

PART 3

IMPLICATIONS

CHAPTER 13 SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPLICATIONS OF THE FINAL RECOMMENDATIONS

Optimising net social, economic and environmental benefits for the whole community has been VEAC's major objective and guiding principle during the Angahook-Otway Investigation. Throughout the lengthy and detailed process of developing its recommendations, VEAC has been continually assessing the outcomes and refining them against this objective accordingly. This chapter summarises VEAC's assessment of the social, economic and environmental implications of the final recommendations.

There are very many parameters and measures of social, economic and environmental implications, and this chapter focuses on those that have been foremost in VEAC's deliberations.

Consultants' Overall Assessment

VEAC commissioned URS consultants to provide detailed, comprehensive and independent advice on, and assessment of, the social and economic implications of the final recommendations. This work builds on the earlier report undertaken for the Draft Proposals Paper by URS. Appendix 4 is a summary of the lengthy assessment—the full report is available at VEAC's website (www.veac.vic.gov.au) or by request from the VEAC office (see opposite title page).

As part of this work, URS estimated the dollar value of the social, economic and environmental costs and benefits of the recommendations. These estimates allow a quantification of the net benefit/cost of the recommendations overall. Such analyses, and the data on which they are based, involve many assumptions and caveats (which are documented in URS' full report), and they should be used cautiously. That said, the consultants' analysis indicates that implementation of the recommendations should lead to a net increase in economic value to Victoria of between \$5.4 million (pessimistic case) and \$30.2 million (optimistic) a year, with a 'conservative case' net benefit of about \$18 million per year. The bulk of the net benefit comes from increased tourism and the non-use values for biodiversity protection (\$4.8 and \$15 million per year respectively in the 'conservative case'). Costs are predicted to be comparatively low, with impacts on industries in the tens of thousands and increased expenditure on public land management of two million dollars.

It should be noted—and this is apparent in the following sections of this chapter—that the quantification and net economic benefit calculations have informed VEAC's decision-making, but did not drive the process. **That is, to reiterate, VEAC's emphasis has been on seeking recommendations that optimise the social, economic and environmental benefits themselves, rather than their dollar value as such.**

Social and Economic Implications

With over 1800 submissions received throughout the investigation, VEAC certainly recognises the wide range of views in the community on both the appropriate social and economic future for the Otways, and the public land settings that may contribute to realising these different futures. To take a simple example, there are obvious difficulties in satisfying both the many people who see no change to public land use as the most socially desirable outcome and those who prefer a very large national park.

Ultimately, though, two things are clear—firstly, it is the character of the region that makes it so popular for people and secondly, that popularity (and its associated pressures) will continue to increase. The challenge is to maintain the region's character so as to continue reaping the benefits of its popularity.

Among the special characteristics that are most under threat are the region's natural and cultural heritage, the rural or seaside village feel of many towns and districts, and the associated relatively low-key, affordable summer holiday venues. VEAC's recommendations contribute in particular to the protection of heritage values and characteristics, as well as the region's status as rural Victoria's premier destination for tourists.

Recreation

Maintaining and, where possible enhancing, the existing recreational opportunities in the Otways is one of the keys to retaining the area's popularity and values. Most of the current popular recreational activities are generally not intrinsically damaging to the environment, and usually only cause damage when excessively focussed on particular sites or when illegal—when trail bike riders leave formed tracks, for example. Generally, these problems, and conflicts with other users, can be reduced or at least minimised with good management planning and education.

VEAC's recommendations provide a framework to assist such management. The national park provides for most existing recreational uses in the context of strong and secure protection for the high natural and cultural values in that park; the forest park is generally located in areas of interest for those activities that are least compatible with national park status. The forest park also provides for protection of natural and cultural values as well as these activities.

Examples of areas of most interest for particular activities in the forest park include areas near towns (e.g. Barwon Downs, Forrest and Lavers Hill) for horseriding or dog walking, and four wheel driving in forest areas near the Head of Aire River and Upper Ford River. That is not to say that four wheel driving—and, for that matter trail bike and horseriding—are

not permitted in the national park; only that it would be generally more appropriate, for example, to locate focal points (such as trail bike unloading areas, or bridle paths) for these activities in the forest park areas. Similarly, key areas for hunting remain available—duck hunting in the existing Aire River Wildlife Reserve, for which a minor extension is recommended, and deer hunting in parts of the western Otways forest recommended as forest park.

There are existing opportunities for dog walking throughout the Otways, especially in forest park, coast reserves and along water frontages. Dog walking is provided for on designated tracks in the Otway Ranges National Park mostly near urban areas. The existing zone for gem fossicking at Wreck Beach near Moonlight Head is retained.

