National Estate Identification and Assessment in the Gippsland Region of Victoria

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Prepared by officials to support the Gippsland Regional Forest Agreement Process

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Foreword

This report provides information on the results of the assessment of national estate values related to forest environments. The information contributed to the comprehensive regional assessment of the Gippsland Region of Victoria. Places with national estate value are components of the natural or cultural environment that have aesthetic, historic, scientific or social significance, or other special value for future generations as well as the present community.

The comprehensive regional assessment of the Gippsland Region has examined environment and heritage, and social and economic values. Information on the range of these values, with the exception of national estate values, is contained in the report *Gippsland Comprehensive Regional Assessment*, published in September 1999.

The information gathered in the comprehensive regional assessment projects including the national estate studies, will be used in the development of a Regional Forest Agreement for Gippsland. Further information on the approaches to the development of the Regional Forest Agreement will be provided in the public consultation paper *Gippsland Regional Forest Agreement Consultation Paper*.

TABLES

MAPS

Summary

This report presents the outcomes of the national estate component of the Comprehensive Regional Assessment of the native forests of Victoria's Gippsland region. It will contribute to the development of a jointly agreed Victorian - Commonwealth Regional Forest Agreement for Gippsland.

Areas identified in this report as having potential national estate value are indicative only and are not necessarily the delineated forest areas that may be listed in the Register of the National Estate. The report documents the natural and cultural values that need to be taken into account in determining national estate places with the data in the report forming the basis of that determination by the Australian Heritage Commission. The data layers and identified areas will remain indicative until they have been considered by the Australian Heritage Commission.

Over 111 sites and areas were identified as indicative national estate areas of social, aesthetic, and historic value. Indicative national estate areas of natural value are identified in value maps covering natural landscapes, undisturbed catchments, old-growth, wilderness, flora, fauna and natural history.

The national estate component of the Comprehensive Regional Assessment has greatly enhanced the knowledge of the occurrence of national estate values in the forests of Victoria's Gippsland region.

It is expected that the Regional Forest Agreement between the Victorian and Commonwealth Governments will include specifications for a jointly agreed national estate outcome in terms of both the listing of places, including a review of places currently listed or interim-listed in the Register of the National Estate, and the long-term management of national estate values in forests.

Chapter 1: Introduction

There are a number of stages in the development of the Gippsland Regional Forest Agreement (RFA) between the Victorian and Commonwealth Governments. The first stage, which follows the signing of the Scoping Agreement, is the Comprehensive Regional Assessment (CRA). Both Governments, in collaboration with experts, have been involved in a wide range of projects designed to provide the information necessary for the analysis and identification of values and the determination of possible approaches for the Gippsland RFA. Subsequent stages include the integration of environment, heritage, social and economic values in the Region, the development of a public consultation paper, and the drafting of the RFA.

This report presents the results of the assessment of natural and cultural national estate values, carried out as part of the CRA, and identifies indicative areas of national estate value in the Region. The values documented in this report will be taken into account in delineating national estate places. Areas endorsed by the Australian Heritage Commission (AHC) will be interim listed in the Register of the National Estate. The interim listing of areas will then be advertised and subject to the statutory period of three months allowed for objections and public comment. It is anticipated that interim listing of areas identified through this process will occur after the Gippsland RFA is signed.

There are five RFA study areas in Victoria; East Gippsland, Central Highlands, North East, West and Gippsland. Agreements for the latter two regions are yet to be signed.

1.1 The National Estate

The national estate is defined in the Australian Heritage Commission Act 1975 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 Australian Heritage Commission's responsibility is to identify the national estate and, under section 30 of the Act, to advise the Commonwealth Government on the protection of national estate places and the potential impact on national estate values of Commonwealth decisions relating to those places. The Act also requires the establishment of the Register of the National Estate (RNE). The Register includes places of importance at a local, regional or national level. The identification and assessment of places for listing in the Register is guided by the national estate criteria (Appendix A). There are eight criteria in the Australian Heritage Commission Act. These are referred to by letter codes A - H. Sub-criteria are written for all of the criteria and referred to by number such as A1, A2, D1, D2.

When making decisions about the use of forests that contain places of national estate significance, for example decisions on whether to grant woodchip export licences, the Commonwealth must consider any potential adverse effects on the national estate.

In the past, the lack of detailed information in a regional context about the national estate values of forests has made it difficult for the Australian Heritage Commission to identify and

register places of national estate significance and to provide the Commonwealth Government with detailed advice about the protection of those places. The lack of information has also contributed to uncertainty for forest-based industries and for State governments about which places will be listed in the Register of the National Estate, and what advice the Commission would give on the protection of those places.

In recognition of these problems, the Commission has developed a methodology for the regional assessment of national estate values which focuses on systematic surveys to identify areas of national estate significance coupled with appropriate management to protect identified values, using a regional framework as the basis for decision-making. A systematic regional approach to the assessment of national estate values ensures that information on the distribution and regional protection of values is available to provide an appropriate context for the Commission to develop its advice to the Commonwealth Government. It also ensures that all stakeholders and the general community are aware of the places of national estate significance in the Region.

In providing advice on the protection of national estate values identified through CRAs, the Commission has developed a policy which recognises the implementation, through the RFA process, of the nationally agreed criteria for a Comprehensive, Adequate and Representative (CAR) reserve system for forests (the JANIS criteria). In summary, the Commission's current policy on the listing and protection of national estate values in a CAR reserve system is that where a RFA has substantially met the various attributes and expectations of the Commission, then it is appropriate to list all places identified through the RFA as containing national estate values which are protected by reservation, by reserve management prescription, by site exclusion, by consultation processes or other measures appropriate to the value, or places that are robust and not affected by timber harvesting or other off-reserve management activities.

Some of the areas identified in this assessment occur within places already listed or interim-listed in the Register of the National Estate (Appendix B and Map1). In addition to the identification of new indicative areas of national estate significance, some places previously listed in the Register may not have retained their national estate values. Places already listed or interim-listed in the Register of the National Estate will be updated in the light of the information gathered during the CRA.

1.2 The National Estate Assessment

The RFA process is designed to comply with a range of Commonwealth and State statutory obligations in relation to the management of forests, including the identification of and provision of advice on the protection of national estate values required under the *Australian Heritage Commission Act 1975*. A regional assessment model for identifying the National Estate was developed in 1991-92 by the Australian Heritage Commission (AHC), in cooperation with the Western Australian Department of Conservation and Land Management (CALM), for the southern forest region of south-west Western Australia (AHC and CALM, 1992). The model was refined in 1993 for regional assessments in Victoria's East Gippsland and Central Highlands RFA regions, with similar assessments later completed for CRAs in Tasmania and Western Australia. The Victorian model was further refined during the RFA process.

The Gippsland national estate assessment research was undertaken in 1997 - 1999. The cultural assessments were directed by the process developed by the technical advisory committee consisting of the Victorian Department of Natural Resources and Environment (NRE), Environment Australia, and observers from the Environment Conservation Council (ECC) (formerly Land Conservation Council), Heritage Victoria and Aboriginal Affairs Victoria (AAV). The natural assessments were undertaken by Environment Australia officers, with input from NRE.

Copies of consultancy reports which have contributed to the national estate assessment are available for inspection in Melbourne and Canberra:

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This report has been prepared by the CRA project team including officers of Environment Australia and the Victorian Department of Natural Resources and Environment, with the assistance of a number of other agencies, organisations and individuals.
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Chapter 2: National Estate Cultural Values

2.1 Introduction

Cultural heritage refers to qualities and attributes possessed by places that have Aboriginal, social, aesthetic, historic or scientific value for past, present or future generations. These values may be seen in a place's physical features, but can also be associated with intangible qualities such as people's associations with or feelings for a place. Documentary and community-centred research reveals a wide range of cultural places within or related to the Gippsland forests, indicative of the history of human interaction with these forests.

The national estate cultural studies component of the CRA has considered forest and forest-related cultural places within the study area across all land tenures. Cultural heritage places have mainly been identified on public lands. In the instances where places of indicative national estate heritage value are located on private land, it is the policy of the Australian Heritage Commission to undertake detailed consultation with all relevant land owners and other parties to verify the significance of the place prior to any action being taken in relation to its listing in the Register of the National Estate. No action towards national estate listing for any places on private land identified in this report will be taken until such consultation has occurred.

The research for the Central Highlands RFA undertaken in 1993-94 extended beyond the Central Highlands RFA boundary. A number of places assessed for that study have been included in the Gippsland assessments.

Within the CRA process for the Gippsland RFA Region, the cultural heritage studies assessed social, aesthetic, and historic values. The cultural projects were structured in a way that built on the work undertaken in 1993 for the East Gippsland and Central Highlands RFA regions. The methods are outlined in Method Papers: East Gippsland and Central Highlands Joint Forest Projects, Volume two - Cultural Values (AHC and CNR 1994b). A new approach for Aboriginal cultural heritage was developed for the North East region and is being implemented in the West and Gippsland RFA studies. This approach is described in Section 2.2.

Victoria's Gippsland region extends from the southern boundary of the North East RFA region which follows the central spine of the Great Dividing Range, south to the coast. In the East it adjoins the East Gippsland RFA region and in the West the Central Highlands RFA region.

A range of forest themes and place types could be determined from the 1993 studies and refined from published histories of the region, in particular, *The Settling of Gippsland* (Morgan 1997) which provided a sound regional history. The national estate cultural places sought were described as forest-related places which are those places located within forests, be they on private or public land, distinct places that continue through forested areas such as a route, or places with a strong forest theme such as a timber mill, that may be located outside forest areas.

A cultural heritage data audit and analysis was commissioned (Marshall, B and Jones, R 1997) to provide a preliminary appraisal of the quality of available data in the region, the representation of place types and historic themes, and the geographic extent of existing data for Aboriginal and non-Aboriginal places and archaeological site types. That study identified forested areas adequately covered by previous studies as; Wilsons Promontory, Mt Worth State Park, forested areas of the Latrobe Valley and forested areas of the Shire of Narracan (since amalgamated Baw Baw and La Trobe shires). Other areas; Alpine National Park, the Gippsland Lakes area, and Dargo area had a number of identified heritage places within them. Recent studies by Bannear (1994, 1995, 1997) on gold mining sites, and Graeme Butler & Associates (1996) on alpine huts provided adequate assessment information on these particular themes. Areas of inadequate documentation of heritage values were the forested areas of the High Country and foothill areas as well as the Alpine National Park, Mitchell River National Park, the Lakes National Park and Tarra and Bulga National Parks. With regard to Aboriginal places the audit noted that although a number of historic and pre-contact sites have been recorded within the forests of the Gippsland region there had been no systematic surveys covering extensive areas.

A range of cultural heritage projects were designed and undertaken to fulfil the requirements for the National Estate component of the CRA (Appendix C). The cultural heritage value assessments involved preliminary identification of places from research, or from community heritage workshops; classification of known historic places according to themes and types; preliminary selection of places of potential national estate significance using significance indicators and field checking and site recording of selected places. This was followed by assessment of places against thresholds developed from both the Australian Heritage Commission Criteria and the collected data leading to the final preparation of place assessments in a data base format.

Themes of human history (following the framework of the Principal Australian Historic Themes) relating to the Gippsland RFA region helped direct research for the national estate historic studies. The following is a brief outline of the themes of human history associated with Gippsland forests. These have been developed from published histories and consultants' work.

2.1.1 Themes of human history

Aboriginal Occupation
The original inhabitants of the Gippsland region were the Kurnai (also referred to as the Gunnai and Ganai) nation. The map by Clark (1996) identifies fivelanguage groups in the region - the Brataualung, Tatungalung, Braiakaulung, Brabralung and Krauatungalung (mostly in East Gippsland). Communities lived mainly around lakes, river systems, beaches and estuaries which were rich sources of food, moving up the rivers into the forests during the winter months. In the north, the Karndtarrngkorramidtung (Kandagora-mittung) clan (part of the Ya-idt'Midtung (Jaitmathang) language group) lived on the Lake Omeo plains, and on the rolling hills of Limestone Creek, Livingstone Creek and the Tambo headwaters. Mountainous areas were generally avoided because of their harsh climates however journeys were made to the alps during warmer months in search of the Bogong Moth.

The culture of Kurnai communities was based on an intimate relationship with the forest ecosystem. Timber and bark were the primary materials for creating tools, fire, shelter and transport, as well as featuring as a spiritual symbol in the dreaming and rituals of the Kurnai. The forest provided a nutritious and varied diet to the Kurnai, who were dependent upon a

wide range of animals and plants as a food source. Animals snared in forests supplied skins for clothing and bones used for weapons and tools. The Kurnai used forest products for medicinal purposes and for weapons. Forest trees provided bark for canoes. The Kurnai shaped the environment through their activities, for example, using fire to encourage regeneration, particularly of edible plant foods, and to expose edible roots.

As a result of the geographic isolation of the Gippsland region, Kurnai culture was quite distinctive. Initiation ceremonies were less of an ordeal, and art and ornamentation were more practical than in other areas. Other distinctive cultural traits were their structured society and their spiritual beliefs. The Kurnai held most of their ceremonies in the mild Autumn months. Feasting on swans and their eggs was an important festival for the Kurnai (Morgan 1997:17-22). It is estimated that at the beginning of European settlement a population of approximately 2,900 representing the five Kurnai clans and the Bidwelli (bush dwellers) lived in East Gippsland (Gardner 1976).

Fighting for the land
Prior to 1840, the Kurnai had had intermittent contact with Europeans, including escaped convicts, shipwreck survivors, whalers and sealers. Whalers and sealers operating around the Bass Strait islands and the Gippsland coast, were a lawless group who raided Aboriginal groups, abducted women and introduced disease.

The early settlers seeking grazing lands came from the Monaro and from Port Philip areas into Gippsland in the 1840s and 1850s. The Aboriginal people strongly resisted European pastoral settlement, killing cattle and occasionally shepherds. These actions provoked reprisals and the Kurnai were hunted and murdered by some of the white settlers. It has been estimated that 700-800 died in murder/massacres (Gardner 1976) in at least seven encounters.

Displacing Aboriginal people
Until 1844 there was no European law or authority. In 1844, the Chief Protector of Aborigines for Port Phillip District and the Commissioner for Crown Lands for Gippsland arrived in Gippsland. The former was charged with the protection of Aborigines, while the latter was in charge of the Native Police. The use of Native Police, who were predominantly from the area around Melbourne and traditional enemies of the Kurnai, led to some particularly gruesome attacks on the Gunai (Morgan 1997:58).

By 1850, the Kurnai had been decimated as an effective opposition due to disease, massacres and declining birthrate. Many Kurnai retreated into the swamps and forests. Thus a severely reduced population began to live on the fringe of white society described by Morgan (1997) as cultural no-man's-land.

A Central Board for the Protection of Aborigines was appointed in 1860, to oversee the interests of the Aborigines in the Colony of Victoria. This Board funded the establishment of missions, including Ramahyuck on the Avon River near Lake Wellington, and Lake Tyers. At Lake Tyers in 1860 Aboriginal people of the Tatungalung, Krauatungalung, Monaro and Bidwelli groups were brought together. The 1886 Half-Caste Act forced non-full bloods off the missions to seek work in the community, leading to separation of families and a further disruption of Kurnai culture. Ramahyuck was closed in 1908 when the remaining residents were moved to Lake Tyers, along with other Aboriginal people from across Victoria.

Utilising forest resources
- extracting and processing timber
The sawmilling and timber industry was a major part of Gippsland's economy and development. In the early stages the industry was restricted due to lack of access to the inland forests and lack of road communication with Melbourne. The earliest sawmills were

therefore located along the coast and it was not until the development of rail in the region, and markets for the timber accessed, that the sawmilling industry could expand.

During the gold rushes in the 1860s and 1870s, timber cutting intensified around the mine areas with timber being used for mine supports, heavy construction and fuel, often leaving hillsides denuded. The sawmilling industry began to grow in the early twentieth century, with sawmills located close to their log supply, which was often deep in the forest. In the 1930s the Forest Commission opened up new areas of forests, and various transport routes expanded in order to increase the access to timber.

- *sustaining forest industries*
In 1931, as part of the reproductive works scheme following the Depression, the Forests Commission embarked upon a program of silvicultural treatment of indigenous forests, and the development of softwood plantation areas. The program included ring-barking operations, concentrated in the Bruthen area (Bannear 1997).

Following the devastating fires of 1939 that incinerated 69 mills, the Forests Commission of Victoria opened up areas encouraging sawmillers to utilise the burnt timber for fuel reduction purposes. They also organised timber salvage operations, building miles of road and tramways to provide access to the timber. Following the salvage operations, timber companies turned their attention to the Alpine Ash forests for high quality building and joinery timber. In 1946, mills were constructed at Swifts Creek and Omeo and in 1949, at Heyfield (Bannear 1997).

- *developing minor forest industries*
Charcoal burning was also extensively carried out in Gippsland, although operations were generally on a small scale by farmers, and miners who produced charcoal for their own blacksmithing needs. With the outbreak of the Second World War, and the associated rationing of petrol, the production of charcoal (which generates producer gas) was stepped up in 1940, and the Forests Commission established the State Charcoal Branch, which operated plants throughout Victoria, including plants at Colquhoun and Boodyarn (Bannear 1997).

Settling the land
The earliest European settlements were associated with the whaling industry and began to flourish in the 1830s when isolated whaling stations were established along the Gippsland coast including Wilsons Promontory (Gardner 1976).

From the 1840s-50s pastoralists began taking up grazing runs on the fertile flats and establishing homesteads. However, settling the mountainous and wooded geography of Gippsland proved difficult. Various government land selection schemes, such as village settlement in the 1890s, closer settlement in the early twentieth century, and soldier settlement schemes after the two wars, were introduced. Only a small fraction of the farms were economic and more than 60 per cent of soldier settlers had walked off their farms by World War Two. Deserted farm sites in mountainous forest terrain, now reclaimed by the Crown, exemplify difficulties encountered in settling the land.

The transitory nature of early settlements was also due to the fact that early gold mining was mostly alluvial and did not allow for long term settlement, the exception being Walhalla. The early timber mill settlements established deep in the forests were also transitory and did not survive. The later mill towns such as Swifts Creek, Licola and Heyfield were distinctive company towns established outside forests.

Moving goods and people
As the region had been first explored from New South Wales and Van Diemen's Land, the early places of entry into the region were Omeo and Port Albert. Omeo was serviced by bullock teams over the mountains, and Port Albert by coastal shipping.

Due to mountainous terrain, thick forest and the number of water courses in the region, it was also difficult to move cattle and supplies within the region. Roads were developed in four stages. First a bridle path for a horse, then a pack track, then a bullock track, and finally a coach road with a firm surface so that coaches would not get bogged. Some roads were made of corduroy (logs lain perpendicular to the track to provide traction in boggy places). Today some of these tracks have become freeways, however some, such as McEvoys Track, retain the atmosphere from the early settlers (Butler 1999).

The development of timber trestled railways allowed access into previously remote areas, causing in some cases, extensive deforestation through extension of timber milling into areas such as Erica and Thorpdale. With the building of the road through Melbourne to Sale (creating an east-west highway) in 1879, and shipping using the lakes, Gippsland was well placed for the commercial and industrial boom years in the 1880s.

Utilising mineral resources
- mining for coal
Coal was found in 1826, earlier than gold (1851), gold mining declined at the end of the century just as black coal development started to grow. Commercial mining began at Cape Patterson in the 1850s, followed by Kilcunda in the 1870s, Coal Creek Jumbunna and Outtrim fields in the 1890s, and the State colliery at Wonthaggi in 1909 (Morgan 1997: 140-41). Unlike gold miners, coal miners had unions and fought for reasonable working conditions.

In 1873 brown coal was found in the Latrobe Valley area. Government owned and run mining commenced in 1920 near Yallourn, the first electricity power station was constructed in 1923 and a rapid increase in population followed. The mining venture ran into debt and was partly sold off to private enterprise (Morgan 1997: 144-6).

- mining for gold
Gold mining in Gippsland came after the big gold rushes in Ballarat and Bendigo, and was largely in the rugged terrain of the Great Dividing Range, following major rivers in remote locations. It was most active in the 1860s and 1870s, and was at a relatively smaller scale, attracting around tens of thousands of people.

There was a higher proportion of alluvial mining, with fewer deep reef mines established. An exception was Walhalla, the largest mining town, which was based on reefs. Walhalla produced gold for around 50 years. Deep lead mining areas had a very different atmosphere to alluvial mining areas. The community was generally a more settled one which allowed miners to bring out their families. In contrast, alluvial gold ran out quickly in many areas and miners quickly moved on due to the terrain and the lack of available flat and arable land in the mountains. Most miners moved south towards the central plain, and what is today the Princes Highway and the former goldfield towns were largely deserted (Morgan 1997).

- mining for other minerals
Other metals mined in the region were tin at Mt Wills from 1888, resulting in the development of Glen Wills, and copper at Benambra.

Engaging Primary Production
Plains to the west of the Gippsland Lakes were occupied by graziers, and four mountain cattle runs between Dargo and Tabberabbera were taken up between 1845 and 1847 (VicRFASC 1999a). Four major Land Acts during the 1860s transformed the region from a grazing to an

agricultural economy. These Acts aimed to encourage new settlers and reduced the squatters' runs. The flat country was quickly selected.

By 1900, parts of the Strzelecki Ranges had been cleared and settled for agriculture. Wildfires in 1898 in the Strzeleckis aided the clearing. Although sheep and cattle were the basis of the agricultural industry, production also included wheat, barley, hops, tobacco, maize and potatoes. The construction of Lake Glenmaggie in 1926 led to the establishment of the Macalister irrigation district (LCC 1982) (VicRFASC 1998a).

Alpine grazing
Alpine grazing commenced following the 'Black Thursday' bushfires in 1851. Montane grazing areas include the Dargo High Plains, Benambra, Omeo and Swifts Creek areas. By the 1860s, a regular pattern of high country grazing had developed on the Bennison, Dargo and Nunniong plateaux. Stockmen also opened a route from Omeo to the Ovens Valley via Mt Hotham. Graziers introduced new fire regimes to the high plains, both to encourage the growth of fodder for their cattle, and as protection against wildfire (VicRFASC 1999a).

Managing Forest Fires
Fire was seen as an easy way of opening up large tracts of land for settlement. The first large bushfires recorded after European settlement in Gippsland were "Black Thursday" in 1851 and "Red Tuesday" on 1 February 1898. Both fires burnt large areas of Gippsland.

The findings of the Royal Commission into the 1939 bushfires resulted in an increase in the number of fire towers in the State (mainly timber framed) and the mandatory provision of adequate refuges (dugouts) at sawmills and industrial operations in fire-prone forest country. Bushfires continue to have a major impact on Gippsland forests.

Aboriginal self-determination and self-management
Despite the devastation of their nation, the Kurnai remained in the region along with Aboriginal people from other groups. They worked on the pastoral properties and in the timber industry.

In 1971 Lake Tyers was granted the first Aboriginal land title in Australia (Caldere & Goff 1991). In 1975 the Aboriginal Affairs function of the State was transferred to the Commonwealth and Aboriginal organisations and cooperatives were established across Victorian to deal with health, housing and cultural matters. The Kurnai people now refer to themselves as the Gunnai-Kurnai. In the Gippsland RFA region, cooperatives are established at Bairnsdale, Sale, and Morwell.

Experiencing the Natural Environment
Once the miners and pastoralists had established access routes, tourism and recreation followed. The ski industry developed distinctive structures in the mountains and the recreation groups compiled some of the more detailed early touring guides and plans of the alpine forest areas. The mountain landscapes developed a rich network of foot or pack tracks through forests and across mountains and snow pole lines were erected across the alps to assist in saving lives.

Apart from the high country recreation, natural environments such as Gippsland Lakes, Wilsons Promontory and Tarra Bulga National Park have been continuously popular for recreation.

2.1.2 Assessment criteria for cultural values

Assessing the significance of national estate cultural heritage values in a regional context is a process that begins in the early stages of place identification and documentation. National estate values are set by the Australian Heritage Commission Criteria, specified in the *Australian Heritage Commission Act 1975* and are listed in Appendix A. The assessment of cultural heritage values involves developing significance indicators from each criterion to direct the identification of places of potential national estate value, and developing thresholds to determine if the value meets an appropriate level of significance.

By suggesting types of places that may contain national estate values, significance indicators direct research to derive lists of places for further assessment. Significance indicators may include consideration of the integrity of a place, the representativeness and distribution pattern of historic themes, the representativeness and distribution of types of places and the attributes and features of places likely to be strongly valued by communities. The indicators depend on knowledge of regional history and its major themes, the range of types of cultural places, and the regional storylines.

A threshold is the measure for determining if a value is of national estate significance. Thresholds are established by factors such as the ability of the place to demonstrate the value, the strength and length of community appreciation, the strength of comparative values, and the rarity of the value expression. The level set by the threshold also involves consideration of the quality and quantity of available regional information, expert opinion, and consideration of existing national estate places.

A national estate threshold is not graded: a place will either meet the threshold or not. Places may be significant against more than one national estate criterion, although a place need only be significant against one criterion to warrant listing in the Register of the National Estate. As the RFA uses a regional perspective for its assessment, a more comprehensive knowledge base for assessing places and for applying the thresholds for national estate significance can be applied.

For Aboriginal cultural values, identification and assessment of places was not undertaken. Section 2.2. describes the Aboriginal heritage values program.

2.1.3 Community consultation

Communities provide important information for the identification of cultural heritage places. In addition, community involvement is essential for the assessment of aesthetic and social value significance because the national estate criteria (AHC Criteria E and G) used to assess these values specify that they must be of significance to a community or cultural group. For the purpose of this study 'the community' refers to any group of people with a common ground. The cultural heritage assessments undertook consultation with the communities as follows:

- workshops for local community groups in regional locations;
- a workshop for State-wide stakeholder and user groups in Melbourne;
- workshops with forest and park officers (also referred to as forest critics);
- meetings with the Gippsland Aboriginal community representatives;
- workshop with Aboriginal cultural heritage officers;

- local community based social value research; and
- a community review process of the community derived cultural value data.

The workshops provided a venue to introduce the comprehensive regional assessment process and engage local communities and major State-wide stakeholder and user groups in the identification of places with heritage value in the region. All information gathered from the community sources, other than Aboriginal communities (which is returned to Aboriginal communities), is to be returned to public repositories in the form of an Inventory of Community Heritage Places.

2.2 Aboriginal Heritage Values

2.2.1 Background

Aboriginal national estate values theoretically and in practice, usually refers to attachment to land, based on a wide range of traditional and contemporary land uses. Interwoven with this is the issue of Native Title land claims, which could involve values considered to overlap with national estate heritage values. Aboriginal heritage values are generally assessed against the national estate Criterion G:

> *strong or special association with a particular community or community group for social, cultural or spiritual reasons*

A number of issues relating to the conventional place assessment of indigenous values surfaced during the Victorian East Gippsland and Central Highlands and the Tasmanian RFA national estate assessment projects:

- The timeframe and resources for the RFA assessments did not allow for the appropriate consultation and involvement for comprehensive identification.
- Aboriginal people are concerned about losing control of the information about places by allowing them to be identified and listed in a national register.
- Aboriginal people are also concerned about other forest issues such as their participation and involvement in forest planning and management.
- Aboriginal people have indicated that they want a greater say in how they participate in the RFA process and do not want their participation restricted to national estate identification.

As a result of these issues, conventional assessments have not been pursued and the Australian Heritage Commission has accepted the shift in focus from identification of places of archaeological, historical or traditional significance to an ongoing consultative process for Aboriginal heritage management. As part of the Gippsland RFA, it is proposed to give greater recognition to Indigenous concepts of cultural heritage and other interests which needed to be addressed in order to develop effective consultation and conservation processes that reflect Indigenous concerns.

Cultural Data Audit

A review of the existing knowledge of Aboriginal heritage places in the Gippsland region was undertaken as part of the cultural data audit (Marshall and Jones 1997), in the general preliminary work for the RFA. With regard to Aboriginal places the audit noted that 528

sites, 65 historic sites and 93 interim listed sites have been recorded within the forests of the Gippsland region. However there have been no systematic surveys of places covering extensive areas and the historic sites record is not complete.

The existing record of Aboriginal sites (archaeological and historic) in the forests of the Gippsland Region as kept by Aboriginal Affairs Victoria and the Register of the National Estate was not extensive and was comparatively incomplete.

With regard to archaeological sites, the audit noted that: "While areas such as the Wilsons Promontory are reasonably well known for Aboriginal sites, a general lack of data makes it problematic to nominate either site types or geographic areas where further research should be directed." (Marshall and Jones 1997:87). The audit further suggested priority areas for investigation being; field surveys, predictive studies and consultation with Aboriginal people.

With regard to historic places the existing data base was small and the audit recommended; investigation of database records, entry of records, updating the database from historical sources and historical societies and consultation with Aboriginal people.

2.2.2 Aboriginal heritage values - the approach

The general aim of the Aboriginal heritage program for the Gippsland RFA is to commence the development of an Aboriginal heritage management system for the forest landscapes of the region, with the support and agreement of relevant Aboriginal communities. The approach is to engage in regular communication with regional Aboriginal communities and with them develop the ongoing Aboriginal heritage management system for the forest landscapes of the Gippsland RFA region. The system will address the issues Aboriginal people have regarding the management of their heritage places.

As a starting point relevant known community groups located in or with extensive land areas in the Gippsland region were approached in order to discuss the proposal. Initial contact was made by mail with the cultural heritage officers at the cooperatives: Central Gippsland Aboriginal Health and Housing Cooperative Ltd, Morwell; Gippsland and East Gippsland Aboriginal Cooperative Ltd, Bairnsdale; and Ramahyuck District Aboriginal Corporation, Sale. Meetings were also held with communities with some land overlap in the region; Lake Tyers Aboriginal Trust, and Moogji Aboriginal Council East Gippsland Incorporated, on the understanding that they would be more directly involved in consultation associated with their land. Contact was made by mail to families of the Wurundjeri group, and to the Borun Aboriginal Land Lore Corporation to inform the groups of the program and seek their involvement.

A brief summary of the meetings and workshops follows. Participants at the meetings are listed in Appendix D

December meetings
An initial round of meetings was held on 8-10 December 1998 with the Aboriginal representatives at the cooperatives to explain the RFA and explain the aim for an agreed participative ongoing Aboriginal heritage management process.

May workshop
A workshop was held at the Gippsland and East Gippsland Aboriginal Cooperative centre, Bairnsdale on 27 May 1999, with the regional cultural heritage officers and representatives of

Natural Resources and Environment (NRE), Aboriginal Affairs Victoria (AAV), and Environment Forest Taskforce (EFT) attending. The workshop identified issues relating to management of heritage places in forests and proposed projects for sensitivity zoning and cultural heritage guidelines (see Section 2.2.3) were discussed.

January workshop
A meeting was held at the Moogji Aboriginal Council East Gippsland Incorporated centre, Orbost on 25 January 2000. At the workshop, the Gippsland RFA Consultation Paper was discussed, issues raised at the May workshop were reviewed, amended and refined (refer Appendix D). Strategies were developed from the issues to set the framework for developing a Gippsland Aboriginal Heritage Management System.

