places in the region. The

workshops involved local organisations, land managers, local business and tourist operators, industry and conservation groups. Many places not on existing databases, or known to experts, were identified and documented as a result of this work. The active participation of local Aboriginal communities was an essential part of the identification and assessment of Aboriginal places.

The assessment of Aboriginal values could not be completed within the time-frames of this study, given the AHC's commitment to having local Aboriginal communities actively involved in the assessment of Aboriginal places. Work with the Aboriginal people of East Gippsland is continuing and results will be incorporated into the study outcomes.

Results

National estate places identified

The study identified many areas of national estate significance on public land within East Gippsland, as well as specific places with national estate significance. These ranged from a World War Two intelligence-gathering complex, to historic mining sites, natural landscapes and places valued by the community for long-standing recreational use, or as a symbol of local identity.

Better definition of national estate values

For the first time, a comprehensive understanding of the region's disturbance history, based on a range of land use studies, was developed. This drew on the extensive datasets on NRE's computer systems.

As expected, additional research led to the better definition of a number of heritage values, such as:

- endemism;
- refugia for flora and fauna;
- old-growth forests;
- successional processes;
- flora and fauna richness; and
- social, or community-based, heritage values.

Private property

While conserving national estate values on public land is the focus of the study, some values do not stop where the private property begins. Geological and geomorphological values, cultural and wetland values are well established and readily mapped, and these have been identified throughout the study area, including private property. The quality of data about other values on private land is variable, and further identification of values on private property would require additional work.

Major outcomes

The study has resulted in the following outcomes:

- identification of the National Estate, based on the assessment of both natural and cultural heritage values in an integrated way across the region;
- better definition of heritage values and analysis of the overall protection of the national estate in the region;
- an improved basis for integrated management of the full range of heritage values on public land within the study area;

- the results will be used by the AHC as the basis for listings on the Register of the National Estate;
- a basis on which to incorporate national estate values into the RFA process.

Introduction

BACKGROUND

The Register of the National Estate is a national register of places in Australia with cultural or natural significance to the community as defined in the *Australian Heritage Commission Act 1975.*

Many forest areas are listed in the Register of the National Estate. These areas are often used for multiple purposes, including timber production. Commonwealth Government decisions about the uses of forests, such as the granting of licences to export native forest products, must consider national estate issues.

In the past, the lack of detailed national estate information about forests, presented in a regional context, has hampered the ability of the AHC to list national estate places. As well, it has been difficult for the AHC to provide detailed, strategic advice about the conservation of these places to the Commonwealth Government. The AHC is obliged, under Section 30 of the *Australian Heritage Commission Act 1975*, to provide conservation advice on listed places adversely affected by Commonwealth actions .

The lack of systematic information about conservation values has also contributed to uncertainty within the forest industry and state governments about what places will be listed next, and what advice about their conservation will be forthcoming from the AHC. Thus, neither the conservation of forests, nor the needs of industry have, in the past, been met in the most effective manner.

In the last decade there have been major changes in the forest debate, including recognition of the need to look at values systematically, rather than on a place-by-place basis. There has been a huge increase in systematic, scientific work to establish the impact of forestry activities.

The Commonwealth responded to the continuing high level of conflict over forest areas in the late 1980s by initiating the *Australian Forest and Timber Resources Inquiry*, undertaken by the Resource Assessment Commission (RAC) in 1990-91, and by setting up the Ecologically Sustainable Development Working Group on Forest Use in 1990. In 1991-92, the same issues also resulted in a concerted push by the forest industry for Commonwealth legislation to guarantee security of access to timber in native forests. National estate issues figured prominently in each of these initiatives.

In its submission to the RAC forest inquiry in October 1990 (AHC 1990), the AHC proposed a method to help resolve national estate forest issues. The proposal focussed on the need for systematic surveys of regions to identify areas of national estate significance. The method involved combining the survey results with appropriate advice about protection of the National Estate, using the regional framework as the basis for decision-making.

A more detailed regional assessment model was developed in 1991-92 by the AHC, in co-operation with the Western Australian Department of Conservation and Land Management

(CALM), in the Southern Forest Region of south-west Western Australia (AHC and CALM 1992). In 1991, the model gained cautious acceptance in the final report of the Resource Assessment Commission (1992) and with the Ecologically Sustainable Development Forest Use Working group (ESD Working Group 1991).

The East Gippsland study in Victoria is the AHC's third regional assessment. The first was the AHC/CALM study of the South West Forest Region of Western Australia, and the second the AHC/NRE study of the Central Highlands forests of Victoria. The regional assessment approach continues to evolve, taking account of the peculiarities of each region, as well as the nature and level of information available.

Since the commencement of this study, there have been many developments in forest policy. The Commonwealth and Victorian Governments in 1995 jointly undertook a Deferred Forest Assessment (DFA), which has resulted in the signature of an Interim Forest Agreement (IFA). The aim of the IFA is to ensure that options for the development of a Comprehensive, Adequate and Representative (CAR) reserve system are not foreclosed while the Comprehensive Regional Assessment (CRA) is being undertaken. The CRA will provide the basis for an East Gippsland Regional Forest Agreement (RFA) between the two Governments. Both Governments are committed to ensuring that the RFA for East Gippsland is negotiated before the end of 1996. A more detailed discussion of the current policy framework, as well as the ongoing joint Government approach to forests assessments and agreements, is provided in the *Background Paper - Comprehensive Regional Assessment* (Commonwealth of Aust. 1996). The criteria to be used in the establishment of a national CAR reserve system are outlined in *Proposed Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia* (JANIS 1996).

WORK TO DATE AND THE BROADER CRA PROCESS

This report outlines the work undertaken to date in assessing national estate values of the forests of East Gippsland. The range of analyses which have already been undertaken are substantial, covering both natural and cultural values.

This report outlines these assessments, together with the major findings of the study. It does not fully document the assessment methods, which are dealt with in two additional methods reports dealing with natural and cultural values. The *Methods Papers: East Gippsland National Estate Assessment* , *Volume One - Natural Values* (AHC/NRE 1996), outlines each of the analyses undertaken, relating these to the GIS coverage for each identified natural value. A companion report, *Method Papers: East Gippsland and Central Highlands Joint Forest Projects, Volume Two - Cultural Values* (AHC/CNR 1994), describes the scope and nature of the cultural assessments undertaken.

This national estate study is one of the range of assessments within the CRA. These will provide the basis for the RFA for East Gippsland.

As noted in this report, some limited additional studies will be undertaken to complete the national estate assessment within the CRA. These assessments include; sites of significance for rare flora and work on heritage places of significance to Aboriginal people. Following completion of these additional studies, a supplementary report outlining these further analyses, and their results, will be made available on request.

The outcomes of this national estate assessment will contribute to the development of options on which the RFA will be based. Comment on the national estate assessment work, including the outcomes presented in this report, will be sought in this broader context.

The following reports on the national estate assessment are available and will contribute to the CRA:

- this National Estate Values Report;

- Method Papers: East Gippsland National Estate Assessment, Volume One - Natural Values (1996) and Method Papers: East Gippsland and Central Highlands Joint Forest Projects, Volume Two - Cultural Values (1994) available on request;
- the maps of the GIS coverages will be available for viewing by arrangement with either the NRE (Gary Featherston NRE Orbost 051 611 222 & Bruce Kilgour 03 9651 3464 NRE Melbourne) or AHC's East Gippsland Team Canberra (1 800 020 652); and
- proceedings of the seven technical workshops are available (see Appendix F) from the AHC.

LISTING OF NATIONAL ESTATE PLACES

The *Australian Heritage Commission Act 1975* requires places identified as being of national estate significance to be entered on the Register of the National Estate. As part of this process, the proposed interim listings will be advertised, and a statutory period of three months allowed for public comment to the AHC. For the national estate values identified in this report, it is anticipated that interim listing will be undertaken during 1997.

THE DEVELOPMENT OF CONSERVATION PRINCIPLES

In addition to this study, conservation principles, or guidelines, will be developed for each of the identified values both as a basis of future AHC advice and as a contribution to NRE management approaches. The development of such principles is an integral component of the development of the final RFA.

The Assessment Study

THE STUDY AREA

The study area is the East Gippsland Forest Management Area (EGFMA). The size of the EGFMA is 1.2 million hectares. It is located in far eastern Victoria, approximately 340 km east of Melbourne and 200 km south of Canberra. The northern boundary is formed by the Victorian-New South Wales border. The western boundary extends along various ridges, rivers and roads, including the main ridge of the Great Dividing Range and the Timbarra River to Lakes Entrance. The southern and eastern boundaries are formed by Bass Strait.

Major biophysical characteristics

East Gippsland is an area of outstanding natural beauty, with a remote and rugged character. Today it remains sparsely populated, with small settlements confined mainly to the coastal strip and major river valleys. More than 80 percent of the landscape remains covered by native forest, managed by NRE as state forest or national park. Almost 90 percent of the land in the study area is public land. The remainder is private property and is used mostly for agriculture.

Climate

The climate is influenced by both south-eastern coastal NSW and southern Victorian weather patterns. Rainfall is fairly evenly distributed throughout the year with most rainfall coming from depressions centred off the east coast directing a flow of warm, moist sub-tropical air from the Tasman Sea over the area. Annual rainfall in the coastal and lowland areas is usually less than 1000mm although heavier rainfall is common in coastal areas between Cann River and Orbost. At higher elevations, such as the Errinundra Plateau, rainfall can exceed 1500mm. Snowfalls occur regularly above 1000m in winter and occasionally at higher elevations during other times of the year. The upper Snowy and Deddick Valleys are in a 'rainshadow' with annual rainfall as low as 700mm. Droughts are relatively common in the rainshadow and tableland areas, and severe drought can periodically affect the whole area (LCC 1985a&b).

Temperature is affected by proximity to the ocean and by elevation. There is less temperature variation in coastal areas than inland areas, with temperatures decreasing as elevation increases. Mild winters in coastal areas are due to the 'Fohn Effect', where northerly and north-westerly winds become warmer as they descend from the highlands towards the coast. Frosts occur across the study area with frequency increasing with elevation.

Geology/Geomorphology

East Gippsland lies in the eastern portion of the Lachlan fold belt and contains seven major geological groups: Ordovician sediments, Devonian granitoids, Devonian volcanics and sediments, Devonian marine sediments, Tertiary volcanics, Tertiary sediments and Quaternary sediments. Around 500 million years ago Ordovician marine sediments, consisting mainly of sandstone and siltstone, were deposited into the Lachlan Geosyncline in a sequence several kilometres thick. Around 450 million years ago these sediments were metamorphosed and tightly folded, and about 430 million years ago they were faulted into a series of major blocks. This group outcrops over much of the foothills and mountains of the study area alternating with Devonian granitoids in the Genoa, Cann River and Mt Ellery areas, and volcanics in the Snowy River area.

Two episodes of granitic intrusion of Ordovician sediments occurred in the Devonian period. The first episode, around 400 million years ago, produced extensive granitoid bodies which now outcrop in 10-15 km wide bands between Maramingo and Wingan Inlet; Mt Coopracambra and Mt Cann; Cabanandra and Deddick; Suggan Buggan and Cowombat Flat and Timbarra and Mt Nunniong. The second episode, around 380 million years ago produced more localised granitoid bodies in the Goongerah-Mt Ellery area and in the Mt Victoria-Gabo Island area. Extensive weathering of the granitoid areas has led to the development of tor fields (eg Goonmirk Rocks) and nutrient-poor sandy soils.

Around 390 million years ago volcanic activity produced Devonian volcanics and sediments, creating a layered series of rhyolites, rhyodacites, tuffs, andesites and basalts collectively termed the Snowy River Volcanics. This group occurs on both sides of the Snowy River from Cobberas to Wairewa and is interbedded with sandstones, shales and conglomerates. Following the cessation of mid-Devonian vulcanism, a shallow sea developed, facilitating the deposition of the Buchan group of limestones and mudstones (Devonian marine sediments). This group outcrops as limestone pavements in the Buchan River valley and its alkaline nature has contributed to the generation of thin but fertile soils.

Around 23 million years ago tertiary volcanism produced thin (120m) basalt caps in the Gelantipy-Wulgulmerang Tablelands and in isolated outcrops at Martins Creek and west of Bendoc. The development of the East Gippsland Basin around 5 million years ago led to the deposition of non-marine sediments (Tertiary sediments) along the basin fringe. These sediments now outcrop in an approximately ten kilometre wide block running east-west, predominantly south of the Princes Highway on the coastal plain but extending into the highlands in the Genoa area. The sandy nature of this group has contributed to the development of well drained but nutrient-poor soils.

From about 2 million years ago to the present day, a series of advances and retreats of the sea have led to the development of sand barriers, marine terraces and sand dunes (Quaternary sediments) which now extend along most of the study area coastline. At the same time, river terraces, levees and associated sediments have developed in many river valleys on the coastal plain, the most extensive examples being in the Orbost-Marlo area where fertile soils have been generated.

Landforms

The landforms of East Gippsland broadly consist of tablelands and plateaux, dissected highlands, coastal foothills and coastal plains (LCC 1985a&b). Tablelands and plateaux around Bendoc and Bonang are part of the Monaro Tablelands extending from southern NSW. The Errinundra Plateau is at the southern limit of the tablelands. This landform once extended to Butchers Ridge in the west of the study area but has been dissected by streams leaving remnant tablelands around Mt Canterbury, Bowen Ranges, Gelantipy Plateau and Butchers Ridge to Forest Hill. The tablelands are gently undulating with broad valleys and low divides. They are tilted towards the north, and north-flowing streams of gentle gradient allow bogs and swamps to develop, as at Delegate Swamp and Craigie Bog.

South-flowing streams have steep gradients leading to the development of waterfalls and deep, sharp valleys. Fertile, friable, well-structured, red and brown gradational loams and high rainfall are features of these areas.

Dissected highlands occur from the edges of the plateaux towards the coast with decreasing elevation and relief. They occupy most of the northern, central and western parts of the area. The patterns of dissection are related to variations in geology. Soils are predominantly red and brown gradational. Low, gently undulating coastal foothills extend from west to east below the dissected highlands. Dominant soils are brown gradational and brown duplex.

The coastal plains consist mainly of Quaternary sediments. A sandy barrier capped by dunes extends from Lake Tyers to Point Ricardo. Extensive swamps, lagoons and heathlands have

developed behind this barrier as a result of streams being blocked or diverted. Extensive sand dune ridges have formed from Point Ricardo to Thurra River. Uniform soils, mainly leached sands and undifferentiated sands, with low fertility and in some cases high salinity, dominate the coastal plains.

Vegetation

As a result of the relatively limited impact of European settlement in East Gippsland and its unique physical features, there remains a diversity of forest types and habitats that is highly significant in the Australian context. The relatively undisturbed vegetation harbours 43 plant species classified as having national botanical significance and 48 species of threatened fauna (Davies & Thompson, 1993).

The diverse flora occurring largely as a result of the great climatic and topographic variation in the study area is also influenced by East Gippsland's location at the south-east corner of Australia where vegetation changes from typically Victorian flora (southern distribution) to that of south-eastern NSW (eastern distribution). Vegetation communities range from sub-alpine woodland and rainshadow woodland to wet, damp and dry forest, cool and warm temperate rainforest and heathlands. Vegetation has been mapped both structurally and floristically in the study area. As part of the recent old-growth study, Ecological Vegetation Classes (EVCs) have been defined to link similar floristic communities which exist under a common regime of ecological processes within a particular environment. Twenty-four floristic vegetation communities (mainly forest communities) were identified by Forbes *et al.* (1981) and Parkes *et al.* (1984). Forty-four EVCs have been identified by Woodgate *et al.* (1994).

Fauna

Limited forest fragmentation and high diversity of vegetation communities in East Gippsland makes the area outstanding for fauna with 319 species of birds, 65 mammals, 38 reptiles, 22 frogs, 53 estuarine or freshwater fish and a large but as yet undetermined invertebrate fauna (Henry & Murray 1993).

This diversity includes a series of specialised habitats, such as breeding sites for waterbirds and seals on the coastal islands and estuaries, roosting camps of flying foxes near Mallacoota, roosting and maternity sites for bats in limestone caves and temperate flora communities providing habitat for refuge-dependent invertebrate and other fauna species.

Of the total fauna for the study area 137 species of birds, 57 mammals, 34 reptiles, 21 frogs and 19 fish are found within state forests (Henry & Murray 1993). The special value of the State forests in the study area is illustrated by the presence of 48 threatened species, including Long-footed Potoroo, Tiger Quoll, Powerful Owl, Sooty Owl and a large number of other species dependent upon old-growth forests.

Demography

The study area includes most of the Shire of East Gippsland. The population of the study area is in excess of 6000 and is mostly located in the south. Most of the community is employed in tourism, sawmilling, agriculture or services to these industries.

Human history

Aboriginal prehistory and post contact history

East Gippsland is one of the few forested areas in Australia which has undergone systematic and intensive archaeological research (Hall 1991). Although no sites have been directly dated, surveys have shown that the forests contain large numbers of sites which are distributed across almost all parts of the forest landscape. Variations in the numbers of sites within

different parts of the forest provide valuable information about the way they have been used in the past.

The coasts of East Gippsland are also rich in archaeological evidence of Aboriginal people's activities in the region. Several of the coastal middens contain faunal remains which demonstrate direct links between the coast and adjacent forests. An especially impressive complex of middens occurs at Mallacoota.

Aboriginal contact history

Early contact with sealers from the Bass Strait Islands in the early 1800's resulted in direct conflict and the introduction of new diseases which had a devastating impact on the Aboriginal population of East Gippsland, estimated at the time of contact to between 15,000 and 50,000 people. The conflict and attendant problems of disease and depressed birth rates continued with the arrival of settlers in the 1830s, so that by 1877, the recorded Aboriginal population of the region had dropped to 213.

During 1838-1851, Aborigines in East Gippsland fiercely resisted the effects of the Anglo-Saxon settlers by raiding stock and property. It is generally agreed amongst historians that resistance by Aboriginal people was stronger in Gippsland than in other parts of the state.

By the end of the 1840's the increasing numbers of new settlers began to have a dominant impact on the East Gippsland landscape eroding the Aboriginal attachment to the landscape, their access to food and other resources, the Aboriginal sense of self and ultimately the basis of their traditional culture.

In the 1850's stations/depots were set up throughout the region to distribute food while missions were created by the Central Board for the Aborigines to provide permanent homes. These stations also provided a place for Aboriginal communities to consolidate as well as the opportunity to pass on some of the traditional characteristics of Aboriginal society. Many of these places are still remembered by Aboriginal people living in the East Gippsland today and are considered a significant part of their heritage.

European history

East Gippsland conceals evidence of a fascinating, though often tenuous European history. Remoteness from urban centres, and a heavily forested landscape, dissected by rivers and mountains, has helped to mould the region's cultural identity. The thin spread of settlement along the river flats and valleys, and the isolated towns at river crossings, reflect the difficulties of settlement in the forest. These cultural landscapes, fringed by the all-pervading forest, are part of the region's rich heritage.

For a century and a half, Europeans have lived in the forests of East Gippsland. The first cattle were introduced into the area by graziers from southern New South Wales, during a run of dry seasons in the 1830s and 1840s. This tradition of raising 'bush cattle' on leasehold areas of forest continues into the 1990s. Stockyards, pens, fencelines, huts, outbuildings, and tracks through the forest are physical reminders of this ongoing forest use. Agriculture was always a tenuous activity. Government-sponsored settlement schemes were only partially successful and resulted in hardship and isolation. The forest has since swallowed many of these abandoned selection blocks, taken up during the periods of optimistic expansion from the 1880s to the 1920s.

Gold discoveries were made at Bendoc and Bonang in the 1850s and 1860s, and at Clarkeville and Club Terrace in the 1880s and 1890s. However, the gold fields of East Gippsland tended to be short-lived, often with poor returns for individual miners, and mining remained limited in scale compared to the fields of Central Victoria. Several former gold towns and the associated network of tracks were adapted this century to service the timber industry.

The extension of the railway to Orbost in 1916 strengthened the timber industry, already active around town centres and in mining areas. Local hardwood timber was harvested for a variety of uses, from railway sleepers to construction timbers. Plentiful timber, steep grades and extensive flood plains resulted in the distinctive timber trestle road and railway bridges constructed early this century, which provide a striking reminder of the importance of transport in the development of the region.

East Gippsland's biological richness attracted botanist Ferdinand Von Mueller in the 1850s and 1860s. Walter Baldwin Spencer, Professor of Biology at Melbourne University, also made a study tour of Croajingolong in 1889.

The limited extent of agricultural and other human impacts on East Gippsland landscapes has resulted in retention of large areas of essentially natural public land, including areas of biological richness or rarity. Growing community recognition of the importance of protecting such remnant or outstanding areas has led to the designation of extensive areas of national parks in East Gippsland. Croajingolong, Coopracambra, Snowy River and Errinundra National Parks cover extensive areas of high quality, largely undisturbed terrain and are among the best examples of forested national parks in Australia.

East Gippsland has long attracted holiday-makers. Guest houses were conveniently located at the end of a day's ride or coach journey, or catered for visitors to popular tourist spots such as the caves of the Buchan area and Mallacoota Inlet. The beauty of the forest itself attracted many visitors and the region has been called 'Victoria's Wilderness Corner'. The ruggedness and grandeur of the Snowy River, in particular, are enshrined in literature and folklore.

THE JOINT NATURE OF THE STUDY

This study built on the AHC's previous experience of regional assessment in Western Australia. There were three major differences between the studies however:

- a far wider range of data was available and actively sought, in particular on cultural values;
- greater emphasis was placed on involving and informing the community through heritage workshops, media coverage and the use of briefings and newsletters; and
- the data, process, research methods and assumptions were open to regular and extensive scrutiny. Consultation with independent scientists and professionals was undertaken.

The study steering committee consisted of senior NRE and AHC staff, and also included observers from the LCC, and the Department of Aboriginal Affairs Victoria (AAV). This committee met on a regular basis to set the study's priorities, track its progress and facilitate the necessary resources.

The study was carried out by teams of technical officers and specialists from both the AHC and NRE who undertook the collection, assessment and analysis of data. Members of the AHC and NRE study teams are listed in Appendix I. A wide range of experts were involved including historians, flora and fauna experts, aerial photograph interpreters and foresters.

It was also necessary to subject the data, the process, research methods and assumptions to regular and extensive scrutiny. The involvement of a range of independent scientists and experts in the various fields was an essential part of the study.

A Technical Advisory Committee (TAC) was set up to provide guidance with the more complex technical aspects of the study. Members of this committee included independent scientists, specialists, and AHC and NRE technical staff (see Appendix J). Major technical decisions, such as the adequacy of data and the assessment methods, were brought before the TAC for discussion and technical direction.

A series of seven technical workshops were convened by the AHC during late 1993 to discuss the developing methods in detail. These workshops covered the following areas:

- identifying Aboriginal archaeological places;
- Aboriginal archival and oral history;
- identifying and assessing aesthetic value;
- assessing diversity in natural heritage;
- identifying places containing fauna values;
- representative vegetation: identifying natural heritage places which demonstrate the principal characteristics of their class; and
- people's places: identifying and assessing social value for communities.

Leading experts and practitioners from a range of disciplines, as well as land and resource managers, attended. Reports and papers are available for each of the seven technical workshops and are listed in Appendix F.

COMMUNITY INVOLVEMENT IN THE STUDY

Communities have a wealth of knowledge about heritage, knowledge which has not often been tapped by professional organisations. Communities and interest groups also have strong opinions about heritage significance and its conservation.

The AHC, with support from NRE, and with the involvement of a number of community organisations, has developed a range of ways to involve and inform the public about regional assessment studies. The AHC and NRE together implemented these ideas through a community participation program.

The program's aims were to:

- involve the community in the identification of its heritage;
- inform all sectors of the community about the study (ie local people and organisations, industry groups, conservation organisations and unions);
- ensure consideration of stakeholders' concerns within the study;
- be open and transparent about process, methods and decisions;
- encourage a better understanding of heritage, and the AHC's role and processes; and
- encourage a stronger understanding of management and conservation measures.

Briefings

Peak groups are principally industry organisations, conservation groups and government authorities, and include: the National Trust, Victorian National Parks Association, the Forest Protection Society, the Australian Conservation Foundation, Environment Victoria, Wilderness Society, East Gippsland Forest Network, Timber Towns Association, the Victorian Association of Forest Industries, the Construction, Forestry, Mining and Electrical Union, Australian Paper Manufacturers, Pulp and Paper Federation, Chamber of Mines, Victorian Farmers Federation, and Concerned Residents of East Gippsland.

Peak groups were given briefings in February, June and October 1993 and in April 1994. Commissioners also met with peak group members during the AHC's 97th meeting in Melbourne in June 1993.

Local Government has been involved in the study in a number of ways. The then Orbost and Tambo Shires were sent information about the study and invited to be involved. Shire representatives attended the local community briefings, the heritage workshops and follow up sessions. Individual discussions about the study were held with several councillors and members of council staff.

Local communities were briefed at meetings held with regional representatives from a range of community organisations. The groups included representatives from shire councils, the business community, tourist operators, conservation and landcare groups, recreation groups, industry and unions. Briefings were held in Orbost in March and August 1993 and April 1994. Staff from NRE and the AHC gave progress reports on the work in which they explained the collection and analysis of data, what heritage values were being identified and the findings from the heritage workshops. Groups were regularly invited to contribute more information about the natural and cultural heritage values of the region.

The groups included representatives from the Forest Protection Society, Orbost Historical Society, Concerned Residents of East Gippsland, the business community, tourist operators, Orbost Women's Awareness Group, Logging Contractors Association, Friends of Mallacoota, the Shire of Orbost, the Victorian Association of Forest Industries, Orbost District Environment Group, the Jarrahmond Landcare Group, Snowy River Improvement Trust, W Tree Progress Association, the Bruthen and District Community Forum, East Gippsland Organic Agriculture Association and the East Gippsland Forest Management Area Advisory Committee.

The heritage workshops (discussed later) also attracted a lot of interest among community groups.

Indigenous community meetings

Five individual Aboriginal community organisations were originally identified as having interests in the East Gippsland assessment area. These are Moogji Aboriginal Council, Lake Tyers Aboriginal Trust, Gunai Women's Aboriginal Co-operative, Far East Gippsland Aboriginal Corporation and Gippsland and East Gippsland Aboriginal Co-operative.

A series of meetings were held with these groups during 1993/94, the purpose of which was to:

- outline the purpose of the study and its objectives;
- provide an opportunity for Aboriginal communities to comment on both the process of identifying relevant cultural data and how the information is assessed;
- develop a forum which allows Aboriginal communities to participate in the compilation of data on cultural values and places for inclusion in the assessment;
- encourage the use of this process in nominating places to the Register of the National Estate;
- create a better understanding of the AHC, particularly the Register of the National Estate and the National Estate Grants Program.

During these earlier meetings, information collected by the consultant for the Aboriginal Historical Places study was discussed and validated with the relevant communities. Places of importance were also documented as part of the assessment of archaeological values.

An organisation known as the Gunai/Kurnai Heritage Land Council was incorporated in May 1995 and it is with this body that more recent consultations have taken place. The Land Council developed out of a need by the various Aboriginal individuals, families clans and organisations to deal with a range of heritage issues on a regional basis, especially relating to Native Title claims.

Discussions are presently underway with the Gunai/Kurnai Heritage Land Council on its possible involvement in furthering the assessment and documentation of Aboriginal values, the next stage of which is the development of "statements of significance" for sites/areas of importance to local indigenous people.

Heritage workshops

Workshops were held in Mallacoota, Orbost, Nowa Nowa and Bonang during the last week in April 1993. Representatives from a wide range of groups met to identify places they consider important. The groups included representatives from local farming and business communities, the Snowy River Tourist Association, local historical and progress associations, teachers, local landcare groups, mountain cattlemen and NRE.

Several distinct themes emerged as important to the history of the area. Many of the places suggested are associated with living and working, both in the past and the present: mining, forestry, agriculture and fishing, tracks and trails, Aboriginal sites, wildlife habitats.