A key issue for many recreational activities—particularly four wheel driving, and trail bike riding—is continued access to roads and tracks through the forest, especially in national parks. VEAC does not envisage the high proportion of track closures that may be appropriate in a relatively small national park such as the existing Otway National Park, being applied across the much larger national park, and has specifically recommended that a network of tracks be retained. With the phase-out of sawlog harvesting and woodchipping by 2008, the requirement for new roads to service the timber industry will be greatly reduced, and other things being equal, minor dead-end logging tracks closed and the need for haulage standard roads reduced.

The new *Road Management Act 2004* may also lead to changes in road and track access independent of VEAC's recommendations. At the same time, fire protection will always be an extremely important issue in the Otways and will ensure that a network of well-maintained roads and tracks is retained.

Land managers also need flexibility to manage the track network in response to particular circumstances as they arise. Detailed proposals on particular tracks are generally beyond VEAC's broad, strategic and long-term scope and would generally be an undesirable restriction on the land managers' flexibility.



In summary, the implications of VEAC's recommendations for recreational opportunities are expected to be:

- enhanced protection of the key natural and cultural heritage values that underpin most recreation—such as native flora and fauna, waterfalls, historic sites and unspoilt landscapes and scenery;
- increased accessibility for a number of activities and sites as facilities are developed in the new parks;
- better integration of public land management, and simpler administrative and planning arrangements across the region;
- improved community participation in public land management decision-making processes through advisory committee participation in implementation of VEAC's recommendations, management planning and in on-going management;
- continuation of existing access for virtually all current recreational activities, including possible relocations as a result of management planning; and
- continuing access to key areas for hunting (particularly the lower Aire wetlands) and dog walking (particularly around towns), but exclusion of these activities from relatively large areas of the national park.

On this basis, URS concluded that VEAC's recommendations would attract more visitors to the study area, leading to economic benefits for the tourism industry (see below)—the increased accessibility of activities and sites being a key factor for tourists relative to the other implications listed above. Any negative effects of the recommendations on recreational activities are likely to be small and heavily outweighed by the benefits.

Industries and Commercial Uses

The industries and commercial activities currently operating on public land make an important contribution to the social and economic character of the region and, apart from sawlog and woodchip harvesting—which is to be phased out by 2008—will continue to do so with relatively little impact on other values.

Specific implications for each industry are as follows.

Tourism

Tourism is the largest industry in the Otways. As indicated above in the consultants' analysis, VEAC's recommendations are likely to attract more visitors to the region—that is in addition to likely increase without VEAC's recommendations—allowing this industry to continue its expansion while ensuring that the natural values on which it depends are protected. The national park expansion is likely to raise the profile as well as standard of funding for infrastructure and resources, thus improving the visitor experience. A significant factor in URS' predictions is the spread of the recommended national park. By linking the coastal and hinterland environments, the park will greatly assist in attracting visitors from the crowded coastal

attractions to the under-utilised hinterland. This, according to URS, is a key to increasing visitor numbers beyond the 'background' level of increase.

With a marked expansion from an already large base, URS has quantified significant social and economic benefits for the region from an increased proportion of interstate and international visitors attracted to the extent and scale of the new national park. The report forecasts an increase in overnight stays and visitor expenditure in the region supported by the range of attractions or experiences within the national park. This analysis is supported by recent trends established by Geelong Otway Tourism pointing towards a decrease in the number of day trips but an increase in the number of domestic overnight stays in the region over the period 1998 to 2002.

Sawlog and Woodchip Harvesting

Sawlogging and woodchipping will be allowed in the forest park under existing entitlements until 2008 when the Government's phase-out of these industries from public land in the Otways will come into effect.

The sawlog potential of parts of the forest park is poorly known, in part because some areas have not been available for harvesting for several years (for example special protection zones that represent vegetation types now well represented in VEAC's recommended permanent reserves—see below). Consequently, it is difficult to be confident at this point that existing commitments can be met, particularly for mountain ash timber. The large area of mixed species forest in the forest park would suggest that sufficient product would be available from this source at least.

Other Forest Harvesting

Large areas of forest park are to remain available for firewood and harvesting of other forest products such as tea-tree stakes. This change may displace some firewood production to more distant areas, resulting in a limited impact on commercial or domestic harvesters.

Extraction of Sand, Gravel and Stone

Table 2 summarises the implications of the final recommendations for extractive industries. The key outcome is that none of the current operations on public land will be adversely affected. Current operations will continue either outside the national park or under provisions of the *National Parks Act 1975*. New licences can be issued in all public land categories (subject to approval by the Minister for the Environment) except the national park and reference areas (where existing tenements are required).

As with mining and exploration (see below), adverse effects are restricted to potential future developments and therefore cannot be quantified, but are likely to be small.

Mining and Exploration

There are no operating mines on public land in the study area, although some public land is subject to exploration licences for coal bed methane and petroleum (see Table 2). It is recommended that these tenements continue in accordance with existing practice. New mining tenements can be issued in all public land categories except reference areas and the national park. By far the majority of other public land is forest park, recommended as restricted Crown land that is available for mining, subject to approval by the Minister for the Environment.