Strategies
From the issues identified, the following strategies for ongoing heritage management and communication are sought/desired by indigenous people in relation to the RFA region:

1 Regular Communication
- Meet with land management agencies regularly, throughout the year, to cover Wood Utilisation Plans (WUPs), National Parks Plans, fire management plans and other planning and land management issues.
- Hold community meetings that include elders upon the release of public documents.

2 Heritage Management
- Continue ongoing involvement of cultural heritage officers and relevant Aboriginal people in management of known sites.
- Provide processes to allow adequate time for consultation within the community for WUPs and other impacts, and to respect the confidentiality of information.
- Use a sensitivity model and cultural heritage management guidelines for ongoing indigenous heritage management.

3 Resources
- Identify potential resources for additional funding for particular places.
- Lobby for additional Aboriginal Cultural Heritage Officers (CHOs), and Aboriginal workers in land management agencies.
- Put skills training in place for CHOs utlising other training couses such as those organised by the Alps Liaison Committee, Alpine Ecology and on-ground work skills within agencies.

4 Clear Contact Protocols
- Develop protocols between cultural heritage program and agencies for formal and informal contacts.

5 Cross-Cultural AwarenessTraining
- Provide cross-cultural training for government workers at all levels to develop their understanding of Aboriginal heritage.

6 Employment
- Create and maintain several dedicated Aboriginal positions in land management agencies for liaison officers, and employ Aboriginal people in 'mainstream' positions at various levels

2.2.3 The ongoing program for Aboriginal heritage

Cultural heritage management project
A model for Aboriginal heritage management was prepared using the North East forest region as reference (Hughes and Buckley 2000). Major components of that project were a model for an archaeological sensitivity zoning plan to produce landscape zones of sensitivity, as well as an Aboriginal heritage management framework that could apply to Victorian. The model takes into account the nature of prior disturbance and the potential for future impacts from forestry activities such as roading, in establishing priorities for the ongoing assessment.

A project has been developed to undertake a heritage management program using the model developed for the North East study. The project will involve developing sensitivity zoning plans for the other RFA regions including Gippsland and adapting the model's management framework for Gippsland.

It is anticipated that a sensitivity zoning plan will allow land managers to plan ground-disturbing activities in least sensitive zones where they are less likely to disturb Aboriginal cultural heritage sites and places. Where ground disturbance cannot be avoided, the sensitivity zoning plans alert land managers to the possibility of site and place disturbance and appropriate actions can be undertaken to minimise disturbance.

The process for ongoing heritage management must have agreement by relevant Aboriginal communities and their continual participation. The sensitivity zoning is to have accompanying guidelines for general management for each delineated zone. The zoning is field checked by reconnaissance surveys with representatives of relevant Aboriginal groups.

Cultural Heritage Guidelines Project
Statewide Guidelines for Cultural Heritage Management are being developed. It is intended that the guidelines will be used by planning and field staff of the NRE and Parks Victoria, to assist in meeting their obligations for the protection of places of Aboriginal and non-Aboriginal cultural heritage value on pubic land. Guidelines have already been prepared for East Gippsland (NRE 1997) as part of the RFA process for that region and these are currently being used as interim statewide guidelines.

The Statewide Cultural Heritage Guidelines will outline procedures for staff to follow in identifying and managing Aboriginal heritage, including Aboriginal community consultation and Aboriginal participation in the heritage management process.

Regular Communication
The strategies create the framework for the Aboriginal Heritage Management System for the Gippsland forests area. Communication and consultation as Strategy 1, is fundamental to the management of Aboriginal heritage values and underpins all other strategies

2.3 Social Value Assessment

The identification and assessment of places of national estate significance for social value in the Gippsland RFA Region was based on national estate Criterion G., which recognises places that have:

> *strong or special association with a particular community or community group for social, cultural or spiritual reasons (AHC Criteria, Appendix A).*

A place significant to the community may be where a memorable event has occurred. These events could be a local disaster which affected much of the community, such as a flood or bushfire, or a place of community celebration. A local landmark may be a waterfall, a hill or mountain, an area of forest or a single tree. Other places of attachment may be those associated with local history or folklore such as a mountain hut or track. Such places are considered important because they form a part of the community's identity.

Very few places having national estate social significance had been previously identified in the region. The information gathered during the CRA process, which enhances our understanding of the importance of this value, will be amalgamated with existing information on places already in the Register of the National Estate.

2.3.1 Data sources

The communities of the Gippsland RFA Region provided the primary source of data for identifying and assessing places of indicative national estate social value during the CRA. Individuals and representatives from a range of organisations attended community workshops to nominate places important to them, to provide information on why those places were important, and to map the location of each place. Seven community workshops were held throughout the Region and one in Melbourne. The workshops were designed, organised and facilitated by consultants Context Pty Ltd (1998 and 1999 a,b) in collaboration with Commonwealth and State Government RFA project officers. Further data were obtained using questionnaires undertaken in selected towns.

Information obtained through the social values community workshop process was also used as a primary source of data for assessing places of aesthetic and historic value in the Region (see Sections 2.4 and 2.5).

2.3.2 Methodology

Identifying the range and extent of places of social value in the Region required a group-based social research method that would draw together a wide range of people willing to share their knowledge, opinions and feelings. From the range of community consultation methodologies available, the workshop method was selected as the most efficient because it could achieve a number of goals. It could:

- involve a large number of people and maximise their input;
- cater for a wide range of community interests and perspectives;
- engage participants in identifying and expressing shared values;
- facilitate comparison between the range of places valued by a community;
- enable a regional and a local focus concurrently;
- be applied in a consistent manner across the Region;
- provide results within the available timeframe;
- allow for the broad dissemination of information about the RFA generally and provide an opportunity for public question time with government officials; and
- provide consistency with methodologies used in the assessment of social value in RFA regions in other States.

Workshop locations
The choice of locations for workshops was based on a range of demographic, geographic and social information. Factors included the accessibility of workshop locations to major community catchment areas and the distance participants would be required to travel. Workshops were held in Bruthen, Omeo, Foster, Dargo, Sale, Heyfield; and Churchill. These were evening sessions to enable as many people as possible to attend. One workshop was held in Melbourne in 1997 to enable state-wide stakeholder and user groups to participate. Workshop locations and some community groups were identified with the assistance of local coordinators.

Identifying potential workshop participants
A local coordinator was appointed for each sub-regional area to provide a local focus, to identify and encourage organisations and individuals to attend the workshops. Invitations with background information on the aims and context of the workshop, were sent to people with interests in local government, business, timber industry, mining, primary industries, community service, conservation, history, tourism and recreation (refer Appendix E). A total of 444 potential participants, including organisations and individuals, were identified, from which 132 attended the workshops (refer Appendix F).

Workshop design and process
Each workshop lasted approximately 3-4 hours and was structured into four phases. The first phase, involving all participants, provided information about the RFA process, the aims of the workshop, the meaning of cultural heritage value to each participant, and the types of places that might have those values. The second phase involved smaller groups of participants in compiling lists of places of possible cultural heritage value through discussion and sharing of ideas. In the third phase participants provided detailed information (including a description of the place, its history, location and boundaries, and its importance) by filling in data forms. In the fourth phase participants located and marked on 1:100 000 topographic maps places they had described, where known.

A total of 627 places were identified through the workshops and submissions. All workshop participants were sent a summary report of their workshop and a list of the places identified.

Identifying places of indicative national estate social value
After the workshops were held, places were then assessed for national estate social value (Context 1999b) according to the following six steps:

Step 1 - Classification and preliminary sieve. The consultants reviewed the workshop data for evidence of social value using three significance indicators:

- importance to a community as a landmark, marker or signature;
- importance as a reference point in a community's identity or sense of itself; and
- strong or special community attachment developed from use and/or association.

Step 2 - Research. The consultants conducted additional questionnaire surveys in 10 towns, Traralgon, Morwell, Heyfield, Sale, Bairnsdale, Bruthen, Omeo, Foster, Leongatha, and Dargo, to further examine the social value of each place. This information was considered along with the community association noted at the workshops, the number of workshop locations in which the place was identified, and the number of workshop groups identifying particular places along with the number of votes the places received.

Step 3 - Preliminary Assessment. The consultants examined the adequacy and completeness of the data to enable an assessment to be made against the criterion. This resulted in a list of potential national estate places. In particular, the examination looked at whether there was:

- an identifiable community that is associated with the place;
- sufficient data to determine the location and boundary of the place; and
- sufficient data available to assess its significance.

Step 4 - Completeness and Site Validation. The consultants then established indicative boundaries, through field work and other research.

Step 5 - Final Assessment and Documentation. The thresholds were refined and applied to identify the nature of a place's social significance and to gauge the strength and endurance of this value. Table 2.1 shows the relationship between significance indicators, the threshold indicators and the thresholds. Following the final assessment the national estate database documentation was completed.

In assessing a place against criterion G, a place reaching the threshold required the following:

- to be identified by a community which is in continued existence today as a definable entity;
- a continuity of use or association, meanings, or symbolic importance over a period of 25 years or more (representing transition of values beyond one generation); and
- an existence of an attachment or association with a place by a defined community, including evidence of use developing into deeper attachment that goes beyond utility value.

Step 6 - Return Data to Community. All the data about places identified at the community heritage workshops were reassembled, combining the original data with the consultant's assessments into a single inventory of places. The inventory was released as a draft for public comment. Following the amendments and inclusions resulting from the consultation, a final inventory of places will be lodged in selected public repositories.

2.3.3 Results

Of the 627 places identified through the workshops, 94 places were deemed to be of predominantly social value, 46 of these places were assessed in detail, with 31 judged to be above threshold for social value significance and worthy of consideration for the Register of the National Estate. Another 17 were significant at a local. Places identified with indicative national estate social value are listed at Appendix H and their location shown on Map 2.

Table 2.1: Thresholds for National Estate Social Value Significance

Significance indicator	Threshold Indicators			
	Threshold	**Relative strength of association**	**Length of association**	**Relative importance to the identified community**
Important to the community as a landmark, marker or signature	Above threshold	Key marker or signature used by a regional or district community to define itself and/or the locality[1]	Longevity and continuity of recognition from past to present	Singular defining landmark, feature or icon for a community
		A well known feature within a defined or local community[2]	Long association, but some discontinuity.	Well-known landmark, marker or signature
	Below threshold	Key marker not widely known beyond the bounds of a small community	Recent association	One of many landmarks; not outstanding to the associated community
		Little known feature within defined community		
Important as a reference point in a community's identity or sense of itself	Above threshold	Represents fundamental community meanings widely recognised throughout a regional or district community	Longevity and continuity of association	Singular or outstanding place Profound meanings Seminal in shaping community identity
		Represents important community meanings widely recognised throughout a defined or local community	Long association, but some discontinuity	Important
	Below threshold	Represents other meanings of lesser/minor importance or less widely recognised	Recent association	Minor importance One of many places providing same connection to identity
		Little known feature within defined community		
Strong or special community attachment developed from use and/or association	Above threshold	Places representing fundamental community attachments developed from long use or association widely recognised throughout a regional or district community:	Longevity and continuity of community use and/or access	Strong attachment shared across community
		Places representing important community attachments developed from long use or association for a defined or local community.	Long association, but some discontinuity	
	Below threshold	As above but not widely known beyond the bounds of a small community.	Recent association	Places representing attachment of minor importance to community
		Functional association without demonstrated attachment Little known or used	Lack of any continuity to the present	One of many similar places with equal and minor attachment

The range of places above threshold reflects the types of places to which communities are attached. Included in the group are eight reserves, one hut, three historic reserves, other

[1] *Regional community* means the Gippsland Forest Region; *District community* means a workshop catchment.
[2] *Defined community* means a community defined by its shared culture, beliefs, ethnicity, activity, experience (rather than locality); *Local community* means the community of a town or rural area.

parks, mountains, camping areas, rail trail and the extensive area of the Strzelecki Ranges, all deemed by the community to be of social significance.

2.4 Aesthetic Value Assessment

The identification and assessment of aesthetic value in the Gippsland RFA Region was based on national estate Criterion E, which recognises places that have:

> *importance for a community for aesthetic characteristics held in high esteem or otherwise valued by the community.*

The working definition for 'aesthetic value' used for the regional assessments in Victoria is:

> *Aesthetic value is the response derived from the experience of the environment or particular natural or cultural attributes within it. This response can be to either visual or non-visual elements and can embrace emotional response, sense of place, sound, smell and any other factors having strong impact on human thought, feelings and attitudes (AHC Technical Workshop Series No 7, 1993)*

The types of places falling into the criteria for aesthetic places include mountain tops, viewing points, scenic drives, mountains, hills, recreation areas, stands of trees, rivers and waterfalls.

2.4.1 Data sources

Scenic value assessments had been undertaken by the LCC in a number of studies particularly of rivers and streams, and by the National Trust of Australia (Victoria) in several heritage landscape assessments in the region. Although these data sources contributed to the research they could not provide an adequate assessment of national estate aesthetic value across the region.

2.4.2 Methodology

The complex nature of aesthetic value, as shown by its definition above, prompts the need for a multifaceted approach to its assessment. Using Criteria E and the definition (described above) a set of significance indicators were used to assist in identifying places with potential national estate aesthetic value as follows:

- natural features and landscapes recognised by experts (forest critics) or community groups as having outstanding scenic and evocative qualities;
- cultural features or landscape with outstanding scenic, evocative or other meaning;
- places having aesthetic attributes or quality that has inspired art, poetry , literature, or tourism promotion;
- aesthetic quality that promotes popularity of a place;
- unusual or rare landform phenomena;
- prominent distinctive landform feature; and
- a place having community recognition as a landmark.

A consultant, Robin Crocker & Associates (1999) undertook the project that consisted of researching and compiling datasets from workshops (primary sources) and focused surveys (secondary sources), combining the data and assessing the value. The datasets are described as follows.

Community heritage workshop dataset
Community heritage workshops as described in the previous section (Section 2.3.2) were held across the region to collect information for both the social, historic and aesthetic value assessments. Around 53% of the places identified at the workshops were recorded as having aesthetic value.

Forest critics workshop dataset
The term 'forest critics' is used for forest officers and parks officers who have a sound knowledge of forest systems and particular forest areas and who can critically evaluate the aesthetic qualities of the landscape. Officers from the region, particularly from the more remote areas, participated in order to provide coverage of the whole study area. Forest Critics Workshops were held at Traralgon and Bairnsdale (refer Appendix G). The workshops involved each officer nominating potential aesthetic places, then the group identifying gaps and overlaps, sieving places to eliminate minor sites, completing place questionnaires, and marking places on 1:100 000 map sheets. Following the workshops the participants rated places on a 1-5 scale for aesthetic value.

Art and literature survey
The aesthetic importance of places is often depicted in art and literature, giving a place both popularity and a role in understanding the aesthetic value of societies. A specialist research consultant (David Young with Robin Crocker & Associates) undertook a survey of literature, fine art, film and photography related to the Gippsland region. Relevant experts were consulted and primary and secondary sources reviewed. Material obtained from the survey was combined and ranked for significance based on:

- frequency of association, that is the number of times a place has been recorded in any art media;
- public recognition of the artists depicting the forest place;
- public recognition of the individual artworks; and
- public recognition of the place depicted.

A total of 52 places in the region were identified in the research with varying degrees of recognition. The most common art forms were prose, poetry and photography. Well known Victorian nineteenth century artists photographers and writers such as Eugene Von Guerard, Nicholas Caire, Nicholas Chevalier, and Rolf Boldrewood used the Gippsland landscape and landform phenomena for subjects and settings for their works. Some of the more modern works of Chris Wallace Crabbe, Hal Porter and the film 'Fortress' have been set in Gippsland. The most popular areas recorded in works of art are Lake Tali Karng, Mitchell River, Moroka River and the Strzelecki Ranges.

Tourist publications survey
Literature generated by the tourism industry both reflects and generates public knowledge and place recognition by encouraging visitation. The availability of information on forests and natural areas was discussed with staff from tourism and conservation organisations, and tourist information outlets, and publications reviewed. Assessments concentrated on high quality, full colour publications with moderate to large print runs and broad distribution based on the understanding that they have the greatest impact on existing and potential visitors to the forested areas. The categories of publications were state, regional and local tourism brochures, statewide and regional park and forest brochures, guidebooks and directories,

posters and a selection of periodicals and large format heritage books. Sites in forested settings were recorded and a scoring system used to measure the level of community exposure to the image (based on print run and distribution) and the number of times a place was depicted.

Other published sources survey
Information concerning previously identified places of aesthetic value within the Gippsland RFA Region was reviewed and considered in the compilation of data for the assessment of national estate aesthetic value. Sources accessed included government and non-government-generated reports, such as the National Trust of Australia (Victoria), lists and databases together with any other relevant publications.

The methodology for the CRA aesthetic value assessment was designed to achieve the best practicable understanding of the range and distribution of aesthetic places in the Gippsland RFA Region within the available timeframe. The assessment process was organised in the following steps:

Step 1 Preliminary Assessment. Information from the datasets was combined into a matrix table and examined for adequacy and completeness of place data. Places were selected for further assessment using the following selection criteria:

- identified at two or more community workshops; or
- identified at one community workshop and in at least one other source; or
- identified at a forest critics workshop and in at least one other source; and
- located in a forest setting.

Step 2 Review and site verification. Places meeting the criteria for preliminary assessment were subject to more rigorous assessment as follows:

- quantitative and qualitative review of all information with an emphasis on community and forest critic derived places;
- field reconnaissance surveys which involved consideration of the extent of selected places and their comparative landscape-character-type scenic quality;
- consideration of the remoteness of places; and
- consideration of the values weighting from the secondary source information

Step 3 Final Assessment. To finalise the assessment, places had to meet one of the following thresholds:

- strongly identified by a number of primary community sources for having aesthetic value;
- identified by community sources and supported by information from forest critics, scenic landscape-character-type comparisons or secondary aesthetic value sources; or
- remote places strongly identified by forest critics as having high aesthetic value in the region and supported by secondary aesthetic value source, or by expert corroboration.

Final documentation for the national estate database was then completed.

2.4.3 Results

In the Gippsland RFA Region 27 places were identified as meeting an appropriate threshold of national estate aesthetic significance as a result of studies carried out for the CRA. These

places incorporated numerous individual places identified in the original data sets, with some places amalgamated where appropriate with larger places, such as national and state parks. The assessment process showed that the majority of places were below the national estate aesthetic threshold, in some cases because of the lack of supporting data. Places identified with indicative national estate aesthetic value are listed at Appendix I and their location shown on Map 3. The 27 aesthetic places above threshold were drawn from:

- 337 places identified with aesthetic value from the community heritage workshops;
- 132 places from the forest critics workshops;
- 52 places from the art and literature survey;
- 25 sites from the tourism literature review; and
- 25 places from other published sources.

Field inspections of 21 areas provided additional information.

The aesthetic value research undertaken for the CRA stressed that communities greatly value the aesthetic quality of the local national parks, identifying numerous features within the parks as well as the full extent of the park landscapes. The Alpine National Park, Avon Wilderness Park, Cape Liptrap Coastal Park, Gippsland Lakes Coastal Park, Mitchell River National Park, Tarra Bulga National Park, the Lakes National Park, and Wilsons Promontory were identified. A few reserves, lookouts and Moormung State Forest were also identified.

2.5 Historic Value Assessment

Historic value reflects how a place reveals information about past events, practices and people. Australian forests have a long human history with the Gippsland region revealing a rich historic heritage arising from a diverse colonial and post-colonial history. Settlement and goldrush histories are dominant, but there are many historical themes, including the more recent theme of recreation and tourism (described in Section 2.1.1) strongly represented in its forested areas.

Places with historic value in the Gippsland region were assessed for national estate significance against the Australian Heritage Commission Criteria A3, A4, B2, C2 D2, F, and H (refer Appendix A). Aspects of heritage significance covered by these criteria are:

- richness and diversity of cultural features (A3)
- important in the course and pattern of history (A4)
- rarity of historic features (B2)
- research potential relating to human history (C2)
- important example of a type of place (D2)
- technical or creative achievement (F)
- association with the life or works of an important person or group (H)

2.5.1 Data sources and data audit

The data audit provided a bibliography of the main sources of heritage place information, an assessment of existing site databases and reports based on minimum data requirements, a list

of historic themes and site types, an indicative list of heritage places within forests, and a geographical and thematic data gap analysis. Data bases with useful place records in the region were the Register of the National Estate, the NRE Historic Places Section database, Heritage Victoria Register, Heritage Victoria Archaeology Database and the National Trust of Australia (Victoria) database.

The audit included all sites which fell within forested areas on both public and private land. It noted the geographic gaps as Alpine National Park, Mitchell River National Park, the Lakes National Park, and Tarra Bulga National Park. It also noted the adequacy of coverage by themes. Forest camp sites, minor forest industries, recreation and sporting sites, conservation and science were amongst those themes poorly represented. Recent heritage assessments of Victorian gold mining sites (Bannear, 1994, 1995, 1997) and alpine huts (Graeme Butler & Associates, 1996) were substantial and available for consideration for the National Estate. The gold mining sites have been considered for the Victorian Heritage Register and are documented in the NRE database.

2.5.2 Historic places research

An assessment by NRE and Environment Australia of the Gippsland Cultural Heritage Data Audit recognised the need for the following historic studies to be undertaken to provide adequate information for a comprehensive regional assessment of cultural values:

- Sawmill and Tramway Sites, for places directly associated with timber harvesting such as sawmills, tramways, mill settlements, and kilns.
- Historic Forest Activity Sites, to cover places associated with minor forest production such as silviculture, fire protection, charcoal production, eucalyptus distillation, wattle barking, and firewood provision, as well as sites associated with forest management such as arboreta, camps, and fire towers.
- Selected Historic Themes, to cover places associated with all other historic themes including places related to pastoralism, agriculture, settlement and people, hydro-electricity, moving goods and people, mining activities (other than gold), recreation and tourism.

The studies were undertaken by Peter Evans (1998), David Bannear (1997) and Graeme Butler & Associates (1999) respectively.

2.5.3 Methodology

The methodology of the three historic studies varied due to the focus of each study and the information resources available but the general approach taken by the studies is as follows.

The first stage of the assessment was a comprehensive investigation of primary and secondary historical sources. This was necessary because previous heritage assessments carried out in the Gippsland area have not covered historic forest sites. A significant proportion of project time was spent on historical research in order to produce a comprehensive regional perspective of the historic and existing resource.

As a regional assessment covers a vast area, it requires a methodological selection process. The selection may be based on the representativeness of the themes or types of place, the

availability of data, or the condition and integrity of the place. Both the sawmill and tramways study and the forest activities study were specific theme studies therefore selections of places were based on typologies and condition and integrity. These typology studies were able to analyse substantial government records to research places and augment that information through consultation with forest officers to ascertain condition and integrity.

The selected themes study considered the geographic and thematic gaps identified in the data audit (Marshall and Jones 1997) along with regional historic storylines such as settling of marginal lands, coal mining and forest timber milling settlements, mountain and bushland grazing and forest tracks, railways and goods. The study selected places to:

- fulfil the thematic and geographic gap analysis identified by the cultural data audit;
- places which contributed a cultural expression of one or more of the identified storylines;
- highly valued thematically relevant places that needed statements of significance; and
- thematically relevant places identified at the community workshops.

Each of the historic studies developed sets of significance indicators to determine the lists of places to be surveyed. For the final assessment they established thresholds to determine which places met the AHC criteria.

Sawmills and tramway places

The study examined information on sawmill and tramway sites from the Government Gazette, Lands Department and Forests Commission records, local historical societies and the Light Railway Research Society of Australia, as well as from a number of community heritage workshops. If places had the potential to meet the threshold for at least two criteria they were listed for field checking.

After field surveys, places were comparatively assessed against the national estate criteria in terms of their ability to represent any of the following:

- development of sawmilling, sawmills and transportation networks;
- economic importance of the industry;
- community development;
- discovery of new seasoning techniques;
- demonstration of a range of occupations and skills in sawmilling;
- demonstration of methods for harnessing landforms;
- distinctive mill layout;
- demonstration of change of technology and engineering achievement; and
- range of products produced.

In each instance the place needed to amply demonstrate one or more of the features above, and be one of the best of its type in the study area in order to meet the threshold level for a place of potential national estate value. Two places assessed by the consultant, *Lake Tyers Timber Co. Mill Site* and *Lake Tyers Timber Co. tramway bridge, Lake Bunga* were outside of the Gippsland RFA boundary, however the assessments of these places will be passed on to the Register of the National Estate.

Forest activities places

A detailed analysis of historic records identified that the only site type found to be adequately represented archaeologically and historically in the region were Forests Commission camps associated with post World War II reconstruction projects. The camps accommodated Forests Commission workers and immigrants from Eastern Europe. The project involved a detailed analysis of historical records, Departmental and community consultation, and on-site inspections and site recording. Forty potential sites were identified primarily in State forests

and also in pine plantations in the initial research stage. Places were assessed against the following significance indicators to determine those of potential national estate value:

- the role the place played in respect to the Forests Commission's strategic priorities, and the historical development of the region and State's timber industry;
- the scientific importance of the data represented in the features of a place and the degree upon which the place may contribute further substantial information;
- the degree to which the place can be demonstrated as having historical integrity and /or rareness in its intactness or condition better than any other similar place;
- the measure of the awareness in the local community of the site and its role in the history of the locality; and
- the degree to which the setting of the place had been modified.

Seven places were assessed as above threshold as indicative places for the national estate. During the final assessment two of these places, *Mount Little Dick Firetower* and *Mount Nowa Nowa Firetower* were found to be outside of the Gippsland RFA boundary.

Selected forest theme places

The research stage of the forest themes study identified over 1200 sites which were listed and classified according to type, theme and potential significance. The community heritage workshops identified over 600 places. From the lists, places were considered to indicate potential national estate significance if they had:

- a heritage value (provided by previous studies) where the place has an identified value to the locality, region, State or nation;
- no known statutory heritage status; and
- no known statement of significance.

Seventy one places were assessed for national estate significance using thresholds based on:

- exceptional richness or diversity of features relating to the theme, or theme/storyline combination;
- regional comparisons with other places in the region relating to the representation on theme type, or a particular event;
- known as a research or teaching place or with exceptional regional potential for public education;
- integrity for demonstrating a type of place; and
- the importance of association with a person or group of regional or state importance.

The study recommended 31 places as having indicative national estate value. During the final assessment one place *Moondarra (Erica) Public Cemetery* was found to be outside of the Gippsland RFA boundary.

2.5.4 Results

For the sawmills and tramways, 10 places were considered to meet the threshold for national estate significance and these included mill sites, a winch, tramways and a tramway bridge.

Of the forest activity places, five were considered to meet the threshold for national estate significance and included fire towers, forest camp sites and plantations. Generally speaking the bulk of the surviving physical evidence at these places dates from the Second World War. The recent age of the surviving evidence is a reflection of the temporary and basic nature of the activities undertaken and the technologies employed.

For the Selected Historic Forest Themes study, 30 of the places were considered above threshold for national estate significance. They included bridges, tracks, huts, recreation sites, railways, water storage and waterworks places, former settlement sites and a quarry site.

Places identified with indicative national estate historic value are listed at Appendix J and their location shown on Map 4.

Chapter 3: National Estate Natural Values

3.1 Introduction

Natural values for the Gippsland RFA Region were assessed against the relevant national estate criteria. They range from values covering some thousands of hectares to values confined to single small sites. Identification and treatment of natural values follows three broad subdivisions:

- extensive natural values;
- localised natural values (flora, fauna); and
- other natural values, including those relating to geology and geomorphology.

As was done for the cultural values assessment, the natural values assessment considered places within the study area across all land tenures. It did not, however, limit itself to forest and forest-related species or places, largely because the distinctions are often not clear. The policy of the Australian Heritage Commission regarding places of indicative national estate heritage value located on private land is described in Section 2.1.

3.1.1 Assessment criteria for natural values

In the regional context, assessment of national estate values requires a comparative appraisal of the significance of places having one or more attributes or values. The values are derived from the national estate criteria listed in Appendix A.

Indicators of significance vary across the national estate natural values and include:

- rarity or threat;
- distribution pattern;
- condition and integrity;
- diversity or richness;
- outstanding example.

The development of thresholds for national estate significance will vary depending on the level of current knowledge about the nature and extent of natural values and their distribution in the landscape at a local, regional or national level. A regional evaluation involves building and interpreting a more comprehensive and integrated knowledge base for assessment of significance than would be possible in considering a place, or places, in isolation.

As with national estate cultural values, a threshold is set in relation to the significance indicators and this threshold is specific to each national estate value. Thresholds of significance for each value were largely based on those used for the North East National Estate Assessment (VicRFASC 1999b), which in turn were adapted from the Central Highlands Joint Forests Project (AHC & CNR 1994a) and the East Gippsland National Estate Assessment (AHC & NRE 1996).

The resultant products are indicative national estate value layers. Individual sub-units within each layer are not graded in significance as they either reach the threshold or they do not. Boundaries of some indicative layers have been rationalised in an ecological or topographic sense, while others have not.

All mapped indicative national estate natural areas have been digitised and are held in ARC/INFO format on a GIS platform held by both Environment Australia and NRE.

3.1.2 Major biophysical characteristics of the Region

Detailed biophysical characteristics of the Gippsland Region are provided in the CRA Report for the Region (VicRFASC 1999a). A brief summary is presented here.

Biogeography
The Region covers over 2.6 million hectares in the south east of Victoria. The main IBRA Regions (*An Interim Biogeographic Regionalisation of Australia*, Thackway and Cresswell 1995) represented are the Australian Alps, the South Eastern Highlands and the South East Coastal Plain, with small areas of the Furneaux and South East Corner regions in the south and east respectively.

Landscape
The Great Dividing Range is the dominant landform feature to the north of the Region. South of the Divide, subsidiary spurs, minor ranges and flat to gently undulating lands run down to the Gippsland Plains. The Strzelecki Ranges and Wilsons Promontory have peaks in excess of 700 metres above sea level.

Climate
The Great Dividing Range has a significant influence on weather patterns. Dry "rainshadow" valleys contrast with adjacent mountains which receive significantly higher levels of precipitation. Precipitation falls mainly as rain, except at high altitudes, where areas over 1500 metres in altitude remain snow-covered throughout winter. Maximum rainfall occurs in winter and spring, and high-intensity rains at any time of the year can cause floods in the lower reaches of most major rivers in the Region. On the coastal plains, rainfall is fairly evenly distributed throughout the year.

Temperature varies according to proximity to the coast and altitude. Low-lying, inland towns such as Sale and Maffra experience the highest temperatures during summer. Mild winters are experienced on the plains and in coastal areas. Higher winter temperatures compared with other parts of the region are a result of winds becoming warmer when descending from the mountains (Föhn effect).

Water Resources
The Gippsland RFA Region is almost entirely within the Australian Water Resources Council South East Coast Division, covering sections of nine river basins. None of the basins are entirely within the Region, with the Tambo, Mitchell, South Gippsland, La Trobe and Thomson being the major River basins. The forested slopes of the Great Dividing Range are an important source of water for use both within and outside the Region.