As a result of the heritage workshops, a list of places identified during the workshops was distributed to all who attended. The reports from the heritage workshops, *East Gippsland Heritage Workshops Data Base of Places Identified* (Johnston & Lewis 1993b) were available to the community and circulated for a one month review. In October 1993, AHC staff revisited Mallacoota, Orbost, Nowa Nowa and Bonang to talk about the report with interested individuals.

Many useful comments, corrections and additional information were received. The complete reports were lodged in the Orbost and Lakes Entrance libraries and the Orbost NRE office. Other reports commissioned for the East Gippsland study, and of interest to the local community are also available from libraries. These are listed in the bibliography section of this report.

INFORMATION AND MEDIA

As part of the commitment to open and transparent processes, a newsletter, *Information Update*, was published and distributed throughout the region. Five issues of the newsletter *Information Update* have been produced and released at the time of writing. The newsletter was designed to provide regular information on the status of the assessment, in plain english with a minimum of technical jargon.

- Information Update # 1, March 1993, The Joint Project: why? what it means, community involvement , the process, and who benefits.
- Information Update # 2, April 1993, The Joint Project: How it Works, what it involves, historic values, heritage workshops, Aboriginal Values, aesthetic values.
- Information Update # 3 , August 1993, Gathering the Information: report back from the heritage workshops, how natural values are identified, forthcoming briefing.
- Information Update # 4, October 1993, Assessing the Information: analysis methods, what values we are looking for.
- Information Update # 5, March 1994, Writing up the Work: Community heritage reports receive public comment, geological and geomorphological consultancy report, gaps in the study, draft report in preparation, more community consultation, NRE staff changes.

Media coverage

Regular liaison with the regional media resulted in a number of articles in the press, and a range of stories on local and regional radio.

East Gippsland is a large area with a population of roughly 6000. To reach the entire population it was necessary to target not only local media, but media operating outside the region (in NSW), who draw their catchment from within the region. The following were targeted: ABC Radio Sale; ABC Radio Bega; 3MBG public radio Mallacoota; *Mallacoota Mouth*; *Snowy River Mail*; *East Gippsland News; Bombala Times; Cann River Jinga*, and the *Community Trading Post*.

Information has also been provided on request to local community and conservation organisations, members of the public, students interested in the process, and those people

with specific information to share. The AHC also made a free call telephone number, 1 800 020 652, available for enquiries.

As part of the current CRA there are additional community involvement programs addressing the range of studies being undertaken. Comments relating to this document and further consideration of the national estate values in the CRA are addressed as part of those processes as outlined in the introduction.

The Methods

THE PROCESS

This chapter discusses the study process and its major phases, including how the national estate criteria were applied, the assessment method and the major datasets used.

The methods developed by the AHC in the Western Australian regional assessment study were incorporated and refined in a number of ways to:

- suit the unique biophysical characteristics of East Gippsland;
- suit regional patterns of cultural prehistory and history;
- utilise the types of data available;
- fully utilise the GIS technology used by NRE;
- better involve the community and address their heritage values; and
- formalise the involvement of independent experts and professionals.

Further refinement resulted from cooperation with the concurrent regional assessment study in the Central Highlands.

Considerable effort was made to ensure that the study process was transparent and open, both to criticism and improvement. The work was scrutinised on a regular basis by the Technical Advisory Committee which provided expert advice on the appropriate use of the available data and the development of technical procedures. Further scrutiny occurred at the technical workshops which involved nationally recognised experts and practitioners who reviewed and advised on the newer methods (see Appendices G &L for details).

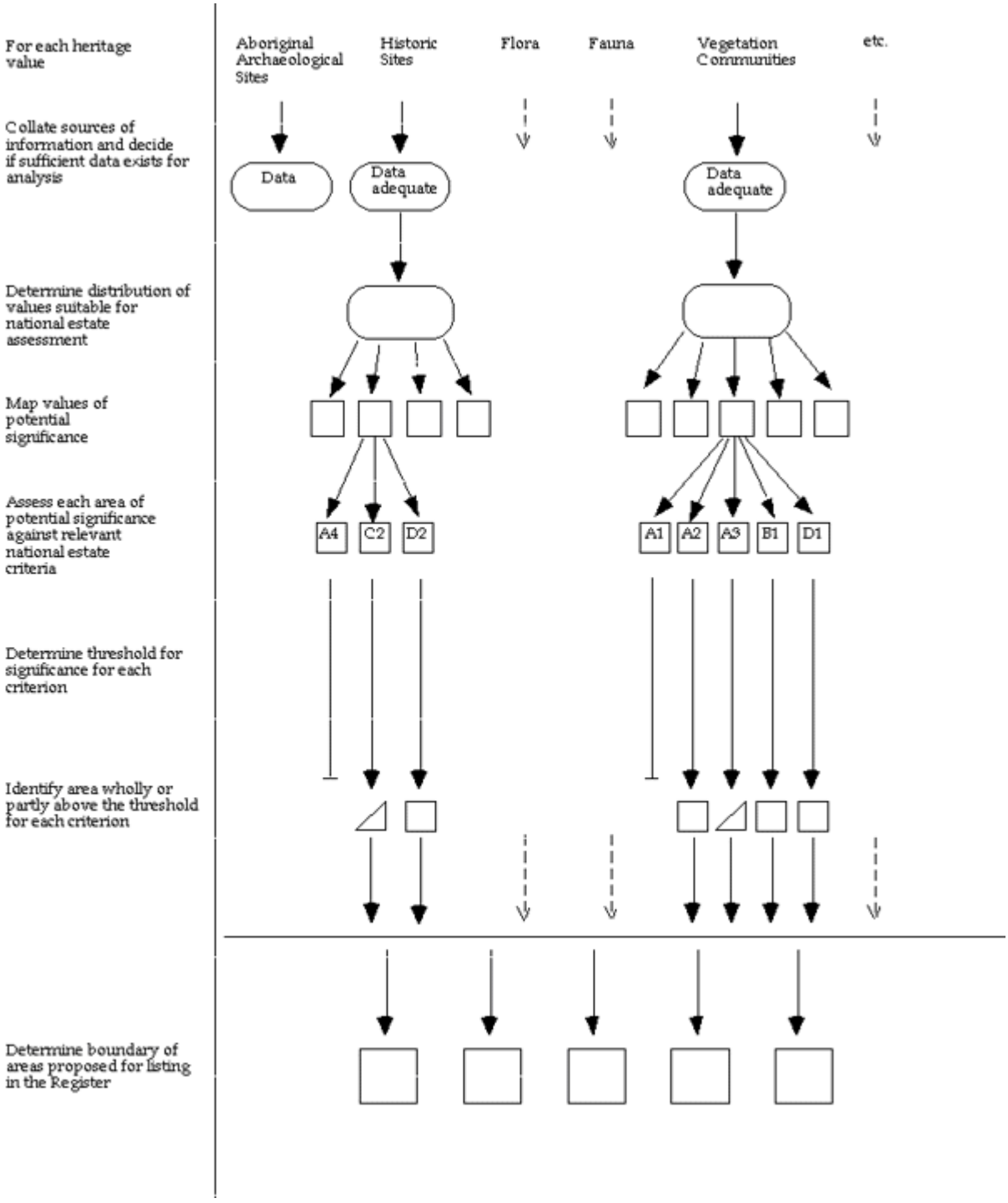
Study phases

The study involved two distinct phases the identification phase followed by the protection analysis phase.

The **identification phase** involved assessing the available information against the national estate sub-criteria to determine areas of value and to delineate national estate places. The major components of this phase were: determining the appropriate methods; applying the sub-criteria to the data available; and applying thresholds of significance.

The **protection analysis** involved an assessment of each type of national estate value and its sensitivity to various types of disturbance. For example, significant historic fabric may not exist at the site of a major event, such as a bushfire disaster, but the place will retain its significant associations despite changes to the site (whether another bushfire or the building of a visitors' centre). However, old-growth forest values are highly sensitive to harvesting, roading or wildfire.

Diagram 1 The identification phase. Ovals represent steps not tied to particular places; squares represent individual places identified during the process; diagonal half-squares represent part of an area above threshold; and truncated lines represent areas below threshold.



1. THE IDENTIFICATION PHASE

Diagram 1 describes the identification process. Each place has only to cross the threshold for one national estate sub-criterion to be eligible for listing.

National estate criteria and application

Assessment was based on the definition of the National Estate in the *Australian Heritage Commission Act 1975* that is:

those places being components of the natural environment of Australia or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community.

The Act also provides more detailed sub-criteria which were used as the framework for identification. A list of the national estate criteria appears in Appendix B. The relationship between the criteria, the sub-criteria and the particular types of national estate value identified and assessed are outlined in Appendix C.

The first step in determining which places met the sub-criteria was to identify those cultural and natural values which met the sub-criteria to some degree; that is, which had some level of national estate value. This led to the identification of a large number of places which exhibited some value under one or more of these sub-criteria.

Degree of value: the application of 'thresholds'

East Gippsland is rich in heritage value. For instance, 44 mining and quarrying sites or areas were identified, all of which had some level of value under a number of different sub-criteria (eg. demonstrating a range of technologies, or as type examples with intact features and buildings). Eleven of these places were assessed to have sufficient value to be listed on the Register of the National Estate.

The next step was to determine which of these very numerous places had a sufficient degree of value, against one or more sub-criteria, to be listed on the Register. This degree, or level, above which a place is considered to have enough value for listing is called the 'threshold of significance'. In the case of the 44 mining and quarrying places only 11 were finally assessed as above threshold.

Determining the thresholds of significance for the large number of values which relate to the sub-criteria was a complex task, which often required innovative approaches from the team. In each case, a separate method for assessment of the threshold was developed, which is described in the method papers. These are available separately on request.

In order to determine the thresholds of significance, an appropriate context must be determined for assessing significance. The context for each value depends on the abundance, natural distribution pattern and homogeneity of the value within the region. Although relatively simple to determine for rare values, the context for extensive values is more difficult.

Some examples of the thresholds established in the course of this study include:

- all natural landscapes have value for the maintenance of ecological processes and are rare nationally. However only those greater than 2000 ha with good natural context were considered above threshold;
- only those mines which have rare surviving technology, or are particularly complete examples of a type, with high integrity when compared with other similar sites, were considered above threshold.

For each extensive value considered, the most appropriate context was determined using the following general guidelines:

- only like values can be compared to determine a threshold of significance;
- the context must be appropriate to the level of knowledge about the value and the accuracy of the data used to compile the value map; and
- for natural values, the context must make ecological sense and be based on sound ecological principles.

These guidelines accord with general principles for the assessment of national estate values which were approved by the Commission in 1990, and outlined in the paper *Future directions in assessing national estate significance* (AHC 1990).

In most cases, the accepted scientific methods already developed, and the level of data for the region, made the setting of thresholds a transparent and readily understood process. In other

cases, establishing an appropriate threshold had not previously been attempted on a regional scale, and this problem was sometimes compounded by a lack of published material. In these cases, workshops of acknowledged experts in the particular field (eg. social value, species richness) reviewed and commented on the proposed method, and advised on its application. The threshold established was then based on the best available current expert advice. Once again, the team has tried to explain this clearly in the method papers, which are available on request.

Delineation of national estate places

Boundaries are delineated around all areas of national estate value above threshold to make national estate places, taking into account logical natural boundaries or existing management boundaries. Frequently there is more than one value above threshold but the presence of only one value is sufficient to warrant listing.

The identified national estate values and their associated sensitivity will provide the basis for consideration of the national estate in the CRA integration process directed toward the development of a comprehensive, adequate and representative reserve system.

2: THE PROTECTION ANALYSIS PHASE

Phase two of the study involved an analysis of the current state of protection for each type of national estate value throughout the region. That is, the aim was to investigate to what extent legislated protection mechanisms including the reserve system, were already protecting the National Estate. Again, each value was considered independently, although some similarities in sensitivity or assessment method informed the analysis. The reserves included in this analysis are listed in Appendix G.

It was recognised that reservation alone does not guarantee protection for some values. This is particularly the case for some cultural heritage values where active management is needed to conserve the site. An assessment of the current levels of reservation is an essential component in determining the adequacy of the existing reserve system. This enables comparison of the adequacy of any future or proposed alternative reserve system with that currently in place.

Victoria's legislated protection measures include:

- the legislated reserve system;
- specific protection legislation such as the Flora and Fauna Guarantee Act 1988 and the Archaeological and Aboriginal Relics Act 1972; and
- the Code of Forest Practices for Timber Production.

Additionally the Forest Management Plan for East Gippsland includes areas which through their zoning are excluded from harvesting. Special Protection Zones have also been considered reserves for this analysis.

For a range of natural environment values, the GIS provided the most efficient and effective way of determining the current state of reservation and protection. The outcomes of these analyses for values considered are given in Chapter 4, and an overall summary in Chapter 5.

THE DATA

Much of the data came from extensive datasets assembled by NRE over many years. These were supplemented by specifically commissioned consultancies and community involvement. A full list of consultancies and reports commissioned in the course of the study appears in Appendix D. Where possible, one source of data was used to complement or confirm another.

Six broad types of data and information were used in the assessment:

- previous scientific studies;
- site specific data obtained from field observation;
- data collected from mapping, usually through aerial photo interpretation;
- information derived from models, using limited ground data;
- historic, social and other values based on information offered by the community; and
- studies conducted by consultants for the AHC.

The major datasets available as GIS coverages at the commencement of the study were:

- Ecological Vegetation Classes (NRE);
- Disturbance (NRE);
- Old-Growth Forest Datasets (NRE);
- the Flora Information System (NRE);
- the Atlas of Victorian Wildlife (NRE);
- the Wetlands Database (NRE);
- Historic Places (NRE); and
- the Aboriginal Affairs Victoria Database (AAV).

All these datasets have limitations to some degree. For more detail on the processes used see the *Methods Papers: East Gippsland National Estate Assessment* , *Volume One - Natural Values* (AHC/NRE 1996).

With over a million hectares in the study area it was not possible to field-check all of this area.

MAJOR DATASETS

Previous studies

The Victorian Land Conservation Council (LCC) was established in 1970 by the Victorian government to make recommendations on the use of public land. The East Gippsland Forest Management Area (EGFMA) includes the whole of the LCC's East Gippsland study area and parts of the Alpine and Gippsland Lakes Hinterland areas.

The following LCC studies have been completed in the EGFMA:

- East Gippsland (LCC 1974a & b, 1977a, 1987);
- Alpine Area (LCC 1977b, 1978, 1982a & b, 1983a & b);
- Gippsland Lakes Hinterland (LCC 1982c & d, 1985c); and
- East Gippsland Review (LCC 1985a & b, 1986a & b).

Section 8 of the *Land Conservation Council Act 1970,* also provides for Special Investigations such as the *Alpine Area Special Investigation* (LCC 1982b, 1983a & b). More recently, the objectives of the *Rivers and Streams: Special Investigation* (LCC 1989, 1990b & 1991a) were to identify and protect rivers and streams in essentially natural condition, ensure rivers and streams of special scenic, recreational, cultural and environmental value are maintained in at least their present condition and to ensure that representative examples of all stream types in the State are protected (LCC 1991a).

The LCC has also conducted a *Wilderness: Special Investigation* (LCC 1990c, 1991b & c) making recommendations on the identification, reservation and use of wilderness areas and other areas of high wilderness quality. The recommendations of these studies have been accepted by the Victorian Government and implemented through relevant statutes.

Other studies utilised in the joint assessment include the *Identification of Sites of Geological and Geomorphological Significance* (McRae-Williams *et al.* (1981), *Sites of Botanical Significance* (Forbes *et al.* 1981) and *Natural Catchments* (MacMillan & Kunert 1990, MacMillan 1990). An annotated bibliography of references used in the East Gippsland study was undertaken by Meredith Fletcher for the AHC (AHC 1994).

As the first part of preparing the Forest Management Plan for the EGFMA, NRE collated contemporary biological information in a statement of resources, uses and values for the area (Lugg *et al.* 1993). This is an invaluable summary of many values which occur in the study area.

The Old-Growth Forest Study

A Study of the Old-Growth Forests of East Gippsland (OGFS) was a prerequisite to the regional assessment, and was partly funded by the Commonwealth Government. It provided essential data on 'forest which contains significant amounts of its oldest growth stage in the upper stratum - usually senescing trees - and has been subjected to any disturbance, the effect of which is now negligible.' (Woodgate *et al.* 1994).

In describing the age and disturbance level of forests, the study concentrated on researching the characteristics which could be most efficiently and objectively assessed using remote sensing techniques and archival research.

The ages of forest stands were evaluated using aerial photograph interpretation of the relative growth stages of trees in the overstorey. As these growth stages can vary with the vegetation type and the site quality, Ecological Vegetation Class (EVC) mapping was also undertaken using a number of sources including previous floristic vegetation mapping, a comprehensive quadrat dataset, field work, additional aerial photograph interpretation and existing structural forest type mapping.

The extent and type of major disturbances known to have altered the floristics, structure or growth stages of forests were delineated through research of historic and contemporary records. This identified eight disturbance types (for detail see The Data: Disturbance dataset, later this chapter). Areas for which there was no disturbance record were described as undisturbed, although it was acknowledged that all forest had probably been affected by wildfire at some time in the past.

The mapped extents of growth stages, EVCs, forest types and disturbances were then entered into NRE's geographic information system (GIS), enabling their combination and analysis. The intensities and effects of the disturbances were evaluated through reference to the growth stage and EVC information, and thresholds set for the maximum levels of disturbance and youngest growth stages which could be considered as 'old-growth forest'. Forest stands within the disturbance level threshold which had slightly younger (although still mature) growth stages were identified as 'negligibly disturbed forest'. Other forest stands which fell outside these parameters were identified as 'significantly disturbed forest'.

Ecological Vegetation Classes

Ecological Vegetation Classes (EVCs) are the vegetation community classifications developed and used by NRE. The system is designed to enable state-wide comparisons of the 'classes', which are based on floristic, structural and ecological information. In East Gippsland these were mapped and described by Woodgate *et al.* (1994).

Disturbance dataset

The disturbance information was initially compiled as part of *A study of the old-growth forests of East Gippsland* (Woodgate *et al.* 1994). The aim was to document and map all known disturbances, both natural and those resulting from human activity, which have affected the forests of the region.

Records of land-use activities since European settlement were used to determine the types of disturbance which occurred in East Gippsland. The disturbances were clear felling, selection logging, fuel reduction burning, mining, grazing, agricultural clearing, dieback, wildfires, mining activities and roads.

In assessing some values the impact of each disturbance type on each EVC was identified. In many cases, the impact of a specific disturbance was determined relative to the EVC in question and a recovery period was allowed for some EVCs. For example, a 30 year period was considered sufficient for the recovery of EVC 22 Grassy Dry Forest after grazing, whereas a 50 year period was considered necessary for the recovery of EVC 44 Treeless Sub-alpine Complex.

Forest growth stage dataset

The forest growth stage classification system is also taken from *A study of the old-growth forests of East Gippsland* (Woodgate *et al* 1994). It is based on the work of Jacobs (1955), which describes the life cycle changes in eucalypts - from saplings through maturity to senescence. Through air photo interpretation and field verification, forest growth stages were mapped. The stages were classified according to the relative proportion of regrowth, mature and senescing trees in the canopy layer.

Flora Information System

The Flora Information System is a database which contains locations (including quadrats) and species lists derived from a variety of surveys conducted within the region (quadrats are approximately 30 square metres where an intensive botanical survey has resulted in a comprehensive species list). These species records were utilised extensively in the study.

Atlas of Victorian Wildlife database

The Atlas of Victorian Wildlife (Atlas) contains species and locality data for Victorian mammals, birds, reptiles and amphibians, as well as threatened freshwater fish and a small number of threatened invertebrates. Both systematic survey data and opportunistic records are incorporated in the database. The Atlas includes records from the many fauna surveys undertaken in East Gippsland.

Wetlands database

The Wetlands database contains a range of information on each wetland, including classification into categories and sub-categories (according to salinity, depth, permanence of water and vegetation); total area (ha), and area of each sub-category for each wetland; information on both conservation status and value; and various types of location data. Within the database is an inventory of wetlands greater than 1 ha in area.

Historic Places database

The Historic Places Section of NRE maintains a database of historic places on public land, grouped according to regional historical themes. Most of the East Gippsland historic places on this register had been recorded as part of the review of public land use by the LCC. This was added to by the collation of disturbance history in the old-growth study (Woodgate *et al* 1994). A state-wide register of historically significant sites is also held by the Historic Buildings Council.

Existing registers of historic places within East Gippsland were reviewed to determine the adequacy of data for assessment, and to identify gaps where additional studies would need to be undertaken.

A study was undertaken by the Historic Places Section of NRE (Brady & Perham 1993) to fill gaps in existing lists of heritage sites for themes including mining and quarrying sites and areas, former selection farms, pastoralism and grazing sites, community settlements and places associated with forest recreation and tourism.

Aboriginal Affairs Victoria database

Aboriginal Affairs Victoria (AAV) maintains a register of Aboriginal places which includes archaeological, traditional, historic, Aboriginal historic and contemporary places. The data are derived from a variety of sources but primarily from field survey and documentary literature. The locations of the sites are generally treated as confidential information.

Community sources

The heritage workshops (as described in Chapter 2) were designed to obtain data on social values within the region and also provide data on historical places within the region. Following the workshops, field recording of selected places was undertaken to collect further data for assessment. Information was compiled and returned to communities for comment and verification. Values identified by the community and assessed to be above threshold have since been entered onto the GIS.

Aboriginal oral history / ethno-history

AAV undertook a consultancy to document all layers of historical records and ethnographic accounts relating to the Aboriginal occupation of the region. This work was also crossed-referenced with oral history work with the Aboriginal communities in the study area. Social values and associations with place were documented and assessed. The database compiled by AAV was validated by the Aboriginal communities during meetings held progressively throughout the study. Unfortunately, it has not been possible to complete the identification and assessment of Aboriginal places of national estate significance in East Gippsland within the timeframe of this study.

Aboriginal archaeological sites

At the commencement of the study there were nearly 800 records of Aboriginal archaeological places in the AAV register. A further study was undertaken by AAV to fill some of the geographic gaps in the existing survey coverage of the region. A thematic study which focussed on routes of human movement within the region was also undertaken. Unfortunately, it has not been possible to complete the identification and assessment of Aboriginal places of national estate significance in East Gippsland within the timeframe of this study.

The Geographic Information System

One feature of this assessment was the use of NRE's GIS to store and analyse the data and information available to the study.

The GIS enables data to be stored in a computer system, so that custom designed analyses and maps can be produced far more readily than through manual techniques. While the computer does not make the data more accurate it significantly increases the types of analyses possible.

The GIS enabled the study to:

- store data readily in a standard format so that it could be easily retrieved;
- update the datasets as new information became available;
- overlay various datasets and so locate the values being sought (eg. to find the places where a particular vegetation class was undisturbed and also above a certain size threshold);
- calculate the area of values and expressions;
- compare alternative methods of identifying values; and
- produce maps according to the requirements of the study.

As for the Old-growth Forest Study all GIS polygons are considered reliable to the nearest 5 hectares and the derived datasets considered reliable to the nearest 10 hectares.

Cultural National Estate Values

- Aboriginal Places
- Historic Places
- Places of Social Value
- Places of Aesthetic Value

As much of the cultural assessment is new in its application, a more detailed discussion of cultural values has been included. Assessment methods are available in the more detailed method papers (see Appendix E).

The rich and diverse forests of East Gippsland are part of human history, as well as part of nature. Knowing where humans have and have not worked in the forest has helped identify natural environment values, especially wilderness and undisturbed forest. Natural processes in the forest can also conceal its human history, swallowing traces of past human occupation in dense regrowth, or razing them with fire. The forests contain immense numbers of archaeological sites attesting to the Aboriginal occupation of the region, yet these are only found when the thick undergrowth is removed by road construction or other clearing. Historic features such as roads and wooden railway trestle bridges rapidly blended with the regrowth forest, while former settlers blocks were quickly reclaimed by the forest, and are now often marked only by massive stumps, agricultural weeds and regrowth forest.

Cultural places in the forest may not be grand or beautiful, but they are of immense value as reminders of a rich human past. These places include areas of traditional significance for Aboriginal people, sites which can inform about the prehistoric past, as well as more recent history associated with activities such as pastoralism and mining. The forest also contains dramatic and beautiful scenery which evokes awe and reverence, and is therefore valued by the community for its aesthetic quality. Results of this study confirm the prevalence of cultural places throughout the forest and their historic, scientific, social and aesthetic significance to the Australian community.

Most of the places identified are within the forest, or on adjoining cleared land which was once part of the forest, and so form part of its story. Towns closely linked to the forest, such as Bonang and Nowa Nowa, have been included in the study; larger towns such as Orbost and Mallacoota were not included, and require their own local government area surveys.

A number of types of cultural values were considered:

- Aboriginal places;
- historic places;
- places of social value; and
- places of aesthetic value.

Many of the region's cultural places of national estate significance are within existing or proposed national parks or state forests; some, such as mining remains at Bonanza Gully and Victoria Star Mine, have already been recommended by the LCC as historic reserves. Some cultural resources, especially Aboriginal archaeological sites, are both widespread and difficult to discover in the forests of East Gippsland. Ongoing forestry operations may impact on these hidden cultural resources, but NRE is developing management strategies for those cultural places which are identified and assessed as significant.

Many of the identified cultural places consist of a single structure or site, such as an isolated hut, or an artefact scatter. Conserving the integrity of these places can often be achieved by management prescription, rather than reservation. Experience has shown that reservation alone does not necessarily conserve cultural places - they also need active management supported by appropriate resources (Lennon 1993). Even for larger areas, such as aesthetic

areas, cultural landscapes and linear routes, management prescription has the capacity to provide adequate protection.

For places which are strongly valued by a community, access and continued use should be ensured so that the value can be maintained. Consultation with Aboriginal communities and Aboriginal Affairs Victoria (AAV) is essential for values relating to Aboriginal culture, archaeology or history. On-site interpretation can provide an enriched understanding of the importance of cultural places in people's memories and sense of cultural identity. This is especially important in remote areas, as community care can be crucial to the maintenance and survival of significant cultural places.

Combined state agency management of the natural environment which takes into account conservation requirements and resource use is already in place. Given the richness of the cultural resource, management of natural and cultural resources needs to be integrated at the regional level. Incorporation of cultural values into forest management is occurring through the implementation of the East Gippsland Forest Management Plan. Efforts to develop a coordinated approach involving AAV and local communities should continue.

ABORIGINAL PLACES

The identification of Aboriginal places with national estate value was one aim of the East Gippsland study. The term Aboriginal places includes archaeological sites, historic sites, and places important for their traditional or contemporary social significance to Aboriginal people. The active participation of local Aboriginal communities is seen as an integral and essential part of the identification and assessment process for Aboriginal places, especially in relation to the verification of levels of significance. Unfortunately, it has not been possible to complete the identification and assessment of Aboriginal places of national estate significance in East Gippsland within the time frame of this study. Neither the proposed method nor any results have been included in this report. However, work on these values is continuing and should be completed within the overall CRA timetable, for inclusion in an RFA.

There is already a legislative framework in Victoria which requires the protection of all Aboriginal places, irrespective of whether these have national estate values or not.

The first piece of legislation which is relevant to the conservation of Aboriginal places in the East Gippsland FMA is the *Archaeological and Aboriginal Relics Preservation Act 1972* . This act requires that all Aboriginal archaeological and historic sites are protected. The Act is administered by Aboriginal Affairs Victoria, which maintains a register of known sites within Victoria. A second act, the *Aboriginal and Torres Strait Islander Act 1984* has an amendment of 1987 which applies directly to Victoria. This act stipulates that all places of significance to Aboriginal communities, including places covered by the *Victorian Aboriginal Relics Act*, are to be protected. The only circumstance under which such places may be damaged or destroyed is with the express permission of the relevant local Aboriginal communities.