Accordingly, the implications of the recommendations are the effective loss of potential for future resource developments in those areas that are not currently covered by tenements and are to be added to the national park, and higher approval standards in the forest park. Both of these implications are impossible to quantify without knowledge of what future developments may eventuate but, given the relatively low level of exploration and prospectivity of the Otways, impacts are likely to be small.





Agriculture

Table 3 summarises the implications of the recommendations for agriculture. It shows that public land grazing by domestic stock in the Otways occurs under licence over about 2138 ha under some 602 licences, generally held by adjoining private landholders.

Grazing by domestic stock can adversely affect natural values, particularly along water frontages where both the riparian and aquatic environments can be affected by soil disturbance, fouling, trampling and removal of native vegetation, and introduction of invasive plants.

VEAC's recommendations will result in cancellation of all or part of 39 licences—with a total licence area of 196 ha to be cancelled—mostly in areas to be added to the Otway Ranges National Park, but also in some areas to be added to the existing Aire River Wildlife Reserve. Implementation of the recommendations may also require fencing of some of the currently licensed areas.

Although some licence areas can play an important role in overall farm management, URS' analysis concluded the direct economic effect of the recommendations was likely to be small.

Commercial Fisheries

Sections of the Aire and Gellibrand Rivers, currently used for commercial eel fishing, are recommended for inclusion in the Otway Ranges National Park. VEAC is aware that commercial eel harvesting is undertaken in the existing national park and nature conservation reserve on these rivers, as well as other Crown land and freehold land. A phase-out of commercial harvesting in the recommended national park is recommended over a ten year period. The commercial implication of the recommendation to exclude commercial eel fishing in the national park may have a significant impact (albeit in ten years' time) on the affected licensees, but relatively little impact on the fishery as a whole.

Other waters, particularly artificial reservoirs, are also fished commercially for eels on a more sporadic basis. With the exception of the natural Lake Elizabeth—which is recommended for inclusion in the national park, and where commercial eel fishing is recommended to cease immediately—no change is recommended for eel fishing in any of these other areas.

Apiculture

Beekeeping is a relatively minor industry on public land in the Otways, with only three designated sites, all in the eastern part of the study area. Only one of these sites is held under a current licence, although it has not been actively used within recent years. All of these sites are located in areas recommended for inclusion in the Otway Ranges National Park.

While national parks in other parts of Victoria contain bee sites, honey bees are an exotic species with potential adverse impact on natural values—through competition with native wildlife for tree hollows (in the case of feral bees) and nectar. Their presence conflicts with the purposes and objectives of national parks. There are several possible options for relocation of the affected bee sites in nearby areas (such as in the forest park). VEAC recommends that in order to maintain the integrity of the national park, the apiary sites be closed when the park is established. If alternatives can be found nearby, the closure of the sites will have no significant impact, otherwise there may be a relatively small impact on one licensee.

Net Outcome

The net outcome for industry overall according to URS is favourable resulting primarily from tourism benefits, with most other industries able to continue with little or no effect. Where effects on a particular industry are greater, the industries themselves are relatively small-scale and these effects do not change the overall economic outcome.

Tourism is expected to grow at an annual rate of at least two percent, to 2012; the Great Ocean Road Region, including the recommended national park, will feature strongly in this growth. Enhanced visitor facilities in the Otways hinterland will improve tourist capacity within the region.

Extractive industries and current petroleum and gas exploration can continue. Regarding sawlog harvesting before 2008, it is expected that planned coupes within areas recommended for inclusion in the national park can either be relocated or otherwise resolved.

Individual commercial eel harvesters may be adversely impacted by VEAC's recommendations. Relocation of the two exiting licensed operations may be possible and should be explored during the recommended phase-out within the national park over the next 10 years.

Other industries—harvesting of firewood and other minor forest products, apiculture, public land grazing—are only marginally affected or readily relocated, so that economic effects are generally minor. Nonetheless, VEAC is recommending that Government establishes a process to evaluate mechanisms and levels of assistance that may be required for any individuals or communities adversely affected as a direct result of these recommendations.

URS has not assessed the implications of the phase-out of the native forest sawlog and pulpwood timber industry—because this does not arise from recommendations by VEAC.