Vegetation
Ecological Vegetation Classes (EVCs) are the basic mapping unit used for forest ecosystem assessments, biodiversity planning and conservation management at the regional scale in

Victoria. A total of 103 EVCs (approximately a quarter of which are mosaics and complexes) have been identified as currently occurring in Gippsland. Fifty-nine of these are classified as rare, vulnerable or endangered according to the National Reserve criteria (JANIS 1997). Those which were most widespread prior to European settlement include Lowland Forest, Shrubby Dry Forest, Damp Forest, Montane Dry Woodland, Shrubby Foothill Forest and Plains Grassy Woodland. A total of approximately 2,500 species of vascular plants have been recorded for the Region, including at least 354 species of conservation significance.

Fauna
The faunal assemblage of Gippsland is also diverse, reflecting the range of environments and habitats represented. Some species, including New Holland Mouse (*Pseudomys novaehollandiae*), Southern Horseshoe Bat (*Rhinolophus megaphyllus*), Swamp Skink (*Egernia coventryi*), frogs, fish and significant invertebrates, have important populations in the Region, often with low abundance, and narrow habitat specificity and small geographic range.

3.2 Extensive Natural Values

The two sub-criteria of relevance to the assessment of extensive natural values are:

Sub-criterion A2: **Importance in maintaining existing processes or natural systems at the regional or national scale; and**

Sub-criterion B1: **Importance for rare, endangered or uncommon flora, fauna, communities, ecosystems, natural landscapes or phenomena, or as a wilderness.**

These are inclusive values, extending broadly across the landscape rather than being confined to single vegetation types, landforms or localities. The values considered in this aspect of the Gippsland assessment are:

- natural landscapes;
- undisturbed catchments;
- wilderness; and
- old-growth forest.

Assessment of these values resulted in the identification of indicative places of importance for the maintenance of natural processes (such as hydrological processes) at regional and national scales, and places that are of regional importance for maintaining specific natural systems (such as remnant vegetation).

Biophysical Naturalness
Biophysical Naturalness is one of the indicators developed for the assessment of wilderness values, using the National Wilderness Inventory (NWI) criteria (Lesslie and Maslen 1995). It is also integral to national estate assessments for natural landscapes and undisturbed catchments. Biophysical Naturalness (BN) is based on the assumption that the degree of change sustained by an ecosystem is directly related to the intensity and duration of interference.

The types of disturbance information used to derive the BN layer are dependent on the available range of reliable data sets. Information used to derive the BN layer for the

Gippsland RFA Region included old-growth coverage and records of timber harvesting, agricultural clearing and mining. Grazing disturbance was also applied in the BN ruleset and was derived from grazing lease history, slope and EVC palatability. Wildfire is considered a natural process and the effects of wildfire did not influence BN rating.

The BN index provides a six-class rating from a value of 0 (most disturbed) to 5 (most natural). A description of the rules used to derive each of the classes is given in Appendix K.

It should be noted that the absence of comprehensive disturbance information and the nature of regrowth in the Gippsland Region forests means that the application of the BN modelling rules in some cases overstates the extent of areas with high BN. For national estate assessments that use biophysical naturalness as an indicator or for thresholding, further validation of areas with indicative national estate significance should be considered.

3.2.1 Natural Landscapes

Natural landscapes are large, relatively undisturbed areas with topographic and catchment integrity where natural processes continue largely unmodified by human intervention. Natural processes include:

- energy flows;
- nutrient cycling;
- hydrological processes;
- ecological processes such as succession; and
- evolutionary processes such as speciation and extinction.

At a national level, 'natural landscapes' are considered rare, and in national estate assessments for Regional Forest Agreement regions they have generally been assessed under sub-criterion B1.

Method

The following measures were used to identify areas of potential natural landscape value:

- naturalness (or level of disturbance indicated by the BN index);
- size; and
- integrity in the landscape.

Boundaries were drawn around contiguous areas of high biophysical naturalness. Rivers, ridge lines, roads and tenure boundaries were used to guide manual delineation of boundaries. Highly irregular boundaries and small narrow fingers were smoothed off or clipped to reduce edge to area ratios and increase overall integrity. In order to rationalise the identification of areas, identified areas could contain fragmented but not significant areas of disturbance.

Threshold

Only areas greater than 5,000 ha and with at least 95% class 5 BN were considered above threshold. For areas adjoining previously identified natural landscapes in adjoining RFA regions, a 3,000 ha size threshold was applied. Five thousand hectares was considered to be an appropriate threshold after reviewing the representation of potential natural landscapes across the Region while at the same time ensuring viability within the landscape.

Results

Nineteen natural landscape areas of indicative national estate significance were identified. These areas cover a total of 311,296 ha and range in size from 4,213 ha (Matlock – addition to natural landscape of same name in the North East) to 47,420 ha (Wilsons Promontory). Delineated areas of natural landscapes are listed in Table 3.1 and shown in Map 5.

Table 3.1: Indicative natural landscape areas.

Natural Landscape		Area (ha)
No.	**Name**	
1	Wilsons Promontory	47,420
2	Avon	31,756
3	Caledonia	31,669
4	Nicholson	26,494
5	Mount Elizabeth	26,184
6	Ben Cruachan	16,318
7	Buenba	15,990
8	Freestone	15,150
9	Wentworth	14,249
10	Wongungarra	14,021
11	Mitchell River	13,927
12	Useful Creek	11,253
13	Holey Plains	9,817
14	Deep Creek	9,464
15	Little River	7,177
16	Seacombe	6,175
17	Timbarra	5,012
18	Strzelecki	5,007
19	Matlock	4,213
	Total Area	**311,296**

3.2.2 Undisturbed Catchments

'Undisturbed catchments' are catchments where natural hydrological processes remain essentially unmodified and unimpeded.

Method
The identification of undisturbed catchments was based on an analysis of river flow impediments and the naturalness of the area within the catchment. The assessment is derived using the River Disturbance Index database that was developed for the Australian Heritage Commission's Wild Rivers project (Stein et al. 1998).

The River Disturbance Index (RDI) is a measure of river/stream quality across sub-catchment areas and is based on calculating scores for sub-catchment condition and flow regime indicators. An RDI database has been constructed by establishing a grid across a primary database containing geographical data and information on watercourses, settlement and infrastructure features (such as built-up areas, reservoirs and canals), the extent of non-natural land cover and an index of biophysical naturalness. The database delineates a separate modelled sub-catchment for each stream segment, as defined on the AUSLIG 1:250,000-scale hydrography theme database. The RDI rates sub-catchment areas on a scale from undisturbed (0) to disturbed (1).

Threshold
Highly undisturbed catchments occur in the RDI range less than or equal to 0.01 and all sub-catchments falling within these parameters were deemed to be above threshold for this value. Maintaining consistency with similar processes carried out for other CRAs, the threshold was

further set to areas of high biophysical naturalness (BN equals 4 or 5) and with an area of 1,000 ha or greater.

Undisturbed catchments that were below 1,000 ha along the boundary of the RFA Region were investigated to see whether such units were part of a larger undisturbed catchment that extended beyond the Region. No such units were evident.

Results
Thirty six undisturbed catchments were identified in the Region (see Map 6). The total area represented is 193,386 ha, with the largest undisturbed catchment (55,238 ha) centred on the Avon Wilderness Area.

3.2.3 Wilderness

Wilderness quality is essentially a measure of the extent to which a location is remote from and undisturbed by the influence of modern technological society (Lesslie and Maslen 1995). This assessment of wilderness quality is considered under sub-criterion B1 as the value is held to be rare when viewed from a continental perspective.

An assessment of wilderness covering the Gippsland Region was undertaken in 1996 in the wider regional context of the forests of Eastern Victoria, given their broad similarity. The report *Wilderness of the Eastern Victorian Forests* (VicRFASC 1996) satisfied the analysis of wilderness quality for the purposes of JANIS requirements across four RFA regions, namely East Gippsland, Central Highlands, North East and Gippsland. For Gippsland, the best available systematic disturbance data at the time of the analysis were updated in 1986 and this should be taken into account when interpreting the outputs.

The 1996 study identified five areas of high wilderness quality within the Gippsland Region - these were Wilsons Promontory (33,228 ha), Avon (39,650 ha), Macalister (33,300 ha), Mt Darling/Snowy Bluff (40,400 ha) and the Indi Addition to Pilot and Davies Plain (24,300 ha). These areas satisfy the National Forest Reserve Criteria for wilderness protection.

Because more recent and detailed disturbance information compiled by NRE is now available, it was decided to re-assess wilderness quality in the Region for national estate purposes.

Method
The National Wilderness Inventory (NWI) methodology, developed by the Australian Heritage Commission, has been adopted as the standard approach to the assessment of wilderness in RFAs throughout Australia. The current national estate assessment of wilderness quality in Gippsland uses this methodology, which is identical to that applied in the earlier work for areas in the Region.

The NWI methodology produces a database of 'wilderness quality' across the Region. This is achieved by measuring the variation in wilderness quality across the landscape using wilderness quality 'indicators' that represent the two essential attributes of wilderness: remoteness and naturalness. The indicators are:

- **Remoteness from Settlement** - remoteness from places of permanent occupation;
- **Remoteness from Access** - remoteness from established access routes;
- **Apparent Naturalness** - the degree to which the landscape is free from the presence of permanent structures associated with modern technological society; and

- **Biophysical Naturalness** - the degree to which the natural environment is free from biophysical disturbance caused by the influence of modern technological society.

The data used in the analysis were those used in the NWI and come from many sources. The distance-related indicators (settlement, access and apparent naturalness) are essentially current AUSLIG digital mapping data updates.

The index of wilderness quality derives from a summing of the component indices (each ranging from 0 to 5) and is represented by a range from zero to 20. To identify areas with high wilderness quality, the criteria used in this assessment were areas with a NWI wilderness quality of at least 12. Although wilderness areas are not identified in this assessment, they are most commonly defined as being areas of high wilderness quality (12 and above) occupying at least 8,000 ha (JANIS 1997, VicRFASC 1996).

Results
Based on the most currently available information, the distribution of wilderness quality in the Gippsland RFA Region is shown in Map 7. Much of the area shown with high wilderness quality is either too small or too fragmented to justify consideration as potential wilderness areas.

A comparison of the current analysis of wilderness quality against that undertaken in 1996 indicates a general increase in the amount of high wilderness quality across the Region. This difference relates largely to the refined interpretations of disturbance information for this part of Victoria, resulting in higher levels of biophysical naturalness than previously identified.

3.2.4 Old-growth forest

Old-growth forest is considered important for maintaining existing natural processes (sub-criterion A2). It is characterised by having the oldest possible growth stage and by being negligibly disturbed. The Gippsland RFA Region old-growth forest study (report in prep.) used the same definition of old-growth forest applied in all other Comprehensive Regional Assessments of old-growth forest studies in Victoria:

> *Old-growth forest is 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).

Method
The old-growth forest identified in the Gippsland RFA Region old-growth forest study was used as the primary data set for identification of indicative national estate old-growth forest values in the study area. Details of the methodology used to delineate old-growth forest are summarised in the Gippsland CRA Report (VicRFASC 1999a).

Areas of indicative national estate old-growth forest significant for ecological processes are considered to be those that have high integrity and natural context (as identified by the NWI BN index) and above a minimum size threshold to ensure the viability and quality of the forest stand.

Threshold
The context in which the old-growth forest areas were located was seen as important in determining minimum size. Old-growth within large areas of high biophysical naturalness functions ecologically within a larger, relatively undisturbed landscape framework. For areas

within natural landscapes (comprising at least 98% BN 5), a minimum patch size of 10 ha was selected as the threshold.

Old-growth outside large areas of high biophysical naturalness is more susceptible to unnatural disturbances such as land clearance and timber harvesting, and effects related to this disturbance, particularly edge effects. The minimum area for old-growth forest in these areas was therefore set at 100 ha to allow for potential edge effects.

Results
A total of 146,000 ha of old-growth forest was identified as above threshold (see Map 8). This represents 70% of all old-growth forest in the Region.

3.3 Flora

Flora values in the Gippsland Region were assessed against national estate sub-criteria A1, A2, A3, B1 and D1 (Appendix A).

Sub-criterion A1: Places demonstrating evidence of past processes

The assessment of flora values under this sub-criterion involved the identification of places where the present distribution and ecology of the Gippsland RFA Region flora reflect the influence of evolutionary, climatic and environmental processes. Key indicators of places important in demonstrating these processes on native flora in the Region were identified as places containing:

- endemic flora;
- flora at the limit of their range;
- flora with disjunct distributions;
- relictual Ecological Vegetation Classes;
- refugia from climatic change; and
- relictual and primitive flora.

Methods for the assessment of endemics, limit-of-range flora and disjunct populations were based on the methods used for national estate assessments for the Central Highlands (AHC & CNR 1994a), East Gippsland (AHC & NRE 1996) and North East Victoria (VicRFASC 1999b) and involved the following steps:

- selection of taxa relevant to each national estate value;
- selection of appropriate points using Geographic Information System (GIS) coverages based on the Department of Natural Resources and Environment's (NRE) Flora Information System (FIS) data; and
- identification of places where major concentrations of relevant records occur.

The perceived natural geographic distribution for each species was used to identify disjunct and limit-of-range populations. Where possible recent human activities (such as land clearing), sampling intensity and environmental parameters were taken into account. This nominal distribution was based on data from the FIS and information contained within the *Flora of Victoria* (Walsh & Entwisle 1993-96) and the *Flora of New South Wales* (Harden 1990-93). All FIS records were used in the identification of values but grid records were not used in creating the final point coverages due to their limited spatial accuracy – an actual site could be anywhere within the 10' grid (approximately 15 by 18 km).

3.3.1 Endemic flora

Endemic flora were defined as:

- those taxa whose natural distribution is wholly confined to the Gippsland Region (E1);
- those taxa whose natural distribution extends beyond the Gippsland Region, but >50% of the nominal distribution is within the Region (E2).

Method
Endemic taxa were identified using the NRE FIS, *Flora of Victoria* (Walsh & Entwisle 1993-96) and the *Flora of New South Wales* (Harden 1990-93). All occurrences of these taxa within Gippsland were plotted.

Areas containing concentrations of endemic taxa were also identified. This was done by assessing the number of endemic taxa that have records within a 5 km radius of each endemic taxa point locality. Two different levels of endemic flora species concentration were applied – 3-4 taxa, and 5 or more taxa recorded within a 5 km radius. For every point locality above arbitrary thresholds, a 2.5 km radius circle was used to delineate a boundary indicating an area with a relatively high concentration of this value. Where these boundaries overlapped, the internal boundaries were removed leaving polygons based on the external boundaries of areas identified as above each concentration level.

Threshold
Each individual point record for all species identified as endemic against either of the endemicity levels was considered to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
Forty taxa were identified as either totally or mostly endemic to Gippsland (see Appendix L and Map 9). Many of these are associated with alpine environments, resulting in the largest concentrations of records occurring along the Snowy Range between Mt Howitt and Mt Wellington, and in areas to the south and south-east of Mt Hotham.

3.3.2 Flora at the limit of their range

Places where a species occurs at the edge of its natural geographic range are considered important as these locations reflect one or more environmental / biophysical features which limit the further expansion of the species' range. Under natural circumstances these features may indicate past environmental change and/or evolutionary processes, but given the recent pattern of human occupation they may also reflect activities such as land clearance, introduction of competitors, etc.

Method
For the purposes of this assessment records identified as representing a limit-of-range were restricted to the extreme geographic limit of the main core of each taxon's range. The extreme limit refers to the noticeable protrusions away from the distribution of the main core,

although clearly in some instances these were not always obvious, and in other cases extreme limits were not a characteristic of the species distribution given the sparse distribution and hence ill-defined core. Where isolated populations occurred well beyond the limit of the main core, these were considered to be better represented under the disjunct population criterion. Likewise, where species distributions extend into Tasmania these were by and large considered as a disjunct and separate part of the taxon's distribution.

It is recognised that limits of range are defined by a much greater complexity of environmental factors than just extreme geographic limits. Further modelling incorporating data such as topography, climatic bands, soils, geology and vegetation communities would enhance the simple model produced here. The model presented here is likely to be a very narrow implementation of the limit-of-range concept.

Limit-of-range taxa were identified using the NRE FIS, *Flora of Victoria* and the *Flora of New South Wales*. Only the specific record(s) of each taxon that were at, or close to, the limit-of-range were selected. Limit-of-range records for all taxa were combined and concentrations were identified using the same method as described in the endemic flora analysis (see above). Two different levels of limit-of-range flora species concentrations were applied – 4-10 taxa, and 11 or more taxa recorded within a 5 km radius.

Threshold
Each individual point record identified as being at the limit-of-range were considered to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
One hundred and thirty four taxa were identified as having limits of geographic range in the RFA Region (see Appendix L & Map 10). The most represented genera are *Eucalyptus* and *Pomaderris* (Fam. Rhamnaceae), each with eight taxa. Concentrations of records occur along the Snowy Range between Mt Howitt and Mt Wellington, along part of the Mitchell River valley in central Gippsland, and around Lakes Entrance.

3.3.3 Flora with disjunct distributions

Places where disjunct populations occur are considered important from an evolutionary point of view due to their isolation from gene flow. This disjunction may have arisen due to mechanisms such as a break in a formerly continuous distribution, or to long distance dispersal over a barrier.

Method
Disjunct populations were defined as those outlying populations separated from the main core of a taxon's distribution. Whether a record was considered disjunct depended on its relative separation from the main core, the overall pattern of the distribution of the taxon in question, and where possible the impact of land clearing.

Taxa with disjunct populations were identified using the NRE FIS, *Flora of Victoria* and the *Flora of New South Wales*. Where a number of records occurred in a tight cluster away from the main distribution, all records within the cluster were considered disjunct. The determination of whether a population, or cluster of populations, was disjunct was based on the relative isolation from the main core, rather than on the basis of any set distance, given the variation in geographic range of taxa from regional to national. Concentrations of disjunct

taxa populations were identified in the same manner described in the earlier assessments for endemicity and limit of range. Two different levels of disjunct populations of flora species concentrations were applied – 4-10 taxa, and 11 or more taxa recorded within a 5 km radius.

Threshold
Each individual point record identified as being disjunct from the main core of the species range was considered to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
Seventy five taxa were identified as having disjunct populations in Gippsland (see Appendix L and Map 11). Wilsons Promontory stands out as being a centre for disjunct flora populations in the Region.

3.3.4 Relictual Ecological Vegetation Classes

Relictual Ecological Vegetation Classes (EVCs) are those classes whose floristic composition carries a relatively high proportion of primitive, relictual and phylogenetically distinct species. Such species are important as indicators of evolutionary history, past or current population movements, evidence of past or current speciation and for evidence of past or current decline. The large altitudinal gradient, diverse range of habitats and the presence of long-term stable landscapes such as heath and rainforests in Gippsland all contribute to the likelihood of persistence of such species in the Region.

Method
EVCs were identified as relictual on the basis of carrying a higher proportion of flora taxa from phylogenetically Gondwanan or primitive groups (such as ferns and rainforest bryophytes and lichens). Identifications were made by NRE experts.

Threshold
With the exception of the Wet Forest EVC, all occurrences of the identified EVCs were considered important for the maintenance of the relictual species occurring within them and were taken as being above threshold. Of those EVCs above threshold, only Wet Forest is subject to potentially significant logging disturbance, which in turn can affect the maintenance of component relictual species. Because of this, only the less-disturbed (BN 4,5) areas of Wet Forest were considered above threshold.

Results
The following EVCs were identified as containing a high incidence of relictual flora:

- Cool Temperate Rainforest;
- Warm Temperate Rainforest;
- Dry Rainforest;
- Gallery Rainforest;
- Wet Forest;
- Treeless Sub-alpine Mosaic;
- Sub-alpine Wet Heathland; and
- Wet Heathland.

They have a relatively restricted distribution across the Region and are generally associated with protected wet environments. The most extensive occurrences of these EVCs are on Wilsons Promontory and in the Strzelecki Ranges (see Map 12). These EVCs occupy a total area of 49,900 ha within Gippsland.

3.3.5 Phylogenetically significant flora

There are two criteria by which flora may be considered phylogenetically significant. Firstly, a taxon may be significant if it has a long fossil record, having also ostensibly remained unchanged, eg Wollemi Pine (*Wollemia nobilis).* A flora taxon may also be significant if it is one of the last remaining living representatives of an old lineage.

The earliest land plants, the *Lycopods* (the Baragwanathia flora) and *Psilophytes* (the Cooksonia flora), evolved around 420 – 385 million years ago from the late Ordovician to early Devonian Periods. In Victoria, the Cooksonia flora is represented by the highly restricted Skeleton Fork-fern (*Psilotum nudum*) and by four other Fork-ferns belonging to the genus *Tmesipteris*. The Baragwanathia flora is represented in Victoria by living Club Mosses (*Lycopodium* spp, *Huperzia* spp and *Phylloglossum* spp).

There are no living representatives in Victoria of the early seed plants that evolved around the late Devonian and early Carboniferous Periods, 385-325 million years ago. There are also no living relatives of the Coal Swamp Flora (Giant Club Mosses, Seed Ferns and Giant Horsetails) of the Carboniferous Period (355-290 million years ago). Quillworts (*Isoete*s), which are distant relatives of the Giant Club Mosses, are significant as they have a lineage that goes back to the Triassic Period (245-208 million years ago).

After the Ice Age of the Late Carboniferous and earliest Permian times, there was a rapid evolution of a rich flora characterised by Glossopterid plants (White 1986). However, there are no living representatives in Victoria of these early Gondwanic flora, such as Ginkgos and Conifers, which were evident during the Permian (290 to 250 million years ago). Modern conifers, i.e. Plum Pines (*Podocarpus* spp), were prominent in the Cretaceous Period (144-66 million years ago) and *Callitris* is a prominent component of Tertiary fossil flora (66 –1.6 million years ago) in south-eastern Australia.

Victoria's more recent phylogenetically significant flora include several primitive angiosperms from the early Cretaceous Period. Lineages dating to the early Cretaceous include the Magnoliid taxa, such as the Southern Sassafras (*Atherosperma moschatum*), the Pepper Plants (*Tasmannia spp*), Dodder-laurels (*Cassytha* spp), Austral Mulberry (*Hedycaria*) and Bolwarra (*Eupomatia laurina*), the latter being one of the most primitive flowering plants in Victoria. Myrtle Beech (*Nothofagus cunninghamii*) reflects the dominant vegetation of the late Cretaceous Period of Gondwana, when New Zealand, Australia and South America were still joined to Antarctica. Myrtle Beech persisted through to the middle Tertiary when it was largely replaced by mainly sclerophyllous flora.

Method
All phylogenetically significant flora taxa were identified using expert advice (A. Drinnan (Melbourne University) pers. comm.) and all point records above threshold were plotted using information contained in the Flora Information System.

Threshold
All point records of taxa identified as significant for this value and which are listed as Victorian Rare or Threatened Species (VROTS) were considered above threshold. Because a number of the significant taxa are not on the list of VROTS, with some of these being very common, only point records falling within natural landscapes were considered above threshold for non-VROTS species.

Results
All species with point records above threshold are listed in Table 3.2 and all records above threshold for these species are shown in Map 13.

Table 3.2: Phylogenetically significant flora.

Scientific Name	Common Name
Atherosperma moschatum	Southern Sassafras
Callitris oblonga	Dwarf Cypress-pine
Cassytha glabella	Slender Dodder-laurel
Cassytha melantha	Coarse Dodder-laurel
Cassytha pubescens s.s.	Downy Dodder-laurel
Hedycarya angustifolia	Austral Mulberry
Huperzia australiana	Fir Club Moss
Huperzia varia	Long Club Moss
Lycopodium deuterodensum	Bushy Club Moss
Lycopodium fastigiatum	Mountain Club Moss
Nothofagus cunninghamii	Myrtle Beech
Phylloglossum drummondii	Pigmy Club Moss
Podocarpus lawrencei	Mountain Plum Pine
Tasmannia lanceolata	Mountain Pepper
Tasmannia xerophila	Alpine Pepper
Tmesipteris elongata ssp. *elongata*	Slender Fork-fern
Tmesipteris obliqua	Long Fork-fern
Tmesipteris ovata	Oval Fork-fern
Tmesipteris parva	Small Fork-fern

3.3.6 Refugia from climate change

The major trend in climatic change in Victoria since the last Ice Age (some 10,000 years ago) has been a decrease in water availability. Refuges were identified as places within the landscape with environmental conditions that have allowed the survival of vegetation characteristic of the last glacial period. Such areas in general tend to be characterised by lower average ambient temperatures and/or greater water availability and a concomitantly lower fire frequency.

Environmental change over the terminal Holocene and even Pleistocene has also been characterised by periods of dryness. It is possible that core dry areas acted as refuges for species dependent on higher fire frequencies than were typical during the mid-Holocene climatic optimum. At present, however, the environmental history of the Region is not sufficiently documented to enable the delineation of potential 'dry refugia', unlike the situation for identification of 'cold' and 'wet' refugia.

Method
A combination of expert knowledge of the current structure and floristics along with topographic information was used to identify refugia and the particular EVCs that typify habitat of cold and the most fire intolerant communities. The EVCs identified as refugia are presented in Table 3.3. All areas of these EVCs in the Region were mapped.

Table 3.3: EVCs identified as refugia from long term climate change.

Environment	EVCs that qualify
Sub-alpine/alpine	Tableland Damp Forest Sub-alpine Grassland Sub-alpine Wet Heathland Sub-alpine Shrubland Sub-alpine Woodland Treeless Sub-alpine Mosaic
Montane	Montane Dry Woodland Montane Riparian Woodland Montane Grassy Woodland Montane Herb-rich Woodland Montane Damp Forest Montane Wet Forest Montane Rocky Shrubland Montane Grassy Shrubland Montane Swamp Montane Riparian Thicket Montane Grassland
Rainforest	Cool Temperate Rainforest Warm Temperate Rainforest Dry Rainforest Gallery Rainforest

Threshold
All occurrences of the EVCs listed in Table 3.3 were considered above threshold for this value.

Results
The high representation of sub-alpine and montane EVCs above threshold for climate change refugia is reflected in the results shown in Map 14, with a large proportion of the refugia falling within the Alpine National Park.

Sub-criterion A2: Places demonstrating existing natural systems

3.3.7 Contemporary flora refuges

For this assessment, a flora refuge is defined as a place that provides protection for flora species during shorter-term climatic changes and environmental disturbances such as frequent

fire and/or drought. Areas that are refuges from long-term climate change (i.e., the last Ice Age) are addressed under sub-criterion A1 (see Section 3.3.6).

Method
All EVCs occurring in Gippsland and having potential to act as flora refuges (being infrequently burnt and/or protected from the effects of drought) were identified. Those for which appropriate information was available were mapped.

Threshold
Those EVCs considered to offer potential flora refuge habitat are listed in Table 3.4.

Table 3.4: Refuges from frequent fire and drought.

EVCs that qualify	Drought refuge type			Fire refuge
	Wetland	Riparian environment	Water-dependent dryland environment	
Billabong Wetland	✓			
Bird Colony Shrubland				✓
Blackthorn Scrub				✓
Blocked Coastal Stream Swamp	✓			
Coastal Lagoon Wetland	✓			
Coastal Saltmarsh				✓
Cool Temperate Rainforest		✓	✓	✓
Damp Forest			✓	✓
Deep Freshwater Marsh	✓			✓
Dry Rainforest				✓
Estuarine Wetland	✓			✓
Floodplain Riparian Woodland		✓		
Gallery Rainforest		✓		✓
Lake Bed Herbland	✓			
Mangrove Shrubland	✓			✓
Montane Riparian Thicket		✓		
Montane Riparian Woodland		✓		
Montane Swamp	✓			✓
Montane Wet Forest	✓			✓
Riparian Forest			✓	
Riparian Scrub		✓		
Riverine Escarpment Scrub				✓
Sandy Flood Scrub		✓		
Sedge Wetland	✓			
Shrubby Damp Forest			✓	✓
Shrubby Wet Forest			✓	
Sub-alpine Wet Heathland			✓	✓
Swamp Scrub	✓			
Swampy Riparian Complex		✓		
Swampy Riparian Woodland		✓		
Tableland Damp Forest			✓	
Warm Temperate Rainforest		✓	✓	✓
Wet Forest			✓	✓
Wet Heathland			✓	
Wet Rocky Outcrop Scrub			✓	✓
Wet Swale Herbland			✓	
Wetland Formation	✓			

All occurrences of these EVCs (greater than or equal to 1 ha) were considered above threshold.

Treeless Sub-alpine Mosaic is a complex of several dry and wet EVCs occurring in the Region and the Mosaic as a whole could therefore not be considered as above threshold. It occupies only 167 ha in the Region.

Results
The EVCs listed above had areas above threshold totalling 350,500 ha (see Map 15).

3.3.8 Successional stages

Succession occurs when one vegetation stage or class replaces another over time. Succession is the directional and continuous pattern of colonisation and extinction on a site by populations of a species. The time scales for succession may vary widely, reflecting the range of underlying causes.

Where an unvegetated landform has not previously been colonised by a community, the sequence of species is referred to as a primary succession.

Secondary succession describes the sequence of species where disturbance has caused partial or complete removal of vegetation but where well-developed soil and seeds and spores remain from which the earlier vegetation class re-emerges. That is, there is a reversion to the prior EVC after disturbance. Secondary succession may occur after major natural disturbances such as fire, flood and windfall.

This value is associated with National Estate sub-criterion A2, which relates to places important for the maintenance of existing processes.

Method
This assessment was unable to be completed due to constraints on time and data availability. A discussion of potentially suitable methodologies and thresholds are nevertheless described below for future consideration.

Those EVCs, or parts thereof, considered to exhibit primary and secondary succession as outlined above were identified using expert knowledge (D. Frood, pers. comm.).

Threshold
Whilst primary succession may occur over a relatively short time span, such as on destabilised sand dunes, the time span for some vegetation types to move through primary succession is much longer. EVCs identified as potentially capable of relatively rapid change, i.e. within a few hundred years, as well as those possibly thousands of years old with the potential to undergo primary succession, may all considered above threshold. The entire range of EVCs identified as potentially capable of demonstrating secondary succession may also be considered above threshold.

For primary succession, the threshold in most instances could be set at any EVC from which the primary successional phase develops. In other instances, only those parts of an EVC with

a particular rainfall and/or aspect might considered likely to move through primary succession to another EVC. For example, only the wettest margins of Wet Forest might have the potential to succeed to Cool Temperate Rainforest due to the maintenance of a requisite water regime and greater likelihood of protection from fire. Identifying parts of an EVC that may give rise to another should be based on identifying the elements of existing derived EVCs that are shared with those that may give rise to it.

Results
Patterns of primary and secondary succession evident in Gippsland are described in Table 3.5.

Table 3.5: Patterns of primary and secondary succession in Gippsland.