HISTORIC PLACES

Assessment methods

The cultural study drew on the history of human activities in the forest which was part of the disturbance information collected for *A study of the old-growth forests of East Gippsland*. This established key forest themes from the time of European settlement. Other data was collected from existing registers including those of NRE, the Australian Heritage Commission, the Historic Buildings Council and the National Trust. These were analysed and studies commissioned to fill gaps.

This study was innovative in that it drew on well-established methods for assessing historic places, but did so in a regional context. This approach had enormous benefits as follows:

- assessment for each value was based on comparison with the full set of like places in the region, rather than treating each place in isolation. For example, considering all known mines which use a particular technology to assess which examples have the highest relative significance;
- values based on attributes, or features, of the region's varied historic places were set to guide the collection of data relating to national estate sub-criteria;
- use of forest themes and regional storylines highlighted the importance of peoples' memories and associations with places, and the threads and stories that often link a place with many other places;
- the study was able to draw on rich community knowledge of the region's historic features and landscapes - and share this knowledge.

The study covered the full range of historic places found in forests, ranging from a building or structure, or groupings of these; linear places and networks, such as tracks, roads or railways; to large areas or cultural landscapes, where the forest has been altered by human activities such as mining, leaving remains of buildings, shafts and earthworks, and machinery.

Over 240 new historic places were identified and documented at the community heritage workshops and in follow-up field survey work in the study area.

This data was then sorted and assessed against the AHC sub-criteria. Thresholds for national estate listing were set according to the nature of the value.

Summary of Results

Over 80 historic places in the study area were identified as above threshold, reflecting the richness and complexity of the region's history. Some forest areas are particularly rich, reflecting layers of history, or strong regional stories, and so are important cultural landscapes. For example:

- Buchan Valley gold and silver mines, a rich mining landscape which includes the productive Mount Tara silver and gold mines, Monarch Mine and the Basin Road silver and lead smelter site as well as a variety of historic remains from the extensive mining activity of the 1890s;
- Black-Allen Line border cairns, a series of rock piles and stone cairns of exceptional interest and rarity as remaining evidence of the Geodetic Survey of the border by Black and Allen in the 1870s, undertaken to complete geographical separation from New South Wales. Associated sites are the former Customs House and state border crossing at Willis;
- Mallacoota Inlet cultural landscape. This is an extraordinarily rich area which reflects early pastoral, agricultural and mining history, the importance of the waterways in trading and transport, the attraction of the inlet for tourists from the 1880s, and the inspiration it provided for notable Australian artists and writers. Included amongst these was Henry Lawson, who was associated with literary patron E.J. Brady, the inlet's most famous resident;
- former selections in the Yalmy District, including those taken up in the 1900s by the Hicks family, when land speculation in the area was triggered by the prospect of the establishment of the new federal capital at Bombala, one of several sites being considered at that time. The remote Yalmy/Rodger River area is off the Bonang Road, which would have provided the link to Melbourne. The farms have reverted to forest and are now within the Snowy River National Park.

The region contains significant early engineering works and features. This includes MacKillop Bridge, a steel truss bridge erected across the mighty Snowy River in the 1930s which was innovative by world standards. Sites associated with isolated settlements, such as old Noorinbee School and the Nowa Nowa township buildings, reflect the improvising skills and bushcraft of local communities.

Little known aspects of forest history are reflected in the World War Two Italian Prisoner of War Camp at the junction of the Bete Bolong and Buchan roads, and at the Glen Arte Timber Workers' Huts, which are basic workers' accommodation erected during the 1950s. Camps

associated with depression-era unemployment relief activities housed workers involved in road construction, sleeper-cutting, wattle-barking, ringbarking and forest thinning. Significant remains of such camps can be found at Snuff Gully and at the Colquhuon railway siding.

The importance of the region in scientific research is reflected in the Cabbage Tree Palms Reserve, associated with the noted government botanist of the nineteenth century, Baron Ferdinand von Mueller. Recent history of nature conservation is reflected in the declaration in 1926 of Alfred and Lind National Parks, which remain highly popular with visitors. Lind National Park was named after Sir Alfred Lind, who represented the people of East Gippsland in the Victorian Legislative Assembly from 1920 to 1961, during which time he promoted the protection of natural places in parks.

Many significant historic buildings or structures are made from the region's abundant forest timbers - for example, Wilson's Hut, which is a rare surviving slab hut — and so are very prone to both bushfire and natural decay, and require protection and regular maintenance. Some sites are complex, and consist of related elements which are not instantly recognisable — for example, mullock heaps as part of a former mine — so that only some parts are conserved. Mining and sawmilling sites often contain machinery and portable items which are at risk of being removed or displaced.

The study involved analysis of some historic values which had not previously been formally assessed. This includes the wide range of historic tracks and routes documented as part of the study. Prominent amongst these is the Ingeegoodbee Track, an important Aboriginal pathway which later became the major stock route from the Monaro to East Gippsland and which continued to be used into the 1960s. These tracks and routes, many of them identified for the first time, have been crucial to human settlement in the region, as the heavily dissected terrain and impassable forests provided the greatest single barrier to settlement of East Gippsland. Important routes were often re-used many times and so reflect the region's many layers of human history. The study also provided the opportunity to re-assess some sites in the light of improved databases and a regional perspective. This applied particularly to historic mining sites which are scattered across the region. Many historic places have important associated values which are not self-evident and require public interpretation for a full appreciation of the region's complex history.

PLACES OF SOCIAL VALUE

Social heritage value is regarded by heritage experts as being difficult to assess, and to date, the parallel study in the Central Highlands has been the only regional scale study where this has been attempted. By their very nature, places of social heritage value have high community use and visibility, and are often at the centre of community conflict over planning issues. The assessment of social heritage value is an innovative aspect of this study.

The assessment of social heritage value within this study draws on a discussion paper published by the AHC (Johnston 1992), and preliminary methods for assessing social heritage value developed by the AHC and others (Blair & Truscott 1988; Jonas 1991; Scott & Walker 1992). To identify social heritage value, the following factors, based on the national estate criteria and the nature of the region, were developed. The place is:

- important to a community as a landmark or has special meaning;
- important as a reference point in a community's identity or sense of place;
- a natural or cultural place to which a community or cultural group has a strong or special attachment, including places which have a history of continued use as places of social interaction; and
- associated with a recent event or events which have had a profound effect on a community or cultural group.

Assessment methods

AHC and NRE staff developed and implemented a series of heritage workshops in order to seek data relating to this important but neglected value directly from community groups within the study area.

The aim of the heritage workshops was to draw on the wealth of knowledge about heritage places held by local communities and groups. Workshop locations were selected to tap the major population catchments so that participation could be as high as possible. Representatives of all known local and regional community groups were invited through local co-ordinators.

At the heritage workshop, places of importance to the community were identified, described and located on 1:100,000 topographic maps. Participants nominated other possible contacts and a network was established back into the communities for follow-up research. The heritage workshops proved to be a major source of information on a wide range of cultural and natural values, and the key source of information on social value. A small number of additional places were identified from historical theme studies commissioned for the study.

Documentation gathered at the heritage workshops was then used by AHC staff to undertake assessment against national estate sub-criteria for each place.

Key parts of the assessment process were to:

- describe the nature of significance and assign specific values to the place on the basis of its heritage values;
- measure the degree of significance based on the strength of community feeling about how special the place is; and
- measure the nature and extent of the community which is attached to the place, eg. is it local or regional

As methods for assessing social heritage value were still largely untested, an expert workshop was held in Melbourne in October 1993 to scrutinise the method and outcomes from the study. Experts drawn from a range of disciplines, including anthropology, social history, planning and landscape architecture, endorsed the approach taken as reflecting best current practice (Blair 1994).

Summary of Results

Social heritage value was identified in more than 60 places in the study area. Nineteen of these places were above threshold, and many of these had other cultural or natural values.

About a quarter of these places are widely-known recreational areas, such as the Lind and Alfred National Parks, the Buchan Caves Reserve, and forest touring routes, such as the Snowy River Road and the former coach road to Lake Tyers House. Many people feel a special attachment to these places which they have visited, often since childhood. Other places are fundamental to community identity, such as the old Noorinbee School, or the Bonang Hall and General Store, and are intensely valued as the focus of local community life in an isolated region. Places may also serve as important symbols of the region and its history, such as Lake Tyers House and the Blacksmith's Tree. The region contains many such places, known to a local or regional community, and often greatly valued by them.

Many of the places which came below the threshold for national estate listing may be useful for local heritage conservation planning. All information collected has been provided to the local council, as well as participants in the heritage workshops.

Forest planning for recreational use covers some aspects of social heritage value by providing for public access. On-going access to traditional places is crucial to the maintenance of some types of social heritage value. In these cases, processes for consultation with relevant

communities are essential before decisions are made which may damage places or restrict access to them.

PLACES OF AESTHETIC VALUE

The identification and assessment of places with aesthetic value was directed by the national estate criterion E which recognises places that exhibit particular aesthetic qualities that are valued by a community or cultural group as having heritage significance.

In October 1993, the Commission conducted a technical workshop at the University of Melbourne involving recognised national experts in broad-scale landscape assessment. Professionals, academics and theorists were called upon to critically review the method and thresholds which were used to assess aesthetic value in East Gippsland and the Central Highlands. As part of this process, the working group also developed a definition of aesthetic value which aimed to be more comprehensive than other definitions used in the past (see discussions in Ramsay & Paraskevopoulos 1994).

Aesthetic value is the response derived from the experience of the environment or particular natural and cultural attributes within it. This response can be either to visual or non-visual elements and can embrace emotional response, sense of place, sound, smell and any other factors having a strong impact on human thoughts, feelings and attitudes.

This definition was used in this study and will be further reviewed in future studies of the AHC's method for assessing places under this criterion.

Assessment methods

Factors in identifying aesthetic value were established and used to direct data gathering and identification of places with national estate significance.

As there were no established data sources identifying places with aesthetic value in the region, information was sought from the following:

- community heritage workshops;
- art and literature;
- recreational and tourist information;
- professional reports and other studies;
- forest planners and field staff; and
- the former Forest Commission of Victoria's Visual Management System (VMS).

Thresholds were developed for measuring the degree of significance for aesthetic value. These were:

- the aesthetic attributes are comparatively stronger than other like places;
- the aesthetic attributes of a place are identified from a range of popular sources;
- the aesthetic attributes are identified by a popular source and corroborated by an expert source;
- the aesthetic attributes have been evaluated by proven expert technique;
- the type of place with the value is rare in the region;
- the place or feature with the value is uncommon within the landscape character type; and
- the place or feature has been substantiated as being a feature of clear form, prominent in the local area, or having symbolic importance.

As the final assessment can involve the cross-comparison of places within areas having similar landscape characteristics, landscape character types were developed based predominantly on the zoning developed for the VMS which is derived from landform and vegetation cover. All landscape areas were classified according to these landscape character types (eg. foothills, southern lowlands, eastern highlands etc), with a view to facilitating better comparative

assessments of like places across the region. Analysis of this kind can also be useful in determining whether the particular landscape type, e.g. an upland valley, was unrepresented under this assessment.

Summary of Results

Approximately 100 places were identified as having aesthetic value in the study area, and 60 of these were assessed as being above threshold. The types of places that were identified include: forest landscapes, including scenic reserves such as Mt Delegate and The Gap; coastal landscapes, including inlets, lakes, beaches, sand dunes and wetlands (for example, Wingan Inlet and the Cape Howe area); scenic routes, such as the Buchan to Orbost Road and the Tulloch Ard Road; lookouts, such as Genoa Peak and Mount Coopracambra; waterfalls, such as St Patricks and Little Cabbage Tree; rivers, creeks and river gorges, including the Mueller River and Snowy River Gorge; mountains, such as the Dawson Range and Mt Bemm; unusual natural features, such as geological formations (for example The Pyramids); cultural features, such as the Point Hicks lighthouse and Mackillop Bridge; and caves, such as those at Buchan. Although scenic quality was certainly a major feature of many of these places, a number of sites were identified as significant for other aesthetic qualities as well (Ramsay & Paraskevopoulos 1994).

Natural National Estate Values

This chapter presents and discusses the natural national estate values identified in East Gippsland. Each value is described and the process used to identify the value defined. Thirty two types of natural values were identified and assessed, ranging from relatively extensive values which occur over several thousand hectares, to site specific values covering as little as a few square metres.

NATURAL ENVIRONMENT VALUES

The natural values have been grouped according to the extensiveness of the value and the type of dataset used to identify the value. The groupings are:

- extensive natural values;
- flora values;
- fauna values; and
- other natural values.

Areas given in the text in hectares refer to the total area over which the value has been identified across the region.

EXTENSIVE NATURAL VALUES

The values addressed in this section are:

- natural landscapes (sub-criterion B1);
- wilderness values (sub-criterion B1);
- old-growth forests (sub-criterion A2); and
- undisturbed catchments (sub-criterion A2).

These values occur extensively across the region. The values also occur in large individual units, the largest of these being in the Snowy River area, where 138,000 ha have been identified as a single natural landscape area.

Natural landscapes (sub-criterion B1)

'Natural landscapes' are large areas in which natural ecological processes and natural systems are thought to be operating, and which are rare at a national level.

What is 'natural' ?

For the purpose of this joint assessment 'natural' landscapes were defined as those areas for which CNR's *A study of the old-growth forests of East Gippsland* (OGFS) disturbance data showed no record of disturbance, negligible natural disturbance, or negligible unnatural disturbance excluding intensively grazed areas (see Woodgate *et al.* 1994). Forests with canopy affected by wildfire, and thus listed in the OGFS as extensively disturbed, were also included here under this definition. Wildfire is viewed (particularly in East Gippsland) as a

natural process. This concurs in general with other notions of what constitutes 'natural' vegetation (eg. Laut *et al.* 1978; Margules & Usher 1981; Purdie 1986; Usher 1986).

Identifying Natural Landscapes

Large aggregations of natural vegetation with topographic and sub-catchment integrity were delineated across the study area. It was decided not to identify examples of natural vegetation on an Ecological Vegetation Class (EVC) basis, as this would artificially fragment mosaics of flora communities across the study area.

Sub-catchment and topographic integrity were determined from an examination of disturbance information, noting the position of each disturbance within the landscape and its likely impact on the natural area identified. Natural landscape areas were ranked according to size and context.

Fifteen natural landscapes were identified, covering 361,313 ha These ranged in size from 2000 ha at Timbarra River (on the western boundary of the study area) to 138,000ha for the Snowy River area.

Wilderness values (sub-criterion B1)

Wilderness was considered in the context of sub-criterion B1, as a rare phenomenon in the Australian environment. East Gippsland contains some of the largest undisturbed contiguous tracts of temperate forest in Australia. It is also known to support areas with wilderness characteristics of considerable significance (LCC 1990c, 1991b&c).

The AHC has developed the National Wilderness Inventory (NWI) which enables a consistent approach to wilderness identification at a national level. To enable an evaluation of wilderness as part of the joint assessment in East Gippsland a method was developed for delineating areas with significant wilderness quality. Wilderness indices were used to set the first threshold for identifying areas. These thresholds conform to a large measure with those used for the delineation of wilderness in the LCC Wilderness Study, (AHC&NRE 1996), (LCC 1991b&c).

The task was to apply the NWI, based on the Lesslie method (Lesslie *et al.* 1987). Wilderness quality is measured in terms of four variables (the Lesslie indicators of wilderness quality):

- remoteness from access;
- remoteness from settlement;
- apparent naturalness (viz aesthetic naturalness);
- biophysical naturalness.

The combination of numeric values for each of the indicators produces a wilderness quality index for each grid cell of 25 ha covering the region.

Places with wilderness quality index above threshold were then selected by considering size and shape as indicators of ecological integrity. Other factors considered in delineating the final areas were topography and vegetation cover, both being features which can determine the level of accessibility, and therefore resilience to unnatural disturbance.

Nine areas with wilderness quality values were identified across the study area, covering 177,494 ha.

Old-growth forests (sub-criterion A2)

It is recognised that old-growth forests are rare at a national level, but they cover extensive areas in East Gippsland. CNR's *A Study of the Old-Growth Forests of East Gippsland* (Woodgate *et al.* 1994) has identified old-growth forest throughout the study area, totalling 224,000 ha.

Patches of old-growth forest identified in this survey were assessed together under sub-criterion A2. Old-growth in specific EVCs was addressed under sub-criterion B1.

Patches of old-growth forest found in East Gippsland vary in size up to 10,000 ha. The minimum reliably mapped unit is 10 ha. Those mapped areas less than 10 ha were not considered further in the analysis.

Integrity within the landscape was considered a key factor in determining the importance of any individual old-growth forest stand. Old-growth stands were assigned significance on the principle of a natural context, based on sub-catchment and topographic integrity. Basing threshold decisions on these natural vegetation units also ensures that the data on old-growth forest is used well within its accuracy limits.

Many hundreds of patches of old-growth forest above this threshold were identified across the study area, covering a total of 175,461 ha.

Undisturbed catchments (sub-criterion A2)

With funding from the National Estate Grants Program (NEGP), MacMillan (1990) undertook a survey of catchments and sub-catchments within the EGFMA to identify those in natural condition. That survey formed the basis for the *Rivers and Streams Investigation* (LCC 1989, 1990b, 1991a) and the *Environmental Handbook* (Department of Water Resources 1989). MacMillan's work also formed the basis of this analysis.

Detailed disturbance information available from *A study of the old-growth forests of East Gippsland* enabled an update of these studies to delineate those catchments and sub-catchments in East Gippsland which are currently undisturbed.

Forty-three sub-catchments were identified as undisturbed across the study area.

ASSESSMENT OF FLORA VALUES IN EAST GIPPSLAND

Flora values addressed in this section are grouped as follows:

Values related to or derived from Ecological Vegetation Classes (EVCs):

- flora refuges (including relictual flora) (sub-criterion A1);

- places important for succession (sub-criterion A2);

- remnant vegetation (sub-criterion A2);

- flora species richness (sub-criterion A3);

- nationally rare/uncommon vegetation (sub-criterion B1);

- old-growth forest/EVC (sub-criterion B1);

- places demonstrating principal characteristics of vegetation classes (sub-criterion D1).

Species related values:

- endemic flora species (sub-criterion A1);

- disjunct flora species (sub-criterion Al);

- limit of range flora species (sub-criterion A1).

Values related to Ecological Vegetation Classes

Ecological Vegetation Class (EVC) mapping was used as the basis for identifying a range of flora values where site information on specific plant species was inadequate. In some instances, certain species are fundamental to the definition of a vegetation class (eg dominant canopy species), thus the occurrence of this EVC relates directly to the occurrence of these species. Site information, where available, was always used in conjunction with EVC mapping.

EVCs have been mapped consistently across the study area and vary greatly in their extent, ranging from 11 ha of Dry Rainforest through to 245,000 ha of Lowland Forest. The mapping of linear EVCs, which include rainforest and riparian communities, tends to overestimate their true extent, sometimes by as much as an order of magnitude. Area statements (ie statements of the areal extent) for these communities should thus be viewed as indicative only.

Flora refuges (sub-criterion A1)

Identification of flora refuge areas was a three stage process that incorporated the following:

a. Relictual (primitive and Gondwanic) flora

Those vegetation classes in East Gippsland either dominated by or containing large proportions of species which are phylogenetically primitive or Gondwanic in origin are listed in Table 5 . These were considered refuge dependent EVC's and determined to be above threshold where they were recorded in refuge areas (see b and c below).

b. Refuge areas associated with vegetation from the last Ice Age

Ice age refuges are undisturbed areas of refuge dependant EVC's that occupy a climatic or topographic location that retains elements of the climatic regime which was operative during the last Ice Age (40,000-10,000 years BP). The refuge areas identified maintain the climatic and disturbance regimes necessary for the continued survival and evolution of these EVC's during the current inter-glacial period (see Table 5).

c. Refuges from frequent fire

refuges from frequent fire are strongly associated with climatic and topographic refuges that have fire regime of reduced fire frequency or intensity compared with the majority of areas in East Gippsland such as the lowland plains, coasts and foothills (see Table 5).

Refuge-dependent EVCs are subject to a range of disturbances, with varying effects on their function as refuges and thus their ability to provide insight into the evolution of Australia's flora. As a consequence disturbance has been used in the application of threshold identifying restricted areas particularly of Wet Forest, Tableland Damp Forest and Treeless Sub-Alpine Complex.

Flora refuge areas identified across the project area ranged from small patches of rainforest through to substantial tracts of montane and alpine areas. The total area of flora refuges identified in the project area was 153,854 ha.

Places important for succession (sub-criterion A2)

Places important for succession include those EVCs which have dynamic examples of succession occurring within them (eg coastal dune complexes), those areas which have been affected by fire halting primary succession processes and EVCs recovering from major wildfires (see Table 5).

To ensure that successional processes occur unhindered, only those areas unaffected by disturbance were considered above threshold.

Extensive areas were identified under this sub-criterion, due to the extent of these EVCs within the study area and the widespread incidence of wildfires. The total area important for succession in study area was 186,838 ha.

Table 5 **:** Ecological Vegetation Classes and Derived Flora Values Remnant vegetation (sub-criterion A2)

This sub-criterion focuses on the current condition and extent of flora across the study area, delineating depleted EVCs and remnant vegetation. Remnants form important present-day refuges and are recruitment areas for both flora and fauna. The analysis began with a broad overview of the status of flora habitats within each geographic unit, in conjunction with an examination of vegetation classes depleted by clearing for agriculture (Table 5).

A threshold was set according to the level of depletion for each EVC and the occurrence of examples in natural or near-natural condition of integrity within the landscape. Many of the areas identified, because of their small size, isolation in the landscape, and poor context in relation to disturbance, fell below threshold in this analysis. The total area of remnant vegetation identified on public land in the study area was 46,158 ha.

Places exhibiting unusual flora species richness (sub-criterion A3)

The East Gippsland region is noted for the diversity of its flora and fauna. Covering only around 4 percent of Victoria, over 30 percent of the vascular plant species of the state are found in the study area (Lugg *et al.* 1993) with habitats ranging from estuarine to sub-alpine.

Places which exhibit an unusually high species richness were delineated by overlaying a 2 km grid (rastering) on the mapped vegetation layer (EVCs) in the GIS, determining the character species for each EVC found in each grid, removing the species listed more than once and producing a character species aggregate for each grid.

A frequency table for the number of species occurring in each grid was produced. Numbers of character species found in each cell ranged from 15 to 283. The top
five percent of these were considered above threshold as places of high species richness.

The total area identified as exhibiting unusual flora species richness in the study area was 53,699 ha.

Nationally rare and uncommon EVCs (sub-criterion B1)

Several of the EVCs that occur in East Gippsland are widely recognised as being uncommon, and others such as the alpine communities are rare nationally in Australia. It is difficult to quantify the total distribution of these communities on a national scale and thus to determine the relative importance of their occurrence in East Gippsland. There are few national overviews of Australian flora (Specht *et al.* 1974, Beadle 1981) to support such an analysis and only limited quantitative data at a coarse scale (Carnihan & Bullen 1990).

The difficulties of obtaining quantitative data in the time available meant limiting the analysis to those vegetation classes entirely or largely restricted to Victoria, with exceptions in some instances where there was reliable and unequivocal information available (see Table 5).

The total area of these EVCs identified on public lands in the study area was 80,752 ha.

Old-growth forests (sub-criterion B1)

The focus of this analysis is to highlight those expressions of old-growth forest in East Gippsland that are found in EVCs which are rare/uncommon nationally. The analysis also highlights those which are rare/uncommon within the FMA and where the levels of disturbance in common EVCs are such that all remaining old-growth areas are potentially of national estate significance.

Most examples of the above fell within old-growth forests identified under sub-criterion A2. Only a few additional stands outside these areas were identified with sufficient topographic/sub-catchment integrity to be above threshold. The total area of old-growth forest identified in the study area was 175,461 ha.

Places demonstrating principal characteristics of vegetation class (sub-criterion D1)

The delineation of flora which is characteristic of its class consisted of:

an examination of EVCs across the study area;

a focus on examples of EVCs in a natural condition and with a high degree of integrity indicative of future ecological viability;

the identification of at least one sample of each EVC within each geographic unit, unless condition and integrity was deemed inappropriate, to ensure replication;

cross-referencing with expert opinion regarding known biophysical variation.

Limited clearing in East Gippsland enabled an examination of EVC map unit sizes as they occurred naturally in the landscape. The assessment was based on this distribution, ie those rare, uncommon, restricted or common within the study area. Each group was dealt with separately.

For each group of EVCs the analysis focussed on identifying those examples with the best condition and integrity. Current condition, EVC map unit size and natural context were the main indicators of integrity in the analysis. Map unit size thresholds were then trialed on the GIS to determine those that enabled the sampling of EVCs in each geographic unit across the study area. A map was then produced for each group of EVCs displaying their total distribution and highlighting those map units above the size thresholds.

Each EVC occurring in the identified natural landscapes was examined to determine the level of representation of EVCs with good condition and integrity.

For areas outside of the natural landscape areas, integrity was also determined by topographic or sub-catchment integrity. This was the case where the map unit size thresholds did not apply (eg rare/uncommon and restricted EVCs), or did not highlight EVC map units in some geographic units. It also applied where there were known inaccuracies in the GIS plots.

In a few instances some EVC map units with moderate disturbance were included if they were the only examples within that geographic unit. Additionally those EVCs that had been subject to agricultural clearing were dealt with as a separate group on a case by case basis.

FLORA SPECIES VALUES

The values addressed in this section are:

- endemic flora species (sub-criterion A1);
- disjunct flora species (sub-criterion A1); and
- limit of range flora species (sub-criterion A1).

These values are all site or localised values, that is they relate to individual site records and/or the modelling of species habitats.

Assessment of the 42 Australian rare or threatened flora species (AROTS) or 230 Victorian rare or threatened species (VROTS) was not undertaken as part of the joint assessment, but are considered in the *Environment and Heritage Report* (The Commonwealth & Victoria 1996). Additionally the Code of Forest Practices for Timber Production currently protects these species in state forests in Victoria. The need for further studies into the status, distribution and ecology of these species is addressed in Chapter 6.

Endemic flora (sub-criterion A1)

Endemic flora have been defined as those taxa:

- whose natural distribution is wholly confined to East Gippsland; or
- whose natural Victorian distribution is mainly confined to East Gippsland.

Endemic plants provide an important insight into the process of evolution of Australia's flora. In the case of East Gippsland, they represent its contribution to the biodiversity of this ancient continent, which is recognised internationally as a centre for 'mega-diversity'.

In some of the cases where concentrations of endemic taxa occur, the role of climate refuges for speciation during periods of climate change is apparent. In others, endemism is high without any apparent link to refugia. Here, biogeographic determinants such as terrestrial and oceanic climatic influences, lithology and localised topographic variation appear to be the major controlling factors.

In the study area endemic species are: restricted in their distribution; usually rare in the landscape; generally sampled coincidently rather than by specific survey; and of those identified, 30 percent have only recently had their taxonomic status determined. Given the data limitations, a method has been developed which uses records from the Flora Information System (FIS) in conjunction with expert opinion. A similar modelling approach has been used for other analyses of sub-criterion A1.

Eighty four species exhibit some degree of endemism in the study area. Only 54 species, either AROTS/VROTS, or Victorian endemics restricted to or centred on the study area, were considered above threshold for endemic taxa. It was impossible in the time available to determine the importance of any one site over another so the analysis did not take account of disturbance.

The total area identified in the study area for endemic flora species was 189,240 ha.

Biogeographic range of flora (major disjunctions or edge of range) (sub-criterion A1)

Disjunct populations are those which have become physically separated over time (thus preventing gene flow between populations) due either to a break in a formerly continuous distribution, or to long distance dispersal over a barrier. In East Gippsland 114 taxa are listed as being at the edge of their biogeographic range for Victoria, and in some cases Australia, and 86 taxa have major disjunctions.

East Gippsland, being the south-east edge of the continent, holds many species at the edge of their range. Species which highlight the biogeographic importance of East Gippsland and convey most about past processes in the evolution of Australia's flora are those listed as AROTS\VROTS that are disjunct within the state or nationally, or those taxa disjunct or at the edge of their range nationally. Taxa which met this threshold were assigned a habitat or EVC in the area that showed major aggregations. This analysis did not consider disturbance, focusing instead on the actual distribution of these taxa.