Primary Succession Sequence →		→	**Secondary Succession Pattern**	**cause**
Limestone Pomaderris Shrubland	Dry Rainforest		←	fire
Wet Forest (generally >1,000 mm rainfall)	Cool Temperate Rainforest		←	fire
Damp Forest (generally >700mm and then only on high phosphate soils)	Warm Temperate Rainforest		←	fire
Swamp Scrub (interface only)	Warm Temperate Rainforest			
Swamp Scrub	Floodplain Riparian Woodland			
Riparian Shrubland	Gallery Rainforest		←	flood
Riparian Shrubland	Riparian Forest		←	flood
Coastal Dune Grassland	Coast Dune Scrub	Coast Banksia Woodland		
Coast Banksia Woodland	Damp Sands Herb-rich Woodland/or Heathy Woodland depending on soil depth and proximity to water table			
Coastal Saltmarsh	Estuarine Wetland			
Coastal Saltmarsh	Coastal Tussock Grassland			
Mangrove Shrubland	Coastal Saltmarsh	Estaurine Wetland		
Wet Swale Herbland	Swamp Scrub			

3.3.9 Remnant vegetation

Remnant vegetation comprises those floristic communities that have been severely depleted. Remnants form important present-day refuges and recruitment areas for both flora and fauna. The primary mechanisms for depletion are agricultural development and other land uses which result in permanent clearing. Consequently, many remnants are in close proximity to private lands.

Method
All occurrences of EVCs identified as having remnant status in the Region were plotted.

Threshold
EVCs were identified as having remnant status where less than 30% of their pre-1750 extent remained. This was determined from information contained in the Gippsland CRA Report (VicRFASC 1999a).

Results
Of the 103 EVCs identified as still occurring in the Gippsland Region, 23 were found to have been depleted to below 30% of their pre-1750 coverage. The great majority of these remnants occur on private property within cleared lands, although the largest single units include areas of Plains Grassy Woodland on mainly public land north-east of Yarram. All occurrences of these EVCs are identified as having national estate value and are shown on Map 16.

There is little information about the relative quality of these remnants. Further research is warranted to clearly identify those areas whose quality, and security from external threatening processes such as rising saline ground water, justify continued recognition of their national estate value.

Sub-criterion A3: Places of unusual richness

3.3.10 Modelled flora richness

The aim of the A3 diversity of flora communities assessment is to identify locations which exhibit a high diversity of flora. Assessments of this value for East Gippsland and the Central Highlands relied on linking a list of character flora species to each EVC. The resultant total number of character species within a 2 km grid cell was used as a rating or index of flora richness. This method effectively uses EVC richness as a surrogate measure of flora species richness.

Method
The above approach was modified for use in the North East national estate assessment and repeated for the Gippsland and West Region assessments. Character species were not used and analysis was based solely on EVC richness per unit area. A Flora Richness Index (FRI) was determined based on the number of EVCs within a 2 km grid cell. The FRI allocated one unit per EVC with the exception of mosaics and complexes, which were allocated a value dependent on the number of component EVCs. Where mosaics or complexes occurred within an area with a particular EVC already recorded in that area, that EVC was not counted twice. Non-natural EVCs (plantations, cleared areas) had no impact on the FRI.

A 2 km grid was used as a sampling technique. To avoid inconsistencies associated with the location of the source of the grid, 16 sampling iterations were conducted. Iterations involved 500 m source point shifts in a 4x4 matrix. The end result was an effective cell size of 500 m x 500 m, with each cell containing a mean FRI value based on all 16 iterations.

Threshold
All grid cells making up the highest 5% of FRI scores across the Region were considered above threshold.

Results
With the exception of Wilsons Promontory, major clusters of above-threshold cells occur in the more northern parts of the Region (see Map 17). As would be expected, several of the

concentrations are associated with areas of major topographic variation, occupying areas along the Mitchell, Macalister, Dargo and Avon River valleys.

Sub-criterion B1: Places of rare and threatened flora

3.3.11 Rare or threatened flora

For the purposes of this assessment, rare or threatened taxa included:

- taxa listed on the Victorian Rare or Threatened Species list for plants (VROTS);
- taxa listed on the list of Rare or Threatened Australian Plants (ROTAP) (Briggs and Leigh 1995);
- taxa listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act); and
- taxa listed under the Commonwealth *Endangered Species Protection Act 1992* (ESP Act).

Method
All non-grid records of threatened flora on the Victorian Flora Information System occurring in the study area were plotted on a GIS. Concentrations of rare or threatened taxa were identified in the same manner described in the earlier assessments for endemicity, limit-of-range and disjunct flora. Three different levels of concentration were applied – 8-15, 16-23 and 24 or more taxa recorded within a 5 km radius.

Threshold
Each individual point record for all species identified as rare or threatened was considered to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
A total of 354 threatened taxa were identified as being above threshold for this sub-criterion in the Region (see Appendix L and Map 18), including 25 species or sub-species that are nationally endangered or vulnerable. With the exception of Wilsons Promontory, all other major concentrations of threatened flora occur in alpine environments in the north of the Region.

3.3.12 Rare Ecological Vegetation Classes

The aim under this environmental characteristic is to identify EVCs where there is clear evidence that the EVC has become nationally rare either through severe depletion or due to natural constraints on extent.

The identification of nationally rare EVCs proved too difficult and this assessment was unable to be completed. This was largely due to two factors: firstly, the EVC classification is not used nationally and equivalents are not necessarily recognised as discrete types; secondly, obtaining data on the extent of depletion or natural rarity of vegetation types on a continental scale is difficult.

The National Vegetation Information System (NVIS) may eventually overcome this problem. The NVIS, currently in a pilot phase, is an initiative of the National Land and Water Resources Audit (a National Heritage Trust Program). It intends to collate all existing vegetation information across Australia into a standardised system based on a set of core attributes agreed by all Australian governments.

3.3.13 Rare old-growth forest

Old-growth forest is considered a regionally and nationally rare phenomenon. Rare old-growth is in even more need of protection.

Method
Old growth forest was considered rare if it met one or more of the following criteria:

- its extent was less than 10% of the total EVC extent;
- the old-growth representation of an EVC was less than 300 ha;
- it was old-growth of an EVC considered rare, vulnerable or threatened under JANIS criteria (see Table 12.7 of Gippsland CRA Report).

Threshold
Areas identified as 'rare old-growth' were all considered above threshold.

Results
Rare old-growth is scattered in generally small parcels across most forested parts of the Region, occupying a total area of 30,000 ha (see Map 19).

Criterion D: Importance in demonstrating principal characteristics of class

3.3.14 Principal characteristics of Ecological Vegetation Classes

Under this criterion EVCs were identified on the basis of their condition and integrity for the purpose of representing the principal characteristics of their class across the project area.

The principles of Comprehensiveness, Adequacy and Representativeness (the CAR principles put forward in the 1992 National Forest Policy Statement) need to be considered across the geographic range within the Gippsland RFA Region. Within each ecosystem there is diversity of the floristic communities over the geographic range, often influenced by environmental factors such as climate and soil types.

Method
EVCs were divided into two groups on the basis of rarity; those considered as rare, vulnerable or endangered under the JANIS criteria, and other EVCs. Geographical Representation Units (GRUs) and natural landscapes were used for the purpose of ensuring an appropriate distribution of above-threshold areas of the EVCs throughout their range.

Threshold
Since the majority of the rare, vulnerable and endangered EVCs are very limited in their extent and/or area, it was considered that all remaining examples of these EVCs should be above threshold for this value. Examples of all 'other' EVCs were considered above threshold where they occurred within natural landscapes. Where these 'other' EVCs were poorly represented within natural landscapes (below about 5% of pre-1750 extent), additional examples were selected from other parts of the Region (preferably with high biophysical naturalness), using GRU representation as a guide.

Results
Of the 29 'other' (non rare, endangered, vulnerable) EVCs, 25 achieved at least 5% of pre-1750 representation within natural landscapes. Additional examples of the other four (Montane Grassy Woodland, Montane Herb-rich Woodland, Shrubby Wet Forest and Tableland Damp Forest) were selected from other areas across the Region with good biophysical naturalness. All areas above threshold for this value are represented in Map 20.

3.4 Fauna

Fauna values were assessed against national estate sub-criteria A1, A2, A3 and B1.

The methods and thresholds applied to the following fauna assessments are based largely on those used in the assessment of national estate values for the Central Highlands (AHC & CNR 1994a), East Gippsland (AHC & NRE 1996) and North East (VicRFASC 1999b). However, some modifications have been made on the basis of expert workshop outcomes, methodologies used for RFA national estate assessments in other states, and differences in datasets and assessment timelines.

3.4.1 Data sources

The following are the main sources of locality and distributional data used for assessing fauna values:

- Atlas of Victorian Wildlife. This is the principal fauna database maintained by NRE's Flora and Fauna Branch. It contains species and locality data for almost 2,000,000 records of mainly birds, mammals, reptiles and amphibians. Freshwater fish and threatened invertebrates are also represented but with relatively fewer records. These data are derived from:
  - fauna surveys conducted by the Flora and Fauna Branch since 1972;
  - fauna surveys conducted specifically for the RFA process;
  - fauna surveys conducted by educational institutions and field naturalists clubs;
  - Atlas of Australian Birds project records;
  - Museum of Victoria specimen records; and
  - natural history journals.

- Atlas of New South Wales Wildlife. This is the principal fauna database maintained by the NSW National Parks and Wildlife Service. It contains species and locality data for

birds, mammals, reptiles and amphibians. Access to this database was necessary for analyses relating to endemicity and populations that are disjunct or at the limit of their range.

- Zoologists familiar with the project area and/or the species within it.

- Standard fauna texts and various fauna survey and assessment reports.

All species with records in the Atlas of Victorian Wildlife since 1970 and with an accuracy of 2' or better were considered in the following assessments. The full list of species is provided in Appendix M. Fish and invertebrate species were only considered where sufficient data or information were available. The absence in the New South Wales Wildlife Atlas of records for these two groups further limited the assessments that could be undertaken for them.

Sub-criterion A1: Importance in the evolution of Australian fauna

The assessment of fauna values under this sub-criterion involved the identification of places where the present distribution and ecology of the Gippsland fauna reflect the influence of past evolutionary, climatic and environmental processes. Key indicators of places important in demonstrating these processes on native fauna in the Region were identified as places containing:

- endemic fauna;
- fauna at the limit of their range;
- fauna with disjunct distributions;
- refuges from climatic change; and
- relictual and primitive fauna.

3.4.2 Endemic fauna

Endemic fauna were defined as:

- those taxa whose natural distribution is wholly confined to the Gippsland Region (E_1); or
- those taxa whose natural distribution extends beyond the Gippsland Region, but >50% of the nominal distribution is within the Region (E_2).

Method
All endemic taxa were identified using mainly Victorian and New South Wales Wildlife Atlas records. A point coverage was created of all records (post 1970 with at least 2' accuracy) of these taxa in Gippsland.

Areas containing concentrations of endemic taxa were also identified. This was done by assessing the number of endemic taxa that have records within a 5 km radius of each endemic taxa point locality. For every point locality above a relatively arbitrary species concentration level (in this case, 2 different taxa within the 5 km), a 2.5 km radius circle was used to delineate a boundary indicating an area with a relatively high concentration of this value. Where these boundaries overlapped, the internal boundaries were removed leaving polygons based on the external boundaries of areas identified as above the arbitrary concentration level.

Threshold

Each individual point record for all species identified as endemic against either of the endemicity levels was considered to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
Seven taxa (including five crayfish species) were identified as meeting the criteria for endemicity in the Gippsland RFA Region (see Table 3.6 & Map 21). It should be noted that the identified boundaries of concentrations are not in any way ecologically meaningful and that such areas nominated for national estate listing should be delineated according to appropriate landscape features.

Table 3.6: Fauna taxa exhibiting endemism.

Scientific Name	Common Name	Endemicity	
		E_1	E_2
Litoria verreauxii alpina	Alpine Tree Frog		✓
Engaeus australis	Lilly Pilly Burrowing Cray	✓	
Engaeus karnanga	South Gippsland Burrowing Cray	✓	
Engaeus phyllocercus	Narracan Burrowing Cray		✓
Engaeus rostrogaleatus	Strzelecki Burrowing Cray	✓	
Euastacus neodiversus	South Gippsland Spiny Cray	✓	
Megascolides australis	Giant Gippsland Earthworm		✓

E_1 - Wholly endemic to the Gippsland RFA Region
E_2 - Mostly endemic to the Gippsland RFA Region (>50% of nominal distribution)

3.4.3 Fauna at the limit of their range

Places where species occur at the limit of their natural biogeographic range are considered important when the location reflects some past environmental change and/or evolutionary process. Species at the limit of their biogeographic range were defined as those whose accepted regular distributions terminate within the RFA Region.

Method
For each species covered by the Victorian Wildlife Atlas, all site records were plotted. Identification of limit of range was not confined to the cardinal axes of the compass, although for many species these directional limits were appropriate. Where, for example, a species is shown to have a "sausage" shaped distribution, only those points at the end of the "sausage" (as opposed to other edges) were considered to be at the species' limit of range. For birds, both their full distributions as well as just their breeding ranges (using Emison et al. 1987) were taken into account. Records of species whose range limits appeared to be artefacts of inadequate fauna survey were excluded. Only the specific records of each species that were at, or close to, the limit of range were selected. Limit of range records for all species were combined and concentrations were identified using the same method as described in the endemic fauna analysis (see above).

Threshold
All species with a limit of range, or of breeding range, in the project area were considered to be above threshold. Only the specific records of each species which were at, or close to, the

limit of range were considered to be above threshold. Identified concentrations show those areas with high species richness for this value.

Results
Twenty nine taxa were identified as having limits of range in the RFA Region (see Table 3.7 & Map 22) – these comprise mainly skinks, fish, amphibians and crayfish.

Table 3.7: Fauna taxa at a limit of their biogeographic range.

Scientific Name	Common Name
Antechinus minimus	Swamp Antechinus
Neophema chrysogaster	Orange-bellied Parrot
Bassiana platynotum	Red-throated Skink
Ctenotus taeniolatus	Copper-tailed Skink
Cyclodomorphus praeltus	Alpine She-oak Skink
Eulamprus heatwolei (WTF)	Yellow-bellied Water Skink
Eulamprus kosciuskoi	Alpine Water Skink
Niveoscincus metallicus	Metallic Skink
Pseudemoia cryodroma	Alpine Bog Skink
Helioporus australiacus	Giant Burrowing Frog
Litoria aurea	Green and Golden Bell Frog
Litoria citropa	Blue Mountains Tree Frog
Litoria littlejohni	Heath Frog
Uperoleia martini	Martin's Toadlet
Uperoleia tyleri	Tyler's Toadlet
Galaxias cleaveri	Australian Mudfish
Galaxiella pusilla	Dwarf Galaxias
Gobimorphus australis	Striped Gudgeon
Gobimorphus coxii	Cox's Gudgeon
Lovettia sealii	Australian Whitebait
Macquaria novemaculeata	Australian Bass
Amarinus lacustris	Freshwater crab
Engaeus affinis	Central Highlands Burrowing Cray
Engaeus cunicularis	Granular Burrowing Cray
Engaeus cymus	North-eastern Burrowing Cray
Engaeus hemicirratulus	Gippsland Burrowing Cray
Engaeus tuberculatus	Tubercle Burrowing Cray
Euastacus woiwuru	Central Highlands Spiny Cray
Hyridella narracanensis	Southern River Mussel

3.4.4 Fauna with disjunct distributions

Species with disjunct distributions were defined as those with resident populations in the project area that are substantially separated from, and would not be expected to interbreed with, other populations of the same species. It should be noted that many species' distributions have become fragmented into disjunct populations by clearing and other activities since white settlement - these disjunctions are not relevant under Criterion A.

Method
Species were considered for analysis if they fell into one or both of the following categories:

- species whose distribution within the RFA Region is disjunct;
- species whose representatives within the RFA Region are, or comprise a part of a population which is, disjunct from a population of the same species outside the Region.

Those records representing the disjunct populations for each species were selected and plotted. Where population disjunctions appeared to be an artefact of inadequate fauna survey, these records were excluded, as were records believed to be of vagrants. Among fish, disjunct populations are only found in non-migratory species that complete their entire life cycles in fresh water (AHC & CNR 1994a). Most native fish "disjunctions" in the Region will probably be an artefact of the impact of trout and therefore are not significant under this national estate criterion. For this assessment, no record had another record of a different taxon within 5 km, so no concentrations of species were identified (see method for endemic fauna).

Threshold
All species assessed as having disjunct populations in Gippsland were considered above threshold. Only those records making up the disjunct population(s) were considered to be above threshold.

Results
Three taxa were identified as having disjunct populations in the RFA Region (see Table 3.8) and all disjunct population records for these species are shown on Map 23. The findings of Seebeck (1981) support the view that the Wilsons Promontory Potoroo population is isolated from other eastern Victorian populations.

Table 3.8: Fauna taxa with disjunct populations.

Scientific Name	Common Name
Potorous tridactylus	Long-nosed Potoroo
Niveoscincus metallicus	Metallic Skink
Litoria citropa	Blue Mountains Tree Frog

3.4.5 Refuges from climate change

This value is used to identify places that are biogeographic refugia during periods of glaciation or climatic warming. Places that are refuges to climatic change for fauna are the same as those that are refuges for flora. This value has therefore been assessed for both flora and fauna as part of the flora assessment (see Section 3.3.6).

3.4.6 Relict primitive (Gondwanic) fauna

A large proportion of the terrestrial vertebrate fauna of the Gippsland region is of Gondwanic origin (e.g. monotremes, marsupials, several families of birds, and many reptiles and frogs – Heatwole 1987) and thus a literal application of this sub-criterion is likely to cover the entire

Region. Instead, this value was considered with respect to only invertebrates, for which there are published accounts of assemblages of relict fauna in sharply defined relict environments.

Method
This value was assessed on the basis of expert information provided by invertebrate specialists.

Threshold
All records and known habitats of the taxa identified were considered to be above threshold.

Results
The Hemiphlebia Damselfly (*Hemiphlebia mirabilis*), which has an important part of its remaining population in the Wilsons Promontory area, has been described as a living fossil (CNR 1993), and is the only species identified as meeting this criterion in the Region. The species is extremely valuable for the study of evolution in the Odonata and provides a link between fossils and other living dragonflies and damselflies (extract from Register of the National Estate Database). Although also found in central Victoria near Yea and Alexandra, the only populations known in Gippsland occur in Wilsons Promontory National Park. The areas occupied by these populations are contained within an existing listing on the Register of the National Estate (RNE Database No. 18880), nominated specifically to protect habitat for this species.

Sub-criterion A2: Importance in maintaining existing processes or natural systems at the regional or national scale.

This sub-criterion is used to identify places exhibiting ongoing processes that are important for the maintenance of natural systems in their present form. Such places may represent key fauna habitats or refuges from frequent fire and drought.

3.4.7 Key fauna habitats

Places that may constitute key fauna habitats include:

- important wetlands;
- important breeding and roosting sites;
- places important for migratory species;
- key remnant habitats.

It should be noted that habitats that are important with respect to species richness or for individual threatened species are addressed separately under sub-criteria A3 and B1 respectively.

Important wetlands

Wetlands invariably support a rich array of flora and fauna, which make them important feeding, breeding and roosting sites for waterbirds and other species. They may also offer valuable refuge during times of drought.

Method
The *Directory of Important Wetlands in Australia* (ANCA 1996) (Wetlands Directory) identifies wetlands of national significance. A number of these wetlands are also listed under the Ramsar Convention (that is, wetlands of international importance). All wetlands occurring in Gippsland and listed in the Wetlands Directory were identified. Information on boundaries for these wetlands was obtained from NRE data sets. Details were also obtained of wetlands intended for inclusion in the 3rd edition of the Directory, but none occur in the RFA Region.

Threshold
All Gippsland wetlands listed in the Directory were considered to meet the threshold of National Estate significance for this value.

Results
The nationally important wetlands identified as occurring within the Gippsland study area are listed in Table 3.9 and shown on Map 24. Five of these wetland areas also have Ramsar significance.

Table 3.9: Wetlands of national and international importance.

Wetland	IBRA* Region	Ramsar Listing
Caledonia Fen	Australian Alpine	-
Davies Plain	Australian Alpine	-
Anderson Inlet	SE Coastal Plain	-
Bald Hills Wildlife Reserve	SE Coastal Plain	-
Billabong Reserve	SE Coastal Plain	-
Bosses/Nebbor Swamp	SE Coastal Plain	-
Corner Inlet	SE Coastal Plain	Corner Inlet
Deep Water Morass	SE Coastal Plain	-
Edithvale-Seaford Wetlands	SE Coastal Plain	-
Lake King Wetlands	SE Coastal Plain	Gippsland Lakes
Lake Victoria Wetlands	SE Coastal Plain	Gippsland Lakes
Lake Wellington Wetlands	SE Coastal Plain	Gippsland Lakes
Lindenow Wildlife Sanctuary	SE Coastal Plain	-
McLeods Morass	SE Coastal Plain	Gippsland Lakes
Russell's Swamp	SE Coastal Plain	-
Shallow Inlet Marine & Coastal Park	SE Coastal Plain	-
Tambo River (Lower Reaches) East Swamps	SE Coastal Plain	-
Lake Tali Karng	SE Highlands	-
Nuniong Plateau Peatlands	SE Highlands	-

* *Interim Biogeographic Regionalisation of Australia* (Thackway and Cresswell 1995)

Important breeding and roosting sites

For many species the availability of suitable breeding and/or roosting sites is a key factor affecting their distribution and abundance. In particular, species that come together to breed or roost as colonies or loose aggregations are the focus of this assessment.

Method
The Atlas of Victorian Wildlife provides for the identification of roost sites (eg. bat caves) and a search of all Atlas records was undertaken for these. Results were confirmed with staff

of NRE's Arthur Rylah Institute who also provided information on new and additional sites not in the Atlas.

Wetlands in the Region identified in the Wetlands Directory and listed in the section above are considered nationally important because they meet at least one of six criteria. The criterion most relevant to important breeding sites is Criterion 3 (…*important as the habitat for animal taxa at a vulnerable stage of their life cycles.*…). A comparative assessment was made of the information provided in the Wetlands Directory on the importance of Gippsland wetlands as bird breeding sites. Because colonial-breeding records contained in the NRE Wetlands Database were already used to consider sites for inclusion in the Wetlands Directory, a separate search of the Database was not undertaken.

Threshold
All sites used by colonially roosting bats were considered above threshold. Sites in the Wetlands Directory were considered above threshold for breeding by waterbirds if, relative to other wetlands in the Region, they are recorded as supporting a diversity and/or large numbers of breeding waterbirds. Breeding and roosting sites relating to other taxa groups were considered above threshold if it was agreed by a majority of experts consulted that they were of national significance and if the areas could be clearly delineated.

Results
The Common Bent-wing Bat (*Miniopteris schreibersii*), Eastern Horseshoe Bat (*Rhinolophus megaphyllus*) and Large-footed Mouse-eared Bat (*Myotis macropus*) are the only cave and mine dwelling bat species known to occur in Gippsland. Seven sites (mainly mines) are known to be used for roosting by these species in the RFA Region (see Map 24).

Table 3.10 provides details of wetlands considered above threshold as significant waterbird breeding sites

Table 3.10: Significant waterbird breeding sites.

Wetland	No. of waterbird species recorded breeding*	Details
Bosses/Nebbor Swamp	8	Includes 300-400 Great Cormorants
Corner Inlet	6	Up to 10% of Victoria's breeding population of Little Terns and Pied Oystercatcher
Edithvale-Seaford Wetlands	24	Breeding species include Blue-billed Duck and Baillon's Crake
Lake King Wetlands	1	At least 10% of the national breeding population of Little Terns
McLeods Morass	8	Regionally significant breeding site for White Ibis, Straw-necked Ibis and Black-winged Stilt

* Source: *A Directory of Important Wetlands in Australia* (ANCA 1996)

Places important for migratory species

Places important for migratory species include regular migration routes and/or areas regularly used by such animals for feeding, breeding or roosting.

Bird and bat migration routes in the Gippsland Region are difficult to define, but both longitudinal and altitudinal migrations are known to occur, especially for birds. Fifteen of the

21 native freshwater fish species recorded from the Region are known or suspected to migrate as part of their life cycle. The Bogong Moth, *Agrotis infusa*, is among the better known invertebrate migrants, migrating from its breeding grounds in New South Wales and Queensland in about November and assembling in the Australian Alps where they aestivate before returning north the following autumn.

Wetlands provide important habitat for many migratory bird species, particularly as feeding sites during the Northern Hemisphere winter. Australia is a signatory to international agreements to protect migratory bird species and their habitats - these include the Ramsar Convention, the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA).

Method
Fauna experts in Victoria were contacted to elicit information about the occurrence of migratory species in the Gippsland Region and the presence of important migratory routes and habitat used by such species.

The Wetlands Directory provides details of the number of JAMBA/CAMBA species (but not individuals) recorded at most of the nationally significant wetlands occurring in the Region. This was considered to provide a more accurate representation of the relative importance of these areas to migratory birds than would have been possible by interrogating the Wildlife Atlas.

Threshold
For migratory routes, only those that could be clearly defined were considered above threshold. Based on the spread of scores for JAMBA/CAMBA species recorded at each wetland, 15 species or more was selected as the threshold for national estate significance.

Results
The areas identified as having indicative national estate significance for migratory species are shown in Map 24. They include four wetlands important for JAMBA/CAMBA species - Anderson Inlet, Corner Inlet, Edithvale-Seaford Wetlands and Lake Wellington Wetlands. Other areas important for migratory species were either unable to be clearly defined, or, in the case of fish, were too difficult to separate out in terms of their importance (T. Raadik, pers. comm.).

Key remnant habitats

Private land makes up 46% of the Region, with most of this having been cleared for agriculture. A large proportion of public land in the Region has also been significantly disturbed. This value is used to identify the most important remnant habitats within the predominantly alienated portions of the Region.

Method
This value was not systematically assessed across the whole Region. Known areas of remnant habitat were largely identified by expert opinion and literature review (including review of relevant Land Conservation Council reports).

It should be noted that, while a number of significant remnant grassland and grassy woodland sites are known to exist in Gippsland (and other Victorian regions), none are identified here. This is because a project (*Victorian Grassland Significant Site Documentation*, funded under the National Reserve System Program) to identify those sites which most efficiently

contribute to biodiversity conservation in each grassland community in the State, is due for completion in early 2000. As the project includes the development of a rule system to identify priority sites, it would be inappropriate to pre-empt the outcomes of that project here.

Threshold
Key remnant habitats that are significant on a state or national scale were considered to be above threshold.

Results
One place, Moormurng Flora and Fauna Reserve (950 ha, 12km south-west of Bairnsdale), stood out as being above threshold for this value. It is surrounded on all sides by extensive areas of cleared private land and was declared a Reserve on the recommendations of the Land Conservation Council's Gippsland Lakes Hinterland Area Investigation (LCC 1983). It contains remnants of vegetation that dominated the Gippsland Plains prior to widespread agricultural clearing, including forest red gum grassy woodland, and supports a diverse native fauna population. The Reserve currently has Indicative Place status on the Register of the National Estate database.

3.4.8 Contemporary fauna refuges

For this assessment, a fauna refuge is defined as a place that provides protection for fauna during shorter-term climatic changes and environmental disturbances such as fire. For instance, the wetter vegetation classes may provide protection for some fauna during fire, or provide food resources for some fauna during drought. Refuges from frequent fire and drought are considered to be similar for flora and fauna. Details of contemporary fauna refuges in Gippsland are therefore provided in the earlier assessment for flora (see Section 3.3.7). Areas that are refuges from long-term climate change (i.e., the last Ice Age) are addressed under sub-criterion A1.

Sub-criterion A3: Importance in exhibiting unusual richness or diversity of fauna

3.4.9 Fauna species richness

A number of methods have been used or considered in other regional national estate assessments to define areas of high fauna species (or fauna habitat) richness. These include analysing the distribution of fauna database records, analysing the number of EVCs in 2km grid cells (used in the Central Highlands assessment), and extending the latter method to also incorporate character terrestrial vertebrate species lists for each EVC (as used in the East Gippsland assessment). None of these methods were used for the North East national estate assessment (VicRFASC 1999b). Instead, the analysis undertaken for places of unusual flora richness in the North East was considered to be a suitable surrogate for fauna species richness.

Recent work by Dr Graham Newell of NRE (unpublished) places into question previous assumptions about links between EVC richness and fauna species richness in Victoria. Because of this, and in the absence of any other accepted methodology, no assessment of fauna species richness was done for the Gippsland Region.

Sub-criterion B1: Importance for rare, endangered or uncommon fauna

This sub-criterion recognises the importance of fauna elements that are rare or uncommon as a result of either natural or unnatural processes.

3.4.10 Rare or threatened fauna

For the purposes of this assessment, all species listed in *Threatened Vertebrate Fauna in Victoria - 1999* (NRE 1999) were considered, as were all invertebrates in *Threatened Fauna in Victoria - 1995* (CNR 1995). "Threatened" in this context denotes faunas that are critically endangered, endangered, vulnerable, rare, lower risk or insufficiently known. The status categories are based on the criteria of the International Union for the Conservation of Nature. All species listed under the Commonwealth *Endangered Species Protection Act 1992* (ESP Act) and the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) which occur in Gippsland are also on the above lists.

Method
All records of threatened fauna on the Victorian Wildlife Atlas reported as occurring in the study area since 1970 were plotted on a GIS. Some additional known records of colonially roosting bat sites (L. Lumsden, pers. comm.) were also included. Available resources did not permit species habitat modelling to be attempted and only points themselves were identified. Concentrations of records were also identified where they represented a number of species; this was done using the same methodology applied earlier for A1 fauna values (see method for assessing endemic fauna values). In this instance, three different levels of concentration were applied – 8-14, 15-21 and 22 or more taxa recorded within a 5 km radius.

Threshold
All listed threatened species and associated records of sufficient accuracy were deemed to be above threshold. The spatial analysis identifying concentrations merely provides an additional visual tool showing those areas with high species richness for this value.

Results
One hundred and nine threatened taxa were identified as meeting the specified threshold limits for this sub-criterion in the Region (see Map 25), including 17 species or sub-species that are nationally endangered or vulnerable. The concentration of threatened fauna records in the south-east of the Region reflects the high proportion of waterbird and fish records in the Gippsland Lakes area.

3.5 Other Natural Values

3.5.1 Geological and geomorphological values

Introduction

The goal of the Gippsland national estate assessment for geological and geomorphological values was the identification of sites demonstrating significant aspects of regional diversity for such values. Geodiversity includes evidence for the history of the earth and a range of processes currently acting on rocks, landforms and soils. It is fundamental to broader ecological processes, contributes to the richness of the natural environment, and provides opportunities for scientific study of the earth's development.

Some elements of geodiversity are relatively robust in the face of human intervention, while others are susceptible to degradation associated with a range of land use activities. An effective approach to the conservation of geodiversity needs to include the development and implementation of management principles designed specifically to protect vulnerable features and processes, and to identify all sites of significance so that their value is assessed and recorded and considered in management decisions.

The Palaeozoic basement rocks in the northern part of the Gippsland Region are grouped into three structural zones, separated by the Mount Wellington and Kiewa Fault Zones. In the southern portion of the Region, the Palaeozoic basement rocks are overlain by Cretaceous and Tertiary sediments of the Gippsland Basin (VicRFASC 1999a).