The total area identified for biogeographic range of flora in the study area was 111,820 ha, predominantly in the coastal lowlands.

FAUNA VALUES

The values addressed in this section are:

- endemic fauna species (sub-criterion Al);
- disjunct fauna species (sub-criterion A1);
- fauna species at the limits of their range (sub-criterion A1);
- relict fauna (sub-criterion A1);
- migratory bird habitat (sub-criterion A2);
- important fauna breeding areas (A2);
- fauna refuge areas (sub-criterion A2);
- fauna species richness (sub-criterion A3); and
- rare or threatened fauna species (sub-criterion Bl).

Endemic fauna species (sub-criterion A1)

Endemic fauna are those species whose distribution is confined entirely to the study area.

Places important for the four endemic species (Long-footed Potoroo and three freshwater crayfish) were assessed. The Potoroo was considered to be an endemic for this study, although it is not strictly confined to the East Gippsland Forest Management Area (EGFMA). A smaller population occurs just over the border in NSW. However, the two populations occur in the same biophysical region, and therefore the artefact of the border was disregarded.

Recently there have been additional records of Potoroos, however, the status of the species has not yet been altered to consider these sightings and this is unlikely until further information is available.

The total area identified for endemic fauna in the study area was 13,270 ha. There were 22 sites identified for endemic fauna, 17 for the Potoroo and five for the three species of crayfish.

Disjunct fauna species (sub-criterion A1)

Disjunct species were defined as those with populations separated by a substantial geographic distance from other populations such that they are unlikely to interbreed. They are evidence of past distributions and therefore demonstrate past processes, as required by sub-criterion A1. Vagrants were excluded from this category.

The total area identified for the 22 disjunct fauna species in the study area was 38,490 ha.

Fauna species at the limit of their range (sub-criterion A1)

Species at the limit of their range were defined as those whose accepted regular distribution ends in the study area. They provide evidence of former extent and therefore demonstrate past processes. Forty species were so defined.

As the edge of a species' distribution is rarely sharply defined, all records of some species in the study area were included. Habitat areas were not delineated for disjunct and limit of range species that are not rare and threatened. Data was only available in 1' grid format, and time limitations did not allow the delineation of habitat areas.

The total area identified for the 50 fauna species at their edge of range in the study area was 35,970 ha.

Relict / primitive (Gondwanic) fauna (sub-criterion A1)

Much of the fauna of East Gippsland is of Gondwanic origin, that is marsupials, monotremes, many reptiles, leptodactylid frogs, several families of birds, many families of invertebrates. There are, however, some places with published accounts of assemblages of relict fauna in sharply defined relict environments, ie the marine invertebrate assemblage in Lake Barracoota (Bayly & Lennon 1983).

Lake Barracoota contains fresh water, but harbours a relict marine fauna, reflecting former connection with the sea. It contains four animal species with marine or estuarine affinities: a polychaete worm (*Boccardia limnicola*); an anthurid isopod crustacean (*Cyathura* sp.); a sphaeromid isopod crustacean (belonging to a new genus); and a planktonic copepod crustacean (*Gladioferens spinosus*). Lake Barracoota was probably once an arm of Mallacoota Inlet, but became isolated by a drop in sea level. The existence of relict marine fauna in closed freshwater lakes has been documented in other parts of the world but is not a common phenomenon. This lake is of high significance.

Several EVCs (see Woodgate *et al.* 1994) were defined under this sub-criterion as part of the flora analysis (eg Alpine Bogs, Rainshadow Woodland, Cool Temperate Rainforest) and they will support a faunal assemblage which is at least partly relictual, especially invertebrates, and thus of high significance.

The total area identified for relictual fauna in the study area was 250 ha.

Key fauna habitats (sub-criterion A2)

(a) Wetland Fauna habitat

Important seasonal roosting and feeding sites were located for the 41 migratory bird species listed under international agreements to which Australia is a signatory ie China-Australia Migratory Bird Agreement (CAMBA) and Japan-Australia Migratory Bird Agreement (JAMBA) as well as wetlands important for other waterfowl species. These sites provide habitat for migratory bird species to over-winter in the Southern Hemisphere; to rest and build sufficient condition for their return flight to breed in the Northern Hemisphere. They are located predominantly in wetland and intertidal areas, and include spawning areas for fish species such as the Australian grayling. Total area identified was 3,760 ha.

(b) Location of important wildlife breeding sites

Much of the fauna of East Gippsland breeds within the study area. This includes breeding colonies of waterbirds and seals on the coastal islands and estuaries, roosting camps of flying foxes near Mallacoota, and roosting and maternity sites of bats mainly in the limestone areas around Buchan and Murrindal. The total area identified as being important for wildlife breeding in the study area totals 3,010 ha.

Fauna refuge areas (sub-criterion A2)

These areas provide refuges for fauna during periods of environmental or climatic stress, and are likely to provide refuges for individuals or populations during wildfire or severe drought. These included:

Riparian Scrub Complex, Riparian Forest, Riparian Shrubland, Montane Riparian Woodland and Montane Riparian Thicket (EVCs 17, 18 19, 40 & 41);

Old Growth Wet Forest and Montane Wet Forest (EVCs 30, 39); and

Cool Temperate Rainforest, Warm Temperate Rainforest and Cool/Warm Temperate Overlap (EVCs 31, 32, 33).

Fauna refuges cover 81,390 ha and are widely dispersed across the study area.

Fauna species richness (sub-criterion A3)

Fauna species richness was determined by applying a similar method to that used for flora species richness. Characteristic species lists were developed for each EVC and the number of species calculated for each 2 km grid cell. The highest 5 per cent of grid cells across the entire FMA and in each geographic unit were considered to be above threshold. Rich areas corresponded to places with a high diversity of EVCs, especially where adjacent EVCs supported distinctive faunal assemblages. These areas were often around the lower slopes of streams and where there is a sharp environmental gradient.

The analysis was also undertaken at a sub-regional level (geographic sub-unit) to help remove any bias towards coastal areas from the FMA analysis.

The total area identified as supporting high numbers of fauna species across the FMA was 72,850 ha and 19,503 ha across geographic sub-units.

Rare and threatened fauna species (sub-criterion B1)

Threatened fauna are listed on the Australian and Victorian registers of rare and threatened species. Threatened species were identified and records of sightings plotted. Based on the habitat requirements of each species an area was identified which would provide short to medium term requirements for each population.

One hundred and seventy-seven areas comprising habitats for rare and threatened species were identified in the study area covering a total of 148,620 ha.

OTHER NATURAL VALUES

The values addressed in this section are:

- wetlands;
- climatic and environmental history sites;
- geological values (several sub-criteria); and
- geomorphological values (several sub-criteria).

Wetlands

A comprehensive inventory of wetlands greater than 1 hectare in area has been prepared by NRE, as part of the Wetlands Conservation Program for Victoria. Each wetland was classified into category and sub-category types based on salinity, depth, permanence of water and vegetation. This database was analysed to identify the numbers of occurrences of each wetland category and subcategory, and the total area (ha) of each. In East Gippsland there were 160 wetlands spread over six categories, with each category having up to nine sub-categories. Information from the inventory formed the core dataset for the assessment of wetlands against sub-criteria B1 and D1.

Other attributes of wetlands were assessed under different sub-criteria, e.g. A1 (climatic and environmental history); A2 (vegetation succession, fauna habitat, geomorphological processes); and C1 (research and teaching sites). The method papers discuss the assessment of these characteristics Appendix E).

Rare or uncommon wetlands (sub-criterion B1)

Wetlands are considered uncommon or rare in terms of frequency of occurrence, total current area, or total area at present compared to their pre-European extent.

Assessment of rare or uncommon wetlands was undertaken at the regional and state scale, at the level of sub-category and category respectively. Those sub-categories with a small number of occurrences (ie less than four) or forming a small area in the region (ie less than 240 ha) were classified as rare or uncommon. A number of sub-categories qualified as being rare or uncommon at the regional scale in terms of frequency of occurrence, as well as area. Those parts of wetlands which contained these sub-categories were then assessed as being above the threshold for national estate significance.

No wetlands qualified as rare or uncommon at the state scale under the rules used in terms of total area, but one category did qualify as rare or uncommon in terms of frequency of occurrence.

A further category of wetlands was considered - those which are rare or uncommon at present, compared to their occurrence before European settlement. NRE have mapped the distribution of wetlands prior to settlement, and calculated their area and numbers. No categories qualified as rare or uncommon under this analysis.

Twelve rare or uncommon wetland sub-category classes were identified in the study area covering a total area of 460 ha.

Wetlands characteristic of their class (sub-criterion D1)

By definition, all wetlands which belong to a particular class demonstrate the principal characteristics of their class. This assessment aimed to differentiate those wetlands which were important in demonstrating the principal characteristics of their class. It was considered that wetlands would be more important for demonstrating the principal characteristics of their class if they were relatively undisturbed.

The relative level of disturbance of each wetland was analysed, taking into consideration the level of disturbance in the surrounding catchment, and the level of disturbance in the immediate surrounds of the wetland. The particular expressions of sub-categories within each wetland considered to be relatively undisturbed were recorded as being above threshold.

Thirty four wetlands demonstrating the principal characteristics of their class were identified in the study area covering a total area of 700 ha.

Climatic and environmental history sites

Places which provide evidence of the evolution of Australian fauna, flora, landscapes and climate in the form of places where climatic and environmental history can be reconstructed, were assessed under this sub-criterion.

Dr Peter Kershaw (Monash University, Department of Geography and Environmental Science), provided information regarding the locations and values of several palaeo-environmental research sites in East Gippsland. These are places where palynological and sedimentary studies have been conducted to reconstruct the history of vegetation, landscape, or climatic change in the surrounding region. Mr Neville Rosengren (LaTrobe University College of Northern Victoria, Department of Geology) provided further information on locations and values of fossil research sites and sites important for the study of landform processes. Assessment of levels of significance was based upon the expert judgements of Dr Kershaw and Mr Rosengren.

Five research sites were identified in the study area.

Geological and geomorphological values (a range of sub-criteria)

Neither NRE nor the AHC held comprehensive databases on sites of geological or geomorphological heritage. A consultant in the field was contracted to undertake an assessment of known sites within the region. The studies were largely literature based, although the consultants who were selected had experience in the region and consulted with other local experts.

Geological and geomorphological values assessed included: sub-criteria A1 -landscape evolution; A2 - existing landscape processes; A3 - places with unusually high landscape diversity; B1 - rare or uncommon landscapes and D1 - principal characteristics of class.

The East Gippsland region has significance as part of a principal geological unit, the Lachlan Geosyncline, which is the main Palaeozoic structure of south-eastern Australia. The region contains diverse geological and geomorphological features. Some relate to those in south-eastern NSW, for example the escarpment defining the edge of the Errinundra Plateau is an extension of the Great Escarpment of eastern Australia. Others are specific to a smaller region, e.g. the limestone caves of the Buchan area.

Fifty-six sites of geological/geomorphological value were identified.

More detail, and discussion of the assessment of these features, can be found in the methods paper on natural values (see Appendix E).

NATURAL HISTORY VALUES (SUB-CRITERION C1)

Five different types of places were identified:

- research sites;
- teaching sites;
- type localities of species type specimens;
- type sections for geological formations; and
- reference or benchmark sites.

Research sites

Research sites are places where research was taking or had taken place and where the overall aim of that research was to increase understanding about an aspect or aspects of Australian natural history. That research was required to have been documented and published. Information regarding research sites was identified from three sources: NRE datasets, consultants' reports, and individual scientists.

Twenty four research sites were identified in the study area.

Teaching sites

Teaching sites were defined as those places where teaching was taking or had taken place, where the primary aim of that teaching was to increase understanding about Australian natural history. This included places used for formal education by schools or universities, for staff training programs, and for general education of the public.

Three teaching sites were identified in the study area.

Type localities - biological

The locations of collection sites of plant and animal type specimens (the specimen from which a species is formally described) are termed type localities. Type specimens are internationally recognised, and they and their locations are important for taxonomic reference.

A list of botanical species which have or might have their type localities in the study area was identified from references and this was followed up by a rigorous bibliographic search.

Four biological type localities were identified in the study area.

Type localities - geological

Identification and assessment of type localities for fossils and stratigraphic sections was undertaken by the geological consultants.

Thirteen geological type localities were identified in the study area.

Reference or benchmark sites

Reference or benchmark sites can be broadly defined as those places which contain examples of biophysical characteristics or processes in a relatively undisturbed state, which provide an opportunity for the progression of natural processes to be measured and observed over time. They also provide places with examples against which the condition of the same characteristics or processes in a more disturbed environment can be compared. They should be places excluded or protected from further human disturbance, and for which there exists detailed information about the characteristic or process for which the place is to be referred as a benchmark.

Only one reference area, Jones' Creek, came above threshold in the study area.

Major Findings

- The National Estate Values of East Gippsland
- The Protection of National Estate Values in East Gippsland
- Summary of Protection of the National Estate
- Protection of National Estate Values on Private Property
- Evaluation of existing National Estate listings and nominations

In chapter 5 the results for each of the natural national estate values identified in the study were presented. This chapter begins by looking at the broad picture of the National Estate in East Gippsland, and then turns to the question of the current conservation status of national estate values across the region. The findings outlined in this Chapter will provide an input to the development of the East Gippsland RFA. The chapter ends with a review of existing national estate listings.

THE NATIONAL ESTATE VALUES OF EAST GIPPSLAND

Maps 6.1 - 6.6 show those places with flora, fauna and cultural values. The scale of these maps means that only those values which occur over relatively large areas are visible. Those values which are smaller and which are not visible on this map can be viewed on the larger scale maps located at AHC and NRE offices (see Summary).

Extensive natural values - Map 6.1

East Gippsland is typified by large areas of undisturbed vegetation both in the coastal zone and in the more rugged terrain of sub-coastal ranges and plateaux. Extensive montane and small sub-alpine areas at Tingaringy and Nunniong contribute to the diversity of ecosystem types and the high species diversity of the study area. The alpine and montane areas, with the Snowy River a dominant and spectacular feature, are mostly unaffected by European land use except by grazing. The lack of fragmentation of native vegetation means that extensive areas occur as natural landscapes, old-growth forests and places with high wilderness quality.

Flora - Maps 6.2 - 6.3

These large areas of undisturbed vegetation combined with strong biogeographic influences (such as cold sub-Antarctic ocean currents, warm temperate influences, rugged topography including high altitude areas and a distinct climate) distinguish East Gippsland as a place of major biogeographic significance at a continental scale. This is reflected in extensive refuge areas for temperate flora and the large number of species of flora that are endemic, rare and threatened or at their distributed limits (including disjunct populations). Coastal and montane areas in particular appear to be major zones of flora speciation. Similarly this lack of disturbance in many areas enables ecological processes, such as vegetation succession, to operate unimpeded at a landscape scale and provides many examples of plant communities that have been extensively impacted by European settlement elsewhere.

Fauna - Map 6.4

Limited forest fragmentation and high diversity of vegetation communities in East Gippsland make the area outstanding for fauna. Values for all major fauna groups were assessed. Insufficient information was available on invertebrates except for the endemic crayfish. Fauna values frequently occur in very small areas which are not easily discerned on this map.

Places important for endemic fauna species (the Potoroo and three crayfish) and rare and threatened fauna species (48) were assessed. The analysis highlighted the importance of coastal areas, moist forests and mountain streams for fauna.

Much of the fauna of East Gippsland breeds within the study area. For sub-criterion A2 (places important for fauna breeding), the analysis focussed on colonial roosting and breeding sites. This included breeding colonies of waterbirds and seals on the coastal islands and estuaries, roosting camps of flying foxes near Mallacoota, and roosting and maternity sites for bats mainly in the limestone areas around Buchan and Murrindal.

Many fauna values were related to Ecological Vegetation Classes (EVCs). For example, places identified as important flora refuges because of the plant communities involved, (eg Warm and Cool Temperate Rainforest), also had importance for fauna. Their importance for invertebrate fauna values was recognised but not assessed.

Places of unusually high fauna species richness within the region were identified. These are generally along the lower reaches of rivers and in coastal areas.

Other natural history values - Map 6.5

This map includes places important as research, teaching or benchmark sites, wetlands and sites of geological or geomorphological significance.

The remoteness of East Gippsland has meant that relatively little use has been made of the area for research or teaching. The study sites for Long-footed Potoroo, the Silvicultural Systems Project site at Cabbage Tree and educational sites at Buchan, Cape Conran and Mallacoota are notable exceptions. The study identified one reference area in East Gippsland, plus research sites and important type localities for a range of natural values. These sites provide a series of important scientific datum points and opportunities to study of a range of natural values.

The number of coastal wetlands identified reflects the relative lack of disturbance in the coastal zone of East Gippsland and the presence of major estuary and lagoon systems. The study area contains several outstanding marine/intertidal complexes, especially in the Lower Snowy River Floodplain. Many of these wetlands are in excellent condition and some in the far East such as Lake Barracoota and Lake Wau Wauka (associated with dune systems in Croajingolong National Park) are virtually undisturbed.

The sites of geological and geomorphological importance reflect the diversity of landforms in the region. These include the active depositional landforms along the coast relating to the Snowy and Wingan River floodplains and extensive sand dunefields. Other features include the ancient and heavily weathered mountainous sites in the Snowy and Genoa River gorges and Errinundra escarpment, which are dominant features within the landscape. They also include smaller limestone and periglacial features, and landforms from tectonic and sedimentary developments on the continental margins.

Cultural values - Map 6.6

The most prominent feature of the cultural values map are the large areas with high aesthetic values. These generally relate to coastal environments, valleys, forest areas, intact catchments, scenic rivers, mountain ranges and gorges. The Buchan Caves Reserve, a major recreational area, is important for aesthetic, social and historic values.

Historic landscapes are also substantial. The largest are associated with the rich and intense history of the Mallacoota Inlet and the Lake Tyers/Lake Bunga area, as well as mining in the Deddick and Bonang districts. Smaller farming landscapes are associated with the Genoa River Flats, Brodribb Drainage Scheme area, Bete Bolong, Wangarabell Valley, Wairewa Valley and the Wallagaraugh River.

Throughout the region there are major routes which have been important in the exploration and settlement of the area, including both historic and more ancient Aboriginal routes. These include the Snowy River Road and the Bairnsdale to Orbost Railway.

A range of small sites is located across the region, including sites associated with the timber industry and early European settlement. As well, a scatter of smaller sites which are important for aesthetic values includes waterfalls, bays, river sections and caves. These are not visible at the scale of map 6.6.

The active participation of local Aboriginal communities is regarded as an integral and essential part of the identification and assessment process for Aboriginal places, especially in relation to verification of levels of significance. Unfortunately, it has not been possible to complete the identification and assessment of Aboriginal Places of national estate significance in East Gippsland within the time frames of this study. Neither the proposed method nor any results have been included in this report.

Indicative national estate places

The primary purpose of the study was to identify all places within the region which have national estate value and merit listing on the Register of the National Estate. A national estate place is a geographically defined area containing at least one national estate value. The overall pattern of national estate values within the region is extremely intricate. Since many areas contain several overlapping values the delineation of the boundaries of places tends to follow management units or existing landscape features.

To simplify description, the areas with value(s) have been separated into three categories of indicative places. These are:

- those which are wholly covered by national estate values above threshold;
- those with a complex pattern of areas with above and below threshold values, those identified through modelling, and those with concentrations of site-specific values; and
- those which contain point or linear values above threshold, which are scattered throughout an area that is mostly below threshold. The registered places for these values will be precisely delineated within the broader area currently identified.

Map 6.7 shows the indicative national estate areas. Many smaller places also with national estate values occur outside of these areas, but are not visible at this scale. Full details of the national estate values found in each area are being documented as part of the Register of the National Estate listing process.

It is important to note that while some values may be wholly contained within a single area, others will extend into adjacent places. For example, an area may include: a uniform coverage of flora species richness value; part of a larger natural landscapes area; a number of representative EVC polygons; a latticework of riparian EVCs with importance as fauna refuges; and a scatter of threatened flora, endemic flora and one historic route.

It is also important to note that a statutory process is required to list places on the Register of the National Estate, the places identified here are best considered indicative until that process is complete. It is also possible that some boundaries will be relocated to better coincide with land tenure boundaries during the CRA integration process.

THE PROTECTION OF NATIONAL ESTATE VALUES IN EAST GIPPSLAND

One of the objectives of the study was to assess the protection of all national estate values within the study area. The effectiveness of the protection depends on the nature of the value. For example, the conservation of historic mining sites can be undertaken through sympathetic management in timber production areas, while conservation of places with high wilderness quality is best ensured through their inclusion in the dedicated reserve system.

The first step in assessing the protection of national estate values was to determine which values were sensitive or potentially sensitive to a range of disturbances. The second step was to determine which reserve types provided protection for these values (see Appendix G). The

third step was to determine the current reservation status of these values (Tables 6.1-6.4). The final step was to determine which legislative mechanisms provide additional protection for these values.

Table 6.1 Reserve status of natural values (excluding D1 flora values)

Table 6.2 Reserve status of EVCs on public land (sub-criterion D1)

Table 6.3 National Estate Value afforded protection by legislated mechanisms

Table 6.4 Reserve status of old-growth forest (public land only) (sub-criteria B1 & A2)

It is important to recognise that the analysis undertaken here relates to the area of the value above the National Estate threshold rather than the total extent of a value within the region.

Sensitivity of values to disturbance

The sensitivity of cultural values to disturbance has already been addressed in Chapter 4.

The sensitivity of identified natural values can be gauged from the factors used in their identification and the setting of thresholds of significance. In many instances disturbance of one type or another has been integral to the application of the threshold, for example natural landscapes, wilderness, old-growth forests, and principle characteristics of class.

The focus of this joint assessment is timber harvesting, but various other types of disturbance occur in the study area which affect national estate values. Many EVCs which occur in the coastal zone in particular, do not contain timbers which are harvested for sawlogs, but some may be subject to removal of trees for fence posts and poles. In coastal areas recreation impacts, such as damage from boat wash, vehicles and concentrated pedestrian movement affect a range of values from geomorphological features through to aesthetics.

Broadly speaking there are three levels of sensitivity recognised.

Firstly, some natural values are sensitive to a wide variety of disturbance, notably natural landscapes, wilderness, old-growth forests and principle characteristics of class.

The second category is those values that are relatively resilient over time to disturbances of the type likely to occur in the area. The modelled flora or fauna richness (sub-criterion A3), and the majority of values associated with geological or geomorphological sites fall into this category.

The third category is especially applicable to species-related values such as rare fauna, and endemic flora species. In these values the response to disturbance varies with the individual species. The only valid assessment of sensitivity for these values is at the species level.

As outlined above, the assessment of protection of national estate values is related to the sensitivity to disturbance. To provide that context the summary of protection that follows includes the relative sensitivity of each value addressed.

Reserve analysis

An important component of the analysis of the protection of national estate values is the reservation analysis. This analysis ascertains the extent to which a particular value occurs within legislated conservation reserves. Values of a local nature, such as localities for rare fauna, have not been included. The reasons were firstly that sensitivity to disturbance varies depending on the species, and secondly that the proportion of known locations in reserves is

not necessarily a good indication of the conservation status of the value. Tables 6.1-6.3 indicate the reserve status of natural values in the study area.

Reserve Types

A series of conservation reserves (as determined by the LCC in 1986 and accepted by Government) occur across the study area. The Special Protection Zones incorporated in the Forest Management Plan are also included. The extent of the conservation reserve system is shown in Map 6.8**.** (For a list of the reserves included in the reserve analysis see Appendix G).

Other legislative mechanisms

Victoria has a number of legislative mechanisms which provide some protection to national estate values. These include the *Flora and Fauna Guarantee Act 1988* and the *Code of Forest Practices for Timber Production 1989*. These mechanisms are frequently referred to as 'off reserve mechanisms' or practices that contribute to ecologically sustainable forest management'. As part of the current comprehensive regional assessment the range of issues relevant to ecological forest management is being addressed.

Flora and Fauna Guarantee Act 1988

This Act creates a mechanism for the protection of rare and threatened species and communities. It also provides a process for dealing with potentially threatening processes. Rare and threatened flora and fauna species listed in Schedule 3 of the Act that are endemic, disjunct or at the limit of their range are afforded a level of protection.

The Code of Forest Practices for Timber Production 1988

The Code sets minimum standards for forest operations and provides principles and guidelines for the regional prescriptions which control timber production activities within state forests. Of particular relevance are sections 2.2.3 relating to protection of water quality and riparian vegetation, and 2.2.7 relating to protection of rainforest. The Code is implemented as part of a Forest Management Plan for the region which includes zoning of areas for conservation purposes and areas for production forestry.

Existing legislative protective mechanisms for cultural values

Heritage Act 1995.

For detail on this Act and its administration see Appendix A point 4 - Heritage Council. There are two places in the study area currently listed on the Heritage Register and Government Buildings Register - the New Works Historic Complex at Lakes Entrance, and the trestle railway bridge over Stony Creek at Nowa Nowa. The study area also contains a number of archaeological sites which are included in the Heritage Inventory established under this act.

Mineral Resources Development Act 1990

This Act aims to encourage an economically viable Victorian mining industry which makes the best use of mineral resources in a way compatible with the state's economic, social and environmental objectives. The Act provides for the granting of licenses to explore and extract minerals. Section 45 of the Act prohibits a licensee from doing any work within 100m of (among other things) places listed on the Victorian Heritage Register, (archaeological) Heritage Inventory, Government Buildings Register, Aboriginal and archaeological sites in Aboriginal Affairs Victoria's Register or the Register of the National Estate without the consent of the relevant authority.

Archaeological and Aboriginal Relics Preservation Act 1972 .

This Act requires that all Aboriginal archaeological and historic sites are protected. The Act is administered by Aboriginal Affairs Victoria, which maintains a register of known sites within Victoria.

Aboriginal and Torres Strait Islander Act 1984

This Act has an amendment of 1987 which applies directly to Victoria. This Act stipulates that all places of significance to Aboriginal communities, including places covered by the Victorian Aboriginal Relics Act, are to be protected. The only circumstance under which such places may be damaged or destroyed is with the express permission of the relevant local Aboriginal communities.

Native Title Act 1993

This Act recognises and protects native title rights and interest in land and waters that Aboriginal and Torres Strait Islander peoples have under their traditional laws and custom and that are also recognised by the common law. The Act contains a process for determining whether or not native title exists and what rights and interests native title holders have. Such rights and interest might range from exclusive possession of land through to non-exclusive rights to hunt, gather, fish or hold cultural or spiritual activities on the land. The Act validates past government actions that extinguished native title (namely the granting of title), and at the same time establishes procedures that must be followed to ensure future actions are not inconsistent with native title rights.

SUMMARY OF PROTECTION OF THE NATIONAL ESTATE

Tables 6.1-6.4 summarise the reserve status of natural values identified in this analysis. Jointly the reserve status and the application of other legislative mechanisms provide a guide to the level of protection necessary for those values that are sensitive to disturbance.

Extensive natural values.

The current protection analysis shows that 70 percent of natural landscape places, 92 percent of the wilderness areas and 63 percent of old-growth forests are located within existing conservation reserves.

Flora

Sub-criterion A1 - endemic species: sensitivity to disturbance varies with the individual species. *The Flora and Fauna Guarantee Act 1988* (FFG) provides mechanisms for protecting scheduled rare and endangered species and includes provisions for the preparation of species-specific Action Statements. Species which are endemic and are also rare or threatened are protected by this Act.

Sub-criterion A1 - limit of range of species, disjunct species: sensitivity to disturbance varies with the individual species. *The Flora and Fauna Guarantee Act 1988* (FFG) provides mechanisms for protecting scheduled rare and endangered species and includes provisions for the preparation of species-specific Action Statements. Species which are at their limit of range or disjunct and are also rare or threatened are protected by this Act.