Data sources

No assessment of geodiversity for national estate values has been undertaken across the whole of the Gippsland RFA Region. Instead, this assessment is restricted to drawing on the outcomes of a study of *Sites of Geological and Geomorphological Significance in Part of North Eastern Victoria* (Rosengren and White 1997), supported by a grant from the Australian Heritage Commission (National Estate Grants Program) to the Geological Society of Australia Inc. The area of the north eastern Victoria study overlaps with only a small part of the Gippsland RFA Region in the north.

It is possible that new localities will be identified over time as further geological and geomorphological research takes place.

Site selection, description and significance rating

The specific criteria used to select sites of geodiversity significance in north eastern Victoria were similar to those established by Rosengren (1984) and involved an assessment of sites of geological and geomorphological value. Soils were not systematically assessed.

Attributes used to select sites of **geological significance** included:

- type locality for a geological formation or other stratigraphic subdivision;
- outcrop or artificial exposure of mineral, rock, sediment or soil;
- contact between geological formations;

- fossil location;
- geological structures such as a fold or a fault; and
- rare mineral or unusual rock type.

Attributes used to select sites of **geomorphological significance** included:

- the relationship between rock type and landform;
- the relationship between a geological structure and landform;
- the present or past action of geomorphological processes; and
- sites which are good representatives of the major landforms of the region.

The study produced an inventory of potentially significant sites in north eastern Victoria and these sites were then assessed for their significance using the following criteria:

- contribution the site makes to understanding the earth sciences in relation to geology and/or geomorphology on a local, regional, state, national or international basis;
- frequency of replication, i.e. the site is a unique, rare or unusual example of a geological formation and/or surface morphology;
- degree of disturbance and/or quality of display at the site;
- the value as a reference and teaching site displaying classic characteristics of a geological formation and/or a relict or active geomorphological process;
- past, present or potential use as a research site; and
- where there is doubt as to the nature or origin of the feature.

Each site was allocated a rating as to whether it was significant at the local, regional, State, national or international level, determined by the extent to which the above criteria were met.

National estate assessment

A threshold of State significance and above was used to determine which sites were of potential national estate significance, with the result that 42 sites in the north eastern Victoria study area were assessed to be in this category. Some areas contain multiple values that met the threshold, and many areas satisfied several national estate criteria. Fifteen of these 42 sites are represented in the Gippsland RFA Region (see Map 26) and 29 are represented in the North East RFA Region (two have bits in both Regions).

The 15 sites in Gippsland were assessed by Environment Australia against the relevant national estate sub-criteria (A1, A2, A3, B1, C1, C2 and D1). Results of the assessment are detailed in Table 3.11. Three of the sites are already on the Register of the National Estate.

Table 3.11: Geoheritage sites of significance identified in Gippsland.

Site	National Estate Status	National Estate Criteria
Benambran Deformation Unconformity	Not Registered	A1, C1, D1
Bogong High Plains	Registered	A1, A3, B1, D1
Lagoon Plateau	Registered	A1, B1, D1
Lake Omeo and Lunette	Not Registered	A1, B1, D1
Limestone Creek	Not Registered	A1, A3, B1, D1
Limestone Road Cuttings	Not Registered	A1, B1, D1
Lower Tableland	Not Registered	A1
Morass Creek and Fraser Tableland	Not Registered	A1, D1
Morass Creek Flats Trachyte Site (Pyles Limestone)	Not Registered	A1
Mount Battery	Under assessment	A1, B1

Mount Hotham - Snow Patch Weathering, Blockstreams	Not Registered	A1, A2, B1, D1
Mount Tabletop and Precipice Plain	Not Registered	D1
Stony Creek	Not Registered	B1, C1, D1
The Brothers	Not Registered	D1
Wonnangatta River Valley	Registered	A1, A3,

Sub-criterion A1: Importance in the evolution of Australian flora, fauna, landscapes or climate

Assessment for values under sub-criterion A1 involved identification of sites where the present geology and landform features reflect the influence of past climatic, geological, and geomorphological processes. Each terrane type identified in the study area contains features that illustrate geological and geomorphological processes operating during a particular period of geological history. For example, the presence of geomorphic features such as relict glacial formations illustrate the influence of a past colder climate, while fossil sites provide a record of the biota which previously existed in the area.

Results

While Gippsland's principal lithologies and structures are of Palaeozoic age, the area includes important Mesozoic and Cainozoic rocks, structures and landforms. Twelve of the 15 sites in Gippsland were identified as demonstrating relationships between geological and geomorphological units, and rock types and structures associated with these epochs. Areas such as the Limestone Road Cuttings and Morass Creek were identified for their evidence of tectonic activity demonstrating the structural earth movements occurring during previous geologic periods.

Sub-criterion A2: Importance in maintaining existing processes or natural systems at the regional or national scale

The identification of areas of national estate significance under this sub-criterion involves assessment of sites important for maintaining ongoing geological or geomorphological processes. These include sites where there is clear evidence of ongoing processes related to the action of water and wind in shaping geomorphic features within the landscape.

Results

One site, Mount Hotham, was identified in this sub-criterion with the theme of snow patch weathering, a process in which the disintegration of rocks around a patch of snow is brought about by alternate freezing and thawing.

Sub-criterion A3: Importance in exhibiting unusual richness or diversity of flora, fauna, landscapes or cultural features

The identification of areas of national estate significance under this sub-criterion recognises the value of sites where large numbers and/or a diversity of geological features and/or landforms are assembled within a relatively small area. Identification of such areas involved assessment of the presence in the landscape of sites with a rich array of rock types, structures or textures.

Results

Three sites in Gippsland were identified as showing a large number and/or a diversity of geological features. The Bogong High Plains site (most of which is in the North East RFA Region) exhibits a rich array of Permian landscape and climate features. Two places were selected as indicative of rich alluvial processes; these are the extensive alluvial Wonnangatta

River Valley with its exposed multiple rock strata, and the rich interior decoration evident in the Limestone Creek cave system.

Sub-criterion B1: Importance for rare, endangered or uncommon flora, fauna, communities, ecosystems, natural landscapes or phenomena, or as a wilderness

This sub-criterion recognises the importance of abiotic elements within the landscape with very limited occurrences as a result of natural processes. Identification of such sites involved assessment of the presence in the landscape of areas with uncommon, rare, or outstanding geology or landforms, and rare fossil sites. Many of the sites identified under sub-criteria A1 and A2, which provide evidence of past or present processes, also illustrated rare or uncommon geological or geomorphological features.

Results
Eight of the sites were identified with rare or uncommon geological or geomorphological features in the Gippsland Region. These included fluvial landforms; Lake Omeo and Lunette were identified as an outstanding example of a lake basin developed by drainage disruption due to faulting, and Lagoon Plateau is one of the few sites showing high plain tertiary fault activity.

Sub-criterion 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

This sub-criterion addresses the importance to the national estate of teaching and research sites which have generally been used over a considerable period and are expected to play an important future role in education and development of a better understanding of the geological and geomorphic history of the study area. It also includes reference areas that have been used to describe particular aspects of the regional geodiversity.

Results
Two Gippsland sites meet this sub-criterion. The Benambran Deformation and Stony Creek have both been recognised as reference sites.

Sub-criterion C2: Importance for information contributing to a wider understanding of the history of human occupation of Australia

This sub-criterion applies to research sites producing research information about the cultural environment or cultural history. Its scope covers sites for which there is a strong presumption of research potential in one of a wide variety of fields (e.g. mining) which may contribute to the understanding of Australian history.

Results
No sites were identified in Gippsland.

Sub-criterion 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

This sub-criterion recognises the significance of conserving ‘representative examples’ of geologic and geomorphic features. Sites assessed against this criterion were identified on the basis of their value in providing representation of landforms that characterise the north east

Victoria study area. Many of the sites identified under sub-criterion A1 and sub-criterion A2 were also assessed under this sub-criterion.

Results
Eleven sites in Gippsland were identified as being 'characteristic of their class', representing a number of themes. For example, areas exposed because of fault activity and erosion episodes were identified and include Lake Omeo (a lake basin developed by drainage disruption due to faulting).

3.5.2 Natural history sites

Sub-criterion 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

The assessment against sub-criterion C1 was broken up into three sub-assessments: type localities for flora species; type localities for fauna species; and places important as research, teaching or benchmark/reference sites.

Type localities for flora species

The objective of this assessment was to provide a list of Gippsland type localities for flora known to occur in the Region. Difficulties in obtaining information for non-vascular flora limited the assessment to vascular plants.

Method
For each species identified as having its type locality in the Region, information was gathered on the collector, locality and year of collection. Localities were given a precision code according to those used by the Tasmanian Herbarium (see Table 3.12). Of the various "types" which may exist, only holotypes and lectotypes were considered (see Glossary for definitions). Data were derived largely from the *Australian Plant Name Index* (Chapman 1991). All vascular plant species recorded for the Region were considered in the assessment.

Table 3.12: Precision codes used in defining type localities.

Precision code	In distance, degrees or minutes	Relative to types of locality
1	Precise to within a 50 m radius (or nearest second)	A six-figure grid reference or GPS reading
2	Falling within a 1 km radius (or nearest minute)	A location able to be pinpointed accurately on a 1:250,000 map; a 'spot locality' (such as a hill or mountain summit with a small surface area, a stream, river or road junction, or an accurate distance from one)
3	Falling within a 10 km radius (or nearest 5 minutes)	A location equivalent to a small town, a hill or mountain with a large surface area, a smallish lake, and so on

4	Falling within a 25-km radius (or nearest 10 minutes)	A location equivalent to a large city, a mountain range, a river 10-50 km long, and so on
5	Greater than a 25 km radius (about 30 minutes or over)	A region such as a large national park, an area such as 'Northern Tasmania', or all of Tasmania

Source: Tasmanian Herbarium.

Threshold
All sites identified with a precision code of 3, 4 or 5 were considered not to meet the threshold: their locations could not be pinpointed with sufficient accuracy. Sites with a precision code of 1 or 2 (that is, precise to within a 50-metre or 1-kilometre radius respectively) were considered to meet the threshold, unless it was known that the species no longer occurred there.

Results
Fourteen flora type localities were identified as meeting the threshold criteria in Gippsland and these are shown in Map 27. The only genera represented by more than one species is *Eucalyptus*, with three representatives (*E. ignorabilis, E. strzeleckii* and *E. willisii)*.

Type localities for fauna species

The objective of this assessment was to compile a list of Gippsland type localities for fauna species, encompassing all vertebrate and invertebrate terrestrial and aquatic species for which information was readily available.

Method
As for the flora type localities project, information was gathered on the collector, locality and year of collection for each species. Similarly, localities were given a precision code (see Table 3.11). Only holotypes and lectotypes were considered. The primary source of information for vertebrate species was the *Zoological Catalogue of Australia*, although this is currently incomplete for fish and birds. The Australian National Insect Collection (CSIRO) provided data on all invertebrate type locality records held and sourced from the study area.

Threshold
As for the flora type localities project, only sites identified with a precision code of 1 or 2 were considered to meet the threshold.

Results
Of those vertebrate species for which information was readily available, none was found to have its type locality in Gippsland. Four invertebrate sites were considered before application of the exclusion rules and the one indicative place that met the threshold (for the Stonefly *Neboissoperla alpina*) is shown on Map 27.

Research, teaching and reference/benchmark sites

The objective of this assessment was to identify sites of National Estate significance based on their contribution to a wider understanding of Australian natural history through their use as research, teaching or benchmark/reference sites.

Data sources
Data sources include the following:

- Land Conservation Council (LCC) study area reports;
- details of permits for research issued by Parks Victoria under the *National Parks Act 1975* and the *Wildlife Act 1975*; and
- consultation with scientists, researchers, academics and other staff attached to universities, museums, NRE, other organisations and survey groups with an interest in the natural sciences.

Site boundaries were determined from the literature, GIS coverages provided by NRE, and/or consultation with experts.

Method
Sites were identified as research, teaching or reference/benchmark sites according to the criteria shown in Table 3.13. Research or teaching sites were only considered if they had a long history of such use.

Table 3.13: Criteria for identifying research, teaching and reference/benchmark sites.

Research sites	Teaching sites	Benchmark/Reference sites
Places where research is taking place or has taken place. Aim of research is to increase understanding about Australian natural history. Results of research are documented and available.	Places where teaching is taking place or has taken place. Aim of teaching is to increase understanding about Australian natural history.	Places with examples of biophysical characteristics or processes in a relatively undisturbed state. Progression of natural processes can be measured and observed and compared with a more disturbed environment.

Threshold
Assessment of the national estate value of sites was based on feedback from experts and assessment by EA and NRE staff. Research, teaching and benchmark/reference sites that are significant on a state or national scale were considered to be above threshold.

Results
Reference Areas are established under the Victorian *Reference Areas Act 1978*. They are tracts of public land containing viable samples of one or more land types that are relatively undisturbed and that are reserved in perpetuity as a reference. All Reference Areas in the Region were considered above threshold for reference/benchmark value. Of the 22 such Areas represented in Gippsland, seven are already on the Register of the National Estate (see Table 3.14 and Map 27). Apart from the 22 Reference Areas, no other reference/benchmark or research sites were identified as being above threshold.

Table 3.14: Reference Areas in Gippsland*.

Name	Size (ha)
Blue Rag	680
Boiler Plain	850
Eaglehawk Creek	290
Entrance Point	750

Forest Hill	4 in Region (tot. 360)
Lagoon Plateau	970
Macks Creek	55
Mullungdung	180
Shepherds Creek	710
Stringybark Creek	620
Tambo River	490
Tom Groggin	940
Twenty Acre Creek	930
Vereker Creek	2650
Wonnanagatta River	500

* Seven additional Reference Areas, Buenba, Burnside, East Caledonia, Mount McAdam, Porphyry Hill, Spring Creek, and Thirteen Mile Spur, are already listed on the Register of the National Estate.

The LCC process has identified a number of Education Areas as areas to be set aside for the primary purpose of environmental education. A number of these occur in Gippsland, one of which (Mount Tamboritha Education Area (former)) is already on the Register of the National Estate. No additional areas are identified here as teaching or educational sites with indicative national estate significance.

Chapter 4: National Estate Outcomes

4.1 National Estate Outcomes: Cultural Values

The national estate assessment of the cultural values of the Gippsland forest region was designed to achieve the best possible understanding of the range and distribution of forest places of cultural significance within the timeframe of the CRA. The cultural assessments were based on a study of social, aesthetic and historic values. The heritage outcomes for Aboriginal values are based on establishing an agreed consultative process for heritage management with Aboriginal communities with the development of guidelines and sensitivity zoning.

The indicative places of national estate cultural value, identified through a heritage data audit, thematic and geographical studies, and through input from the communities of Gippsland fill major gaps in the understanding of national estate forest cultural values. The following are among the main outcomes from the assessment of these values:

- identification of over 111 indicative national estate forest places of particular importance to the communities of Gippsland;
- identification of a wide range of indicative historic national estate places, including huts, mining areas, walking tracks, waterfalls, forest camps, pine plantations, fire towers, sawmills and tramways that provide the community with a sense of identity and attachment to forests;
- an agreed consultative process for the management of Aboriginal heritage places involving the Gippsland Aboriginal communities; and
- a greater understanding of places that are valued by the community.

The assessments provide an account of the current state of knowledge of cultural values, regional surveys and documentation of places in heritage registers. These will be used to inform the development of conservation strategies for places of cultural significance to ensure they are considered in forest management.

4.2 Future Research: Cultural Values

There were a number of potential National Estate places of cultural value for which insufficient information was available, or where it was not possible to make a final assessment due to snow or other access restrictions. These places (noted in the relevant cultural studies) were not fully assessed and would benefit from future research to clarify their significance.

Social value
Community groups identified a number of places which had not been investigated as part of the CRA process. It is anticipated that the Community Inventory will be used as a base to encourage further research and conservation of heritage places by local communities.

Some other suggestions for future forest-related social value work include:

- targeting community sources for further place identification; and
- encouraging community members to research heritage places and to record interviews with people who worked in forest areas.

Aesthetic value

Detailed investigation of all places of potential aesthetic value was not possible particularly for those sites with difficult access. Sites of possible national estate aesthetic value should be further investigated, for example during the preparation of forest management plans. This applies particularly to places in remote areas where, in the absence of detailed investigations, observations by forest officers may be the only source of information. Further investigation of a number of sites identified in the community review process as having additional aesthetic value is warranted.

Historic value

The Sawmill and Tramways study (Evans, 1998) noted that only a small proportion of the sawmill sites established as part of the project's inventory have been surveyed. The small "footprint" of many of the mill sites in Gippsland means that they remain largely unknown both to local historians and NRE officers.

Considerable areas of the forest remain largely unsurveyed yet research has revealed areas with a long history of sawmilling. Areas that warrant further research include the Colquhuon State Forest and parts of the Strzelecki Ranges.

The assessment of the historic forest activity sites in the Gippsland RFA region (Bannear, 1997) was hampered by the absence of comparative data and little has been written about this type of place. Sites which have subtle physical characteristics appear to be little known even within their local communities. This was reflected in responses at Gippsland RFA community workshops held in July 1997. Few forest activity sites were mentioned by those who attended. The pine plantations, for example, are a significant physical characteristic of the region, and it is interesting that their history is largely overlooked by the local communities. The study furthermore recommended that oral histories should be recorded of the surviving forest workers before the chance is lost forever.

The assessment of selected historic forest themes by Butler (1999) suggested that future forest related studies should:

- assess place groups, such as the McEvoys Track, gold related places, or the coal fields in South Gippsland;
- integrate the gold mining places with the associated forest activities such as timber cutting in remote areas;
- list all the timber framed bridges recorded by the National Trust noting their link with forest products;
- use historic maps and 1: 25,000 topographic maps to uncover potential historic places not obvious today;
- develop forest related sub-themes and place categories to reflect those places identified in this study;
- further consult with forest workers;
- target community sources and provide infrastructure for identification by community interest groups.

4.3 National Estate Outcomes: Natural Values

The assessment of national estate values for the Gippsland CRA has resulted in the identification of areas of indicative national estate significance for a wide range of values. Extensive and localised values, covering aspects of the flora and fauna as well as other features of the natural landscape (including old-growth forest and undisturbed catchments) were all examined. Much of the information required for the assessments was already available in one form or another. Collation of the data, together with additional work commissioned as part of the CRA for the Region, provided a sound basis for undertaking the various assessments. The results of the study represent a considerable enhancement of our understanding of the natural national estate in the Region.

The following are among the main outcomes of the assessment of natural values:

- identification of many hundreds of individual sites and places of significance for a range of national estate values, many of them having significance for multiple values;
- a greatly enhanced understanding of the forests of the Gippsland Region of Victoria and their natural heritage significance; and
- the creation of a profile of the current state of scientific knowledge and opinion relating to Gippsland natural places for use as a resource, in particular for the better appreciation and management of places of national estate significance.

4.4 Future Research: Natural Values

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 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, the non-vascular flora (such as mosses, ferns, lichens) are also of interest.

Terrestrial invertebrate fauna
As for many regions of Australia, the terrestrial invertebrate fauna is inadequately known. The wide range of habitat types in Gippsland is likely to support a very diverse and biogeographically interesting terrestrial invertebrate fauna.

Habitat modelling
Species-specific habitat models are available for only a very few taxa (such as some owls) in Victoria, therefore restricting the use of this concept to identify, for example, key fauna habitat for particular threatened species.

Fauna species richness modelling
The analysis for this national estate value was not undertaken for reasons discussed in Section 3.4.9. The development and validation of a method for identifying areas of high fauna species richness is a priority for further research.

Remnant vegetation
See point made in last paragraph of Section 3.3.9.

4.5 Management of National Estate Values

An objective of the Gippsland Regional Forest Agreement (RFA) is to provide for the conservation of environment and heritage values through the development of a framework of comprehensive, adequate and representative reserve systems, and through ecologically sustainable forest management. Fundamental to the environment and heritage objectives for the RFA is ensuring that national estate values are adequately protected within this framework. In developing the RFA for Victoria, governments will consider the level of representation of national estate values in reserves, the recommendations of the expert advisory group on ecologically sustainable forest management, and the results of an assessment of mechanisms for the protection of national estate values.

A component of the CRA has been the assessment by an independent expert advisory group of the systems and processes for ecologically sustainable forest management. Included in this assessment was an examination of the information, policy, planning, implementation and review mechanisms for conserving heritage values. The recommendations of the group are contained in the report Victorian Statewide Assessment of Ecologically Sustainable Forest Management (VicRFASC 1997).

While some national estate values, particularly extensive values such as old-growth forests and natural landscapes, may be best protected by formal reservations, the protection of other values, particularly site values such as historic or archaeological features, may be best achieved through other mechanisms such as management prescription.

The consultation program with Aboriginal communities strongly noted the need for an ongoing program of participation in management of Aboriginal heritage and ongoing communication with forest managers.

The cultural projects identified several issues concerning the management of cultural forest sites. They found the large number of very fragile sites and limited resources makes site protection difficult.

A process for cultural heritage management is provided for in the report *Guidelines for the Management of Cultural Heritage Values in the Forests, Parks and Reserves of East Gippsland (NRE 1997).* This report, undertaken as part of the East Gippsland RFA will form the basis for the development of statewide cultural heritage guidelines. A project to develop the statewide guidelines is currently underway.

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Glossary

Acronyms

AAV	Aboriginal Affairs Victoria
AHC	Australian Heritage Commission
ANCA	Australian Nature Conservation Agency
ANIC	Australian National Insect Collection
ANZLIC	Australia New Zealand Land Information Council
AUSLIG	Australian Surveying and Land Information Group
BN	Biophysical Naturalness
CAMBA	China-Australia Migratory Bird Agreement
CAR	Comprehensive, Adequate and Representative
CNR	Conservation and Natural Resources, Department of
CRA	Comprehensive Regional Assessment
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EA	Environment Australia
ECC	Environment Conservation Council
EVC	Ecological Vegetation Class
FIS	Flora Information System
FRI	Flora Richness Index
GIS	Geographic Information System
GRU	Geographic Representation Unit
IBRA	Interim Biogeographic Regionalisation of Australia
JAMBA	Japan-Australia Migratory Bird Agreement
JANIS	Joint Australian and New Zealand Environment and Conservation Council and Ministerial Council of Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Subcommittee
LCC	Land Conservation Council
NRE	Natural Resources and Environment, Department of
NWI	National Wilderness Inventory
NVIS	National Vegetation Information System
Ramsar	Convention on Wetlands of International Importance
RAOU	Royal Australasian Ornithologists Union
RDI	River Disturbance Index
RFA	Regional Forest Agreement
RFASC	Regional Forest Agreement Steering Committee
ROTAP	Rare Or Threatened Australian Plants

Definitions

Action Statement A formal statement providing management prescriptions that aim to ensure the long-term conservation of a species. An Action Statement must be prepared for

every plant and animal species that is listed under the Victorian *Flora and Fauna Guarantee Act 1988*.

aesthetic value 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.

aestivate Spend the summer in a torpid condition.

ARC/INFO Software used to display and analyse spatially represented data.

biodiversity *see* biological diversity.

biogeographic region A region defined by a combination of biological, social and geographic criteria rather than geopolitical criteria; generally, a system of related, interconnected ecosystems.

biophysical Biophysical relates to combinations of physical features, such as climate, soils, geology and landforms, and biological features, such as flora and fauna.

bioregion see biogeographic region

Cainozoic The geological era of rocks of most recent age, extending to the present.

complex (vegetation complex) Occurs where floristic entities are unable to be distinguished in an area but are known to exist discretely elsewhere.

comprehensive, adequate and representative reserve system A reserve system displaying the features of comprehensiveness, adequacy and representativeness.
comprehensiveness—the degree to which the full range of ecological communities and their biological diversity is incorporated in the reserve system.
adequacy—the reserve system's ability to maintain the ecological viability and integrity of populations, species and communities.
representativeness—the extent to which areas selected for inclusion in the reserve system are capable of reflecting the known biological diversity and ecological patterns and processes of the ecological community or ecosystem concerned.

comprehensive regional assessment A joint Commonwealth–State assessment of all forest values—environmental, heritage, economic and social—leading to the establishment of a comprehensive, adequate and representative reserve system, agreements on forest management, and the signing of a regional forest agreement.

conglomerate Rock consisting of rounded and waterworn pebbles, etc., embedded in a finer cementing material.

conservation The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment.

conservation advice The Australian Heritage Commission 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. 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.

criteria The eight criteria used by the Australian Heritage Commission 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 A.

cultural heritage value Aesthetic, historic, scientific or social value for past, present or future generations.

cultural place A site, area, landscape, building, structure or combination of these, and associated contents and surrounds.

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 Any of a range of factors affecting 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 that are important when considering disturbance are the origin, duration, and intensity of the disturbance, and its impact on the environment.

disturbance data Records of disturbances such as clearing, grazing, fire or timber harvesting that may affect themes, species or assemblages being assessed.

diversity 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 The components of a vegetation classification system. They are groupings of vegetation communities based on floristic, structural and ecological features.

ecosystem A set of normally co-occurring and interacting species associated with a particular setting in the physical environment. The aggregate of plants, animals and other organisms, and the non-living parts of the environment with which these organisms interact. A dynamic complex of plant, animal, fungal, and micro-organism communities and the associated non-living environment interacting as an ecological unit.

endemic species Species confined to a specific region or locality.

epoch A subdivision of a period in geological time. For example, the Holocene and Pleistocene epochs are subdivisions of the Quaternary period.

extensive national estate values Those national estate values that are widespread over the landscape, for example, natural landscapes (Criterion A.2).

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

forest critics Forest officers and parks officers who had a sound knowledge of forest systems and particular forest areas.

fluvial Related to the effects of water in terrestrial environments. A valley is a fluvial landform.

geodiversity The natural range (diversity) of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes. Geodiversity includes evidence for the history of the earth (evidence of past life, ecosystems, and environments) and a range of processes (biological, hydrological and atmospheric) currently acting on rocks, landforms and soils.

geographic information system A system displaying spatially represented data; for example, ARC/INFO.

geographic representation units Subdivisions of the region that share broadly similar biophysical characteristics, especially in regard to landform, geology, soils and climate.

geoheritage Those components of geodiversity that are important to humans for purposes other than destructive exploitation; things we would wish to retain for present and future generations.

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

geomorphological characteristics Features associated with active landform processes such as erosion and deposition.

Gondwanic 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’.

graben A downthrown structure produced by faulting at the earth’s crust.

grid cells Square grids of an appropriate scale (such as 2 km) which are laid over maps and data sets on the geographic information system to aid interpretation of data and analysis of patterns.

growth stages The forest growth stage classification 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.

habitat The place or environment in which an organism naturally occurs.

heritage All those things which we have inherited from previous generations and which we value. Heritage includes places (including the National Estate places), things (movable objects) and folklore (customs, songs and sayings).

historical themes Major historical activities, such as tourism and recreation, or events, such as fire disasters.

Holocene the Recent epoch.

holotype A single specimen designated by the author of a plant or animal name, at the time of original publication, as that to which the name shall apply; the 'voucher specimen' of a name.

hydrological Pertaining to the science of water, its properties, movement, and distribution over the earth's surface.

igneous Igneous rock is formed by the solidification of magmas, from a molten state, either extrusive on the earth's surface (associated with volcanic activity), or intrusive into the rocks forming the earth's crust.

indicative national estate values Qualities of place that have been identified as having national estate importance and are awaiting formal assessment by the Australian Heritage Commission for consideration for the Register of the National Estate.

Interim Biogeographic Regionalisation of Australia A bioregional framework delineating natural regions in each State and Territory based on biophysical, environmental and vegetation considerations—for example, climate, soils, landform, vegetation, flora and fauna, and land use—that allow cross-border regionalisation.

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

identified national estate value A national estate value identified by the Australian Heritage Commission.

layer The representation of each national estate value, such as endemic plant species, on a map.

lectotype A specimen selected from among those cited with the original description of a species or subspecies to serve in place of a holotype where the holotype is missing or destroyed, or where no holotype was designated.

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.

Mesozoic Belonging or relating to the geological time between the Palaeozoic and Cenozoic; from 245 million years BP.

metadata Information about the content, quality, condition and other characteristics of datasets.

methodology The application of the 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 Occurring on mountains.

mosaic (vegetation mosaic) Consisting of discrete floristic entities (EVCs) which were unable to be distinguished in the mapping due to the scale used.

national estate 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 and for the present community.

national estate place An area or location listed in the Register of the National Estate. A National Estate Place is the end point in the identification and assessment process.

national estate values The aesthetic, historic, scientific or social values attributed to places by the Australian Heritage Commission.

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 The National Forest Policy Statement defined old-growth forest as 'forest that is ecologically mature and has been subjected to negligible unnatural disturbance such as logging, roading and clearing'. For the purposes of this assessment, the proposed operational interpretation from JANIS (1997) was used; that is, 'old-growth forest is ecologically mature forest where the effects of disturbances are now negligible'.

Palaeozoic The era of geological time from 570 million years BP. This era lies between the Precambrian and Mesozoic, and is the oldest era in which life is known to have existed. It includes the Cambrian, Ordovician, Silurian, Devonian, Carboniferous and Permian periods.

periglacial On or bordering a glacial area.

Permian Of the uppermost divisions of the Palaeozoic series of strata.

phylogenetic Referring to the evolutionary line of descent of an individual taxon or groups of taxa.

point site A site that covers a limited area, expressed as points when mapped at a large scale.

predictive model for archaeological sites A model that predicts archaeological sites or locations inferred from existing information and usually links site density to particular landscape units.

prescription 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 The essential features which define, or are most commonly associated with a particular heritage value. The concept is sometimes expressed as representative examples.

Recovery Plan A management plan intended to ensure the long-term conservation of a species, prepared under the Commonwealth *Endangered Species Protection Act 1992* which requires recovery plans to be prepared for scheduled species.

refugia, refuges Biological communities or geographic entities that, because of their moderating structural characteristics or physical isolation, or both, provide a sanctuary to which species or groups of species have retreated or have been confined in response to threatening processes, including climatic change.

Regional Forest Agreement An agreement, between the Commonwealth and a State or Territory government, for the long-term management and use of forests in a particular region. The purpose is to reduce uncertainty, duplication and fragmentation in government decision making by establishing a durable agreement on the management and use of forests.

Register of the National Estate 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. It serves to notify all Australians, and particularly planners and decision-makers, of places of national estate significance.

richness 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 occur within that EVC. The concept is closely related to diversity.

riparian Associated with river banks.

selective logging The logging of a selected portion of a stand of timber, usually according to pre-determined criteria relating to the intensity of the logging and the nature of the stand remaining after logging.

significance indicators Used to provide an indication of whether or not a place potentially holds national estate value.

stakeholder Established groups or organisations with an interest in the forests of the region, e.g. industry, recreation or conservation.

species A group of organisms capable of interbreeding with each other.

storylines 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. They often link places with one another.

subcriteria 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 A).

succession 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 (*pl.* taxa) The named classification unit to which individuals or species are assigned.

terrane Geological formation or series of formations.

threshold 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.

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

vascular plant A plant that possesses a vascular system, the conducting tissue that enables the transport of water, minerals and synthesised food materials throughout the plant and provides mechanical support.

wilderness quality 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: remoteness from access, remoteness from settlement, apparent naturalness, and biophysical naturalness.

Appendices

Appendix A: The Australian Heritage Commission Criteria for the Register of the National Estate

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:
ITS 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:
ITS 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:
ITS 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:
ITS 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:
ITS 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:
ITS 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:
ITS 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.

Appendix B: Forest Places in the Register of the National Estate

The following list is a compilation of registered national estate places relating to forests in the Gippsland region.
Map 1 shows National Estate places in the Gippsland region (some overlapping place numbers in the Gippsland coverage were deleted for clarity).
The forest places marked by an asterisk in the table below had not been incorporated into the data coverage at the time of the preparation of Map 1.

Place name	Nearest town	Class	Number	Status
Aberfeldy River Upper Catchment	Aberfeldy	Natural	4822	Registered
Avon Wilderness Area	Licola	Natural	4728	Registered
Bandstand Group	Walhalla	Historic	4815	Registered
Baw Baw National Park	Parkers Corner	Natural	4819	Registered
Benambra Creek Cascades Reserve (former)	Benambra	Natural	4696	Registered
Bengworden Grinding Grooves Area	Bengworden	Aboriginal	4723	Registered
Bennison Reserve (former)	Licola	Natural	4733	Registered
Bentley Plain Reserve	Ensay	Natural	4701	Registered
Bindi Homestead & stone outbuildings	Swifts Creek	Historic	4687	Registered
Blue Rag Range Reserve former	Hotham Heights	Natural	4597	Registered
Blue Rag Reference Area	Hotham Heights	Natural	4593	Registered
Bogong High Plains	Falls Creek	Natural	4590	Registered
Boisdale Axe Grinding Rock	Maffra	Aboriginal	4737	Registered
Boisdale Homestead- Outbuildings and Water Tower	Maffra	Historic	4725	Registered
Bruntons Bridge	Walhalla	Historic	4818	Registered
Buenba Reference Area	Benambra	Natural	4695	Registered
Bulga National Park (former)	Balook	Natural	4793	Registered
Burn Brae	Yinnar	Historic	15641	Registered
Burnside Reference Area	Benambra	Natural	4692	Registered
Cairnbrook Farm Complex	Glengarry	Historic	15673	Registered
Cassilis Historic Area	Swifts Creek	Historic	4703	Registered
Christ Church Anglican Church	Tarraville	Historic	4796	Registered
Clydebank Bridge Scarred Trees	Sale	Aboriginal	4716	Registered
Dargo High Plains Reserve former	Hotham Heights	Natural	4596	Registered
Dowd Morass State Game Reserve	Longford	Natural	4774	Registered
Fulham Park	Sale	Historic	4769	Registered
Gippsland Lakes Coastal Park	Loch Sport	Natural	4776	Registered
Glenaladale National Park (former)	Walpa	Aboriginal	4720	Registered
Grant Historic Area	Dargo	Historic	4714	Registered
Gunyah Area	Toora	Natural	16411	Registered
Hawthorn Bank	Yarram	Historic	4792	Registered
Hemiphlebia Mirabilis Damselfly Habitat	Tidal River	Natural	18880	Registered
Holey Plains Park	Rosedale	Natural	4775	Registered
Horseshoe Vale Homestead	Yinnar	Historic	15371	Registered
Ichmo Cave Area	Benambra	Aboriginal	4705	Registered
Jack Smith Lake Area	Darriman	Aboriginal	4800	Registered
Jack Smith Lake State Game Reserve	Darriman	Aboriginal	4795	Registered

Kilmany Park	Wurruk	Historic	4772	Registered
Knob Reserve	Stratford	Aboriginal	4715	Registered
Koonwarra Fossil Site	Koonwarra	Natural	4830	Registered
Lagoon Plateau Reference Area	Hotham Heights	Natural	4594	Registered
Lake Tali Karng	Licola	Natural	4730	Registered
Livingstone Creek Reserve	Omeo	Natural	4690	Registered
Macfarlane Lookout Reserve	Benambra	Natural	4697	Registered
Marble Gully	Swifts Creek	Natural	19457	Registered
Marilyns Beach Area	Woodside	Aboriginal	4802	Registered
Mechanics Institute and Free Library Former	Toongabbie	Historic	15039	Registered
Megascolides Australis Habitat	Poowong	Natural	18882	Registered
Mewburn Park and stables	Maffra	Historic	4724	Registered
Mitchell River Silt Jetties	Eagle Point	Natural	4722	Registered
Morwell National Park original	Churchill	Natural	4807	Registered
Mossiface Hop Kiln Complex	Mossiface	Historic	4785	Registered
Mount Cobberas Area	Benambra	Natural	4757	Registered
Mount Feathertop and the Razorback	Falls Creek	Natural	4592	Registered
Mount Freezeout Reserve former	Hotham Heights	Natural	4598	Registered
Mount Gibbo Reserve	Nariel Creek	Natural	4683	Registered
Mount McAdam Reference Area	Dargo	Natural	4584	Registered
Mount Skene Reserve	Jamieson	Natural	4501	Registered
Mount Tambo Reserve	Benambra	Natural	4698	Registered
Mount Tamboritha Education Area former	Licola	Natural	4734	Registered
Mount Useful Reserve	Licola	Natural	4732	Registered
Mount View	Briagolong	Historic	4726	Registered
Mount Worth State Park	Darnum	Natural	4829	Registered
Mullungdung Forest Area	Darriman	Natural	16412	Registered
Nambrok Homestead	Rosedale	Historic	4773	Registered
Notched Log Cottage	Poowong	Historic	4832	Registered
Nunniong Plains Reserve	Swifts Creek	Natural	4699	Registered
Oriental Claims Historic Area	Omeo	Historic	4702	Registered
Pinnacles-Castle Hill Reserve former	Dargo	Natural	4713	Registered
Porphyry Hill Reference Area	Benambra	Natural	4693	Registered
Poverty Point Bridge	Parkes Corner	Historic	15272	Registered
Ramahyuck Cemetery Reserve	Stratford	Aboriginal	4710	Registered
Rodondo Island nature Reserve	Tidal River	Natural	12583	Registered
Shepherds Creek Reference Area	Hotham Heights	Natural	4595	Registered
South Gippsland Marine and Coastal Parks Area	Foster	Natural	16413	Registered
Spring Creek Reference Area	Omeo	Natural	4689	Registered
Stratford Area Grinding Grooves	Stratford	Aboriginal	4717	Registered
Strathavon	Maffra	Historic	4711	Registered
Strathfieldsaye	Stratford	Historic	4707	Registered
Swing Bridge Road	Longford	Historic	4771	Registered
Tarra Valley National Park former	Balook	Natural	4794	Registered
The Bluff - Mt Clear Area	Mount Buller	Natural	4499	Registered
The Crinoline Reserve former	Licola	Natural	4735	Registered
The Holey Plain Homestead	Rosedale	Historic	15403	Registered
The Lakes National Park	Loch Sport	Natural	4770	Registered
Thirteen Mile Spur Ref Area	Dargo	Natural	4712	Registered
Thomson River Narrow-Gauge Railway Bridge	Walhalla	Historic	19194	Registered

Tom Grogan Reference Area	Nariel Creek	Natural	4755	Registered
*Toombon Township	Aberfeldy	Historic	4820	Registered
Trapyard Hill - Tali Karng Reserve (former)	Licola	Natural	4729	Registered
Victoria Falls Historic Area	Omeo	Historic	4691	Registered
Wabba Wilderness Park	Nariel Creek	Natural	100076	Registered
Walhalla Conservation Area	Walhalla	Historic	4816	Registered
Walhalla Post Office	Walhalla	Historic	4814	Registered
Warrigal Creek Massacre Site	Darriman	Aboriginal	5874	Registered
Wilsons Promontory Lightstation	Tidal River	Natural	15599	Registered
Wilsons Promontory National Park	Tidal River	Natural	4824	Registered
Wilsons Promontory Sites Complex	Yanakie ?	Aboriginal	4825	Registered
Windsor House	Walhalla	Historic	4813	Registered
Wombat Creek Reference Area	Benambra	Natural	4694	Registered
Wonnangatta -Moroka National Park former	Dargo	Natural	4581	Registered
Wonnangatta River Reference Area	Hotham Heights	Natural	4583	Registered
Wonnangatta Station Site	Dargo	Historic	16384	Registered

Places with Indicative Status in the Database of the Register of the National Estate. These places have not been assessed for national estate significance, and are not included on Map 1. A number are under assessment as part of the RFA process.

Place name	Nearest town	Class	Number	Status
Alberton Cemetery Grassland Site	Alberton	Natural	19646	Indicative Place
APM Staff House 1	Traralgon	Historic	19755	Indicative Place
APM Staff House 2	Traralgon	Historic	19756	Indicative Place
APM Staff House 3	Traralgon	Historic	19757	Indicative Place
APM Staff Housing group	Traralgon	Historic	19754	Indicative Place
Briagolong Forest Reserve	Briagolong	Natural	100479	Indicative Place
Cape Liptrap and Waratah Bay Coastal Ar	Walkerville	Natural	4827	Indicative Place
Fang Alley (Gibsons Lane) Grassland Site	Benambra	Natural	19716	Indicative Place
Gippsland Lakes Area	Bairnsdale	Natural	15528	Indicative Place
Jirnkee Water Race	Swifts Creek	Historic	15010	Indicative Place
Lake Gutheridge	Sale	Natural	100624	Indicative Place
Lake Omeo Grassland Site	Benambra	Natural	19714	Indicative Place
Lake Omeo Roadside Grassland Site	Benambra	Natural	19715	Indicative Place
Leinster Forest Block	Benambra	Natural	100078	Indicative Place
Marble Creek Limestone Site	Cowwarr	Natural	17902	Indicative Place
McKenzies Road Swamp	Won Wron	Natural	17903	Indicative Place
Mitchell River Archaeological Area	Bairnsdale	Aboriginal	4721	Indicative Place
Mitchell River National Park and adjacen	Walpa	Natural	100454	Indicative Place
Moormurng Flora and Fauna Reserve	Bairnsdale	Natural	100481	Indicative Place
Mount Wills Historic Area	Omeo	Historic	15663	Indicative Place
Mount Worth - Moonlight Creek Area	Darnum	Natural	4823	Indicative Place
Parkside Aerodrome Grassland Site	Yarram	Natural	19644	Indicative Place
Providence Ponds Flora and Fauna Reserve	Fernbank	Natural	100473	Indicative Place
Remnant Trees	Sale	Historic	100615	Indicative Place
Rintoul Creek Site	Tyers	Natural	17904	Indicative Place
The United Brothers Battery Site	Omeo	Historic	15670	Indicative Place
Upper Buenba Forest Block	Benambra	Natural	100080	Indicative Place

Wellington Plateau and Lake Tali Karng	Licola	Natural	4731	Indicative Place

Appendix C: Consultancy Reports Commissioned

Bannear, D. (1997). A Study of Historic Forest Activity Sites in the Gippsland Forest Region, Victoria

Context Pty Ltd (1998). Community Heritage Workshops Reports

Context Pty Ltd (1998). Identification and Assessment of Community Heritage Values in the Gippsland Forest Region, Victoria: Workshop Overview Report

Context Pty Ltd (1999). Identification and Assessment of Community Heritage Values in the Gippsland Forest Region, Victoria: Social Value Assessment Report

Context Pty Ltd (1999). Identification and Assessment of Community Heritage Values in the Gippsland Forest Region, Victoria: Inventory of Community Heritage Places

Evans, P. (1998). A Study of Historic Sawmill and Tramway Sites in the Gippsland Forest Region, Victoria

Graeme Butler & Associates (1999). A Study of Places Relating to Selected Historic Forest Themes in the Gippsland Forest Region Victoria

Huonbrook Environment & Heritage Pty Ltd (1998). Development of a Model for Aboriginal Cultural Heritage Management in the Victorian Regional Forest Agreement (RFA) Areas

Marshall, B., Jones, R. and Jordan, J. (1997). Victorian Cultural Heritage Data Audit and Analysis for the RFA Regions: Gippsland

Robin Crocker & Associates (1999). Identification and Assessment of Aesthetic value in the Gippsland Forest Region Victoria

Sheehan, M. (1996). Regional Community Profiles for the Victorian Regional Forest Agreement Assessment Process

Appendix D: Consultation with Aboriginal People and Issues Raised

8 December 1998: Meeting at Moogji Aboriginal Council East Gippsland Incorporated

Chris Allen	Moogji
Linda Meehan	Moogji
Christine Millikin	Moogji
Megan Goulding	Aboriginal Affairs Victoria
Mick Harding	Aboriginal Affairs Victoria
Juliet Ramsay	Environment Forest Taskforce
Rob Stewart	Natural Resources and Environment

9 December 1998: Meeting at Lake Tyers Aboriginal Trust

Les Wilkinson	Lake Tyers group
Tony Lotton	Advisor, Lake Tyers
Megan Goulding	Aboriginal Affairs Victoria
Juliet Ramsay	Environment Forest Taskforce
Rob Stewart	Natural Resources and Environment

9 December 1998: Meeting at Gippsland and East Gippsland Aboriginal Cooperative Ltd, Bairnsdale

Gratten Mullet	Cultural Heritage Officer
Juliet Ramsay	Environment Forest Taskforce

9 December 1998: Meeting at Ramahyuck District Aboriginal Corporation

Jason Eades	Ramahyuck
Noel Yarram	Ramahyuck
Gavin O'Shanessy	Cultural Heritage Officer
Juliet Ramsay	Environment Forest Taskforce
Megan Goulding	Aboriginal Affairs Victoria
Gordon Robson	Natural Resources and Environment

10 December 1998: Meeting at Central Gippsland Aboriginal Health and Housing Cooperative

Brendon O'Kane	Cooperative Administrator
Juliet Ramsay	Environment Forest Taskforce
Megan Goulding	Aboriginal Affairs Victoria
Gordon Robson	Natural Resources and Environment

27 May 1999: Meeting at Gippsland and East Gippsland Aboriginal Cooperative Ltd, Bairnsdale

Gratten Mullet	Regional Coordinator, Cultural Heritage
Alex Baxter	Cultural Heritage Officer
Gavin O'Shanessy	Cultural Heritage Officer
Joanna Freslov	Aboriginal Affairs Victoria
Kate Challis	Environment Forest Taskforce
Juliet Ramsay	Environment Forest Taskforce
Rob Stewart	Natural Resources and Environment

25 January 2000: Meeting at Moogji Aboriginal Council East Gippsland Incorprated, Orbost

Gratten Mullet	Cultural Heritage Officer
Alex Baxter	Cultural Heritage Officer
Barry Kenny	Cultural Heritage Officer
David Hewat	Regional Coordinator, Cultural Heritage
Jason Eades	CEO Ramahyuck Distoric Aboriginal Corporation
Barbara Tilley	Ramahyuck Distoric Aboriginal Corporation
Marilyn Truscott	Environment Forest Taskforce
Juliet Ramsay	Environment Forest Taskforce
Rob Stewart	Natural Resources and Environment
Gordon Robson	Natural Resources and Environment
Larissa Murray	Natural Resources and Environment
Gail Wright	Parks Victoria

Summary of Aboriginal Forest Heritage Issues

Communication

- There is a need for good, regular communication and more participation by Aboriginal people in forest management and decision making.

- In relation to participation in decision-making, more discussion is needed rather than large written reports.

- Aboriginal people have difficulty dealing with and understanding Wood Utilisation Plans (WUPs), but they should be involved in commenting on Wood Utilisation Plans (WUPs), and the undertaking of preliminary surveys within the coupes when required.

- The Regional Heritage Unit should be the first point of contact for heritage matters. NRE and Parks and Wildlife officers are often not aware of the existence of the Regional Heritage Units.

- There should be a more integrated approach with land management issues. It should be proactive rather than reactive.

Heritage management concerns

- Heritage issues are broader than the identification and places and Aboriginal people often do not like to divulge information about their heritage places for registers.

- A large amount of the area is not surveyed for cultural heritage places. Problems will occur in the future with many sites to be discovered/surveyed, therefore increasing the number of sites to manage.

- Heritage management involves liaison back to communities and elders. Adequate time must be allowed in the consultation process with Aboriginal people with regard to commenting on WUPs and for Permits to destroy sites and these concerns must be signed off by the Board of Directors of the communities.

- Conservation of specific sites often does not include the landscape area associated with them. Sites are always associated with other areas, therefore when they occur in coupes they may need considerable buffer zones.

- The Gippsland area is too large and there are too few cultural heritage officers to manage so many issues occurring within the area, particularly as there is a large amount of harvesting within the Gippsland region. The cultural heritage officers have too many demands placed on them with too few resources. A minimum of 6 field workers is required for the Gippsland area at one time. Currently there is no one to manage issues on Gippsland Lakes, no access to a boat, and not an adequate supply of fuel to access areas .

- Far East Gippsland, and Lake Tyers do not have separate contacts to deal with cultural issues and the issuing of permits. Moogji are currently liaising with Far East Gippsland communities.

- Cultural heritage management needs people with knowledge of the area who are willing to do the work.

- Cultural heritage officers need further training to improve their skills such as in GPS and surveying.

Cross Cultural Training

- Cross-cultural training courses are needed to highlight Aboriginal concerns, and train forestry officers, contractors, and people working in State Parks and reserves to recognise Aboriginal heritage and develop an appreciation of Aboriginal culture. Required for all levels of Forests and Parks staff. Good examples of good communication, are Coastcare/Coastaction,

Employment

- Employment of Aboriginal people is a major concern in the region, and Aboriginal people are needed in Parks and NRE as Aboriginal liaison officers and also as general staff.

Appendix E: Organisations invited to Participate in the Community Heritage Workshops

Industry Organisations – Timber/Forest Products

Construction Forestry Mining & Energy Union (CFMEU)
Forest Protection Society
Pulp and Paper Federation
Timber Promotion Council
Victorian Association of Forest Industries

Industry Organisations - Other

Country Victoria Tourism Council
Host Farms Association
Mountain Cattlemen's Association of Victoria
Prospectors & Miners Association
Victorian Apiarists Association
Victorian Chamber of Mines
Victorian Farmers Federation
Victorian Tour Operators Association

Recreation Organisations

Australian Anglers Association (Victorian Division) Inc.
Australian Deer Association
Australian Motorcycle Trail Riders Association (AMTRA)
Australian Trail Horse Riders Association (Vic)
Bicycle Victoria
Bird Observers Club of Australia
Birds Australia (Royal Australasian Ornithologists Union)
Camping Association of Victoria
Federation of Victorian Walking Clubs Inc. (VICWALK)
Game Fishing Association of Victoria
Guides Victoria
Horse Riding Clubs Association of Victoria
Melbourne Bushwalkers
Melbourne Older Adults Recreation Network
Outdoor Recreation Centre
Scout Association of Victoria
Shooting Sports Council of Victoria Inc.
Ski Touring Association of Victoria
Sport & Recreation Victoria
Sporting Shooters Association of Victoria
Victorian Association of Four Wheel Drive Clubs
Victorian Association of Photographic Societies
Victorian Canoe Association
Victorian Climbing Club

Victorian Field & Game Association
Victorian Fossickers Club
Victorian Game & Deerstalking Association
Victorian Gem Clubs Association
Victorian Metal Detector & Prospectors Association
Victorian Orienteering Association
Victorian Piscatorial Council
Victorian Recreational Fishing Peak Body (VRFISH)
Victorian Rogaining Association
Victorian Speleological Association

Environment/Conservation Organisations

Australian Conservation Foundation
Australian Trust for Conservation Volunteers
Environment Victoria
Environs Australia
Field Naturalists Club of Victoria
Friends of the Earth
Friends Network Committee
Greening Australia (Vic)
Indigenous Flora & Fauna Association
Roadside Conservation Committee of Victoria
The Wilderness Society
Threatened Species Network
Trust for Nature
Victorian National Parks Association
World Wide Fund for Nature

Education Organisations

Gould League of Victoria
Victorian Association for Environmental Education
Victorian Outdoor Education Association

Aboriginal Heritage Organisations

Aboriginal Heritage Branch, Aboriginal Affairs Victoria
Mirimbiak Nations Aboriginal Corporation

Heritage Organisations

Heritage Victoria
National Trust of Australia (Vic)
Scienceworks
Institution of Engineers, Heritage Branch
Royal Historical Society of Victoria

Other Organisations

Country Women's Association
Landcare Groups
Public Land Council

Timber Towns Victoria
Parks Victoria
Land Conservation Council
Municipal Association of Victoria
Dept. Natural Resources and Environment

Appendix F: Participants in the Community Heritage Workshops

Attendance list – Bruthen Workshop

Bryan Matthew	
Fred and Pat Sievers	
James Turner	
Peter Calvert	4Wheel Drive Club
Brigitte Gibson	Bairnsdale Historical Society
Pat Tratt	Bird Observers Club and Field Naturalists Club
Dorothy and John Margetts	Bruthen Bed and Breakfast
Bryce Green	Bruthen Citizen Association and Scout Association
John Hills	Bruthen Citizens Association
Ken Pickering	Bruthen Primary School
Therese Pollard	Bush Walking Club
Chris Sewell	Bush Walking Club
J Whadcoat	East Gippsland Heritage Network
Helen Martin	East Gippsland Shire Council
Eric Sjerp	East Gippsland Shire Council
Jenny Edwards	High Country Tours
Darrin Mckenzie	Neville Smith Timber Industries
Neil Hodge	Parks Victoria
Maurie Williams	Prospectors and Miners Association Victoria (PMAV) Gippsland Branch
Fred Ward	PMAV Gippsland Branch
Brian Donchi	S.M. Collins Sawmill Pty Ltd
Ian Ingram	State Emergency Service

Attendance list – Churchill Workshop

Graham McIntyre	
Frances Wilson	
Philip Whiteman	Amcor Plantations
John Campbell	Australian Paper
Joan Hoeben	Boolarra Wildlife Shelter
Diane Blackwood	Forest Protection Society
Elaina Fraser	Friends of Gippsland Bush
Theo Morsink	Friends of Gippsland Bush
Suzie Zent	Friends of Gippsland Bush
John Pulis	Friends of Morwell National Park
Catherine Carder	Gumnut Haven Animal Shelter
Elaine Wood	La Trobe Shire
Ross Ollquist	Latrobe Valley Community Forum
Phillip Raymond	Latrobe Valley Field Naturalists
Christopher Devers	Strzelecki Walking Club
Ray Beebe	Strzelecki Scouts
Thelma Mayze	Traralgon Historical Society
Valma Plant	Traralgon Historical Society
Jim Micah	W.H. Micah & Sons

Attendance list – Dargo Workshop

Jenny & Norm
Wilkinson
Narra Demozuk

Attendance list – Foster Workshop

Julie Constable	
Stephanie Deutschbein	
G.W. Ellie	
Betty Singh	
Ron Vandon	
Greg Smith	A.W. Smith & Son
Shirley Dwyer	Coastal Business & Tourism
Des Humpharies	Foster Walking Group
Robert Bormann	Gippsland Prospectors and Miners Association
Gordon Henry	Henrys Creek Sanctuary
Bart Citroen	Korumburra Area Tourism
Allan Standering	Landcare
Russell Cross	Leongatha Gem Club
Maryanne Waycott	Mirboo and District Community Association
Gero Gardiner	Mirboo and District Community Association
Suzanne Campbell	Mirboo North & District Historical Society
Ross Williamson	Parks Victoria
Paddy Percival	Roadside Conservation Association
Brian Dwyer	Shire Council
Jeanette Harding	Shire Council
Max Speedy	Shire Council
Eric Miles	SG Woodworkers Group
Steve Burge	South Gippsland Field and Game
Troy Burge	South Gippsland Field and Game
Donald Caiper	South Gippsland Wood Workers
Rosemary Crawford	South Gippsland Wood Workers
Marion Haupt	Toora & District Family History Group
Ron Haehnel	Waratah Bay Ratepayers & Progress Association
David Meikle	Waterwatch
Gary Wallis	West Gippsland Catchment Management Authority

Attendance list – Heyfield Workshop

Brian Burleigh	
Pat Coleman	
Bill Cumming	
Ian Thomas	
Allan Ford	4 x 4 Club
Anthony Mair	Aollangara Outdoor Education Centre
Robyn Gartung	Briagolong Pony Club
Laurie Manning	Briagolong Tourism
Judith Stone	Cowwarr Lions Club
Gary Hammer	Cowwarr School
Syd Gregg	ENLA

Cheryl Gamble	Forest Protection Society
John Smyk	Heyfield Angling Club
Bob Rumpff	Heyfield Bushwalking
Ross Brown	High Rider Tours
Vince Hurley	Neville Smith Timber Industries
John Gell	Paradise Valley Camping Park
Bill Kelly	Resource Centre
Don Macreadie	Rosedale Historical Society
Lynda Farley	Thomson Valley Bush Races
John Dunne	Thomson Valley Races

Attendance list – Omeo Workshop

Joan Condon	
Margaret Hallett	
Billie Kelly	
Tash Robinson	
Simon Turner	
Jim Commins	"Araleun"
Roger Haddwell	Alpine Resorts Commission
June Soutter	Bushwalking & Naturalist
Betty Fitzgerald	Country Women's Association.
Bill Flannagan	East Gippsland Shire
Ann Petersen	Friends of the Oriental Claims
Helen Packer	Lakes and Wilderness
Barry Fitzgerald	Mountain Cattlemen's Association Victoria
Catherine McCoy	McCoy Horse Rides
Richard Darby	Miners Cottages & Swifts Creek Store
Rod O'Connell	O'Connell's Bus Lines
Jennifer McMillan	Omeo Fire Brigade
Jason Williams	Omeo Fire Brigade
Jeff Cooper	Omeo Historical Society
Brett Lee	Omeo Historical Society
Joy McMillan	Omeo Urban Fire Brigade
Craig Jeffs	Parks Victoria
Maureen Webb	Rural Women's Association

Attendance list – Sale Workshop

Albert Coleman	
Don Ripper	Adult Community Education
Margaret Geraghty	Ben Cruachan Walking Club
Rob Stewart	Department of Natural Resources and Environment
Fred Lotton	Monro Landcare Group
John Cribbes	Phoenix Four Wheel Drive Club
J Harrap	PMAV
Graham Watt	PMAV
Brian Heath	Sale Community Business Association
Peter Synan	Sale Historical Society
Brendan Lee	Stratford & District Historical Society
Geoff Mansfield	The Knob Reserve
John Jago	Victorian Wetlands Trust

Appendix G: Participants in the Forest Critics Workshops

Traralgon Workshop

Gordon Robson	Natural Resources and Environment
Kylie White	Natural Resources and Environment
Wayne McCallum	Natural Resources and Environment
Peter Duncan	Parks Victoria
Geoff Pike	Natural Resources and Environment
Peter Kershaw	Parks Victoria
Juliet Ramsay	Environment Forest Taskforce
Robin Crocker	Robin Crocker & Associates

Bairnsdale Workshop

Rob Stewart	Natural Resources and Environment
Joe Stephens	Natural Resources and Environment
Neil Crabtree	Natural Resources and Environment
Peter Overy	Natural Resources and Environment
Tim Crawford	Natural Resources and Environment
Juliet Ramsay	Environment Forest Taskforce
Robin Crocker	Robin Crocker & Associates

Appendix H: Indicative National Estate Places of Social Value

Places meeting the threshold for National Estate Value Criterion G1

Ben Crauchen
Blue Duck Inn Hotel
Blue Pool
Boola Camp
Briagolong Red Gum Reserve
Cheynes Bridge (camping area)
Dargo High Plains
Dargo Township
Davies Plain Hut and Davies Plain
Den of Nargun
Dogs Grave
Fairy Dell Scenic Reserve
Foster North Scenic View Point
Freda Treasure Tree Reserve
Glen Wills Historic Area
Grand Ridge Road
Grant Historic Area
Hinnomunjie Bridge
Horsehair Hut
Licola Township
Mossvale Park
Narracan Falls Reserve
Omeo Pioneer Cemetery
Oriental Claims Historic Area
Rail Trail - Mirboo North to Boolarra
Strzelecki Ranges
Tarra Bulga National Park
The Knob Recreation Reserve
Tidal River
Wilson's Promontory National Park
Wonnongatta Station

Appendix I: Indicative National Estate Places of Aesthetic Value

Places meeting the threshold for National Estate Value; Criterion E1

Alpine National Park
Australian Alps Walking Track
Avon River, The Channels
Avon Wilderness Park
Ben Crauchan
Cape Liptrap Coastal Park
Dargo High Plains Road
Den of Nargun, Mitchell River National Park
Fairy Dell
Freestone Creek, Old Dargo Road
Grand Ridge Road
Gippsland Lakes Coastal Park
Haunted Stream Valley and Stirling Ghost Town
Macalister River Valley
McFarlanes Lookout Reserve
Mitchell River National Park
Moormung (Flora Reserve)
Mount Elizabeth (Scenic Reserve)
Mount Tambo Flora and Fauna reserve
Nunniong Plateau (Nunniong Plain)
Nyerimilang Park
Pendergast lookout
Tambo River (Valley) Road
Tarra-Bulga National Park
The Lakes National Park
Wilsons Promontory National Park
Wongungarra River (Headwaters)

Appendix J: Indicative National Estate Places of Historic Value

Places meeting the threshold for National Estate values: Criteria A3, A4, B2, D2, F1 or H1

Selected Forest Theme Places:

Bairnsdale Colquhoun Railway Line (part Bairnsdale to Orbost line)
Bairnsdale waterworks complex
Barkly River Bridge
Bennison Creek Railway Bridge (part Leongatha Port Albert line)
Bingo Munjie Creek Bridge
Blue Duck Inn, Anglers Rest picnic and camping grounds & Timber Bridge precinct
Bullumwaal township and cemeteries
Calulu Mitchell River Bridge
Foster Landing, trees
Glenaladale weir
Horsehair Hut
John McMillan homestead site & trees
Jubilee or Livingstone Creek Bridge
Manson Bridge, Macalister River
McDonalds Track
McEvoy's Track
Moe Thorpdale Railway
Moe-Walhalla Railway
Moscow Vila, former Forests Commission of Victoria towerman’s hut
Mossiface Wharf
Nyora railway water reserve
Old Settlement Beach
Outtrim Cemetery
Outtrim Coal Mine
Pender's (or Pendergast's) hut & limestone caves reserve
Pipeline, Tyers River-Traralgon
Split Board Cottage
Thomson River Marble Quarry
Turtons Creek, falls and township site
Wuk Wuk Bridge, Mitchell River

Forest Activity Places

Chairman’s Stand
Childers Camp
Mount Sugarloaf Firetower
Mullundung Firetower
Surveyors Creek Camp

Sawmill and Tramway Places:

Froud's sawmill site
Gippsland Timber Company sawmill site
Goodwood Timber and Tramway Company
Hallet's sawmill site
Jamieson and Thompson sawmill
Peter Ah Sen Sawmill
Sealers Cove sawmill sites
South Gippsland Sawmill and Tramway Co tramway
Thompson Brothers' sawmill site
Washington Winch

Places from Other RFA Assessments:

Aberfeldy – Toombon Mining Area
Aberfeldy Township and Surrounding Mines
Bruntons Bridge
Donnellys Creek Mining Area
Toombon Township
Walhalla Mining Area
Walhalla Township
White Star Mines

Appendix K: Biophysical Naturalness Code Decision Rules.