Sub-criterion A1 - flora refuges: The sensitivity of this value varies with both the nature of the disturbance and the particular EVC. The level of protection within existing conservation reserves of the whole area of value is 82 percent. Rainforest and riparian areas are protected under the Code of Forest Practices, and heathlands and several other refuge-dependent EVC's are not subject to timber harvesting. Consistent with the proposed national reserve criteria consideration will be given to maximising refuges in development of the CAR reserve system.

Sub-criterion A2 - places important for succession: these areas are sensitive to disturbance. 65 percent occur in reserves. Rainforest and riparian areas are protected under the Code of Forest Practices. Many component EVCs are unsuitable for timber harvesting.

Sub-criterion A2 - remnant vegetation: these EVCs are vulnerable to degradation from disturbance which affects their species composition or which introduces pests or pathogens. Rainforest and riparian areas are protected under the Code of Forest Practices. The bulk of the distribution of Limestone Grassy Forest and Herb-rich Forest occur on private land. (Refer to the section on private land for further discussion.)

Sub-criterion A3 - flora species richness: this value is resilient to a level of short term and/or localised disturbance, such as under current timber harvesting. It is, however, sensitive to disturbances (such as permanent clearing) that are long term or broadscale. The overall level of protection within existing conservation reserves is 45 percent. Many component EVCs are unsuitable for timber harvesting. Rainforest and riparian areas are protected under the Code of Forest Practices.

Sub-criterion B1 - nationally rare/uncommon EVCs: these EVCs vary in their sensitivity to disturbance. Wetland and sub-alpine EVCs are not subject to timber harvesting. Rainforest and riparian areas are protected under the Code of Forest Practices. The bulk of the distribution of Limestone Grassy Forest and Herb-rich Forest occurs on private land. (Refer to the section on private land for further discussion.)

Sub-criterion B1 - old-growth forest: this value is sensitive to disturbances which affect its structure and floristic composition. The current levels of reservation are as shown in Table 6.4 .

Sub-criterion C1 - flora natural history sites: The overall level of protection within existing conservation reserves is 85 percent.

Sub-criterion D1- principal characteristics of class: It is preferable to consider the level of protection accross the range of geographic sub-units rather than just for the total area resereved of each EVC across the region. The current reservation analysis is provided in Table 6.5.

Fauna

Sub-criterion A1 - endemic fauna species: places important for these species are within the reserve system or are protected by the Code of Forest Practices.

Sub-criterion A1 - disjunct fauna species: this value is widespread across the study area however species which are sensitive to timber harvesting and occur in state forest are protected by the Code of Forest Practices.

Sub-criterion A1 - fauna species at the limits of their range: this value is widespread across the study area however species which are sensitive to timber harvesting and occur in state forest are protected by the Code of Forest Practices.

Sub-criterion A1 - relict fauna: Lake Barracoota, which is the only place identified, is protected within a reserve. Generally, invertebrates associated with flora refuges are protected by prescriptions under the Code of Forest Practices.

Sub-criterion A2 - key wildlife habitats:

1. Wetland fauna habitat. These include habitats for the species protected under management regimes in accordance with the China Australia Migratory Bird Agreement and Japan Australia Migratory Bird Agreement, and Wetlands Important for other Waterfowl. They

also include breeding and feeding areas for the endangered Little Tern and spawning areas for fish species such as Australian Grayling. The Code of Forest Practices protects those habitats within State Forest.

2. Important fauna breeding sites. Most of the important fauna breeding areas defined under this sub-criterion are along the coast or are site-specific, such as bat caves and flying-fox roosting camps. In forest areas, older mature and senescing trees are amongst the most important breeding resources for fauna. Prescriptions under the Code of Forest Practices protect riparian and rainforest communities.

Sub-criterion A2 - fauna refuge areas: fauna refuges are widely dispersed over the study area. The overall level of protection within the existing conservation reserves is 63 percent. Additionally all riparian, wetland and rainforest communities are currently protected in the reserve system or by prescription under the Code of Forest Practices in state forest. Consistent with the proposed national reserve criteria (JANIS 1996) consideration will be given to maximising refuges in development of the CAR reserve system.

Sub-criterion A3 - fauna species richness: this value is recognised as operating at the landscape scale rather than the site specific scale. This value is resilient to short term or localised disturbance, but it is sensitive to disturbance that is long term (such as permanent clearing) or broadscale. The overall level of protection within existing conservation reserves is 64 percent. Many component fauna habitats are unsuitable for timber harvesting. Rainforest and riparian areas are protected under the Code of Forest Practices.

Sub-criterion B1 - rare or threatened fauna species: The sensitivity of threatened species to disturbance varies but a conservative approach is generally adopted. The FFG Act provides such a mechanism for protecting scheduled rare and endangered species and includes provisions for the preparation of species specific Action Statements.

Fauna

Sub-criterion A1 - endemic fauna species: places important for these species are within the reserve system or are protected by the Code of Forest Practices.

Sub-criterion A1 - disjunct fauna species: this value is widespread across the study area however species which are sensitive to timber harvesting and occur in state forest are protected by the Code of Forest Practices.

Sub-criterion A1 - fauna species at the limits of their range: this value is widespread across the study area however species which are sensitive to timber harvesting and occur in state forest are protected by the Code of Forest Practices.

Sub-criterion A1 - relict fauna: Lake Barracoota, which is the only place identified, is protected within a reserve. Generally, invertebrates associated with flora refuges are protected by prescriptions under the Code of Forest Practices.

Sub-criterion A2 - key wildlife habitats:

1. Wetland fauna habitat. These include habitats for the species protected under management regimes in accordance with the China Australia Migratory Bird Agreement and Japan Australia Migratory Bird Agreement, and Wetlands Important for other Waterfowl. They also include breeding and feeding areas for the endangered Little Tern and spawning areas for fish species such as Australian Grayling. The Code of Forest Practices protects those habitats within State Forest.

2. Important fauna breeding sites. Most of the important fauna breeding areas defined under this sub-criterion are along the coast or are site-specific, such as bat caves and flying-fox roosting camps. In forest areas, older mature and senescing trees are amongst the most

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with the proposed national reserve criteria (JANIS 1996) consideration will be given to maximising refuges in development of the CAR reserve system.

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Sub-criterion B1 - rare or threatened fauna species: The sensitivity of threatened species to disturbance varies but a conservative approach is generally adopted. The FFG Act provides such a mechanism for protecting scheduled rare and endangered species and includes provisions for the preparation of species specific Action Statements.

Sub-criterion C1 - fauna natural history sites: within the Forest Management Plan the two research sites for the Potoroo are protected by Special Management Zones or Special Protection Zones where they coincide with other values. Type localities are useful to historians and taxonomists. The Code of Forest Practices contains prescriptions on state forests that should ensure these species continue to exist on these sites.

Wetlands

Sub-criterion B1 rare or uncommon wetlands: the overall protection of Wetlands identified as rare or uncommon within existing conservation reserves is 56 percent. Component EVCs are unsuitable for timber harvesting.

Sub-criterion D1 characteristic of class: the overall level of protection within existing conservation reserves is 94 percent.

Geological and geomorphological values

Sub-criterion A1 - landscape evolution: The overall level of protection within existing conservation reserves is 79 percent. Dunefields may be affected by recreational impacts within reserves. Agriculture, drainage and reclamation works in areas outside of reserves, may mask surface exposures and/or destroy certain features. Geological outcrops are generally resilient to disturbance.

Sub-criterion A2 - existing landscape processes: The overall level of protection within existing conservation reserves is 87 percent. Agriculture, drainage and reclamation works in areas outside of reserves, may interfere with depositional processes.

Sub-criterion A3 - places with unusually high landscape diversity: The overall level of protection within existing conservation reserves is 90 percent. These values in most places are generally robust (see A1).

Sub-criterion B1 - rare /uncommon landscapes: The overall level of protection within existing conservation reserves is 66 percent. These values in most places are generally robust (see A1).

Sub-criterion C1 - geological and geomorphological natural history sites: protection is most desirable for reference areas, teaching sites and research sites. Many of these occur within reserves or are protected by prescription. Type localities are useful to historians and taxonomists.

Sub-criterion D1 - geological and geomorphological features characteristic of their class: The overall level of protection within existing conservation reserves is 74 percent. These values in most places are generally robust (see A1).

Other Natural History Values

Sub-criterion A1 - climatic & environmental history sites: The overall level of protection within existing conservation reserves is 75 percent.

Sub-criterion A2 - undisturbed catchments: these are sensitive to disturbance, and all remaining undisturbed catchments are located within the reserve system.

PROTECTION OF NATIONAL ESTATE VALUES ON PRIVATE PROPERTY

National estate values on private property posed a particular challenge for the study. While public land is quite properly the focus for the protection of national estate values, values do not stop where private land begins, and values have been identified throughout the study area including private property.

Data on values on private land are, however, variable. While the study had good disturbance data for public land, this was not the case for private land. Disturbance on private land generally has a more complex history and may not be recorded in documentary form. Variable management on private land over both time and space meant that the assessment team could not always obtain all the information necessary for a formal assessment in the time available.

Time constrained what could be reasonably achieved with private land, because of the extra work required to confirm and consult on the values there. However, it is recognised that validation of existing data on private lands is required to more clearly define flora and fauna values in particular.

Cultural, geological, geomorphological and wetland values are relatively well established and clearly defined on private land, such as through heritage workshops or in existing reports. Private land also undoubtedly supports important values such as remnant vegetation and samples of nationally rare EVCs, but the accuracy of existing maps precludes definitive delineation of these values at this stage.

EVALUATION OF EXISTING NATIONAL ESTATE LISTINGS AND NOMINATIONS

In general the outcomes of the study show that the existing places listed in the Register of the National Estate have been found to contain significant heritage values. This means that previous nominations and listings were soundly based. Appendix H lists existing places on the Register, nominations and their status.

Major Outcomes

- Better Identification
- Values Not Completed
- Avenues for Further Research

This study has identified a number of significant outcomes as follows:

- a regional identification of the National Estate, assessing both natural and cultural heritage values across the region;
- improved the information basis for the full range of national estate values on public land within the study area;
- identified some new national estate values;
- provides the basis on which to incorporate the national estate into the RFA for East Gippsland;
- provides an analysis of the protection of national estate values in the region;

BETTER IDENTIFICATION

This study examined national estate values in the East Gippsland forests, given the constraints of data and time. The study has found national estate values across the range of natural and cultural environments.

Scientific or social research that significantly enhances our knowledge of the values of the region including forest ecology, archaeology or understanding of human interaction with the forest, would provide the basis on which to justify a reassessment of the significance of the values.

Both agencies consider that the extensive natural environment values have been comprehensively assessed, in particular those relating to natural landscapes, old-growth forests and Ecological Vegetation Classes (EVCs). A wide range of site-specific natural and cultural values have also been systematically identified.

Cultural environment

Another significant outcome of the study has been the integration of cultural environment assessments with those of the natural environment focus of the study. The forests of East Gippsland have both cultural and natural heritage significance, and these are strongly inter-related. Even though data collected to date on Aboriginal places has not been included in the study, other data on historic, aesthetic and social value has been included.

Past human activities have changed the nature of the forest, as well as leaving landscapes and structures which are now part of the region's cultural heritage. Many places not on existing databases, or known to experts, have been identified and documented by drawing on community knowledge.

The support and involvement of community organisations in the identification of heritage values within the region has been invaluable and has contributed significantly to the study.

Private land

The study has collated a substantial amount of information relating to heritage values on private land, in particular places of significance for cultural, geological, geomorphological and wetland values. Places important for other values on private land have not been delineated as it was not possible to accurately assess their current condition and integrity.

It is proposed that the information collated for all private lands as part of this study be provided to local government in order to confirm and support more detailed work on the identification of heritage values. For the further identification and listing of cultural heritage values on private land, co-operative processes will also be developed with the relevant state agencies, Aboriginal Affairs Victoria (AAV) and the Heritage Council.

VALUES NOT COMPLETED

Rare and threatened plant species

The current status of rare and threatened plant species across the region is uncertain as they are seldom systematically surveyed and often not recognised in the field. The study has identified all known locations of those species recognised as rare and threatened but has not identified the habitat requirements of each species. Additional work is intended to determine those areas of rare and threatened plant habitat which are of national estate significance and to consider sensitivity of those areas to disturbance. The broader issues with regard to the status of rare and threatened plant species are addressed in the *Environment and Heritage Report* (The Commonwealth & Victoria 1996).

Aboriginal values

Full identification and assessment of Aboriginal values across the study area requires further consultation with, and the active participation of the local Aboriginal communities of East Gippsland. This is particularly in regard to the communities' verification of the levels of significance of places. The AHC is continuing to talk with the East Gippsland Aboriginal communities about these issues, and contingent on reaching agreement with the communities, expects to complete the assessment and documentation of Aboriginal values within the overall CRA timeframe.

Ecological Vegetation Classes

Both the AHC and NRE consider that EVCs are the appropriate scale for regional analyses, as the classes combine structural and floristic information with some physical attributes. However, academic research into the compatibility of the EVC system with other vegetation mapping units on a national basis is necessary for the delineation of nationally rare and uncommon EVCs or equivalents. Publication of the EVC methods is occurring as part of the CRA in the *Environment and Heritage Report* (The Commonwealth & Victoria 1996).

AVENUES FOR FURTHER RESEARCH

Another important outcome of the study is that a number of the assessment methods and their results provide very clear direction for future research. Whilst it is generally agreed that the methods adopted were 'best practice', it is recognised that some of the assumptions applied could be usefully tested through further academic and field research.

The areas of most interest are:

Non-vascular flora

The assessment focuses predominantly on flora communities and selected vascular plant species. Given the biogeographic importance of the study area and the high incidence of flora refuges in East Gippsland the non-vascular flora (such as mosses, ferns, lichens) are also of interest.

Invertebrates

Systematic stratified sampling surveys would add considerably to the currently available information.

Species richness modelling

While both the agencies and experts consulted consider that the model developed for the analysis of species richness (flora and fauna) has validity as an indicator of biodiversity, the model should be verified in the field. An analysis of the sensitivity of the model to changes in grid size or the location and size of grid cells would be valuable.

Historic value

The assessment undertaken of routes of human movement including; Aboriginal pathways in the Genoa, Cann, Tambo and Snowy River valleys; MacKillop journey; Stewart Ryrie's journey and Ferdinand Von Mueller's journey, has identified some areas of significance. Further development of the methodology to document more extensive routes of movement and determine significance would be valuable.

Social value

Places identified in the heritage workshop database as having potential social value, but lacking sufficient information for assessment, require further consultation with the relevant local community.

Aesthetics

While the study has pioneered a method which has received professional support, a field trial with landscape and other related professionals could provide some additional insights.

Appendix A: Agencies Involved in the Study

1. The Australian Heritage Commission

The Australian Heritage Commission aims to help all Australians appreciate and care for the National Estate - our natural, historic and Aboriginal and Torres Strait Islander places worth keeping for the future.

Established under the *Australian Heritage Commission Act 1975,* the Commission is an independent statutory authority directed by a Chairman and Commissioners.

To fulfil its responsibilities, the Commission:

- advises the Commonwealth Minister responsible for the environment on all matters concerning the National Estate;
- compiles a Register of the National Estate;
- develops public information and education programs, research and professional training; and
- co-ordinates the National Estate Grants Program and administers its national component.

The National Estate

National estate places help give Australia its distinctive character. Sometimes they are places which are important to Australia and the world, like the Great Barrier Reef or Uluru. Sometimes they are places which are special to a region or a particular group of people. They include both the grand and the humble and are drawn from both the natural and the cultural environments. In S.4(1) of the *Australian Heritage Commission Act* the National Estate is defined as:

those places, being components of the natural environment of Australia, or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations, as well as for the present community.

The Register of the National Estate is the national reference point, or inventory, of national estate places. It alerts planners, decision makers, researchers and the community at large to the heritage value of these places.

2. Department of Natural Resources and Environment

The Department of Natural Resources and Environment (NRE) is the Victorian government agency responsible for managing most of the public land and its associated resources and values throughout Victoria. It was until recently referred to as the Department of Conservation and Natural Resources (CNR) as it was for the majority of the time the study was being undertaken. NRE is the agency responsible for the conservation of heritage values on public land in its charge and is also responsible for managing the various uses of that land. These include timber and water production, recreation, grazing on public land and some mineral and gravel production.

In addition NRE is responsible for managing flora, fauna and land protection throughout the area regardless of land tenure.

To direct the decision-making in these areas, NRE uses a number of planning mechanisms such as park and forest management plans. NRE also develops functional plans such as flora and fauna management plans and action statements and fire protection plans. A forest management plan for East Gippsland has recently been finalised.

NRE also has responsibility for administering the *Flora and Fauna Guarantee Act 1988* which establishes processes to achieve its principal objective; that 'all taxa of Victoria's flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild'. Under the provisions of the Act a number of forest species, and the cool temperate rainforest community, have been listed as threatened, and the loss of hollow-bearing trees listed as a potential threat. Under the Act, NRE is obliged to prepare action statements to address these issues. Action statements are management documents which specify the conservation actions the department will take.

3. Local Government

The study area encompasses the majority of the Shire of East Gippsland. The majority of the study was undertaken prior to the amalgamation of Shire Councils across Victoria. All of the previous Shire of Orbost and part of the previous Shire of Tambo comprised the study area.

The Shire of East Gippsland is responsible for the approval of proposals for the use and development of private land. This is achieved through planning schemes developed under the *Planning and Environment Act 1987*. Planning schemes can make any provision which relates to the use, development, protection or conservation of any land. Environmental issues must be considered, while social and economic issues may be considered in the planning process.

The Council clearly has a role in the management of cultural and heritage assets on private land within the study area. It also manages most municipal parks and gardens, many public facilities such as libraries and infant welfare centres, most public roads, streets and associated road reserves. The principal planning issues with heritage implications are issue of permits for construction and alteration of buildings, sub-division of land and clearing of native vegetation. The shire also often acts as a committee of management for areas of public land which are used for public purposes, such as community halls, sports grounds and some areas of foreshore and some recreation sites.

4. Heritage Victoria

Heritage Victoria administers legislation for the registration and protection of significant non-Aboriginal heritage places and objects in Victoria. This group was formed through the amalgamation of the historic buildings function of Department of Planning's Heritage Branch and those elements of the Victorian Archaeological Survey that dealt with historic and maritime archaeology.

The *Heritage Act 1995* provides the framework for the operations of Heritage Victoria. This legislation covers works and objects of architectural, historic, scientific, aesthetic and social significance. It replaces the *Historic Buildings Act* and incorporates coverage for historic archaeological sites previously dealt with under the *Archaeological and Aboriginal Relics Preservation Act*. It also replaces the state's *Historic Shipwrecks Act*.

The Heritage Act establishes a Heritage Council as the statutory body which decides which places and objects are of special cultural heritage significance to Victoria. These are listed on the state Heritage Register. A permit must be obtained by the owner or site manager to remove, or demolish, damage or despoil, develop or alter, excavate, a listed place and to remove a listed object. The Council reports to the Victorian Minister for Planning and Local Government.

The Heritage Inventory is the statutory record of all places identified as historic archaeological sites and the known occurrences of archaeological relics. Consent must be obtained by any person who seeks to uncover, expose, damage, interfere with an archaeological relic, or to excavate to discover an archaeological relic.

The Heritage Act extends the coverage previously provided by the Historic Buildings Act to include gardens, cemeteries and moveable objects. The provisions for historic precincts and

archaeological areas give it greater capacity to deal with inter-connected complexes of structural sites, cultural landscape features, and transport networks associated with mining, pastoralism and the forest industry. This means that a broad range of historic places identified in the East Gippsland forest study will be relevant to the Heritage Council as potential listings.

The Council may also have a future role in ensuring the effective management of listed historic places within forest areas.

The AHC and NRE regularly kept the Historic Buildings Council (HBC), predecessor of the Heritage Council, informed on progress of the joint study. It is recommended that Heritage Victoria consider for their register the historic places of national estate significance identified during the East Gippsland joint study.

5. Aboriginal Affairs Victoria, Aboriginal Heritage Services Branch

The Aboriginal Heritage Services Branch (AHSB) was formerly a part of the Victoria Archaeological Survey which was set up in 1973 to implement the Victorian State *Archaeological and Aboriginal Relics Act 1972 .* This act provides legislative protection to all Aboriginal archaeological relics and sites in Victoria.

The amalgamation of the AHSB within Aboriginal Affairs Victoria (AAV)'s infrastructure has expanded AAV's role in promoting opportunities for Aboriginal people to participate in controlling their own cultural heritage.

The responsibilities of the AHSB are to:

- maintain the Victorian Aboriginal archaeological site register;
- provide information on known sites and probable site locations;
- provide lists of consulting archaeologists able to survey and assess cultural sites and to consult with the Aboriginal communities;
- liaise with other State and Commonwealth agencies, Local Government and Aboriginal communities to promote the protection and appropriate management of Aboriginal sites and relics;
- provide assistance to Aboriginal communities regarding the preservation of their cultural heritage through identification and recording of Aboriginal culture and heritage education of both the Aboriginal people and all Victorians;
- issue permits to disturb archaeological sites after they have been granted by the appropriate Minister or relevant Aboriginal community; and
- provide advice on impact mitigation strategies.

The involvement of AAV in the regional assessment study in East Gippsland has been extensive, providing expert advice on the consultancies for the assessment of Aboriginal and archaeological sites within the study area, and undertaking the oral history consultancy.

AAV was involved in the study through representation on the Technical Advisory Committee (TAC), and on the Steering Committee. AAV provided staff to collate and assist in the assessment of the cultural data, and regional site officers participated in liaising with East Gippsland Aboriginal communities. AAV are also participating in the current National Estate assessment work being undertaken within the CRA.

Appendix B: National Estate Criteria and Sub/Criteria

Criteria for National Estate Significance

Without limiting the generality of sub-section (1) of the *Australian Heritage Commission Act*, a place that is a component of the natural or cultural environment of Australia is to be taken to be a place included in the national estate if it has significance or other special value for future generations as well as for the present community because of:

CRITERION A: Importance in the course, or pattern, of Australia's natural or cultural history

A.1 Importance in the evolution of Australian flora, fauna, landscapes or climate.

A.2 Importance in maintaining existing processes or natural systems at the regional or national scale.

A.3 Importance in exhibiting unusual richness or diversity of flora, fauna, landscapes or cultural features.

A.4 Importance for association with events, developments or cultural phases which have had a significant role in the human occupation and evolution of the nation, state, region or community.

CRITERION B: Possession of uncommon, rare or endangered aspects of Australia's natural or cultural history

B.1 Importance for rare, endangered or uncommon flora, fauna, communities, ecosystems, natural landscapes or phenomena, or as a wilderness.

B.2 Importance in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised, in danger of being lost, or of exceptional interest.

CRITERION C: Potential to yield information that will contribute to an understanding of Australia's natural or cultural history

C.1 Importance for information contributing to a wider understanding of Australian natural history, by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.

C.2 Importance for information contributing to a wider understanding of the history of human occupation of Australia.

CRITERION D: Importance in demonstrating the principal characteristics of:
(i) a class of Australia's natural or cultural places; or
(ii) a class of Australia's natural or cultural environments

D.1 Importance in demonstrating the principal characteristics of the range of landscapes, environments or ecosystems, the attributes of which identify them as being characteristic of their class.

D.2 Importance in demonstrating the principal characteristics of the range of human activities in the Australian environment (including way of life, custom, process, land-use, function, design or technique).

CRITERION E: Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

E.1 Importance for a community for aesthetic characteristics held in high esteem or otherwise valued by the community.

CRITERION F: Importance in demonstrating a high degree of creative or technical achievement at a particular period

F.1 Importance for its technical, creative, design or artistic excellence, innovation or achievement.

CRITERION G: Strong or special associations with a particular community or cultural group for social, cultural or spiritual reasons

G.1 Importance as a place highly valued by a community for reasons of religious, spiritual, symbolic, cultural, educational, or social associations.

CRITERION H: its special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history

H.1 Importance for close associations with individuals whose activities have been significant within the history of the nation, state or region.

Criteria for National Estate Significane

The criteria for registration in the National Estate are set out in the *Australian Heritage Commission Act.* Criteria are printed below in bold, and how they apply to this study area is explained in the following text.

CRITERION A: Importance in the course, or pattern, of Australia's natural or cultural history.

This criterion refers to the ***evolutionary or historic*** value of place, that is, when a place is an important part of Australia's cultural or natural history, and can tell us how the land was formed or how flora and fauna evolved in the past. Historically, it may tell us about human activity, customs or cultural phases, or how a place has influenced or been influenced by an historic period, activity, event or person.

Areas were identified which contain evidence and products of past and continuing climatic, geomorphological, ecological and biological processes. Much information in East Gippsland is gained from the biogeographic characteristics of the plants and animals.

This criterion also covers refuges which are important for animals following periods of environmental stress. The environmental stresses considered significant in East Gippsland are frequent wildfire and severe drought.

Locations which exhibit a high diversity of flora and fauna were determined using a modelling approach.

Places where an event or cultural phase relates to the broad patterns of Australian prehistory or history here include archaeological landscapes which provide evidence of the Aboriginal occupation of the continent, places where elements of traditional ways of life persisted, such as a pastoral property or Aboriginal mission, or cultural landscapes which show how mining or sawmilling was done in the past.

CRITERION B: Possession of uncommon, rare or endangered aspects of Australia's natural and cultural history.

This applies to aspects of the environment which are ***uncommon, rare or endangered*** and include flora, fauna, ecosystems, natural landscapes, wilderness or other natural phenomena.

Old-growth forest is a regionally and nationally rare phenomenon. The analysis of old-growth forest in East Gippsland was conducted by CNR through its East Gippsland Old-Growth Forest Project.

Wilderness is a nationally rare phenomenon. In East Gippsland, natural landscapes were identified where natural vegetation ecosystem processes can proceed largely uninterrupted by human disturbance.

This criterion also includes places which show past human activities, and which are now rare, endangered or uncommon, for example, sites showing evidence of human occupation during the Pleistocene, or Aboriginal art sites.

CRITERION C: Potential to yield information that will contribute to an understanding of Australia's natural or cultural history.

This criterion refers to the ***research value*** of a place, that is when a place has the potential to increase our understanding of the past by providing new information about Australia's natural and social history. Places were identified which are important research sites, teaching sites, reference or benchmark sites. The lack of disturbance in many of East Gippsland's plant communities, including rainforests, and the presence of relict fauna make the region a rich potential resource for research.

Places important for what they show of the history of human occupation in this study include excavated archaeological sites which have made a significant contribution to the understanding of Australian prehistory.

CRITERION D: Importance in demonstrating the principal characteristics of a class of Australia's natural or cultural places or environments.

This criterion refers to the ***representative value*** of a place, that is where a place is important because it is a good example of this type of place, both natural and cultural, or it demonstrates a particular type of human activity.

Places were identified which demonstrate the principal characteristics of the range of landscapes, environments or ecosystems, which makes them typical. When assessing vegetation communities, the aim was to identify areas of a community with sufficient condition of that particular class, for example, Wet Forest or Montane Dry Woodland. Until the regional assessment model was implemented, the AHC was unable to establish this criteria without knowledge of the regional context.

One aim of the assessment under D1 is to ensure adequate representation of EVCs across each of these geographic units, and to obtain the best examples of each class independent of that class' value against other criteria and values.

Places important for demonstrating key characteristics of human activities in the environment (including way of life, custom, process, land-use, function, design or technique) were also identified. Much work has already been done across East Gippsland on mining sites, which represent an important human activity closely related to the forests, and forest resources.

CRITERION E: Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

This criterion refers to the ***aesthetic value,*** that is when a place is widely recognised for its visual qualities or design. Aesthetic value takes into account people's perception of form, scale, colour, texture and material, smell and sound. Places are often considered to be beautiful or dramatic, for example, waterfalls, lookouts, scenic reserves and forest drives. Nostalgia can also contribute to aesthetic value where affection and attachment to a place have been built up over time, eg. the Mallacoota Inlet, where many people have been holidaying since childhood.