Old-growth / Grazing dist[urbance]	LOGGING DETAILS: no record		less intensive event: <1950		less intensive event: >1950 once		less intensive event: >1950 many		intensive event: <1950	intensive event: >1950	Hist. Site	Plantation: HW	Plantation: SW	Mine
	NoA	Ag	NoA	Ag	NoA	Ag	NoA	Ag	NoA	NoA				
Old-growth														
No grazing dist.	5	5	4	4	4	4	3	3	n/a	1	1	n/a	0	0
Mature (neg. dist)														
No grazing dist.	5	5	4	4	3	3	2	2	n/a	1	1	n/a	0	0
Grazing in lease	3	3	3	3	3	3	2	2						
Grazing possible	4	4	4	4	3	3	2	2						
Natural Regrowth														
No grazing dist.	5	4	4	4	3	3	2	2	n/a	1	1	1	0	0
Grazing in lease	2	2	2	2	2	2	2	2						
Grazing possible	4	4	4	3	3	3	2	2						
Unnatural Regrowth														
No grazing dist.	5	4	4	4	3	3	2	2	n/a	1	1	1	0	0
Grazing in lease	2	2	2	2	2	2	2	2						
Grazing possible	4	3	3	3	3	3	2	2						
Plantation Lease														
No grazing dist.	5	4	n/a		3	3	2	2	n/a	1	n/a	1	0	n/a
Grazing in lease	2	2			2	2	2	2						
Grazing possible	4	4			3	3	2	2						
Unclassified														
No grazing dist.	5	4	4	4	3	3	2	2	n/a	1	1	1	0	0
Grazing in lease	2	2	2	2	2	2	2	2						
Grazing possible	4	4	4	4	3	3	2	2						
Cleared														
No grazing dist.	0	0	n/a		3	2	2	2	n/a	1	1	1	0	0
Grazing in lease	0	0			1	1	1	1						
Grazing possible	0	0			2	2	2	2						
Non Forest														
No grazing dist.	5	1	n/a		4	1	3	1	n/a	1	1	1	0	0
Grazing in lease	2	1			2	1	2	1						
Grazing possible	3	1			3	1	3	1						
Freehold														
No grazing dist.	3	1	4	1	3	1	2	1	n/a	1	1	1	0	0
Grazing in lease	2	1	2	1	2	1	2	1						
Grazing possible	3	1	4	1	3	1	2	1						
Water														
No grazing dist.	5		n/a		n/a		n/a		n/a	n/a	1	n/a	n/a	n/a

Notes:
Agricultural Clearing: NoA = no clearing records; Ag = cleared at some time (1800-1999).
Plantation: HW = Hardwood (Eucalypt); SW = Softwood (pine & other)

Appendix L: Flora Species Occurring in the Gippsland RFA Region with A1 and B1 Values

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Pop[ulation/s]	Endem-icity[2]
		AROTS	VROTS	FFG	ESP			
Acacia alpina	Alpine Wattle		r					
Acacia buxifolia ssp. buxifolia	Box-leaf Wattle						✓	
Acacia caerulescens	Limestone Blue Wattle	V	v		V			
Acacia dawsonii	Poverty Wattle		v					
Acacia howittii	Sticky Wattle	R	r					E2
Acacia mitchellii	Mitchell's Wattle						✓	
Acacia retinodes	Wirilda					✓		
Acacia retinodes var. uncifolia	Coast Wirilda		r				✓	
Acacia siculiformis	Dagger Wattle					✓		
Acacia silvestris	Red Wattle					✓		
Acacia verticillata var. latifolia	Broad-leaf Prickly Moses		r					E2
Aciphylla glacialis	Snow Aciphyll		v			✓		
Aciphylla simplicifolia	Mountain Aciphyll		r					
Acmena smithii	Lilly Pilly						✓	
Acronychia oblongifolia	Yellowwood		r			✓		
Acrotriche leucocarpa	Tall Ground-berry		r			✓		
Adiantum diaphanum	Filmy Maidenhair		e	L				E1
Adiantum hispidulum	Rough Maidenhair		r					
Adriana quadripartita (pubescent form)	Coast Bitter-bush		v					
Adriana tomentosa var. tomentosa	Eastern Bitter-bush		r			✓		
Adriana tomentosa var. tomentosa (pubescent form)	Eastern Bitter-bush		r					
Agrostis aemula var. setifolia	Gilgai Blown-grass		v					
Agrostis australiensis	Tiny Bent		r			✓		
Agrostis avenacea var. perennis	Wetland Blown-grass		k					
Agrostis billardierei var. filifolia	Gilgai Blown-grass		v	L				
Agrostis meionectes	Alpine Bent	R	r					
Agrostis muelleriana	Mueller's Bent		r					
Agrostis rudis	Ruddy Bent		r					
Alchemilla sp. 1	Lady's Mantle		r					
Allocasuarina paradoxa	Green She-oak						✓	
Almaleea capitata	Slender Parrot-pea	R	r	L		✓		
Amphibromus fluitans	River Swamp Wallaby-grass	V	k	X	V			
Amphibromus sinuatus	Wavy Swamp Wallaby-grass		v				✓	
Anisopogon avenaceus	Oat Spear-grass					✓		
Aphelia pumilio	Dwarf Aphelia					✓		
Apium annuum	Annual Celery					✓		
Apium insulare	Island Celery		r					
Aristida calycina var. calycina	Dark Wire-grass		r					
Aristida ramosa	Cane Wire-grass						✓	
Arthropodium sp. 1 (robust glaucous)	Tall Vanilla-lily		r					
Arthropodium sp. 3 (aff. strictum)	Small Chocolate-lily		k					
Asplenium hookerianum	Maidenhair Spleenwort	V	e	N	V		✓	
Asplenium trichomanes	Common Spleenwort		r					
Asplenium trichomanes ssp. quadrivalens	Common Spleenwort		r					
Asplenium trichomanes ssp. trichomanes	Common Spleenwort		r					
Astrotricha linearis	Narrow-leaf Star-hair		r					
Astrotricha parvifolia	Small-leaf Star-hair	R	r					E2
Atriplex australasica	Native Orache		k					
Atriplex billardierei	Glistening Saltbush		v					
Atriplex paludosa ssp. paludosa	Marsh Saltbush		k				✓	
Atriplex pseudocampanulata	Mealy Saltbush		r					
Australina pusilla ssp. pusilla	Small Shade-nettle		r					
Australopyrum retrofractum	Comb Wheat-grass		r					

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Australopyrum velutinum	Mountain Wheat-grass		r					
Austrodanthonia alpicola	Crag Wallaby-grass					✓		
Austrodanthonia induta	Shiny Wallaby-grass		k					
Austrodanthonia oreophila	Mountain Wallaby-grass					✓		
Austrodanthonia pilosa var. paleacea	Large Velvet Wallaby-grass		r					
Austrodanthonia sp. (syn. Danthonia procera)	Tall Wallaby-grass		k					
Austrofestuca eriopoda	Lanky Fescue		r					
Austrofestuca littoralis	Coast Fescue		v					
Austrostipa muelleri	Wiry Spear-grass					✓		
Avicennia marina ssp. australasica	White Mangrove		r					
Baeckea ramosissima ssp. prostrata	Rosy Baeckea		r					
Baloskion australe	Mountain Cord-rush					✓		
Banksia saxicola	Rock Banksia		r				✓	
Barbarea grayi	Native Wintercress		v			✓		
Baumea laxa	Lax Twig-sedge		r				✓	
Bertya cunninghamii	Sticky Bertya		r			✓		
Bertya findlayi	Mountain Bertya	R	v					
Berula ? erecta	Water Parsnip		k					
Beyeria lasiocarpa	Wallaby-bush		r			✓		
Beyeria lechenaultii	Pale Turpentine Bush						✓	
Beyeria viscosa	Pinkwood		r			✓		
Billardiera scandens var. brachyantha	Velvet Apple-berry		r					
Blechnum vulcanicum	Mountain Water-fern		e					E1
Boronia citrata	Lemon-scented Boronia	R	v	X				E1
Boronia galbraithiae	Aniseed Boronia	V	v	L				E1
Boronia ledifolia	Showy Boronia		v					
Bossiaea bracteosa	Mountain Leafless Bossiaea		r					
Bossiaea heterophylla	Variable Bossiaea		r				✓	
Botrychium australe	Austral Moonwort		v					
Brachyscome obovata	Baw Baw Daisy		r					
Brachyscome petrophila	Rock Daisy	R	r					
Brachyscome radicans	Marsh Daisy		r					
Brachyscome rigidula	Leafy Daisy					✓		
Brachyscome tadgellii	Tadgell's Daisy		r					
Brachyscome tenuiscapa	Mountain Daisy		v	L				
Bracteantha palustris	Swamp Everlasting	V	v	L				
Burnettia cuneata	Lizard Orchid	R	r					
Caladenia alata	Fairy Caladenia		k					
Caladenia aurantiaca	Orange-tip Caladenia		r					
Caladenia australis	Southern Spider-orchid		k					
Caladenia dilatata s.s.	Green-comb Spider-orchid		k					
Caladenia fitzgeraldii	Fitzgerald's Spider-orchid					✓		
Caladenia fragrantissima	Scented Spider-orchid		e					
Caladenia fragrantissima ssp. orientalis	Eastern Spider-orchid	E	e	L	E			E2
Caladenia hildae	Honey Caladenia		r					E2
Caladenia patersonii s.s.	Cream Spider-orchid		k					
Caladenia tessellata s.s.	Thick-lip Spider-orchid		k		V			
Caladenia valida	Robust Spider-orchid	R	e					
Callistemon pallidus	Lemon Bottlebrush						✓	
Callitriche palustris	Swamp Water-starwort		k					
Callitris oblonga	Dwarf Cypress-pine	V			V			
Calocephalus lacteus	Milky Beauty-heads					✓		
Calochilus gracillimus	Slender Beard-orchid		k					
Cardamine tenuifolia	Slender Bitter-cress		k					
Carex archeri	Archer's Sedge		v			✓		
Carex capillacea	Hair Sedge	R	r	X		✓		
Carex echinata	Star Sedge		v				✓	
Carex iynx	Tussock Sedge		k					
Carex paupera	Dwarf Sedge	V	v	L				E2
Carex raleighii	Raleigh Sedge	R	r	X				E2
Cassytha phaeolasia	Rusty Dodder-laurel					✓		
Celmisia sericophylla	Silky Daisy	R	r	L				

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Cissus hypoglauca	Jungle Grape					✓		
Clematis microphylla var. leptophylla	Skeleton Vine		k					
Colobanthus affinis	Alpine Colobanth		r			✓		
Coprosma moorei	Turquoise Coprosma		r					
Coprosma nivalis	Snow Coprosma		r			✓		
Correa reflexa var. speciosa	Eastern Correa		r					
Corybas aconitiflorus	Spurred Helmet-orchid		r					
Corybas fimbriatus	Fringed Helmet-orchid		r					
Corybas hispidus	Bristly Helmet-orchid		r					
Craspedia alba	White Billy-buttons	R	k					
Craspedia coolaminica	Ashen Billy-buttons					✓		
Craspedia jamesii	Green Billy-buttons					✓		
Cryptandra amara var. longiflora	Bitter Cryptandra		r					
Cullen parvum	Small Scurf-pea	E	e	L	E			
Cuscuta tasmanica	Golden Dodder		k					
Cyathea cunninghamii	Slender Tree-fern	R	v	L				
Cyathea leichhardtiana	Prickly Tree-fern		v	L		✓		
Cyathodes juniperina	Crimson Berry		v					
Cymbonotus lawsonianus	Bear's-ears		r					
Cyphanthera anthocercidea	Large-leaf Ray-flower	R	r					
Cystopteris tasmanica	Brittle Bladder-fern	R	r					
Dampiera purpurea	Mountain Dampiera		r				✓	
Daviesia buxifolia	Box-leaf Bitter-pea					✓		
Dennstaedtia davallioides	Lacy Ground-fern					✓		
Deschampsia caespitosa	Tufted Hair-grass		r					
Desmodium varians	Slender Tick-trefoil		k					
Deyeuxia contracta	Compact Bent-grass		r			✓		
Deyeuxia crassiuscula	Thick Bent-grass		r					
Deyeuxia decipiens	Devious Bent-grass		v					
Deyeuxia scaberula	Rough Bent-grass						✓	
Dianella longifolia var. grandis	Pale Flax-lily		v					
Dillwynia sieberi	Sieber's Parrot-pea		r					
Diplarrena moraea	Butterfly Flag						✓	
Diplaspis nivis	Snow Pennywort		r					
Discaria nitida	Shining Anchor Plant	R	e	L		✓		
Discaria pubescens	Hairy Anchor Plant	R	v	L				
Diuris brevissima	Short-tail Leopard-orchid		k					
Diuris ochroma	Pale Golden Moths	V	v		V			
Diuris punctata var. punctata	Purple Diuris		v	L				
Dockrillia striolata ssp. striolata	Streaked Rock-orchid		r			✓		
Dodonaea boroniifolia	Hairy Hop-bush		r				✓	
Dodonaea triquetra	Large-leaf Hop-bush					✓		
Drabastrum alpestre	Mountain Cress	R	v	L				
Drosera whittakeri ssp. aberrans	Scented Sundew					✓		
Dryopoa dives	Giant Mountain Grass						✓	
Echinopogon caespitosus	Bushy Hedgehog-grass		e					
Elaeocarpus holopetalus	Black Oliveberry					✓		
Elaeocarpus reticulatus	Blue Oliveberry						✓	
Elymus multiflorus	Short-awned Wheat-grass		k					
Entolasia stricta	Upright Panic		k					
Epacris breviflora	Drumstick Heath						✓	
Epacris celata	Cryptic Heath		r			✓		
Epacris glacialis	Reddish Bog Heath		r					
Epacris microphylla s.l.	Coral Heath						✓	
Epilobium brunnescens ssp. beaugleholei	Bog Willow-herb	V	v		V			E1
Epilobium pallidiflorum	Showy Willow-herb		v					
Eragrostis benthamii	Bentham's Love-grass		k					
Eragrostis elongata	Close-headed Love-grass					✓		
Eragrostis leptostachya	Paddock Love-grass		k					
Eragrostis trachycarpa	Rough-grain Love-grass		v	D				E1
Eryngium vesiculosum	Prickfoot						✓	
Eucalyptus angophoroides	Apple Box					✓		
Eucalyptus blakelyi	Blakely's Red-gum						✓	

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Eucalyptus bosistoana	Coast Grey-box		r			✓		
Eucalyptus chapmaniana	Bogong Gum					✓		
Eucalyptus conspicua	Silver Swamp Stringybark					✓		
Eucalyptus elata	River Peppermint					✓	✓	
Eucalyptus fulgens	Green Scentbark		v					
Eucalyptus glaucescens	Tingaringy Gum		r					
Eucalyptus globulus ssp. globulus	Southern Blue Gum		r			✓		
Eucalyptus kitsoniana	Bog Gum	R	r					E2
Eucalyptus kybeanensis	Mallee Ash		r					
Eucalyptus mackintii	Gippsland Stringybark		r			✓		
Eucalyptus mannifera ssp. mannifera	Brittle Gum					✓		
Eucalyptus neglecta	Omeo Gum	R	r					E2
Eucalyptus perriniana	Spinning Gum		r					
Eucalyptus sieberi	Silvertop Ash						✓	
Eucalyptus strzeleckii	Strzelecki Gum	V	e		V			E2
Eucalyptus tereticornis	Gippsland Red-gum		v					
Eucalyptus willisii ssp. willisii s.s. (Prom)	Promontory Peppermint		r					E1
Eucalyptus yarraensis	Yarra Gum	R	k	X		✓		
Euchiton nitidulus	Shining Cudweed	V	v		V			
Euchiton umbricolus	Cliff Cudweed		r					
Euphrasia caudata	Tailed Eyebright		r					
Euphrasia collina ssp. muelleri	Purple Eyebright	E	e	N	E			
Euphrasia eichleri	Bogong Eyebright	V	v		V			
Euphrasia scabra	Rough Eyebright	K	e	L				
Eurychorda complanata	Flat Cord-rush						✓	
Eustrephus latifolius	Wombat Berry					✓		
Exocarpos syrticola	Coast Ballart		r					
Festuca muelleri	Alpine Fescue					✓		
Gahnia grandis	Brickmakers' Saw-sedge		v					
Gahnia melanocarpa	Black-fruit Saw-sedge					✓		
Gahnia microstachya	Slender Saw-sedge		r					
Galium liratum	Furrowed Bedstraw					✓		
Geitonoplesium cymosum	Scrambling Lily					✓		
Genoplesium arrectum	Erect Midge-orchid	R	r					
Genoplesium despectans	Sharp Midge-orchid	K						
Genoplesium nudum	Tiny Midge-orchid		r					
Geranium obtusisepalum	Kosciusko Cranesbill		k					
Geranium sessiliflorum ssp. brevicaule	Alpine Cranesbill		r			✓		
Gingidia harveyana	Slender Gingidia		v			✓		
Glycine latrobeana	Clover Glycine	V	v	L	V			
Gompholobium ecostatum	Dwarf Wedge-pea						✓	
Goodenia macmillanii	Pinnate Goodenia		r					
Grammitis magellanica ssp. nothofageti	Beech Finger-fern		v				✓	
Gratiola nana	Matted Brooklime		v					
Grevillea celata	Colquhoun Grevillea	V	v					E2
Grevillea chrysophaea	Golden Grevillea		r					E2
Grevillea miqueliana	Oval-leaf Grevillea		r					
Grevillea willisii	Rock Grevillea	R	r					E2
Gynatrix macrophylla	Gippsland Hemp Bush		r					E2
Hakea eriantha	Tree Hakea					✓		
Hakea microcarpa	Small-fruit Hakea					✓		
Helichrysum aff. rutidolepis (Alps)	Pale Everlasting							E2
Helichrysum elatum	Tall Everlasting					✓		
Herpolirion novae-zelandiae	Sky Lily		r					
Hibbertia diffusa	Wedge Guinea-flower		r					
Hibbertia hermanniifolia	Outcrop Guinea-flower	R	r					
Hibbertia pedunculata	Stalked Guinea-flower		r					
Hierochloe rariflora	Cane Holy Grass					✓		
Hovea pannosa (Mount Elizabeth form)	Mt Elizabeth Hovea		r					E1
Howittia trilocularis	Blue Howittia					✓		
Huperzia australiana	Fir Clubmoss		r					

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Huperzia varia	Long Clubmoss		v					
Hybanthus monopetalus	Slender Violet-bush		r					
Hydrocotyle acutiloba	Broad-leaf Pennywort					✓		
Hypsela tridens	Hypsela		k					
Irenepharsus magicus	Elusive Cress	R	r					
Isolepis gaudichaudiana	Benambra Club-sedge		v					
Isolepis montivaga	Fog Club-sedge		r					
Isolepis wakefieldiana	Tufted Club-sedge		r					
Isopogon ceratophyllus	Horny Cone-bush					✓		
Isopogon prostratus	Prostrate Cone-bush		e	L			✓	
Juncus antarcticus	Cushion Rush		v					
Juncus falcatus	Sickle-leaf Rush		r					
Juncus phaeanthus	Dark-flower Rush		r					
Juncus revolutus	Creeping Rush		r					
Koeleria cristata	Crested Hair-grass		r					E2
Korthalsella rubra ssp. rubra	Jointed Mistletoe		v			✓		
Lagenifera montana	Square-stem Lagenifera							E1
Lasiopetalum macrophyllum	Shrubby Velvet-bush						✓	
Laxmannia gracilis	Slender Wire-lily		r			✓		
Lepidium aschersonii	Spiny Pepper-cress	V	e	L	V			
Lepidium desvauxii	Bushy Pepper-cress		r				✓	
Lepidosperma canescens	Hoary Rapier-sedge		r			✓		
Lepidosperma gunnii	Slender Sword-sedge		k					
Leptorhynchos elongatus	Lanky Buttons		e					
Leptospermum emarginatum	Twin-flower Tea-tree		r					
Leptospermum myrtifolium	Myrtle Tea-tree					✓		
Lespedeza juncea ssp. sericea	Chinese Lespedeza		r					
Leucopogon attenuatus	Grey Beard-heath		r			✓		
Leucopogon juniperinus	Long-flower Beard-heath		k			✓		
Leucopogon montanus	Snow Beard-heath		r					
Leucopogon pilifer	Trailing Beard-heath		r					
Limonium australe	Yellow Sea-lavender		r				✓	
Lindsaea trichomanoides	Oval Wedge-fern	R	e				✓	
Lomandra confertifolia ssp. leptostachya	Slender Mat-rush					✓		
Lomandra glauca s.s.	Blue Mat-rush		k					
Lomandra nana	Dwarf Mat-rush					✓		
Lotus australis	Austral Trefoil		k					
Luzula acutifolia ssp. acutifolia	Sharp-leaf Woodrush		r					
Luzula alpestris	Tussock Woodrush		r			✓		
Luzula novae-cambriae	Coarse Woodrush					✓		
Macroglena caudata	Jungle Bristle-fern		r				✓	
Marsdenia flavescens	Yellow Milk-vine		r					
Marsdenia rostrata	Milk-vine					✓		
Marsilea drummondii	Common Nardoo						✓	
Melaleuca armillaris ssp. armillaris	Giant Honey-myrtle		r					
Melaleuca decussata	Totem-poles						✓	
Melaleuca gibbosa	Slender Honey-myrtle						✓	
Micrantheum hexandrum	Box Micrantheum					✓		
Microseris aff. lanceolata (Alps)	Alpine Yam-daisy							E2
Microsorum scandens	Fragrant Fern						✓	
Microtis orbicularis	Dark Mignonette-orchid		v					
Monotoca glauca	Currant-wood		r					
Monotoca oreophila	Mountain Broom-heath	R	r					E2
Morinda jasminoides	Jasmine Morinda					✓		
Muehlenbeckia axillaris	Matted Lignum		r			✓		
Muehlenbeckia diclina	Twiggy Lignum						✓	
Muehlenbeckia rhyticarya	Wrinkle-nut Lignum		r					
Muellerina celastroides	Coast Mistletoe		r					
Myriophyllum alpinum	Alpine Water-milfoil		r					
Myriophyllum muelleri	Hooded Water-milfoil					✓	✓	
Nematolepis frondosa	Leafy Nematolepis	V	v					E1
Nematolepis squamea ssp. coriacea	Harsh Nematolepis	V	v				✓	
Notodanthonia longifolia	Long-leaf Wallaby-grass					✓		
Nymphoides geminata	Open Marshwort		r					

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Olearia adenophora	Scented Daisy-bush	R	r					
Olearia allenderae	Promontory Daisy-bush	R	v				✓	
Olearia alpicola	Alpine Daisy-bush					✓		
Olearia astroloba	Marble Daisy-bush	V	v	L	V			E1
Olearia ciliata	Fringed Daisy-bush						✓	
Olearia frostii	Bogong Daisy-bush	R	r					
Olearia stellulata	Starry Daisy-bush		k					
Olearia tenuifolia	Thin-leaf Daisy-bush		v				✓	
Olearia viscosa	Viscid Daisy-bush		r					E2
Omphacomeria acerba	Leafless Sour-bush					✓		
Ophioglossum petiolatum	Stalked Adder's-tongue		r					
Oplismenus hirtellus	Basket-grass					✓		
Oreobolus oxycarpus ssp. oxycarpus	Tuft-rush		r					
Oreobolus pumilio ssp. pumilio	Alpine Tuft-rush		r					
Oreomyrrhis argentea	Silver Carraway		v	X		✓		
Oschatzia cuneifolia	Wedge Oschatzia	R	r					
Oxylobium ellipticum	Common Oxylobium					✓		
Ozothamnus adnatus	Winged Everlasting	K	v			✓		
Ozothamnus alpinus	Alpine Everlasting					✓		
Ozothamnus argophyllus	Spicy Everlasting		r					
Ozothamnus rogersianus	Nunniong Everlasting		r					
Patersonia glabrata	Leafy Purple-flag						✓	
Patersonia sericea	Silky Purple-flag					✓		
Persoonia asperula	Mountain Geebung		e				✓	
Persoonia confertiflora	Cluster-flower Geebung					✓		
Persoonia linearis	Narrow-leaf Geebung					✓		
Philotheca trachyphylla	Rock Wax-flower					✓		
Philotheca verrucosa	Fairy Wax-flower					✓		
Philydrum lanuginosum	Woolly Waterlily		v					
Phyllangium divergens	Wiry Mitrewort					✓		
Pimelea axiflora ssp. alpina	Alpine Bootlace Bush		r					
Pimelea biflora	Matted Rice-flower		r					
Pimelea drupacea	Cherry Rice-flower		v				✓	
Pimelea flava ssp. dichotoma	Diosma Rice-flower		r				✓	
Pimelea ligustrina ssp. ciliata	Fringed Rice-flower		r					
Pimelea linifolia ssp. linoides	Slender Rice-flower		r				✓	
Pimelea pauciflora	Poison Rice-flower		r					
Pimelea serpyllifolia ssp. serpyllifolia	Thyme Rice-flower					✓		
Plantago antarctica	Mountain Plantain					✓		
Platylobium triangulare	Ivy Flat-pea		k					
Platysace ericoides	Heath Platysace		r				✓	
Plectranthus parviflorus	Cockspur Flower					✓		
Poa clivicola	Fine-leaf Snow-grass		r					
Poa fordeana	Forde Poa		k				✓	
Poa gunnii	Avon Tussock-grass		r					E2
Poa hookeri	Hooker's Tussock-grass		r					
Poa labillardierei var. acris	Sharp Mountain Tussock-grass		v					E1
Poa meionectes	Fine-leaf Tussock-grass		r					
Poa petrophila	Rock Tussock-grass		v					
Poa phillipsiana	Blue Snow-grass					✓		
Poa saxicola	Rock Poa		v	L				
Poa sieberiana var. cyanophylla	Blue-leaf Tussock-grass		r					
Poa sp. aff. tenera (Hairy)	Soft Slender Tussock-grass		r					
Polygala japonica	Dwarf Milkwort		v			✓		
Polyscias sambucifolia ssp. B	Mountain Panax						✓	
Polystichum formosum	Broad Shield-fern		r			✓		
Pomaderris angustifolia	Narrow-leaf Pomaderris					✓		
Pomaderris aurea	Golden Pomaderris		r					
Pomaderris discolor	Eastern Pomaderris		r			✓		
Pomaderris eriocephala	Woolly-head Pomaderris					✓		
Pomaderris ligustrina ssp. ligustrina	Privet Pomaderris					✓		

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Population/s	Endemicity[2]
		AROTS	VROTS	FFG	ESP			
Pomaderris oraria	Bassian Pomaderris	R	r					
Pomaderris oraria ssp. calcicola	Limestone Pomaderris	R	r					E2
Pomaderris oraria ssp. oraria	Bassian Pomaderris	R	r					
Pomaderris paniculosa ssp. paralia	Coast Pomaderris					✓		
Pomaderris phylicifolia	Slender Pomaderris					✓		
Pomaderris pilifera	Striped Pomaderis							E2
Pomaderris racemosa	Cluster Pomaderris					✓		
Pomaderris velutina	Velvet Pomaderris					✓		
Potamogeton australiensis	Thin Pondweed		k					
Prasophyllum correctum	Gaping Leek-orchid	E	e	L	E			E2
Prasophyllum frenchii	Maroon Leek-orchid	E	e	N	V			
Prasophyllum lindleyanum	Green Leek-orchid		v	X				
Prasophyllum morganii	Mignonette Leek-orchid	V	e		V			
Prasophyllum parviflorum	Slender Leek-orchid		v	X				
Prasophyllum patens	Broad-lip Leek-orchid		r					
Prasophyllum pyriforme s.s.	Silurian Leek-orchid		k					
Prasophyllum rogersii	Marsh Leek-orchid		v					
Pratia gelida	Snow Pratia	V	v					
Prostanthera decussata	Dense Mint-bush		r					
Prostanthera galbraithiae	Wellington Mint-bush	V	v					E1
Prostanthera rhombea	Sparkling Mint-bush		v				✓	
Prostanthera walteri	Monkey Mint-bush	R	r			✓		
Pseudanthus divaricatissimus	Tangled Pseudanthus	R	r					
Pseudoraphis paradoxa	Slender Mud Grass		e	N			✓	
Pteris umbrosa	Jungle Brake					✓		
Pterostylis aenigma	Enigmatic Greenhood	E	e					E1
Pterostylis aestiva	Long-tongue Summer Greenhood		r			✓		
Pterostylis alveata	Gippsland Greenhood		v					
Pterostylis bicolor	Black-tip Greenhood		k					
Pterostylis cucullata	Leafy Greenhood	V	v	L	V			
Pterostylis fischii	Fisch's Greenhood		r			✓		
Pterostylis grandiflora	Cobra Greenhood		r					
Pterostylis oreophila	Blue-tongue Greenhood		e					
Pterostylis pedoglossa	Prawn Greenhood		v					
Pterostylis sanguinea	Banded Greenhood					✓		
Pterostylis tenuissima	Swamp Greenhood	V	v		V			
Pterostylis tunstallii	Granite Greenhood		v				✓	
Pultenaea capitellata	Hard-head Bush-pea		r					
Pultenaea fasciculata	Alpine Bush-pea		r					
Pultenaea foliolosa	Small-leaf Bush-pea		r			✓		
Pultenaea lapidosa	Stony Bush-pea		v					
Pultenaea laxiflora	Loose-flower Bush-pea						✓	
Pultenaea tenella	Delicate Bush-pea		r					
Ranunculus collinus	Strawberry Buttercup		r					
Ranunculus eichlerianus	Eichler's Buttercup	R	r	X				E2
Ranunculus gunnianus	Gunn's Alpine Buttercup		r					
Ranunculus millanii	Dwarf Buttercup		r			✓		
Ranunculus muelleri var. muelleri	Felted Buttercup		v					
Ranunculus victoriensis	Victorian Buttercup		r					E2
Rubus hillii	Queensland Bramble					✓		
Rubus rosifolius	Rose-leaf Bramble					✓		
Rulingia prostrata	Dwarf Kerrawang	E	e	L	E		✓	
Rytidosperma nivicolum	Snow Wallaby-grass		r					
Sagina namadgi	Native Pearlwort		k					
Samolus valerandii	Water Pimpernel		r			✓		
Scaevola ramosissima	Hairy Fan-flower					✓		
Schizacme montana var. montana	Mountain Mitrewort		r					
Schizeilema fragoseum	Alpine Pennywort		v					
Schoenus carsei	Wiry Bog-sedge		r					
Scirpus polystachyus	Large-head Club-sedge		r					
Scleranthus diander	Tufted Knawel		r					
Scleranthus fasciculatus	Spreading Knawel		r					
Scleranthus singuliflorus	Mossy Knawel		r					
Senecio diaschides	Shingle Fireweed		r			✓		
Senecio pectinatus var. major	Alpine Groundsel		r					

Scientific Name	Common Name	Conservation Status[1]				Limit of Range	Disjunct Pop[ulation/s]	Endem-icity[2]
		AROTS	VROTS	FFG	ESP			
Senna aciphylla	Sprawling Cassia		r					
Sicyos australis	Star Cucumber		v			✓		
Smilax australis	Austral Sarsaparilla					✓		
Solanum linearifolium	Mountain Kangaroo Apple		r					
Solanum pungetium	Eastern Nightshade					✓		
Sowerbaea juncea	Rush Lily		r					
Spiranthes sinensis	Austral Ladies' Tresses		v					
Stackhousia pulvinaris	Alpine Stackhousia		r			✓		
Stackhousia spathulata	Coast Stackhousia		k					
Stylidium aff. graminifolium (Montane Swamps)	Montane Swamp Trigger-plant		k					
Styphelia adscendens	Golden Heath						✓	
Swainsona behriana	Southern Swainson-pea		r					
Taraxacum aristum	Austral Dandelion	R	r	X				
Tasmannia xerophila	Alpine Pepper						✓	
Tetratheca subaphylla	Leafless Pink-bells		r			✓		
Thelymitra benthamiana	Blotched Sun-orchid		v					
Thelymitra circumsepta	Naked Sun-orchid		v					
Thelymitra epipactoides	Metallic Sun-orchid	E	e	L	E	✓		
Thelymitra matthewsii	Spiral Sun-orchid	V	v	L	V			
Thesium australe	Austral Toad-flax	V	e	L	V			
Thomasia petalocalyx	Paper Flower		r				✓	
Thryptomene micrantha	Ribbed Thryptomene		r					
Tmesipteris elongata ssp. elongata	Slender Fork-fern		v				✓	
Tmesipteris ovata	Oval Fork-fern		r				✓	
Tmesipteris parva	Small Fork-fern						✓	
Triglochin minutissimum	Tiny Arrowgrass		r					
Trisetum spicatum ssp. australiense	Bristle-grass					✓		
Tristaniopsis laurina	Kanooka					✓		
Trochocarpa clarkei	Lilac Berry		r					E2
Tylophora barbata	Bearded Tylophora					✓		
Uncinia flaccida	Weak Hook-sedge					✓		
Uncinia nemoralis	River Hook-sedge		r				✓	
Utricularia monanthos	Tasmanian Bladderwort		v					
Utricularia tenella	Pink Bladderwort					✓		
Veronica notabilis	Forest Speedwell						✓	
Veronica serpyllifolia	Thyme Speedwell						✓	
Viola fuscoviolacea	Dusky Violet		r					
Viola improcera	Dwarf Violet	R	k				✓	
Vittadinia tenuissima	Delicate New Holland Daisy		v			✓		
Wahlenbergia densifolia	Fairy Bluebell		v	L				
Wahlenbergia planiflora ssp. planiflora	Bluebell						✓	
Wurmbea latifolia ssp. vanessae	Broad-leaf Early Nancy						✓	
Wurmbea uniflora	One-flower Early Nancy		r					
Xanthorrhoea resinifera	Spear Grass-tree						✓	
Xanthosia tridentata	Hill Xanthosia					✓		
Zieria cytisoides	Downy Zieria		r			✓		
Zieria robusta	Robust Zieria		r				✓	
Zieria smithii	Sandfly Zieria		r			✓		
Zieria veronicea	Pink Zieria		r				✓	

Notes:

1. AROTS = Australian Rare Or Threatened Species (based on Briggs & Leigh 1995)
   VROTS = Victorian Rare Or Threatened Species
   FFG = Victorian *Flora and Fauna Guarantee Act 1988*
   ESP = Commonwealth *Endangered Species Protection Act 1992*

2. E1 = natural distribution wholly confined to the Gippsland RFA Region
   E2 = natural Australian distribution mainly (>50%) confined to Gippsland RFA Region.

E, e = Endangered; K, k = insufficiently known; L = Listed; N = Nominated for listing, R, r = Rare; V, v = Vulnerable;
X = rejected for listing,

Appendix M: Fauna Species Occurring in the Gippsland RFA Region and Showing those with A1 and B1 Values

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Pop[ulation/s]	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Mammals								
Acrobates pygmaeus	Feathertail Glider							
Antechinus minimus	Swamp Antechinus	LR						✓
Antechinus stuartii	Brown Antechinus							
Antechinus swainsonii	Dusky Antechinus							
Burramys parvus	Mountain Pigmy-possum	E	L	V				
Canis lupus dingo	Dingo	DD						
Cercartetus nanus	Eastern Pigmy-possum							
Chalinolobus gouldii	Gould's Wattled Bat							
Chalinolobus morio	Chocolate Wattled Bat							
Dasyurus maculatus	Tiger Quoll	E	L	V				
Dasyurus viverrinus	Eastern Quoll							
Falsistrellus tasmaniensis	Great Pipistrelle							
Hydromys chrysogaster	Water Rat							
Isoodon obesulus	Southern Brown Bandicoot							
Macropus rufogriseus	Red-necked Wallaby							
Mastacomys fuscus	Broad-toothed Rat	LR						
Miniopterus schreibersii	Common Bent-wing Bat	V	L					
Mormopterus sp.	Southern Freetail Bat							
Myotis macropus	Large-footed Mouse-eared Bat							
Nyctophilus geoffroyi	Lesser Long-eared Bat							
Nyctophilus gouldi	Gould's Long-eared Bat							
Ornithorhynchus anatinus	Platypus							
Perameles nasuta	Long-nosed Bandicoot							
Petauroides volans	Greater Glider							
Petaurus australis	Yellow-bellied Glider							
Petaurus breviceps	Sugar Glider							
Petrogale penicillata	Brush-tailed Rock-wallaby	C	L	V				
Phascogale tapoatafa	Brush-tailed Phascogale	V	L					
Phascolarctos cinereus	Koala							
Potorous longipes	Long-footed Potoroo	E	L	E				
Potorous tridactylus	Long-nosed Potoroo	LR					✓	
Pseudocheirus peregrinus	Common Ringtail Possum							
Pseudomys fumeus	Smoky Mouse	E	N					
Pseudomys novaehollandiae	New Holland Mouse	C	L					
Pteropus poliocephalus	Grey-headed Flying-fox	V						
Pteropus scapulatus	Little Red Flying-fox							
Rattus fuscipes	Bush Rat							
Rattus lutreolus	Swamp Rat							
Rhinolophus megaphyllus	Eastern Horseshoe-bat	V	L					
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V						
Scotorepens orion	Eastern Broad-nosed Bat							
Sminthopsis leucopus	White-footed Dunnart							
Tachyglossus aculeatus	Short-beaked Echidna							
Tadarida australis	White-striped Freetail Bat							
Trichosurus caninus	Mountain Brushtail Possum							
Trichosurus vulpecula	Common Brushtail Possum							
Vespadelus darlingtoni	Large Forest Bat							
Vespadelus regulus	King River Eptesicus							
Vespadelus vulturnus	Little Forest Eptesicus							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Vombatus ursinus	Common Wombat							
Wallabia bicolor	Swamp Wallaby							
Birds								
Acanthagenys rufogularis	Spiny-cheeked Honeyeater							
Acanthiza chrysorrhoa	Yellow-rumped Thornbill							
Acanthiza lineata	Striated Thornbill							
Acanthiza nana	Yellow Thornbill							
Acanthiza pusilla	Brown Thornbill							
Acanthiza reguloides	Buff-rumped Thornbill							
Acanthorhynchus tenuirostris	Eastern Spinebill							
Accipiter cirrhocephalus	Collared Sparrowhawk							
Accipiter fasciatus	Brown Goshawk							
Accipiter novaehollandiae	Grey Goshawk	LR						
Acrocephalus stentoreus	Clamorous Reed-Warbler							
Actitis hypoleucos	Common Sandpiper							
Aegotheles cristatus	Australian Owlet-nightjar							
Alauda arvensis	Skylark							
Alcedo azurea	Azure Kingfisher							
Alisterus scapularis	Australian King-Parrot							
Anas castanea	Chestnut Teal							
Anas gracilis	Grey Teal							
Anas rhynchotis	Australasian Shoveler	V						
Anas superciliosa	Pacific Black Duck							
Anhinga melanogaster	Darter							
Anseranas semipalmata	Magpie Goose	E						
Anthochaera carunculata	Red Wattlebird							
Anthochaera chrysoptera	Little Wattlebird							
Anthus novaeseelandiae	Richard's Pipit							
Apus pacificus	Fork-tailed Swift							
Aquila audax	Wedge-tailed Eagle							
Ardea alba	Great Egret	E	L					
Ardea ibis	Cattle Egret							
Ardea intermedia	Intermediate Egret	C	L					
Ardea pacifica	White-necked Heron							
Ardeotis australis	Australian Bustard	C	L					
Arenaria interpres	Ruddy Turnstone							
Artamus cyanopterus	Dusky Woodswallow							
Artamus leucorynchus	White-breasted Woodswallow							
Artamus personatus	Masked Woodswallow							
Artamus superciliosus	White-browed Woodswallow							
Aythya australis	Hardhead	V						
Biziura lobata	Musk Duck	V						
Botaurus poiciloptilus	Australasian Bittern	E	N					
Cacatua galerita	Sulphur-crested Cockatoo							
Cacatua roseicapilla	Galah							
Cacatua sanguinea	Little Corella							
Cacatua tenuirostris	Long-billed Corella							
Cacomantis flabelliformis	Fan-tailed Cuckoo							
Cacomantis variolosus	Brush Cuckoo							
Calamanthus sp.	Fieldwren							
Calidris acuminata	Sharp-tailed Sandpiper							
Calidris alba	Sanderling							
Calidris canutus	Red Knot							
Calidris ferruginea	Curlew Sandpiper							
Calidris melanotos	Pectoral Sandpiper	DD						
Calidris ruficollis	Red-necked Stint							
Calidris tenuirostris	Great Knot							
Callocephalon fimbriatum	Gang-gang Cockatoo							
Calmanthus sp.	Fieldwren							
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo							
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	L					

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Cereopsis novaehollandiae	Cape Barren Goose	V						
Charadrius bicinctus	Double-banded Plover							
Charadrius hiaticula	Ringed Plover							
Charadrius leschenaultii	Greater Sand Plover							
Charadrius mongolus	Lesser Sand Plover							
Charadrius ruficapillus	Red-capped Plover							
Cheramoacea leucosternus	White-backed Swallow							
Chenonetta jubata	Australian Wood Duck							
Chlidonias hybridus	Whiskered Tern	LR						
Chlidonias leucopterus	White-winged Black Tern							
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo							
Chrysococcyx lucidus	Shining Bronze-Cuckoo							
Chrysococcyx osculans	Black-eared Cuckoo							
Chthonicola sagittata	Speckled Warbler	V						
Cincloramphus cruralis	Brown Songlark							
Cincloramphus mathewsi	Rufour Songlark							
Cinclosoma punctatum	Spotted Quail-thrush							
Circus approximans	Swamp Harrier							
Circus assimilis	Spotted Harrier							
Cisticola exilis	Golden-headed Cisticola							
Cladorhynchus leucocephalus	Banded Stilt							
Climacteris erythrops	Red-browed Treecreeper							
Climacteris picumnus	Brown Treecreeper							
Colluricincla harmonica	Grey Shrike-thrush							
Coracina novaehollandiae	Black-faced Cuckoo-shrike							
Coracina papuensis	White-bellied Cuckoo-shrike							
Coracina tenuirostris	Cicadabird							
Corcorax melanorhamphos	White-winged Chough							
Cormobates leucophaeus	White-throated Treecreeper							
Corvus bennetti	Little Crow							
Corvus coronoides	Australian Raven							
Corvus mellori	Little Raven							
Corvus tasmanicus	Forest Raven							
Coturnix australis	Brown Quail							
Coturnix chinensis	King Quail	C	L					
Coturnix pectoralis	Stubble Quail							
Cracticus nigrogularis	Pied Butcherbird							
Cracticus torquatus	Grey Butcherbird							
Cuculus pallidus	Pallid Cuckoo							
Cygnus atratus	Black Swan							
Dacelo novaeguineae	Laughing Kookaburra							
Daphoenositta chrysoptera	Varied Sittella							
Dendrocygna eytoni	Plumed Whistling-Duck							
Dicaeum hirundinaceum	Mistletoebird							
Dicrurus bracteatus	Spangled Drongo							
Dromaius novaehollandiae	Emu							
Drymodes brunneopygia	Southern Scrub-robin							
Egretta garzetta	Little Egret	C	L					
Egretta novaehollandiae	White-faced Heron							
Egretta sacra	Eastern Reef Egret							
Elanus axillaris	Black-shouldered Kite							
Elanus scriptus	Letter-winged Kite							
Elseyornis melanops	Black-fronted Dotterel							
Eopsaltria australis	Eastern Yellow Robin							
Epthianura albifrons	White-fronted Chat							
Erythrogonys cinctus	Red-kneed Dotterel							
Eurostopodus mystacalis	White-throated Nightjar							
Eurystomus orientalis	Dollarbird							
Falco berigora	Brown Falcon							
Falco cenchroides	Nankeen Kestrel							
Falco longipennis	Australian Hobby							
Falco peregrinus	Peregrine Falcon							
Falco subniger	Black Falcon	E						
Falcunculus frontatus	Crested Shrike-tit							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Pop[ulation/s]	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Fulica atra	Eurasian Coot							
Gallinago hardwickii	Latham's Snipe							
Gallinula tenebrosa	Dusky Moorhen							
Gallinula ventralis	Black-tailed Native-hen							
Gallirallus philippensis	Buff-banded Rail							
Geopelia cuneata	Diamond Dove	V						
Geopelia striata	Peaceful Dove							
Gerygone mouki	Brown Gerygone							
Gerygone olivacea	White-throated Gerygone							
Glossopsitta concinna	Musk Lorikeet							
Glossopsitta porphyrocephala	Purple-crowned Lorikeet							
Glossopsitta pusilla	Little Lorikeet							
Grallina cyanoleuca	Magpie-lark							
Grantiella picta	Painted Honeyeater	V	L					
Grus rubicunda	Brolga							
Gymnorhina tibicen	Australian Magpie							
Haliaeetus leucogaster	White-bellied Sea-Eagle	E	L					
Haliastur sphenurus	Whistling Kite							
Heteroscelus brevipes	Grey-tailed Tattler							
Hieraaetus morphnoides	Little Eagle							
Himantopus himantopus	Black-winged Stilt							
Hirundapus caudacutus	White-throated Needletail							
Hirundo ariel	Fairy Martin							
Hirundo neoxena	Welcome Swallow							
Hirundo nigricans	Tree Martin							
Hylacola pyrrhopygia	Chestnut-rumped Heathwren	DD						
Ixobrychus minutus	Little Bittern	E	N					
Lalage sueurii	White-winged Triller							
Larus atricalla	Laughing Gull							
Larus dominicanus	Kelp Gull	C						
Larus novaehollandiae	Silver Gull							
Larus pacificus	Pacific Gull	LR						
Lathamus discolor	Swift Parrot	E	L	V				
Leucosarcia melanoleuca	Wonga Pigeon							
Lichenostomus chrysops	Yellow-faced Honeyeater							
Lichenostomus fuscus	Fuscous Honeyeater							
Lichenostomus leucotis	White-eared Honeyeater							
Lichenostomus melanops	Yellow-tufted Honeyeater							
Lichenostomus penicillatus	White-plumed Honeyeater							
Lichenostomus melanops cassidix	Helmeted Honeyeater	E	L	E				
Lichenostomus virescens	Singing Honeyeater							
Limicola falcinellus	Broad-billed Sandpiper							
Limosa lapponica	Bar-tailed Godwit							
Limosa limosa	Black-tailed Godwit							
Lophoictinia isura	Square-tailed Kite	E	N					
Lopholaimus antarcticus	Topknot Pigeon							
Malacorhynchus membranaceus	Pink-eared Duck							
Malurus cyaneus	Superb Fairy-wren							
Manorina flavigula	Yellow-throated Miner							
Manorina melanocephala	Noisy Miner							
Manorina melanophrys	Bell Miner							
Megalurus gramineus	Little Grassbird							
Melanodryas cucullata	Hooded Robin							
Meliphaga lewinii	Lewin's Honeyeater							
Melithreptus brevirostris	Brown-headed Honeyeater							
Melithreptus gularis	Black-chinned Honeyeater							
Melithreptus lunatus	White-naped Honeyeater							
Melopsittacus undulatus	Budgerigar							
Menura novaehollandiae	Superb Lyrebird							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Merops ornatus	Rainbow Bee-eater							
Microeca fascinans	Jacky Winter							
Milvus migrans	Black Kite							
Mirafra javanica	Singing Bushlark							
Monarcha melanopsis	Black-faced Monarch							
Morus serrator	Australasian Gannet	V						
Motacilla alba	White Wagtail							
Myiagra cyanoleuca	Satin Flycatcher							
Myiagra inquieta	Restless Flycatcher							
Myiagra rubecula	Leaden Flycatcher							
Myzomela sanguinolenta	Scarlet Honeyeater							
Neochmia temporalis	Red-browed Finch							
Neophema chrysogaster	Orange-bellied Parrot	C	L	E				✓
Neophema chrysostoma	Blue-winged Parrot							
Neophema pulchella	Turquoise Parrot	LR	L					
Ninox connivens	Barking Owl	E	N					
Ninox novaeseelandiae	Southern Boobook							
Ninox strenua	Powerful Owl	E	L					
Numenius madagascariensis	Eastern Curlew	LR						
Numenius minutus	Little Curlew							
Numenius phaeopus	Whimbrel							
Nycticorax caledonicus	Nankeen Night Heron	V						
Oriolus sagittatus	Olive-backed Oriole							
Oxyura australis	Blue-billed Duck	V	N					
Pachycephala olivacea	Olive Whistler							
Pachycephala pectoralis	Golden Whistler							
Pachycephala rufiventris	Rufous Whistler							
Pandion haliaetus	Osprey							
Pardalotus punctatus	Spotted Pardalote							
Pardalotus striatus	Striated Pardalote							
Pedionomus torquatus	Plains-wanderer	E	L	V				
Pelecanus conspicillatus	Australian Pelican							
Petroica goodenovii	Red-capped Robin							
Petroica multicolor	Scarlet Robin							
Petroica phoenicea	Flame Robin							
Petroica rodinogaster	Pink Robin							
Petroica rosea	Rose Robin							
Pezoporus wallicus	Ground Parrot	V	L					
Phalacrocorax carbo	Great Cormorant							
Phalacrocorax fuscescens	Black-faced Cormorant	V						
Phalacrocorax melanoleucos	Little Pied Cormorant							
Phalacrocorax sulcirostris	Little Black Cormorant							
Phalacrocorax varius	Pied Cormorant	LR						
Phaps chalcoptera	Common Bronzewing							
Phaps elegans	Brush Bronzewing							
Philemon citreogularis	Little Friarbird							
Philemon corniculatus	Noisy Friarbird							
Phylidonyris albifrons	White-fronted Honeyeater							
Phylidonyris melanops	Tawny-crowned Honeyeater							
Phylidonyris novaehollandiae	New Holland Honeyeater							
Phylidonyris pyrrhoptera	Crescent Honeyeater							
Platalea flavipes	Yellow-billed Spoonbill							
Platalea regia	Royal Spoonbill	V						
Platycercus elegans	Crimson Rosella							
Platycercus elegans flaveolus	Yellow Rosella							
Platycercus eximius	Eastern Rosella							
Plegadis falcinellus	Glossy Ibis	V						
Pluvialis fulva	Pacific Golden Plover							
Pluvialis squatarola	Grey Plover							
Podargus strigoides	Tawny Frogmouth							
Podiceps cristatus	Great Crested Grebe							
Poliocephalus poliocephalus	Hoary-headed Grebe							
Polytelis swainsonii	Superb Parrot	E	L	V				
Porphyrio porphyrio	Purple Swamphen							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Porzana fluminea	Australian Spotted Crake							
Porzana pusilla	Baillon's Crake	V	N					
Porzana tabuensis	Spotless Crake							
Procelsterna cerulea	Grey Ternlet							
Psephotus haematonotus	Red-rumped Parrot							
Psophodes olivaceus	Eastern Whipbird							
Ptilonorhynchus violaceus	Satin Bowerbird							
Pycnoptilus floccosus	Pilotbird							
Pygoscelis antarctica	Chinstrap Penguin							
Rallus pectoralis	Lewin's Rail	E	N					
Recurvirostra novaehollandiae	Red-necked Avocet							
Rhipidura fuliginosa	Grey Fantail							
Rhipidura leucophrys	Willie Wagtail							
Rhipidura rufifrons	Rufous Fantail							
Rostratula benghalensis	Painted Snipe	E						
Scythrops novaehollandiae	Channel-billed Cuckoo							
Sericornis frontalis	White-browed Scrubwren							
Sericornis magnirostris	Large-billed Scrubwren							
Smicrornis brevirostris	Weebill							
Stagonopleura bella	Beautiful Firetail							
Stagonopleura guttata	Diamond Firetail							
Sterna albifrons	Little Tern	V	L	E				
Sterna bergii	Crested Tern	LR						
Sterna caspia	Caspian Tern	V						
Sterna hirundo	Common Tern							
Sterna nereis	Fairy Tern	V	L					
Sterna nilotica	Gull-billed Tern	E	N					
Sterna paradisaea	Arctic Tern							
Sterna striata	White-fronted Tern							
Stictonetta naevosa	Freckled Duck	E	L					
Stipiturus malachurus	Southern Emu-wren							
Strepera graculina	Pied Currawong							
Strepera versicolor	Grey Currawong							
Tachybaptus novaehollandiae	Australasian Grebe							
Tadorna tadornoides	Australian Shelduck							
Taeniopygia bichenovii	Double-barred Finch	DD						
Thinornis rubricollis	Hooded Plover	E	L	V				
Threskiornis molucca	Australian White Ibis							
Threskiornis spinicollis	Straw-necked Ibis							
Todiramphus sanctus	Sacred Kingfisher							
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet							
Trichoglossus haematodus	Rainbow Lorikeet							
Tringa glareola	Wood Sandpiper							
Tringa nebularia	Common Greenshank							
Tringa stagnatilis	Marsh Sandpiper							
Turnix pyrrhothorax	Red-chested Button-quail	V						
Turnix varia	Painted Button-quail							
Turnix velox	Little Button-quail	DD						
Tyto alba	Barn Owl							
Tyto novaehollandiae	Masked Owl	E	L					
Tyto tenebricosa	Sooty Owl	V	L					
Vanellus miles	Masked Lapwing							
Vanellus tricolor	Banded Lapwing							
Xanthomyza phrygia	Regent Honeyeater	C	L	E				
Xenus cinereus	Terek Sandpiper							
Zoothera lunulata	Bassian Thrush							
Zosterops lateralis	Silvereye							
Reptiles								
Amphibolurus muricatus	Jacky Lizard							
Austrelaps ramsayi	Highland Copperhead							
Austrelaps superbus	Copperhead							
Bassiana duperreyi	Eastern Three-lined Skink							
Bassiana platynotum	Red-throated Skink							✓
Chelodina longicollis	Eastern Long-necked							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Pop[ulation/s]	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
	Tortoise							
Ctenotus taeniolatus	Copper-tailed Skink							✓
Cyclodomorphus praealtus	Alpine She-oak Skink	C	L					✓
Drysdalia coronoides	White-lipped Snake							
Egernia coventryi	Swamp Skink	V						
Egernia cunninghami	Cunningham's Skink							
Egernia saxatilis intermedia	Black Rock Skink							
Egernia whitii	White's Skink							
Eulamprus heatwolei (WTF)	Yellow-bellied Water Skink							✓
Eulamprus kosciuskoi	Alpine Water Skink	C	L					✓
Eulamprus tympanum (CTF)	Southern Water Skink							
Hemiergis decresiensis	Three-toed Skink							
Lampropholis delicata	Grass Skink							
Lampropholis guichenoti	Garden Skink							
Lerista bougainvillii	Bougainville's Skink							
Nannoscincus maccoyi	McCoy's Skink							
Niveoscincus coventryi	Coventry's Skink							
Niveoscincus metallicus	Metallic Skink						✓	✓
Notechis scutatus	Eastern Tiger Snake							
Physignathus lesueurii howittii	Gippsland Water Dragon							
Pogona barbata	Eastern Bearded Dragon							
Pseudechis porphyriacus	Red-bellied Black Snake							
Pseudemoia cryodroma	Alpine Bog Skink	V	L					✓
Pseudemoia entrecasteauxii	Southern Grass Skink							
Pseudemoia pagenstecheri	Tussock Skink							
Pseudemoia rawlinsoni	Glossy Grass Skink	LR						
Pseudemoia spenceri	Spencer's Skink							
Pseudonaja textilis	Eastern Brown Snake							
Pygopus lepidopodus	Common Scaly-foot							
Rhinoplocephalus nigrescens	Eastern Small-eyed Snake							
Saproscincus mustelinus	Weasel Skink							
Tiliqua nigrolutea	Blotched Blue-tongued Lizard							
Tiliqua rugosa (Trachydosaurus rugosus)	Stumpy-tailed Lizard							
Tiliqua scincoides	Eastern Blue-tongued Lizard							
Tympanocryptus diemensis	Mountain Dragon	C						
Varanus gouldii GROUP	Gould's Goanna							
Varanus varius	Lace Monitor	DD						
Vermicella annulata	Bandy Bandy	LR	N					
Amphibians								
Crinia signifera	Common Eastern Froglet							
Geocrinia victoriana	Victorian Smooth Froglet							
Heleioporus australiacus	Giant Burrowing Frog	V	L					✓
Limnodynastes dumerilii	Eastern Banjo Frog							
Limnodynastes dumerilii dumerilii	Southern Bullfrog							
Limnodynastes dumerilii insularis	Southern Bullfrog							
Limnodynastes peronii	Brown-striped Frog							
Limnodynastes tasmaniensis	Spotted Marsh Frog							
Litoria aurea	Green and Golden Bell Frog	LR						✓
Litoria citropa	Blue Mountains Tree Frog						✓	✓
Litoria ewingii	Brown Tree Frog							
Litoria lesueuri	Lesueur's Frog							
Litoria littlejohni	Large Brown Tree Frog	V						✓
Litoria paraewingi	Plains Brown Tree Frog							
Litoria peronii	Peron's Tree Frog							
Litoria phyllochroa	Leaf Green Tree Frog							
Litoria raniformis	Growling Grass Frog	V	X					
Litoria spenceri	Spotted Tree Frog	C	L	E				
Litoria verreauxii alpina	Alpine Tree Frog	C				✓		

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Litoria verreauxii verreauxii	Verreaux's Tree Frog							
Paracrinia haswelli	Haswell's Frog							
Pseudophryne bibronii	Brown Toadlet							
Pseudophryne dendyi	Dendy's Toadlet							
Pseudophryne semimarmorata	Southern Toadlet							
Uperoleia laevigata	Smooth Toadlet							
Uperoleia martini	Martin's Toadlet	DD						✓
Uperoleia tyleri	Tyler's Toadlet	DD						✓
Fish								
Gadopsis bispinosus	Two-spined Blackfish							
Gadopsis marmoratus	River Blackfish	DD						
Galaxias brevipinnis	Broad-finned Galaxias							
Galaxias cleaveri	Australian Mudfish	E	L					✓
Galaxias olidus	Mountain Galaxias	DD						
Galaxias truttaceus	Spotted Galaxias							
Galaxiella pusilla	Dwarf Galaxias	LR	L	V				✓
Geotria australis	Pouched Lamprey							
Gobiomorphus australis	Striped Gudgeon	V						✓
Gobiomorphus coxii	Cox's Gudgeon	E	L					✓
Lovettia sealii	Australian Whitebait	V	L					✓
Maccullochella macquariensis	Trout Cod	C	L	E				
Macquaria australasica	Macquarie Perch	E	L					
Macquaria novemaculeata	Australian Bass							✓
Misgurnus anguillicaudatus	Oriental Weatherloach							
Mordacia mordax	Short-headed Lamprey							
Nannoperca australis	Southern Pigmy Perch							
Philypnodon sp. nov.	Dwarf Flat-headed Gudgeon							
Prototroctes maraena	Australian Grayling	V	L	V				
Tasmanogobius lasti	Lagoon Goby							
Invertebrates								
Acrodipsas myrmecophila	Small Ant Blue	E	L					
Amarinus lacustris	Freshwater crab							✓
Engaeus affinis	Central Highlands Burrowing Cray							✓
Engaeus australis	Lilly Pilly Burrowing Cray	R			✓			
Engaeus cunicularius	Granular Burrowing Cray							✓
Engaeus cymus	North-eastern Burrowing Cray							✓
Engaeus hemicirratulus	Gippsland Burrowing Cray							✓
Engaeus karnanga	South Gippsland Burrowing Cray				✓			
Engaeus phyllocercus	Narracan Burrowing Cray	R	L			✓		
Engaeus rostrogaleatus	Strzelecki Burrowing Cray	R			✓			
Engaeus tuberculatus	Tubercle Burrowing Cray							✓
Euastacus kershawi	Gippsland Spiny Cray							
Euastacus neodiversus	South Gippsland Spiny Cray	R			✓			
Euastacus woiwuru	Central Highlands Spiny Cray							✓
Hemiphlebia mirabilis	Dragonfly	V	L					
Hyridella narracanensis	Southern River Mussel							✓
Megascolides australis	Giant Gippsland Earthworm	V	L	V		✓		
Planarian sp2 (RSC)	Flatworm							
Planarian sp3 (RSC)	Flatworm							
Planarian sp4 (RSC)	Flatworm							
Plectrotarsus gravenhorstii	Caddisfly	K						
Reynoldsonia reynoldsoni	planarian							
Spathula agelaea	planarian							
Spathula tryssa	planarian							

Scientific Name	Common Name	Conservation Status			Endemicity[4]		Disjunct Population/s	Limit of Range
		TFV[1]	FFG[2]	ESP[3]	E_1	E_2		
Tanjistomella verna	Caddisfly	V						
Thaumatoperla timmsi	Stonefly	R						

Notes:
1. TFV = *Threatened Vertebrate Fauna in Victoria* list (NRE 1999) for vertebrate fauna, *Threatened Fauna in Victoria* list (CNR 1995) for invertebrates.
2. FFG = Victorian *Flora and Fauna Guarantee Act 1988* .
3. ESP = Commonwealth *Endangered Species Protection Act 1992.*
4. E_1 = natural distribution wholly confined to the Gippsland RFA Region
   E_2 = natural Australian distribution mainly (>50%) confined to Gippsland RFA Region.

C = Critically Endangered, DD = Data Deficient (insufficiently known), E = Endangered, K = insufficiently known, L = Listed, LR = Lower Risk, N = Nominated for listing, R = Rare, V = Vulnerable, X = rejected for listing,

Appendix N: Metadata Reference

The importance of documenting key aspects of data so as to better understand, manage and use the data is being increasingly recognised. This description, or documentation, of the data is commonly referred to as 'metadata'.

As part of the CRA process, a standard approach had been used to document data consistently. The standard was developed by the Australia New Zealand Land Information Council (ANZLIC), a group formed to coordinate the collection and transfer of all land and geographic information across all levels of government. All jurisdictions are represented on ANZLIC.

The core metadata outlined in the ANZLIC standard provide basic information about the data, including descriptions of the data, their geographic extent, currency, status, accessibility and quality, and contact information. A list of attributes has also been included in the data descriptions.

The metadata inventory of datasets will be available on the CRA/RFA web site as follows: http://www.rfa.gov.au/index.html