CRITERION F: Importance in demonstrating a high degree of creative or technical achievement at a particular period.

These are places important for ***technical or creative*** value, or when a place shows a particular creative or technical achievement for its time. For example, East Gippsland's McKillop's Bridge, erected in 1934, was innovative by world standards.

CRITERION G: Strong or special associations with a particular community or cultural group for social, cultural or spiritual reasons.

This criterion refers to the ***social value*** of a place and indicates the qualities for which a place has become a cultural landmark to a majority or minority group. Such places within a community are a focus for spiritual, political, national or other cultural sentiment. For example, the Noorinbee School and the Bonang Hall and General Store are intensely valued as the focus of local community life in an isolated region.

CRITERION H: Special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history

A place has ***historical associations*** when there has been a special and close association with an important person, persons or cultural group important to the history of the country or a region. For example, Mallacoota Inlet provided inspiration for notable Australian artists and writers, including Henry Lawson, who was a frequent guest of literary patron E.J.Brady, the inlet's most famous resident.

Appendix C: National Estate Values Assessed

CRITERION	SUB - CRITERION	NATIONAL ESTATE VALUES
CRITERION A: Importance in the course, or pattern, of Australia's natural or cultural history.	A1 Importance in the evolution of Australian flora.	Biogeographic characteristics of flora such as: species at the limit of their natural range; widely separated populations of the same species (disjunction); species with distribution restricted mainly to the study area (endemics); vegetation communities which contain a high incidence of primitive species; flora refuge areas, including refuges from climatic change; relictual vegetation classes/EVCs.
	1 Importance in the evolution of Australian fauna.	Biogeographic characteristics of fauna such as: species whose distribution is restricted mainly to the study area endemic); refugia for fauna; biogeographic range of fauna; relictual fauna.
	A1 Importance in the evolution of Australian Landscapes	Geological and geomorphological sites; features which may be significant in understanding landform evolution.
CRITERION A: Importance in the course, or pattern, of Australia's natural or cultural history	A2 Importance in maintaining existing processes or natural systems at the regional or national scale - landform processes.	Places where natural landform processes are active; pseudo karst.
	A2 Importance in maintaining existing processes or natural systems - biological and ecological processes.	Key fauna habitats; habitat for migratory species; important wildlife breeding areas eg feeding, breeding, nursing; areas which are refuges for fauna in times of environmental/climatic stress/frequent fire and drought; remnant vegetation/EVCs; places important for vegetation succession; undisturbed catchments; Old-growth
CRITERION A:	A3 Importance in exhibiting unusual richness or diversity of flora features	Areas of unusually high flora species richness.
	A3 Importance in exhibiting unusual richness or diversity of fauna features.	Areas of unusually high faunal species richness (at a regional and subregional level; areas of unusual habitat richness
	A3 Importance in exhibiting unusual richness or diversity of landscape features	Areas of unusually high occurrence of geological/geomorphological features
	A3 Importance in exhibiting unusual richness or diversity of	Places with unusual diversity or abundance related to a particular historic theme, eg sawmill tramways, archaeological remains,

	historic features	cultural landscape or other cultural features
CRITERION A: Importance in the course, or pattern, of Australia's natural or cultural history	A4. Importance for association with events, developments or cultural phases - historic	Places which are associated with important historic events or phases of development, such as: exploration and trade routes; early settlement, land-use, regional expansion, technological/economic adaption and other associations with endeavour.
CRITERION B: Possession of uncommon, rare or endangered aspects of Australia's natural or cultural history	B1 Importance for rare, endangered or uncommon flora (and communities).	Nationally rare vegetation communities/EVCs
	B1 Importance for rare, endangered or uncommon fauna (and communities).	Rare, endangered or uncommon fauna species and their habitats (immediate habitat at known sites). Threatened fauna species.
	B1 Importance for rare, endangered or uncommon natural landscapes or phenomena - geology/geomorphology.	Rare, endangered or uncommon geological and/or geomorphological features, including landforms. Uncommon wetlands.
	B1 Old-growth forest.	EVCs where old-growth forests are rare/uncommon in East Gippsland.
	B1 Importance for rare, endangered or uncommon natural landscapes.	Natural landscapes: areas lacking significant disturbance to natural vegetation.
	B1 Areas with remote and natural value.	Areas of very high, high and moderate wilderness quality.
CRITERION B: Possession of uncommon, rare or endangered aspects of Australia's natural or cultural history	B2 Importance in demonstrating a distinctive way of life - historic.	Places which exhibit: Cultural features including technology, design style, lifestyle, land use practice, resource exploitation which were once present but are now poorly represented in the region; Sites with uncommon elements, such as organic, plant or animal, remains; a use of a marginal environment, remote area or place heavily impacted by current development.
CRITERION C: Potential to yield information that will contribute to an understanding of Australia's natural or cultural history.	C1 Importance for information contributing to a wider understanding of Australian natural history, by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.	Includes sites that are: type localities for flora and fauna, fossils and geological type sections; important teaching and research sites; important sites of geology and landforms, including benchmark sites; important fossil sites (disjunct fauna); places showing evidence of former climates
	C.2 Importance for information contributing to a wider	Includes: Sites which provide information about Aboriginal occupation, eg dated pleistocene

	understanding of the history of human occupation of Australia.	sites or paleoenvironmental data; sites which provide information about European occupation, such as historic areas, etc; important teaching and research sites for Aboriginal culture and historic research; educational places for social history and lifestyle; reference or benchmark site - human occupation.
CRITERION D: Importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places; or (ii) a class of Australia's natural of cultural environments.	D1 Importance in demonstrating the principal characteristics of the range of landscapes, environments or ecosystems, the attributes of which identify them as being characteristic of their class.	Principle characteristics of vegetation class/EVCs; principle characteristics of geological classes; principle characteristics of geomorphological classes; principle characteristics of wetland classes.
	D2 Importance in demonstrating the principal characteristics of the range of human activities in the Australian environment (including way of life, custom, process, land-use, function, design or technique).	Places identified as representative examples of: sites, or groups of sites, of their type; an array of features of a particular type; an intact type of structure, technology, design style, landscape or network
CRITERION E: Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.	E1 Importance to a community for aesthetic characteristics held in high esteem or otherwise valued by the community	Places with outstanding aesthetic qualities including: natural features of outstanding scenic and evocative qualities; cultural features/landscapes with outstanding scenic, evocative or other special meaning to people; places which are used for recreational activities or are popular because of their aesthetic qualities; scenes and places depicted in the art, poetry and literature of the area.
CRITERION F: Importance in demonstrating a high degree of creative or technical achievement at a particular period.	F1 Importance for its technical, creative, design or artistic excellence, innovation or achievement.	Includes places important for: providing information about technological advancement or other innovation; being acknowledged as having outstanding design or creative expression.
CRITERION G: Strong or special associations with a particular community or cultural group for social cultural or spiritual re sons.	G1 Importance as a place highly valued by a community for reasons of religious, spiritual, symbolic, cultural, educational,or social associations.	Includes places important for: representing community attitudes, beliefs and behaviours fundamental to community identity; association with events having a profound effect on the community; spiritual or traditional connections between past and present;

		longevity of use or association, including continuity to present
CRITERION H: Special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history	H1 Importance for close associations with individuals whose activities have been significant withing the history of the nation, state or region	Places associated with persons prominent in local, state or national history

Appendix D: Consultancies Undertaken

Consultant	Title of Report
Aboriginal Affairs Victoria (Megan Goulding)	The Aboriginal Historical Places - East Gippsland. Report to the Australian Heritage Commission.
Aboriginal Affairs Victoria (Alistair Grinbergs)	A study of land routes of human movement in East Gippsland. Report for the Australian Heritage Commission.
Biosis Research Pty Ltd	Conservation advice for natural national estate values in East Gippsland and Central Highlands, Victoria.
NRE (Adam Lewis)	Archaeological modelling project.
HERA (Heritage Australia Database)	Bibliography - the forests of the Central Highlands & East Gippsland, Victoria (AHC Bibliography Series #12).
Sue Hodges	Survey of art and literature sources relating to East Gippsland and the Central Highlands.
Philip Hunt	Hinterland forests of East Gippsland: an archaeological survey of the East Gippsland forest management area (study undertaken for NRE/AHC, with funding from the AHC's National Estate Grants Program).
Chris Johnston (Context Pty Ltd)	Technical assessment of social value: East Gippsland.
Chris Johnston (Context Pty Ltd) & Nigel Lewis (Nigel Lewis Richard Aitken Pty Ltd)	The East Gippsland heritage workshops, comprising: - Report on project - Bonang workshop report - Orbost workshop report - Nowa Nowa workshop report - Mallacoota workshop report Volume 1 - database of places identified Volume 2 - database of places identified.
Jane Lennon	Conservation advice for cultural national estate values in East Gippsland and Central Highlands, Victoria.
Nigel Lewis (Nigel Lewis Richard Aitken Pty Ltd) and Joy McCann	Assessment of historic values: East Gippsland forest project.
Aboriginal Affairs Victoria (James W Rhoads)	East Gippsland Aboriginal archaeological heritage - threshold analysis methodology briefing.
Neville Rosengren	East Gippsland forest management area: geological and geomorphological values.
Rob Tom & Associates	Regional assessment database redesign, user manual production and data import.

Appendix E: Method Papers

Australian Heritage Commission & Department of Natural Resources and Environment, Victoria. (1996). *Method Papers : East Gippsland National Estate Assessment. Volume 1 - Natural Values.*

1 Geology and Geomorphology Assessment

2 Wetland Assessment

3 Flora Assessment

4 Fauna Assessment

5 Wilderness Quality in East Gippsland and the Central Highlands

6. Sites Important for Understanding Australia's Natural History

Australian Heritage Commission & Department of Conservation and Natural Resources, Victoria. (1994). *Method Papers : East Gippsland and Central Highlands Joint Forest Projects. Volume 2 - Cultural Values*.

Appendix F: Proceedings of Technical Workshops

Abrahams, H. (ed.) (1994). *Identifying Places containing Fauna Values of National Estate Significance in a Regional Context: Report of Technical Workshop, 29 October 1993.* AHC Technical Workshop Series # 1. AHC, Canberra.

Blackburn, R. (ed.) (1994). *Representative Vegetation: identifying Natural Heritage Places which demonstrate the Principle Characteristics of their Class: Report of Technical Workshop, 19 October 1993.* AHC Technical Workshop Series # 3. AHC, Canberra.

Blair, S. (ed.) (1994). *People's Places: identifying and assessing Social Value for Communities: Report of the Social Value Workshop, held at the University of Melbourne, 20 October 1993*. AHC Technical Workshop Series # 6. AHC, Canberra.

Clarke, C. (ed.) (1994). *Aboriginal Archival and Oral History Workshop: Report of the Technical Workshop, November 1993*. AHC Technical Workshop Series # 4. AHC, Canberra.

Cummings, B. (ed.) (1994). *Assessing Diversity in Natural Heritage: Report of the Technical Workshop, 20 October 1993.* AHC Technical Workshop Series # 2. AHC, Canberra.

Dunnett, G. & Feary, S. (eds.) (1994). *Identifying Aboriginal Archaeological Places which demonstrate the Principle Characteristics of their Class: Report of the Technical Workshop, October 1993.* AHC Technical Workshop Series # 5. AHC, Canberra.

Ramsay, J & Paraskevopoulos, J. (eds.) (1994). *More than meets the Eye: identifying and assessing Aesthetic Value: Report of the Aesthetic Value Workshop held at the University of Melbourne, 27 October 1993.* AHC Technical Workshop Series # 7. AHC, Canberra.

Appendix G: Reserve Analysis

All of the following reserve types were included in the reserve analysis and considered existing reserves.

Reserve type one

Existing gazetted National Parks and State Parks, Reference Areas, Heritage Rivers and gazetted water catchments that exclude timber harvesting.

National Parks:

- Croajingolong National Park
- Alpine (Cobberas-Tingaringy) National Park
- Snowy River National Park
- Lake Tyers State Park
- Errinundra National Park
- Coopracambra National Park
- Lind National Park
- Alfred National Park

Reference areas:

- Gelantipy Plateau
- Mountain Creek
- Zig Zag Creek
- Big River
- Barga
- Yambulla
- Merragunegin
- Jones Creek
- Baawang
- Benedore River
- Seal Creek
- Beehive Creek
- Concordia Gully
- Musket Creek
- Winnot Creek
- Forest Hill

Heritage rivers:

- Genoa River
- Snowy River
- Lower Berrima River
- Bemm River
- Goolengook River
- Arte River
- Errinundra River
- Little River
- Suggan Buggan River
- Upper Buchan River

Reserve type two

Essentially conservation tenures that exclude timber harvesting. Includes those areas that have been gazetted as reserves under the *Crown Lands Reserves Act (1978)* and those reserves approved by Government but not yet gazetted under that Act. It comprises:

- Sydenham Inlet-Cape Conran Coastal Park
- Mount Raymond Regional Park
- Ewing Marsh Wildlife Reserve
- Lake Corringle-Lake Wat Wat Wildlife Reserve
- Lake Curlip Wildlife Reserve
- Cabbage Tree Creek Flora Reserve
- Mottle Range Flora Reserve
- Wood Point Flora Reserve
- Brodribb Flora Reserve
- Maramingo Creek Flora Reserve
- St George Plain Flora Reserve
- William Hunter Flora Reserve
- First and Second Islands Flora Reserve
- Plum Gully Flora Reserve
- Murrindal Flora Reserve
- Kanni Flora Reserve
- Brodribb River Flora and Fauna Reserve
- Little Bog Creek Flora and Fauna Reserve
- Mount Bendock Bushland Reserve
- Cann River Bushland Reserve
- Mallacoota Bushland Reserve
- Mortimer's Paddock Bushland Reserve
- Bushland Reserves (four along Gelantipy Road-Snowy River Road, one near Buchan)
- Coastal reserves: Marlo Coastal Reserve; Mallacoota Coastal Reserve; Lakes Entrance to Lake Tyers Coastal Reserve; Cape Howe Scenic Coast
- Natural features zones: Wallagaraugh River; Betka River; Wingan River; Mueller River; Cann River; Combienbar River; Brodribb River; Lower Snowy River; Mellick Munjie River; Buchan River; Butcher's Creek; Timbarra River; Murrindal River; Boggy Creek
- Natural & scenic features zones: Nunnett Plain Natural Features and Scenic Reserve; Mount Stewart Natural Features and Scenic Reserve; W Tree Falls Natural Features and Scenic Reserve
- Education areas: Bidwell Education Area; Sardine Creek Education Area; Cape Conran Education Area; Serpentine Creek Education Area; Mallacoota Education Area; Cutfinger Education Area
- Scenic reserves: The Gap Scenic Reserve; Mount Delegate Scenic Reserve; Bemm River Scenic Reserve; Martin's Creek Scenic Reserve
- Caves Reserves (seven in Buchan-Murrindal area).

Reserve type three

Areas which through their zoning are excluded from harvesting in the current Forest Management Plan for East Gippsland

- Special Protection Zones.

Appendix H: Existing & Nominated Places on the Register

As part of the regional assessment process it was recognised that with more detailed and recent knowledge the existing listed RNE database could be updated and existing places be reviewed and possibly de-listed.

The following table outlines the places, their status, and the results of the recent regional assessment.

Code: Type N = natural, H = historic, A = Aboriginal/ archaeological.

Status: R = registered, I = interim listed, N = nominated, Rep= reported site.

File Number	RNE number	Name	Type Status	Notes
209270000301	004740	Alfred National Park	N/R	significant within a registered(Croajingolong area).
207236000102	016416	Alpine National Park (proposed)	N/N	currently under AHC consideration: partly within the study area (extends from east of Mansfield to NSW border, including Bogong, Wonongatta-Moroka, Cobberas-Tingaringy and Snowy River National Parks, Wabong Plateau State Park, Avon Wilderness and adjacent public land. As designated in *Alpine National Park Bill 1985* by DCFL, map N70).
207236000101	004497	Victorian Alps	N/R	Approximately 420000ha, as defined by LCC Final Recommendations, 1979.
209270000408	004748	Betka River and catchment	N/R	significant within a registered area (Croajingolong area)
209274000901	018427	Buchan Butter Factory	H/N	
209274000101	004782	Buchan Cave Area	N/R	
108284000701	001059	Byadbo Wilderness, Jindabyne	N/R	sub-area registered, intrinsic significance to be assessed (115000ha, 30km from Jindabyne extending across the border: NSW area is National Park; Victorian area is proposed National Park).
209270001001	004761	Cape Everard Area	N/R	
209270000404	004744	Captain Cook Lighthouse Reserve	H/R	significant within a registered area (Croajingolong area)
209270000501	004751	Captain Steven's Point Area	N/R	
209274000201	004783	Cloggs Cave Area	N/R	
209270000601	004753	Cobberas-Tingaringy National Park	N/R	Partly within study area & significant within a registered area (Victorian Alps)
209270001701	015227	Coopracambra Extension Area - Mt Kaye/Mt	N/R	

		Denmarsh Area/Jones Creek		
20927000801	004759	Coopracambra State Park	N/R	
209270000401	004741	Croajingolong Area	N/R	
209270001901	015226	Errinundra Plateau Area	N/R	
209270001902	007017	Errinundra Plateau Area Extensions	N/R	
209270000901	004760	Ewing Morass State Game Reserve	N/R	significant within a registered area (Croajingolong area).
209270000201	004739	Gabo Island Lighthouse	H/R	
209270000202	016631	Gabo Island lightstation Complex	H/R	Comprising the whole island and the complex.
209270001401	017972	Genoa Corridor	N/Rep	Genoa River corridor.
209270002001	016559	Genoa Road Bridge	H/Rep	
		Hunters Hill	N/Rep	
209270000406	004746	Lake Barracoota	N/R	significant within a registered area (Croajingolong area).
209270000411	004750	Lake Beadle	N/R	significant within a registered area (Croajingolong area).
209270000405	004745	Lake Elusive	N/R	significant within a registered area (Croajingolong area).
209274000701	004788	Lake Tyers Aboriginal Mission	H/R	
209274000601	004787	Lake Tyers Church	H/R	
209270000410	004749	Lake Wau Wauka	N/R	significant within a registered area (Croajingolong area).
209270001501	004766	Mallacoota Inlet Midden Complex	A/R	
209270000402	004742	Mallacoota Inlet National Park	N/R	significant within a registered area (Croajingolong area).
209270002101	017973	Martin Creek Rainforest & Catchment	N/N	
20970001301	004764	Monumental City Shipwreck	H/Rep	declared under the *Historic Shipwrecks Act 1976* on 11/3/1982
209270000605	004757	Mount Cobberas Area	N/R	significant within a registered area
209274000501	004786	Mount Stewart Reserve	N/R	significant within a registered area
108272001601	001019	Nadgee Wilderness Area	N/R	partly within the study area - significant within a registered area (Croajingolong Area)(22000ha 8km SE of Womboyn, comprising Nadgee Nature Reserve in NSW and part of Croajingolong National

				Park in Victoria)
209274000801	016158	New Works Historic Area	H/R	
209270002201	017971	North Brodribb Tributaries	N/Rep	
209238001501	004700	Nunnett Plain Reserve	N/R	significant within a registered area (Victorian Alps)
20927000101	004738	Point Hicks Lighthouse Station	H/R	also known as Cape Everard light house
209270001101	004762	RAAF Underground Operations Room (Former)	H/R	
209274000301	004784	Railway Trestle Bridge, Nowa Nowa	H/R	
209270001801	015225	Rodger River Area	N/R	
209270001802	017296	Rodger River Area Extensions	N/R	
209270002501	018123	Snowy River - Errinundra Forest Link - upper Goongerah & Sun Creek Catchments	N/N	
209270000702	015851	Snowy River National Park	N/R	
209270000407	004747	Tamboon Inlet	N/R	significant within a registered area (Croajingolong area)
209270002401	017969	Three Sisters	N/Rep	
209270000201	004754	Tingaringy National Park	N/R	
209270002301	017970	Tonghi Jungle	N/Rep	
209270000403	004743	Wingan Inlet National Park	N/R	significant within a registered area (Croajingolong area)
209270001601	04767	Wroxham Grinding Grooves	H/R	

Appendix I: Members of the AHC / NRE Study Teams

AHC Study Staff

Anne-Marie Delahunt - Project Manager
Ric Bland - Project Leader
Maria Woodgate - Senior Conservation Officer
Bruce Cummings - Senior Conservation Officer
Angela Rymer - Conservation Officer
Geoff Dunn - Conservation Officer
Leonie Hellmers - Communications Consultant
Sandy Blair - Principal Conservation Officer
Charmaine Clarke - Aboriginal Liaison Officer
Stuart Read Senior - Conservation Officer
Deb Edwards - Conservation Officer
Marina Walkington - Senior Conservation Officer
Jane Dakin - Executive Support
Bronwen Wicks - Senior Conservation Officer
David Risstrom - Technical Support
Jenny Carnell - Technical Support

NRE Study Staff

Dave Holmes - Project Manager
Stephen Henry - Project Leader (part)
Tony Bartlett - Project Leader (part)
David Parkes - Flora and Fauna Branch
Bill Peel - Flora and Fauna Branch
Anita Brady - Historic Places
Fleur King - GIS Operator
Karen Taylor - Fauna and Wetlands
Phil King - Drafting Section
Jon Drohan - Executive Co-ordinator

NB: For those people who specifically contributed to the Method Papers, see acknowledgments in the Method Papers.

Appendix J: Members of the Technical Advisory Committee

Anita Brady Formerly - NRE, Historic Places;

Dr Charles Meredith - Biosis Pty Ltd;

David Parkes - NRE, Flora Branch;

Dr Graham Watson - Zoology Dept, University of Melbourne;

Chair, - AHC Victorian Natural Advisory Panel;

Neville Rosengren - Geology Department, LaTrobe University College of Northern Victoria, and member of the AHC Victorian Natural Environment Advisory Panel;

Meredith Fletcher - Director, Centre for Gippsland Studies, Monash University;

Graeme Butler - Graeme Butler & Associates Pty. Ltd;

AHC Project Team - (various members);

NRE Project Team - (various members).

Appendix K: Technical Workshops and Participant

1. ABORIGINAL ARCHAEOLOGICAL WORKSHOP

Title: Identifying Aboriginal archaeological places which demonstrate the principle characteristics of their class,

Date: 8 November 1993,

Venue: Australian Heritage Commission offices, Canberra,

Purpose of workshop: To explore current thinking in the identification and management of representative samples of archaeological landscapes and sites in forests, and to develop methods for the Victorian regional assessment projects.

Mr Barry Cundy	AIATSIS
Dr Klim Gollam	National Parks & Wildlife Service, NSW
Mr Roger Hall	NSW Forestry Commission
Mr Adam Lewis	Conservation & Natural Resources, VICMs
Anne McConnell	Tasmanian Forestry Commission
Mr Paul Packard	National Parks & Wildlife Service, NSW
Mr Jim Rhoads	Aboriginal Affairs Victoria
Ms Laura-Jane Smith	Charles Sturt University
Mr Phil Hunt	Consultant
Mr Gary Dunnett	Australian Heritage Commission
Ms Sue Feary	Australian Heritage Commission
Mr Brian Prince	Australian Heritage Commission
Ms Marilyn Truscott	Australian Heritage Commission
Dr Elizabeth Williams	Australian Heritage Commission
Ms Charmaine Clarke	Australian Heritage Commission

2. ABORIGINAL HISTORICAL WORKSHOP

Title: Aboriginal archival and oral history seminar,

Date: 18 November 1993,

Venue: Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra,

Description of workshop: A seminar by Megan Goulding, Aboriginal Affairs Victoria, on methods for researching Aboriginal history, with reference to her work on Aboriginal historic places in East Gippsland.

Ms Julie Finlayson	LaTrobe University
Mr Collon Mullett	Aboriginal Affairs Victoria
Dr Luke Taylor	National Museum of Australia
Ms Lorraine Coutts	National Museum of Australia
Ms Lori Richardson	National Museum of Australia
Dr Sarah Colley	University of Sydney
Ms Anne McGrath	University of NSW
Dr David Bennett	Aboriginal & Torres Strait Islander Commission

Ms Sue Wesson	Aboriginal Affairs Victoria
Ms Annie Clark	Australian National University
Mr Stuart Read	Australian Heritage Commission
Ms Sue Feary	Australian Heritage Commission
Ms Charmaine Clarke	Australian Heritage Commission
Dr Liz Williams	Australian Heritage Commission
Ms Marina Walkington	Australian Heritage Commission

3. AESTHETIC VALUES WORKSHOP

Title: More than meets the eye: identifying and assessing aesthetic value,

Date: 27 October 1993,

Venue: University of Melbourne,

Purpose of workshop: To review the method used for identifying and assessing aesthetic values for the Victorian regional assessment projects in the light of current expert values, define aesthetic value and consider related issues.

Professor David Yencken	University of Melbourne
Ms Anne McGregor	Context Pty Ltd
Mr Bob Itami	University of Melbourne
Ms Jan Schapper	University of Melbourne
Dr Mary Mc Closkey	University of Melbourne
Mr Dennis Williamson	Scenic Spectrums
Dr Richard Lamb	University of Sydney
Dr Luke Taylor	National Museum of Australia
Mr Andrew Lothian	Department of Environment, SA
Ms Gini Lee	Royal Melbourne Institute of Technology
Ms Sue Hodges	State Library of Victoria
Mr Grant Revell	Conservation and Land Management, WA
Mr Alan Hordacre	Conservation and Land Management, WA Assoc.
Professor Ken Taylor	University of Canberra
Ms Helen Armstrong	University of NSW
Mr Paul Dartnell	Conservation & Natural Resources, VIC
Mr John Cleary	Conservation & Natural Resources, VIC
Mr Mike Leonard	Conservation & Natural Resources, VIC
Mr Laurie Jeremiah	Conservation & Natural Resources, VIC
Mr Gerry de Gryse	Collins Street, Hobart
Mr Bruce Chetwind	Forestry Commission, TAS
Mr John Van Pelt	EDAW, Sydney
Ms Megan MacDougal	Historic Building Council
Ms Kirsten Maloney	Consultant Commissioner
Bill Jonas	Australian Heritage Commission Commissioner
Haig Beck	Australian Heritage Commission
Mr Neville Wale	National Trust, VICMs
Sue Feary	Australian Heritage Commission
Dr Sandy Blair	Australian Heritage Commission

Ms Melinda Brouwer	Australian Heritage Commission
Ms Juliet Ramsay	Australian Heritage Commission
Mr John Paraskevopoulos	Australian Heritage Commission
Mr Stuart Read	Australian Heritage Commission
Ms Anne-Marie Delahunt	Australian Heritage Commission
Mr Mike Cavanagh	Australian Heritage Commission

4. FAUNA VALUES WORKSHOP

Title: Identifying places containing fauna values of national estate significance in a regional context,

Date: 29 October 1993,

Venue: Australian Heritage Commission offices, Canberra,

Purpose of workshop: To receive expert review and comment on technical direction for identifying and assessing fauna values in a regional context, and to inform the forest research community of this work.

Dr Andrew Claridge	Centre for Resource and Environmental Studies, Australian National University
Mr Steve Cook	-
Mr Stuart Davey	Bureau of Resource Sciences
Ms Liz Dovey	National Parks & Wildlife Service, NSW
Mr Brendan Edgar	Australian Nature Conservation Agency
Mr Arthur Chapman	Environmental Resources Information Network
Mr Don Glasco	Environmental Resources Information Network
Dr Steve Henry	Conservation & Natural Resources, VIC
Mr Greg Hollis	Conservation & Natural Resources, VIC
Dr Tony Norton	Centre for Resource and Environmental Studies, Australian National University
Mr Felix Schlarger	Australian Nature Conservation Agency
Dr Andrew Smith	University of New England
Dr Grant Wardell-Johnson	Conservation and Land Management, WA
Mr Rodger Hnatuik	National Forest Inventory
Mr Harry Abrahams	Australian Heritage Commission
Mr Ric Bland	Australian Heritage Commission
Ms Chris Perrers	Australian Heritage Commission
Dr Rosemary Purdie	Australian Heritage Commission
Mr Brian Weavers	Australian Heritage Commission
Ms Maria Woodgate	Australian Heritage Commission

5. REPRESENTATIVE VEGETATION WORKSHOP

Title: Representative vegetation: identifying natural heritage places which demonstrate the principle characteristics of their class,

Date: 19 October 1993,

Venue: Australian Heritage Commission offices, Canberra,

Purpose of workshop: To generate discussion on the method developed for identifying representative vegetation for the Victorian regional assessment projects.

Dr Mike Austin	Commonwealth Scientific & Industrial Research Organisation
Dr Mick Brown	Tasmanian Forestry Commission
Mr Sandy Gilmore	Consultant ecologist
Mr Richard Gijsbers	Conservation & Natural Resources, VIC
Mr Peter Hitchcock	Wet Tropics Management Authority & Australian Heritage Commission
Professor Jamie Kirkpatrick	University of Tasmania
Mr Paul Sattler	Department of Environment & Heritage, QLD
Ms Rebecca Blackburn	Australian Heritage Commission
Mr Ric Bland	Australian Heritage Commission
Mr Mike Cavanagh	Australian Heritage Commission
Mr Bruce Cummings	Australian Heritage Commission
Mr Brian Prince	Australian Heritage Commission
Ms Denise White	Australian Heritage Commission

6. DIVERSITY WORKSHOP

Title: Assessing diversity in natural heritage,

Date: 20 October 1993,

Venue: Australian Heritage Commission offices, Canberra,

Purpose of workshop: To discuss procedures for identifying places of high flora and fauna species richness and the issues relating to diversity assessment.

Dr Mike Austin	Commonwealth Scientific & Industrial Research Organisation
Dr Mick Brown	Tasmanian Forestry Commission
Mr Sandy Gilmore	Consultant ecologist
Mr Richard Gijsbers	Conservation & Natural Resources, VIC
Mr Peter Hitchcock	Wet Tropics Management Authority & Australian Heritage Commission Professor
Jamie Kirkpatrick	University of Tasmania
Mr Paul Sattler	Department of Environment & Heritage, QLD
Ms Rebecca Blackburn	Australian Heritage Commission
Mr Ric Bland	Australian Heritage Commission
Mr Mike Cavanagh	Australian Heritage Commission
Mr Bruce Cummings	Australian Heritage Commission
Mr Brian Prince	Australian Heritage Commission
Ms Denise White	Australian Heritage Commission

7. SOCIAL VALUES WORKSHOP

Title: People's places: identifying and assessing social value for communities,

Date: 20 October 1993,

Venue: University of Melbourne,

Purpose of workshop: To define social value, explore the fundamentals of assessment and develop a model for community participation for the Victorian regional assessment projects.

Ms Chris Johnston	Context Pty Ltd
Ms Joy McCann	Heritage consultant, Melbourne
Dr Kim Dovey	University of Melbourne
Dr Julie Finlayson	LaTrobe University
Professor Peter Spearritt	Monash University
Ms Meredith Walker	Consultant planner, Sydney
Ms Helen Armstrong	University of Sydney
Mr Tom Griffiths	Historian, VIC
Ms Jane Lennon	Heritage consultant, QLD
Mr Ian Wight	National Trust, VICMs
Katherine Murphy	'Place' consultant, VIC
Mr Gary Wilmott	Landscape architect, TAS
Dr Jim Russell	University of Tasmania
Dr Christine Liao	Chinese Museum, Melbourne
Mr Graeme Butler	Heritage consultant, VIC
Ms Jan Schapper	University of Melbourne
Prof. David Yencken	Heritage consultant and academic
Mr Ray Tonkin	Conservation & Natural Resources, VIC
Ms Anita Brady	Conservation & Natural Resources, VIC
Commissioner Haig Beck	Australian Heritage Commission
Ms Sharon Sullivan	Australian Heritage Commission
Ms Alex Marsden	Australian Heritage Commission
Dr Sandy Blair	Australian Heritage Commission
Mr Mike McGrath	Australian Heritage Commission
Mr Ken Charlton	Australian Heritage Commission
Mr Martin Brine	Australian Heritage Commission
Ms Juliet Ramsay	Australian Heritage Commission

Appendix L: Organisations and Participants attending Heritage Workshops and Study Briefings

ORGANISATIONS AND PARTICIPANTS ATTENDING THE HERITAGE WORKSHOPS HELD IN THE REGION

NB: For each of the workshops, various organisations and individuals were invited but were unable to attend. Their names are not listed here.

PARTICIPANTS IN THE BONANG WORKSHOP

Peter Killackey	Community Trading Post
Patsie Manning	Bendoc Progress Association
Jane Dillon	Bonang General Store
Wayne Dillon	Snowy River Tourist Association
Kaye Minchin	Deddick River Remote Area Womens' Group
Annette Stuckey	Tubbut Tattler
Allan Stuckey	Deddick River Landcare Group
Bob McIlroy	Concerned Residents of East Gippsland (CROEG)
Cr Laurie Reed	Shire of Orbost
Meg Mustard	Bonang
Astrid Brandenburg	Bendoc
Gerald Ventry	Visitor (Grenfell, NSW)
Allan Neven	Tubbut
Vence Edwards	Tubbut
Cliff Reed	Delegate River
Phil Prendergast	Bonang
Tom Ventry	Deddick via Bonang

LIST OF PARTICIPANTS IN THE ORBOST WORKSHOP

Kate Murphy	Shire of Orbost (Town Planner)
Joan Potter	Shire of Orbost (Community Recreation Officer)
Tony Bartlett	Formerly NRE, Orbost
Anita Pike	Forest Protection Society
Graham Young	Jarrahmond Landcare Group
Chris Nixon	Victorian Farmers' Federation, Orbost
Geoff Stevenson	Orbost Historical Society
Jean Leatham	Orbost Womens' Awareness Group
Heather Richardson	Orbost Womens' Awareness Group
John Pritchard	John Pritchard Consultancy Services
Max White	Snowy River Improvement Trust
Terry Hooper	Orbost Primary School
Paul Dawson	Orbost Secondary College
Dave McKenzie	Orbost Secondary College

PARTICIPANTS IN THE NOWA NOWA WORKSHOP

Darlene Lewendon	Shire of Tambo

Heather Livingstone	Victorian Farmers' Federation, Buchan-Gelantipy
Geoff Hammond	Friends of Buchan Caves
Dudley Lee	Bairnsdale Fly Fishing Club
Peter McGregor	Bairnsdale Fly Fishing Club
Alex Larkins	Tambo Shire Historical Society
John Rigby	Tambo Shire Historical Society
Paul Kneale	NRE, Nowa Nowa
Graham Parkes	NRE, Buchan
Tom Henderson	United Dairy Farmers (Victorian Farmers' Federation)
James Turner	Bairnsdale Field Naturalists' Group
Jack Whadcoat	Lake Tyers Protection Group
Deb Schmetzer	W Tree Progress Association
John Mathews	W Tree Progress Association

PARTICIPANTS IN THE MALLACOOTA WORKSHOP

Rex Corthorn	Mallacoota Historical Society
Ken Howe	Mallacoota Historical Society
Bob Semmens	Friends of Mallacoota
Ray Cameron	Mallacoota RSL
Graeme Berry	Mallacoota Water Board
Hans Van der Sant	Mallacoota Water Board
Estelle McKenzie	St Peter's Church, Mallacoota
Dave Huxtable	NRE, Mallacoota
Stephen Henry	NRE, Orbost
Wendy Robinson	River Management Board
Don Taylor	Mallacoota & District Angling Club
Phil Coynd	Mallacoota & District Angling Club
Alan Robertson	Gipsy Point Lodge
Leo Opden Broun	Mallacoota Surfriders
Allan Peisley	Farmer, Genoa
Jim Bridle	Farmer, Genoa
Ken Morrison	Friends of Mallacoota

ADDITIONAL GROUPS AND INDIVIDUALS INVOLVED IN STUDY BRIEFINGS

Name	**Organisation/Of ...**
Penny Johnson	ABC Radio, Sale
John Morrissey	Australian Deer Association
Beth Isakson	Bairnsdale & District Field Naturalists' Club
Ken Norris	Victorian Farmers' Federation, Bairnsdale
Martin Westbrooke	Ballarat University College
Thomas Orange	Booroondara Bushwalking Club
Gordon Muir	Brown & Dureau, Orbost
Cathy Hall	Bruthen & District Community Forum
George Bradford	Buchan Tourist Association
Suzanne Hoverman	Centre for Resource & Environmental Studies,Australian National University

Bob Ackeroyd	Country Fire Authority (Vic) - Tambo Group
Leonie Cameron	Concerned Residents of East Gippsland
Jill Redwood	Concerned Residents of East Gippsland/Upper Brodribb Protection Committee
Dr Brian Turner	Dept. of Forestry, Australian National University
Ross Walker/Wendy Robinson	East Gippsland River Management Board
Aileen Mongta-Blackburn	Far East Gippsland Aboriginal Corporation
Helen Hoppner/Lyn Dobson	Forest Protection Society
Debbie Hall	Forest Protection Society
Anita Pike	Forest Protection Society
Peter Sands	Friends of Mallacoota Gippsland & East Gippsland Aboriginal Cooperative
Peter Hall	Member of the Legislative Assembly, Gippsland Province
	Gunai Womens Aboriginal Cooperative
Graham Young	Jarrahmond Landcare Group
	Lake Tyers Aboriginal Trust
David Jones	Landscape Architecture Unit, Royal Melbourne Institute of Technology
Graeme Berry	Mallacoota Water Board
Raj Rajakumar	Mallacoota Water Board
Robert Farnham	Moogji Aboriginal Council
Brian Stevens	Moogji Aboriginal Council
Sue Silvers	Mountain Cattlemens' Association of Victoria
Michael Coleman	Natural Resources Conservation League
Ellis Stevens	Orbost Chamber of Commerce & Industry
Geoff Lambert	Orbost District Environment Group
John Zimmer	Orbost District Environment Group
Hugh Adams	Victorian Farmers' Federation, Orbost
Chris Nixon	Victorian Farmers' Federation, Orbost
Les Mathieson	Orbost Water Board
Heather Richardson	Orbost Womens' Awareness Group
Robyn Grant	Organic Agriculture Association
Ms C Copley	Student, Royal Melbourne Institute of Technology
Kate Murphy/Graeme Duff	Shire of Orbost
Diane Hollins	Snowy River Mail
anon. representative	Shire of Tambo
Uta Wohl	Tambo Shire Historical Society
Alex Larkins	Tambo Shire Historical Society
John Rigby	Tambo Shire Historical Society
anon. representative	Tambo Water Board
Bob Humphreys	Victorian Association of Forest Industries
John Swan	Victorian Association of Forest Industries
Peter Devonshire	Victorian Association of Forest Industries
Peter Miles	Victorian Association of 4 Wheel Drive Clubs
Bruce Connelly	Victorian Eastern Development Authority
Claudine Wallace	Victorian Recreational Fishermens' Advisory Committee

Roger Taylor	Victorian Speleological Association
Lionel Pollard	W Tree Progress Association
Deborah & Peter Schmetzer	W Tree Progress Association
Bob Henderson	Orbost
Bob Semmens	Mallacoota
Margaret Valentin	Orbost
Neil Freestone	Orbost

Acronym List

AAV Aboriginal Affairs Victoria

AHC Australian Heritage Commission

AROTS Australian Rare or Threatened Species

AVW Atlas of Victorian Wildlife

BP Before Present

CALM Department of Conservation and Land Management WA

CAMBA China-Australia Migratory Bird Agreement

CAR Comprehensive, adequate and representative (reserve system)

CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora

CNR Department Conservation and Natural Resources, Victoria, (previously Department of Conservation and Environment, DCE, and prior to that Department of Conservation, Forests and Lands, CFL)

CRA Comprehensive Regional Assessment

DFA Deferred Forest Areas

DSOP Draft Statement of Principles

DWR Department of Water Resources, Victoria

EVC Ecological vegetation classes

FFG Flora & Fauna Guarantee Act 1988 (Victoria)

FIS Flora Information System

FMA Forest Management Area

FMP Forest Management Plan

GIS Geographic Information System

ICOMOS International Council on Monuments and Sites

IFA Interim Forest Agreement

JAMBA Japan-Australia Migratory Bird Agreement

LCC Land Conservation Council

NFPS National Forest Policy Statement

NRE Department of Natural Resources and Environment, (previously Department of Conservation & Natural Resources (CNR) Department of Conservation and Environment, DCE, and prior to that Department of Conservation, Forests and Lands, CFL)

OGFS Old-Growth Forest Study

RADB Regional Assessments Database

RFA Regional Forest Agreement

TAC Technical Advisory Group

VMS Visual Management System

VROTS Victorian Rare or Threatened Species

Glossary

National Estate Report

Action Statement
An Action Statement must be prepared for every plant and animal species listed under the Victorian Flora and Fauna Guarantee Act 1988 . The Action Statement is designed to provide management prescriptions that ensure the long term conservation of the species.

Aesthetic value
Aesthetic value is the response derived from an experience of the environment or particular natural and cultural attributes within it. This response can be either to visual or non-visual elements and can embrace emotional response, sense of place, sound, smell and any other factors having a strong impact on human thoughts, feelings and attitudes.

Assessments database
The assessments database is a relational database written in a programming language called 4th Dimension™ (4D), which collates, manipulates and presents all aspects of an identified national estate place's elements. The assessments database was used to produce the values and places tables.

Biophysical
A combination of physical features, such as climate, soils, geology and landforms, and biological features, such as flora and fauna.

Burra Charter
A document adopted by the Australia International Council on Monuments and Sites (ICOMOS) at a meeting at Burra, South Australia, in 1979, outlining the (now widely) accepted standard for heritage conservation practice. The Burra Charter defines the basic principles and procedures to be observed in the conservation of significant places, and is written for Australian conditions.

CAMBA
China-Australia Migratory Bird Agreement.

Cells
Cells are square grids of an appropriate scale (such as 2 km x 2 km) which are laid over maps and datasets on the Geographic Information System as an aid to interpreting data and analysing patterns.

Characteristic
Characteristics are specific features or components of the natural or cultural environment which may be analysed for national estate significance. A characteristic may be, for example, some aspect of vegetation communities, species of plants and animals, wetlands, archaeological sites or historic sites.

Code of Forest Practices
This code is a set of guidelines established by the Department of Conservation and Natural Resources for conducting timber harvesting and other associated works. The guidelines aim to ensure that impacts on environmental and heritage values associated with forests are minimised.

Conservation
As defined in the Burra Charter, conservation is looking after a place to maintain the original qualities which make it special and important. Retaining a place's cultural significance may include maintenance, preservation, restoration, reconstruction and adaptation or a combination of these.

Conservation advice / principles
The Australian Heritage Commission (AHC) has a statutory obligation to furnish advice on the protection of the national estate. The advice is based on conservation principles which are aimed at protecting and maintaining national estate places or values. Advice is available for land management agencies and individuals who own places that have been identified as having national estate value. However, they are under no obligation to accept this advice - the AHC can only recommend ways of protecting the national estate, not enforce them.

Context
Context means the position of a feature or area in the landscape relative to the rest of the landscape or topographic features, other vegetation and/or disturbance. For example some values such as old-growth forest need to be considered in context, that is in terms of their relationship to disturbance, other vegetation and the landscape in general.

Criteria
The Australian Heritage Commission uses eight criteria to determine whether places meet the requirements for listing on the Register of the National Estate. These criteria are stipulated in the Australian Heritage Commission Act 1975 and are listed in Appendix C of this report.

Disjunct
Disjunct populations are physically separated from one another, that is, there is no gene flow between the populations. They are formed over time due to the appearance of a barrier in a formerly continuous distribution. Disjunct populations often have distinctive features in an evolutionary sense from the 'parent' population, and in time may become separate species.

Disturbance
Disturbance is a term that encompasses a range of factors which affect the condition of natural areas. Disturbance may be natural or human-induced. Natural disturbance includes wildfires and rainstorms, and is part of natural ecological processes. Human-induced or 'unnatural' disturbance includes timber harvesting, agricultural clearing, mining and grazing. The factors which are important when considering disturbance are the origin, duration, and intensity of the disturbance, and its impact on the environment.

Diversity
Diversity is a measure of the physical or biological complexity of a system. It refers to a range of features from artefact scatters to species presence.

Ecological vegetation classes
Ecological vegetation classes are the components of a vegetation classification system. They are groupings of vegetation communities based on floristic, structural and ecological features.

Endemic species
Endemic species are those whose natural distribution is restricted to a specific area, in this case East Gippsland.

Expression of national estate value
An expression of national estate value is an occurrence of that value, identified on a map, or on the ground. In terms of the assessment database an expression of national estate value is a combination of coarse and fine level descriptions. Expressions are represented in the form 'general value/specific value' (eg. Endemic Flora/Acacia frigescens). Expressions are identified and then linked to sub-areas and national estate places.

Extensive national estate values
Extensive national estate values are those which are widespread over the landscape, for example, places important for vegetation succession (criterion A2).

Fabric
Fabric is the physical material of a place. For example, the fabric of cultural places might be an artefact scatter or hut.

Floristic
Floristic refers to the plant species of an area or a vegetation community.

Forest Management Plan
A Forest Management Plan is a strategic plan prepared by NRE for the management of a forest area/region, which is effected through a system of zoning. FMPs are required to be economically viable, ecologically sustainable, and environmentally sensitive and are produced with public input in the planning processes.

General value
A general value is the term used throughout the assessments database to define the coarser level of definition, (eg. endemic flora, important historical phases or development). The general value is used in conjunction with a specific value to form an expression of national estate value.

Geographic units
Geographic units are sub-divisions of the region that share broadly similar biophysical characteristics, especially in regard to landform, geology, soils and climate.

Geological characteristics
Geological characteristics are features and structures associated with the formation of the earth's crust as well as major landform units such as mountains.

Geomorphological characteristics
Geomorphological characteristics are features associated with active landform processes such as erosion and deposition.

Gondwanic
Gondwanic refers to those characteristics or features which relate to an ancient phase of the earth's development, at a time when the land masses of the southern hemisphere were joined together. This agglomeration of the southern continents is termed Gondwana, hence the adjective 'gondwanic'.

Grid cells
Grid cells are square grids of an appropriate scale (such as 2 km by 2 km) which are laid over maps and datasets on the GIS to aid interpretation of data and analysis of patterns.

Growth stages
The forest growth stage classificatory system is a way to classify the life-cycle of trees. The system is based on tree structure, namely, crown form. Growth stages are the categories of this system, the main ones being mature, regrowth and senescent, or over-mature. For this project, forest growth stages were mapped through air photo interpretation and field verification and forests were classified according to the relative proportion of regrowth, mature and senescent trees in the canopy layer.

Heritage
Heritage encompasses all those things which we have inherited from previous generations and which we value. Heritage includes places (including national estate places), things (moveable objects) and folklore (customs, songs and sayings).

Historical themes
Historical themes are major historical activities, such as tourism and recreation, or events, such as fire disasters.

Identified national estate value
Identified national estate value refers to national estate value identified by the Australian Heritage Commission.

Interim list
The AHC enters places on the interim list by announcing its intention to register those places in the press and in the Commonwealth Government Gazette. Once a place is entered on the interim list, and before it can be entered in the Register, there is a minimum statutory period of three months during which any person may object to the proposal in writing. If objections are received, they must be given due consideration by the AHC, but uppermost consideration must be given to the national estate significance of the place concerned.

JAMBA
Japan-Australia Migratory Bird Agreement.

Layer
Each national estate value, such as endemic plant species, is represented on a map which is referred to as a layer, eg the endemic plants layer.

Limnology
Limnology is the study of the physical and biological features of lakes and other fresh waters.

Linear EVCs
Linear EVCs are those vegetation communities which most commonly occur in an elongated linear form. They are mostly associated with water courses.

Linear network
A place of cultural significance which exists as a linear feature, such as a track or a route and associated sites alongside.

Lithology
The general characteristics of rock formations, such as composition and texture, and the sequence in which the formations were laid down.

Maintenance
The continuous protective care of the fabric, contents or setting of a place, as distinguished from repair. Repair involves restoration or reconstruction.

Mapped values
Mapped values are national estate values presented in a mapped form.

Methodology
Methodology is defined as the application of the national estate criteria and thresholds to determine national estate values within a regional context. The methodology for regional assessments is distinguished by the fact that it does not consider national estate values in isolation but attempts to place them in the context of national estate values for an entire region.

Montane
Montane means occurring on mountains.

National Estate
The National Estate is a collection of places - components of the natural or cultural environment of Australia - that have aesthetic, historic, scientific or social significance or other special value for future generations and for the present community. These places are listed on the Register of the National Estate.

Nomination
Nomination of a place for consideration as a national estate place involves informing the Australian Heritage Commission (AHC) of the place and its value. Anyone can nominate a place for listing on the Register of the National Estate. The place then undergoes detailed assessment by AHC staff and relevant outside experts. Each place is examined against specific criteria, and assessed solely on the basis of national estate values.

Old-growth forest
Old-growth forests are ecologically mature and have been subjected to negligible human-induced disturbance such as logging, roading and clearing. Old-growth forests are usually dominated by trees that exhibit late mature or senescent growth stages in the upper stratum.

Palaeobotany
Palaeobotany is the study of fossil plants.

Palaeontology
Palaeontology is the study of fossils.

Palaeo-environmental sites
Palaeo-environmental sites are places where palynological (pollen analysis) and sedimentary studies reconstruct a history of vegetation, landscape or climatic change.

Palynology
Palynology is the study / analysis of pollen.

Place (cultural)
Site, area, building or structure, group of buildings or structures together with associated contents and surrounds.

Place (national estate)
Areas and locations listed on the Register of the National Estate are called places. A national estate place is the end point in the identification and assessment process.

Point sites
Point sites cover a limited area and are expressed as points when mapped at a large scale.

Predictive model
The predictive model is used for archaeological sites and predicts archaeological sites or locations inferred from existing information and usually links site density to particular landscape units.

Prescription
Prescriptions are standards specified within the Code of Forest Practices which describe acceptable management practices related especially to timber harvesting. They are regulatory rather than legislative.

Principal characteristics of class
Principal characteristics of class refer to the essential features which define, or are most commonly associated with a particular heritage value. The concept is sometimes expressed as a typical example or a representative samples.

Recovery Plan
Under the Commonwealth Endangered Species Protection Act 1992 there is a requirement to prepare recovery plans for scheduled species. These are management plans which guide actions to ensure the long term conservation of the species.

Refugia
Refugia are places that offer protection for flora or fauna from (geologically) recent climatic change and associated environmental shifts, such as increased frequency of fire.

Regional assessment
Regional assessment is a type of project in which the Australian Heritage Commission works in conjunction with state and local authorities and other groups to identify all national estate values in a designated region.

Register of the National Estate
The Register of the National Estate is the national inventory of places of natural, historic and Aboriginal heritage significance, which have been rigorously assessed by the Australian Heritage Commission and deemed to be worth conserving for present and future generations. The Register serves to notify all Australians, and particularly planners and decision-makers, of places of national estate significance.

Reserve types
These are public land tenures set aside for reservation under various state acts and recommendations accepted by State Government.

Richness
Richness is a measure of the abundance of individual elements within a particular place. For instance, the species richness of an Ecological Vegetation Class (EVC) is the number of species which occurs within that EVC. The concept is closely related to diversity.

Schedule
A list appended to an Act of Parliament and referred to in the Act, for example, the Endangered Species Act has a schedule of endangered species.

Special Management Zones
Special Management Zones delineated in Forest Management Plans are created to ensure that management protects a particular feature of an area, for example, fauna habitat, whilst allowing timber harvesting to occur.

Specific value
Specific value is the term used throughout the assessments database to define the finer level of definition, (eg. Acacia frigescens). The specific value is used in conjunction with a general value to identify an expression of national estate value.

Storylines
Storylines are strong regional patterns or stories which provide links between historical themes, for example, sawmill sites and transport links in remote forest locations. Storylines are the product of people's memories and association with places.

Stratigraphy
Stratigraphy is a branch of geology dealing with the study of stratified rocks (which are rocks occurring as a bed or beds or "strata layers").

Sub-criteria
Sub-criteria are components of the eight criteria used by the Australian Heritage Commission. They are useful in applying the eight criteria to specific aspects of the environment (see Appendix D).

Succession
Succession is the change in vegetation composition over time, one community 'succeeding' over the other. For example, Wet forests in areas such as gullies that are protected from fire and other disturbance may eventually become rainforest. This occurs over a long period of

time in which rainforest species first colonise the understorey and, as the emergent eucalypts die out, rainforest species become the dominant species in the canopy.

Taxon (plural: taxa)
All living organisms can be defined according to their taxonomy. That is, each organism has been allotted a place, in common with like organisms, in the hierarchy of all living things. The hierarchy consists of many levels, from kingdom to species. A taxon is a taxonomic group of any level. For example, at the genus level, taxa may include Eucalyptus and Hakea.

Threshold
Threshold is the level above which a value is considered acceptable for entry on the Register of the National Estate. Thresholds are developed through scientific assessment or expertise, and an analysis of data within a regional context. An hypothetical example could be an area threshold: if 1500 hectares was the minimum area for remote and natural places to potentially qualify as wilderness areas, then only those areas greater than 1500 hectares would be considered.

Type specimen (biological/geological)
A type specimen is the original specimen from which a new species (biological) or geological term is scientifically described. A type location is the place where the original type specimen was found.

Value
Value refers to the particulars of a place which have worth, merit or significance.

Values and places tables
The values and places tables are the published results of the regional assessment process in the form of a series of tables detailing those expressions of national estate value identified as being above threshold.

Visual Management System
NRE's Visual Management System is a way in which scenic resources of forested land are made into an inventory and assessed by NRE.

Wilderness quality
Wilderness quality is a measure of differing levels of human impact on the natural environment, as part of a continuum of remote and natural conditions varying from pristine to urban. Wilderness quality is measured in terms of four variables (the Lesslie indicators of wilderness quality):

- remoteness from access;
- remoteness from settlement;
- apparent naturalness; and
- biophysical naturalness.

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Table 5: Ecological Vegetation Classes and Derived Flora Values

Ecological Vegetation	A1 refuge (climatic)	A1 refuge (frequent fire)	A1 relictual flora	A2 places important for succession	A2 remnant vegetation	B1 nationally rare/uncommon
1. Coastal Dune Scrub Complex				#		
2. Coast Banksia Woodland				#		#
3. Coastal Grassy Forest					#	#
4. Coastal Vine-rich Forest						#
5. Coastal Sand Heathland				#		#
6. Sand Heathland						#
7. Clay Heathland						
8. Wet Heathland			#			
9. Coastal Saltmarsh				#		
10. Estuarine Wetland				#		#
11. Coastal Lagoon Wetland				#		
12. Wet Swale Herbland				#		#
13. Brackish Sedgeland						#
14. Banksia Woodland				#		
15. Limestone Box Forest					#	#
16. Lowland Forest						
17. Riparian Scrub Complex			#	#		
18. Riparian Forest				#	#	
19. Riparian Shrubland				#		
20. Heathy Dry Forest						
21. Shrubby Dry Forest						
22. Grassy Dry Forest						
23. Herb-rich Forest				#		
24. Foothill Box Ironbark Forest						
25. Limestone Grassy Woodland					#	#
26. Rainshadow Woodland	#	#				#
27. Rocky Outcrop Scrub		#		#		#
28. Rocky Outcrop Shrubland		#				
29. Damp Forest				#		
30. Wet Forest	#	#		#		

31.	Cool Temperate Rainforest2	#	#	#	#		#
32.	Warm Temperate Rainforest3	#	#	#	#		#
33.	Cool/Warm Temperate Overlap	#	#				#
34.	Dry Rainforest		#				#
35.	Tableland Damp Forest	#	#			#	#
36.	Montane Dry Woodland	#					
37.	Montane Grassy Woodland	#				#	
38.	Montane Damp Forest	#					
39.	Montane Wet Forest	#	#				
40.	Montane Riparian Woodland	#				#	#
41.	Montane Riparian Thicket	#	#				#
42.	Sub-alpine Shrubland	#					#
43.	Sub-alpine Woodland	#					#
44.	Sub-alpine Treeless Complex	#	#	#			#

Footnotes:

1. Derived flora values utilise EVC mapping and flora quadrats contained therein as a basis for particular attributes. This table identifies the EVC's of which some areas may be above threshold for the indicated criterion.

2. Cool Temperate Rainforest in East Gippsland is recognised as floristically distinct from other examples.

3. Warm Temperate Rainforest in East Gippsland is recognised as floristically distinct from other examples.

Table 6.1: Reserve status of natural values (excluding D1 flora values)

National estate value and sub-criterion	National estate value on public land (ha)	Area in reserves (ha)	Percent of value in reserves
Landscape evolution (A1)	89,100	84,490	94.8
Existing landscape processes (A2)	62,210	61,330	98.6
Places with unusually high landscape diversity (A3)	55,990	55,140	98.5
Rare, uncommon landscapes (B1)	13,640	13,550	99.3
Geological and geomorphological features characteristic of their class (D1)	11,660	11,560	99.1
Places with unusually high flora species richness (A3)	53,330	29,810	55.9
Places with unusually high fauna species richness (A3) - FMA	47,500	34,780	73.2
Places with unusually high fauna species richness (A3) - GRU	40,160	34,350	85.5
Climatic & environmental history sites (A1)	8,930	8,880	99.4
Endemic flora (A1)#	189,240	121,850	n/a
Endemic fauna (A1)#	13,270	6,020	n/a
Flora refuges (A1)	153,860	127,150	82.6
Relictual fauna (A1)+	na	na	na
Limit of range of flora - including disjuncts (A1)	111,820	109,370	97.8
Limit of range of fauna (A1)	35,970	27,810	77.3
Disjunct fauna (A1)	38,490	30,100	78.2
Undisturbed catchments (A2) *	--	--	All
Old-growth forests (A2 & B1)	176,700	127,920	72.4
Remnant vegetation (A2)	46,050	32,500	70.6
Places important for flora succession (A2)	185,480	134,450	72.5
Wetland fauna habitat (A2)+	3760+	3,530	93.7
Important fauna breeding sites (A2)+	3010+	2,720	90.4
Fauna refuge areas (A2)**	81,390	51,240	63.0
Natural landscapes (B1)	360,650	277,750	77.0
Places with wilderness quality (B1)	177,120	164,990	93.2
Nationally rare, uncommon EVCs (B1)	80,040	67,520	84.4
Rare, threatened fauna (B1)#	148,620	100,090	n/a
Rare, uncommon wetlands (B1)+	460+	440	95.7
Natural history sites (C1)	67,230	64,570	96.0
Wetlands characteristic of their class (D1)+	700+	700	100.0

Notes:

Code of Forest Practices exclusions have not been included as reserves.

Water bodies are not included in the above analysis.

+ Values with a high proportion of their area in water bodies are:

- Relictual fauna (A1) 250
- Wetland fauna habitat (A2) 3,000
- Important fauna breeding sites (A2) 1,550

- Rare, uncommon wetlands (B1) 220
- Wetlands characteristic of their class (D1) 2,080

The area reserved is not an appropriate measure of protection status; additional protection measures exist. See Table 6.3.

* Digital data unavailable to calculate areas and percentages.

** Riparian vegetation and Rainforest are protected under the Code.

Table 6.2: Reserve status of EVCs on public land (sub-criterion D1)

Ecological Vegetation Class	Total area (ha)	National Estate value (ha)	NE value reserved (ha)	NE value reserved (%)	Subject to timber harvesting
1. Coastal Dune Scrub	3,245	2,490	2,488	99.9	No
2. Coast Banksia Woodland	3,413	2,659	2,659	100.0	No
3. Coastal Grassy Forest	95	40	40	100.0	No
4. Coastal Vine-rich Forest	121	73	73	100.0	No
5. Coastal Sand Heathland	681	681	681	100.0	No
6. Sand Heathland	4	0	0	NA	No
7. Clay Heathland	1,780	426	421	98.8	No
8. Wet Heathland	9,514	5,681	5,058	89.0	No
9. Coastal Saltmarsh	831	458	458	100.0	No
10. Estuarine Wetland	237	70	69	98.6	No
11. Coastal Lagoon Wetland	541	171	171	100.0	No
12. Wet Swale Herbland	789	0	0	NA	No
13. Brackish Sedgeland	195	195	195	100.0	No
14. Banksia Woodland	36,996	25,121	21,517	85.7	part
15. Limestone Box Woodland	4,659	4,657	3,432	73.7	Yes
16. Lowland Forest	245,165	62,252	40,071	64.4	Yes
17. Riparian Scrub Complex	17,697	7,044	5,292	75.1	No
18. Riparian Forest	12,958	12,713	10,639	83.7	part
19. Riparian shrubland	649	388	382	98.5	No
20. Heathy Dry Forest	2,989	2,126	1,840	86.5	part
21. Shrubby Dry Forest	209,874	125,106	88,113	70.4	part
22. Grassy Dry Forest	16,902	3,000	2,819	94.0	part
23. Herb-rich Forest	9,679	9,451	5,834	61.7	part
24. Foothill Box Ironbark Forest	596	263	192	73.0	Yes
25. Limestone Grassy Woodland	471	470	435	92.6	No
26. Rainshadow Woodland	22,231	20,831	20,788	99.8	No
27. Rocky Outcrop Scrub	5,051	4,173	3,775	90.5	No
28. Rocky Outcrop Shrubland	1,606	1,193	1,187	99.5	No
29. Damp Forest	238,314	109,865	65,425	59.6	Yes
30. Wet Forest	90,287	47,901	30,027	62.7	Yes
31. Cool Temperate Rainforest	2,564	1,776	1,278	72.0	No
32. Warm Temperate	6,796	6,778	3,900	57.5	No

Rainforest					
33. Cool/Warm Temperate Rainforest Overlap	269	191	125	65.4	No
34. Dry Rainforest	11	6	6	100.0	No
35. Tableland Damp Forest	6,999	6,442	3,889	60.4	Yes
36. Montane Dry Woodland	48,569	33,747	28,614	84.8	part
37. Montane Grassy Woodland	4,824	4,824	3,683	76.3	No
38. Montane Damp Forest	13,962	11,247	10,425	92.7	Yes
39. Montane Wet Forest	13,506	9,976	9,336	93.6	Yes
40. Montane Riparian Woodland	515	515	502	97.5	No
41. Montane Riparian Thicket	37	5	5	100.0	No
42. Sub-alpine Shrubland	202	202	202	100.0	No
43. Sub-alpine Woodland	7,322	6,662	6,403	96.1	No
44. Sub-alpine Treeless Complex	1,088	241	236	97.9	No
Total	**1,044,233**	**532,110**	**382,685**		

NB: Water bodies not included in analysis.
Code of Forest Practices exclusions not included as reserves.

Table 6.3: National Estate Value afforded protection by legislated mechanisms

National estate value and sub-criterion	Afforded protection by Flora and Fauna Guarantee Act or Code of Forest Practices
a. Values sensitive to disturbance:	
Climatic & environmental history sites (A1)	wetlands
Undisturbed catchments (A2)	
Old-growth forests (A2 & B1)	
Remnant vegetation (A2)	
Places important for flora succession (A2)	rainforest + riparian EVCs
Wetland fauna habitat (A2)	wetlands
Important fauna breeding sites (A2)	
Places with unusually high flora species richness (A3)	rainforest + riparian EVCs
Places with unusually high fauna species richness (A3)	rainforest + riparian EVCs
Natural landscapes (B1)	
Places with wilderness quality (B1)	
Nationally rare , uncommon EVCs (B1)	rainforest + riparian EVCs
Rare, uncommon wetlands (B1)	wetlands
Natural history sites (C1)	
Principle Characteristics of Vegetation Class (D1)	rainforest + riparian EVCs
Wetlands characteristic of their class (D1)	wetlands
b. Values relatively resilient to disturbance:	
Landscape evolution (A1)	
Existing landscape processes (A2)	
Places with unusually high landscape diversity (A3)	
Rare, uncommon landscapes (B1)	
Geological and geomorphological features characteristic of their class (D1)	
c. Values whose sensitivity is species dependent:	
Endemic flora (A1)	VROTs only
Endemic fauna (A1)	VROTs only
Relictual fauna (A1)	VROTs only
Limit of range of flora - including disjuncts (A1)	VROTs only
Limit of range of fauna (A1)	VROTs only
Disjunct fauna (A1)	VROTs only
Rare, threatened fauna (B1)	VROTs
d. Values whose sensitivity to disturbance is yet to be determined	
Flora refuges (A1)	rainforest + riparian EVCs
Fauna refuge areas (A2)	rainforest + riparian EVCs

Table 6.4: Reserve status of old-growth forest (public land only) (sub-criteria B1 & A2)

Ecological Vegetation Class	Total EVC area (ha)	Old-growth forest (ha)	Old-growth % EVC	NE old-growth value (ha)	NE old- growth value reserved (%)
1 Coastal Dune Scrub Complex	3,245	304	9.38	271	100
2 Coast Banksia Woodland	3,413	1,086	31.82	709	100
3 Coastal Grassy Woodland	95	0	-	0	-
4 Coastal Vine-rich Forest	121	22	17.97	18	100
5 Coastal Sand Heathland	681	0	-	0	-
6 Sand Heathland	4	0	-	0	-
7 Clay Heathland	1,780	0	-	0	-
8 Wet Heathland	9,514	0	-	0	-
9 Coastal Saltmarsh	831	0	-	0	-
10 Estuarine Wetland	237	0	-	0	-
11 Coastal Lagoon Wetland	541	0	-	0	-
12 Wet Swale Herbland	789	0	-	0	-
13 Brackish Sedgeland	195	0	-	0	-
14 Banksia Woodland	36,996	18,337	49.56	13,309	82
15 Limestone Box Woodland	4,660	323	6.93	0	-
16 Lowland Forest	245,164	16,486	6.72	13,221	76
17 Riparian Scrub Complex	17,697	4,393	24.82	2,074	74
18 Riparian Forest	12,958	522	4.03	282	75
19 Riparian Shrubland	649	0	-	0	-
20 Heathy Dry Forest	2,989	767	25.64	666	85
21 Shrubby Dry Forest	209,874	87,995	41.93	63,650	74
22 Grassy Dry Forest	16,902	55	0.33	51	100
23 Herb-rich Forest	9,680	141	1.45	26	67
24 Foothill Box Ironbark Forest	596	377	63.33	197	73
25 Limestone Grassy Woodland	471	7	1.57	0	-
26 Rainshadow Woodland	22,231	2,392	10.76	480	100
27 Rocky Outcrop Scrub	5,051	2,639	52.25	2,129	88
28 Rocky Outcrop Shrubland	1,606	715	44.56	461	100
29 Damp Forest	238,313	42,747	17.94	32,272	65
30 Wet Forest	90,287	36,584	40.52	26,341	68

31 Cool Temperate Rainforest	2,563	0	-	0	-
32 Warm Temperate Rainforest	6,796	0	-	0	-
33 Cool/Warm Temp.Rainforest	269	0	-	0	-
34 Dry Rainforest	11	0	-	0	-
35 Tableland Damp Forest	6,999	2,180	31.14	1,618	83
36 Montane Dry Woodland	48,567	2,885	5.94	1,365	77
37 Montane Grassy Woodland	4,825	0	-	0	-
38 Montane Damp Forest	13,962	275	1.97	218	98
39 Montane Wet Forest	13,506	3,329	24.65	2,240	100
40 Montane Riparian Woodland	515	30	5.83	2	100
41 Montane Riparian Thicket	37	3	9.07	3	100
42 Sub-alpine Shrubland	201	0	-	0	-
43 Sub-alpine Woodland	7,320	54	0.74	9	100
44 Sub-alpine Treeless Complex	1,088	0	-	0	-
Total	**1,044,230**	**224,649**	**161,612**		

Table 6.5: Characteristics of Class (EVC) - Reservation by Biogeographic Unit

Biogeographic Unit	1 Far East and Foothills			2 Far East and Coastal			3 Cann Foothills		
Ecological Vegetation Classes	National estate D1 flora value on public land (ha)	Area in res (ha)	% of value in res	Nat'l est. D1 value pub land	Area in res (ha)	% of val in res	Nat'l est. D1 value pub land	Area in res (ha)	% of val in res
1. Coastal Dune Scrub	0	0	-	1,603	1,601	100	0	0	-
2. Coast Banksia Woodland	0	0	-	1,221	1,221	100	0	0	-
3. Coastal Grassy Forest	0	0	-	0	0	-	0	0	-
4. Coastal Vine-rich Forest	0	0	-	73	73	100	0	0	-
5. Coastal Sand Heathland	0	0	-	416	416	100	0	0	-
7. Clay Heathland	0	0	-	319	313	98	0	0	-
8. Wet Heathland	19	0	0	3,640	3,090	85	149	106	71
9. Coastal Saltmarsh	0	0	-	139	139	100	0	0	-
10. Estuarine Wetland	0	0	-	69	69	100	0	0	-
11. Coastal Lagoon Wetland	0	0	-	60	60	100	0	0	-
13. Brackish sedgeland	0	0	-	195	195	100	0	0	-
14. Banksia Woodland	235	12	5	15,523	12,602	81	724	429	59
15. Limestone Box Woodland	17	17	100	0	0	-	0	0	-
16. Lowland Forest	7,342	5,578	76	41,648	28,810	69	5,723	1,653	29
17. Riparian Scrub Complex	235	219	94	3,588	2,500	70	314	118	38
18. Riparian Forest	3,088	2,444	79	2,431	2,239	92	1,998	1,500	75
19. Riparian Shrubland	0	0	-	0	0	-	0	0	-
20. Heathy Dry Forest	65	65	100	0	0	-	1,429	1,145	80
21. Shrubby Dry Forest	13,127	12,687	97	299	299	100	10,397	1,567	15
22. Grassy Dry Forest	41	37	92	0	0	-	0	0	-
23. Herb-rich Forest	2,823	1,923	68	221	137	62	693	324	47
24. Foothill Box Ironbark Forest	0	0	-	0	0	-	0	0	-

25. Limestone Grassy Woodland	0	0	-	13	0	0	0	0	-
26. Rainshadow Woodland	0	0	-	0	0	-	0	0	-
27. Rocky Outcrop Scrub	0	0	-	0	0	-	0	0	-
28. Rocky Outcrop Shrubland	431	431	100	20	17	84	0	0	-
29. Damp Forest	17,295	14,290	83	5,867	4,844	83	19,105	3,920	21
30. Wet Forest	1,810	1,645	91	310	269	87	9,784	2,431	25
31. Cool Temperate Rainforest	0	0	-	0	0	-	636	238	37
32. Warm Temperate Rainforest	1,190	894	75	884	775	88	1,269	486	38
33. Cool/Warm Temp Rf Overlap	13	13	100	0	0	-	25	5	20
34. Dry Rainforest	0	0	-	0	0	-	0	0	-
35. Tableland Damp Forest	0	0	-	0	0	-	0	0	-
36. Montane Dry Woodland	0	0	-	0	0	-	0	0	-
37. Montane Grassy Woodland	0	0	-	0	0	-	0	0	-
38. Montane Damp Forest	0	0	-	0	0	-	0	0	-
39. Montane Wet Forest	0	0	-	0	0	-	0	0	-
40. Montane Riparian Woodland	0	0	-	0	0	-	0	0	-
41. Montane Riparian Thicket	0	0	-	0	0	-	0	0	-
42. Sub-alpine Shrubland	0	0	-	0	0	-	0	0	-
43. Sub-alpine Woodland	0	0	-	0	0	-	0	0	-
44. Sub-alpine Treeless Complex	0	0	-	0	0	-	0	0	-
Total	**47,731**	**40,256**	**84**	**78,539**	**59,669**	**76**	**52,245**	**13,922**	**27**

Biogeographic Unit	**4 Bemm-Brodribb Coastal**			**5 Errinundra Tablelands**			**6 Brodribb Foothills**		
Ecological Vegetation	**National estate D1**	**Area in res**	**% of value**	**Nat'l est. D1**	**Area in res**	**% of**	**Nat'l est. D1**	**Area in res**	**% of**

Classes	flora value on public land (ha)	(ha)	in res	value pub land	(ha)	val in res	value pub land	(ha)	val in res
1. Coastal Dune Scrub	887	887	100	0	0	-	0	0	-
2. Coast Banksia Woodland	1,436	1,436	100	0	0	-	0	0	-
3. Coastal Grassy Forest	6 0 0 - 0 0 -	6	100	0	0	-	0	0	-
4. Coastal Vine-rich Forest	0	0	-	0	0	-	0	0	-
5. Coastal Sand Heathland	265 0 0 - 0 0 -	265	100	0	0	-	0	0	-
7. Clay Heathland	0	0	-	0	0	-	15	15	100
8. Wet Heathland	1,872 0 0 - 0 0 -	1,862	99	0	0	-	0	0	-
9. Coastal Saltmarsh	317 0 0 - 0 0 -	317	100	0	0	-	0	0	-
10. Estuarine Wetland	0	0	-	0	0	-	0	0	-
11. Coastal Lagoon Wetland	111 0 0 - 0 0 -	111	100	0	0	-	0	0	-
13. Brackish sedgeland	0	0	-	0	0	-	0	0	-
14. Banksia Woodland	8,495 0 0 -	8,331	98	0	0	-	143	143	100
15. Limestone Box Woodland	0	0	-	0	0	-	0	0	-
16. Lowland Forest	5,363 0 0 -	3,055	57	0	0	-	657	279	42
17. Riparian Scrub Complex	2,503 0 0 -	2,243	90	0	0	-	8	7	82
18. Riparian Forest	1,163	1,024	88	29	29	100	2,152	1,831	85
19. Riparian Shrubland	0	0	-	0	0	-	0	0	-
20. Heathy Dry Forest	0	0	-	0	0	-	0	0	-
21. Shrubby Dry Forest	174	171	98	264	209	79	20,693	5,418	26
22. Grassy Dry Forest	0	0	-	0	0	-	49	14	30
23. Herb-rich Forest	13	0	0	0	0	-	1,211	422	35
24. Foothill Box Ironbark Forest	0	0	-	0	0	-	263	192	73
25. Limestone Grassy Woodland	0	0	-	0	0	-	0	0	-
26. Rainshadow Woodland	0	0	-	0	0	-	0	0	-
27. Rocky	0	0	-	0	0	-	327	178	54

Outcrop Scrub									
28. Rocky Outcrop Shrubland	0	0	-	0	0	-	32	32	100
29. Damp Forest	327	246	75	1,010	458	45	30,216	9,653	32
30. Wet Forest	0	0	-	8,717	6,851	79	16,567	8,778	53
31. Cool Temperate Rainforest	0	0	-	768	682	89	245	242	99
32. Warm Temperate Rainforest	301	193	64	14	14	100	2,151	994	46
33. Cool/Warm Temp Rf Overlap	0	0	-	0	0	-	150	103	69
34. Dry Rainforest	0	0	-	0	0	-	0	0	-
35. Tableland Damp Forest	0	0	-	6,442	3,889	60	0	0	-
36. Montane Dry Woodland	0	0	-	733	563	77	20	15	73
37. Montane Grassy Woodland	0	0	-	0	0	-	0	0	-
38. Montane Damp Forest	0	0	-	182	131	72	61	61	100
39. Montane Wet Forest	0	0	-	524	428	82	457	457	100
40. Montane Riparian Woodland	0	0	-	172	159	92	0	0	-
41. Montane Riparian Thicket	0	0	-	0	0	-	5	5	100
42. Sub-alpine Shrubland	0	0	-	0	0	-	0	0	-
43. Sub-alpine Woodland	0	0	-	11	11	100	0	0	-
44. Sub-alpine Treeless Complex	0	0	-	12	12	100	0	0	-
Total	**23,234**	**20,148**	**87**	**18,879**	**13,437**	**71**	**75,420**	**28,838**	**38**

Biogeographic Unit	7 Snowy-Deddick Rainshadow			8 Rodger-Snowy River Valley			9 Upper Buchan		
Ecological Vegetation Classes	National estate D1 flora value on public land (ha)	Area in res (ha)	% of value in res	Nat'l est. D1 value pub land	Area in res (ha)	% of val in res	Nat'l est. D1 value pub land	Area in res (ha)	% of val in res
1. Coastal Dune Scrub	0	0	-	0	0	-	0	0	-
2. Coast Banksia	0	0	-	0	0	-	0	0	-

Woodland									
3. Coastal Grassy Forest	0	0	-	0	0	-	0	0	-
4. Coastal Vine-rich Forest	0	0	-	0	0	-	0	0	-
5. Coastal Sand Heathland	0	0	-	0	0	-	0	0	-
7. Clay Heathland	0	0	-	57	57	100	0	0	-
8. Wet Heathland	0	0	-	0	0	-	0	0	-
9. Coastal Saltmarsh	0	0	-	0	0	-	0	0	-
10. Estuarine Wetland	0	0	-	0	0	-	0	0	-
11. Coastal Lagoon Wetland	0	0	-	0	0	-	0	0	-
13. Brackish sedgeland	0	0	-	0	0	-	0	0	-
14. Banksia Woodland	0	0	-	0	0	-	0	0	-
15. Limestone Box Woodland	0	0	-	0	0	-	0	0	-
16. Lowland Forest	0	0	-	78	78	100	0	0	-
17. Riparian Scrub Complex	0	0	-	0	0	-	0	0	-
18. Riparian Forest	27	16	59	565	504	89	146	137	94
19. Riparian Shrubland	140	140	100	136	129	95	0	0	-
20. Heathy Dry Forest	223	223	100	0	0	-	410	407	99
21. Shrubby Dry Forest	34,677	28,794	83	31,723	29,219	92	8,000	6,243	78
22. Grassy Dry Forest	1,289	1,251	97	659	659	100	953	847	89
23. Herb-rich Forest	0	0	-	1,087	723	67	2,319	1,381	60
24. Foothill Box Ironbark Forest	0	0	-	0	0	-	0	0	-
25. Limestone Grassy Woodland	0	0	-	259	259	100	6	0	0
26. Rainshadow Woodland	18,517	18,474	100	1,386	1,386	100	928	928	100
27. Rocky Outcrop Scrub	1,382	1,381	100	870	861	99	37	37	100
28. Rocky	569	569	100	43	43	100	87	87	100

Outcrop Shrubland									
29. Damp Forest	3,752	3,226	86	24,285	22,710	94	5,190	4,214	81
30. Wet Forest	204	201	98	9,748	9,732	100	761	120	16
31. Cool Temperate Rainforest	22	22	100	84	81	97	21	13	60
32. Warm Temperate Rainforest	0	0	-	283	161	57	47	0	0
33. Cool/Warm Temp Rf Overlap	0	0	-	3	3	100	0	0	-
34. Dry Rainforest	0	0	-	6	6	100	0	0	-
35. Tableland Damp Forest	0	0	-	0	0	-	0	0	-
36. Montane Dry Woodland	2,340	2,060	88	390	390	100	30,264	25,587	85
37. Montane Grassy Woodland	916	897	98	18	18	100	3,889	2,768	71
38. Montane Damp Forest	475	475	100	33	33	100	10,496	9,725	93
39. Montane Wet Forest	61	61	100	4,718	4,718	100	4,216	3,670	87
40. Montane Riparian Woodland	72	72	100	0	0	-	271	271	100
41. Montane Riparian Thicket	0	0	-	0	0	-	0	0	-
42. Sub-alpine Shrubland	0	0	-	0	0	-	202	202	100
43. Sub-alpine Woodland	238	238	100	181	181	100	6,231	5,973	96
44. Sub-alpine Treeless Complex	0	0	-	0	0	-	229	224	98
Total	**64,906**	**58,100**	**90**	**76,610**	**71,950**	**94**	**74,702**	**62,834**	**84**

Biogeographic Unit	**10 Buchan-Orbost Foothills**			**11 Lake Tyers-Corringle**			**12 Coastal**		
Ecological Vegetation Classes	**National estate D1 flora value on public land (ha)**	**Area in res (ha)**	**% of value in res**	**Nat'l est. D1 value pub land**	**Area in res (ha)**	**% of val in res**	**Nat'l est. D1 value pub land**	**Area in res (ha)**	**% of val in res**
1. Coastal Dune Scrub	0	0	-	0	0	-	2,490	2,488	100

2. Coast Banksia Woodland	0	0	-	1	1	100	2,659	2,659	100
3. Coastal Grassy Forest	0	0	-	34	34	100	40	40	100
4. Coastal Vine-rich Forest	0	0	-	0	0	-	73	73	100
5. Coastal Sand Heathland	0	0	-	0	0	-	681	681	100
7. Clay Heathland	35	35	100	0	0	-	425	420	99
8. Wet Heathland	0	0	-	0	0	-	5,681	5,058	89
9. Coastal Saltmarsh	0	0	-	2	2	100	458	458	100
10. Estuarine Wetland	0	0	-	0	0	-	69	69	100
11. Coastal Lagoon Wetland	0	0	-	0	0	-	171	171	100
13. Brackish sedgeland	0	0	-	0	0	-	195	195	100
14. Banksia Woodland	0	0	-	0	0	-	25,121	21,517	86
15. Limestone Box Woodland	17	17	100	4,623	3,399	74	4,656	3,432	74
16. Lowland Forest	543	483	89	897	134	15	62,251	40,071	64
17. Riparian Scrub Complex				396	205	52	7,043	5,292	75
18. Riparian Forest	1,114	915	82	0	0	-	12,713	10,639	84
19. Riparian Shrubland	112	112	100	0	0	-	388	381	98
20. Heathy Dry Forest	0	0	-	0	0	-	2,126	1,840	87
21. Shrubby Dry Forest	5,752	3,506	61	0	0	-	125,106	88,112	70
22. Grassy Dry Forest	9	9	100	0	0	-	2,999	2,818	94
23. Herb-rich Forest	1,083	924	85	0	0	-	9,450	5,833	62
24. Foothill Box Ironbark Forest	0	0	-	0	0	-	263	192	73
25. Limestone Grassy Woodland	192	177	92	0	0	-	470	435	93
26. Rainshadow Woodland	0	0	-	0	0	-	20,831	20,788	100
27. Rocky	1,557	1,318	85	0	0	-	4,173	3,775	90

Outcrop Scrub									
28. Rocky Outcrop Shrubland	10	8	81	0	0	-	1,192	1,187	100
29. Damp Forest	2,748	1,824	66	71	38	54	109,865	65,425	60
30. Wet Forest	0	0	-	0	0	-	47,901	30,027	63
31. Cool Temperate Rainforest	0	0	-	0	0	-	1,776	1,278	72
32. Warm Temperate Rainforest	528	293	55	110	91	83	6,777	3,900	58
33. Cool/Warm Temp Rf Overlap	0	0	-	0	0	-	191	125	65
34. Dry Rainforest	0	0	-	0	0	-	6	6	100
35. Tableland Damp Forest	0	0	-	0	0	-	6,442	3,889	60
36. Montane Dry Woodland	0	0	-	0	0	-	33,747	28,614	85
37. Montane Grassy Woodland	0	0	-	0	0	-	4,823	3,683	76
38. Montane Damp Forest	0	0	-	0	0	-	11,247	10,425	93
39. Montane Wet Forest	0	0	-	0	0	-	9,976	9,335	94
40. Montane Riparian Woodland	0	0	-	0	0	-	516	502	97
41. Montane Riparian Thicket	0	0	-	0	0	-	5	5	100
42. Sub-alpine Shrubland	0	0	-	0	0	-	202	202	100
43. Sub-alpine Woodland	0	0	-	0	0	-	6,662	6,403	96
44. Sub-alpine Treeless Complex	0	0	-	0	0	-	241	236	98
Total	**13,702**	**9,620**	**70**	**6,135**	**3,906**	**64**	**532,102**	**382,680**	**72**