Table 2. Implications of the Final Recommendations for Mining, Extractive and Petroleum Tenements

	Existing Area (ha)	Area under VEAC Recommendations (ha)	Change (ha)
Mining (categories as defined in the <i>Mineral Resources Development Act 1990</i>)			
Area of Exempt Land (not available for mining)	40,128	103,482	+63,355
Area of Restricted Land (available subject to Ministerial consent)	13,278	47,028	+33,750
Area of Unrestricted Land	103,719	6,615	-97,105
Extractive Industry			
Area not available for extractive industry	40,128	103,482	+63,354
Area available subject to Ministerial consent	116,997	53,643	-63,354
Petroleum and Fossil Fuels (categories as defined in the <i>Petroleum Act 1998</i>)			
Wilderness Crown Land (not available; includes reference areas)	2170	3145	+957
Parks Crown Land and Restricted Crown Land	51,968	149,498	+97,530

Note: Rights under existing tenements, including applications are unaffected by VEAC's recommendations.

Table 3. Implications of the Final Recommendations for Grazing Licences

Location	Number of Licences	Total Area of Licences Affected (ha)
Licences affected by expanded national park	33	137
Licences affected by expanded Aire River Wildlife Reserve	8	59
Total Affected by Recommendations	39	196
Total of All Licences	602	2138

Note: The total numbers and areas of licences affected are less than the sums of the numbers and areas affected in the national park and wildlife reserve because parts of two licences are in both categories. Changes to this table since the Draft Proposals Paper reflect improved source data, as well as changes to VEAC's proposals.

Environmental Implications

Ecosystem Protection

Biodiversity is the variety of all life forms: genetic diversity, species diversity and ecosystem diversity, and their interactions with each other and the physical environment. There is a great deal that is not known about biodiversity (and is likely to remain so for the foreseeable future)—many lower plants and animals have not been discovered, let alone been studied, and ecological relationships and genetic diversity are generally even more poorly known. The challenge for the community is to protect biodiversity for future generations with limited knowledge about much of it.

Confronting this challenge is the basis of the comprehensive, adequate and representative (CAR) reserve system approach—the reasoning is that if *adequate*

areas of a *comprehensive* range of ecosystems are included in a *representative* system of conservation reserves (where biodiversity protection is paramount), then a large proportion of biodiversity—known and unknown—will be conserved. Consequently, establishment of a CAR reserve system is a fundamental prerequisite in the conservation of biodiversity, which is itself a core element of ecologically sustainable development. Accordingly, the establishment of such a reserve system in the Otways has been a key driver in the formulation of VEAC's recommendations.

In developing its recommendations, VEAC has used Ecological Vegetation Classes (EVCs) as surrogates for ecosystems, and the nationally-agreed JANIS criteria for a CAR reserve system. EVCs and the JANIS criteria are described in more detail in the Angahook-Otway Investigation Discussion Paper. The key elements of the

JANIS criteria are reserve system representation targets of 100 percent of the current extent of rare or endangered EVCs, 60 percent of the remaining extent of vulnerable EVCs and at least 15 percent of the pre-1750 (that is, pre-European) extent of all other EVCs.

Table 4 shows the representation of the 38 Angahook-Otway EVCs in existing and recommended permanent reserves in the study area. VEAC has also analysed the EVC representation in each of the four main bioregions in the study area—the results of these analyses are available on VEAC's website (www.veac.vic.gov.au) or by request from the VEAC office (see opposite title page).

Table 4 shows that VEAC's recommendations more than double the total area of permanent reserves from 49,340 ha to 108,542 ha. It also shows that several EVCs are poorly represented in existing permanent reserves (not meeting or barely achieving the JANIS targets summarised above). For several of these EVCs, existing informal reserves (special protection zones in state forest) complement existing permanent reserves and thereby achieve the JANIS targets. However, VEAC has been keen to see the much more secure protection afforded by permanent reserves extended to as many EVCs as practicable, especially with the phasing-out of sawlog harvesting from state forest in the Otways.

Table 4 shows that VEAC's new dedicated reserves satisfy the JANIS targets for most EVCs. Key EVCs for which permanent reserve representation is recommended to increase significantly include cool temperate rainforest, herb-rich foothill forest, herb-rich foothill forest/shrubby foothill forest complex, lowland forest, and riparian scrub/swampy riparian woodland complex. Additionally, the percent change to permanent reserve representation increases for each of these EVCs across the four bioregions within the study area. This is especially so for the Warrnambool Plain Bioregion for most EVCs, however it should be noted that only part of this bioregion is within the study area, and consequently VEAC is limited in achieving JANIS targets for all EVCs. That is, VEAC cannot recommend reserve system additions (or any other changes) outside the study area.

Those EVCs for which the recommended permanent reserves do not satisfy the JANIS targets, either have a small absolute extent on public land or occur in small or narrow patches in the forest park. In the latter instance, large additions to the national park would have been required to incorporate these small patches in the permanent reserve system, generally in places with few other documented national park values and of importance for other public land uses. These areas can be satisfactorily protected by subsequent management planning in the forest park.

The economic value of biodiversity protection is measured in terms of the dollar values that well-informed respondents to surveys would be willing to pay to gain additional biodiversity protection (see Appendix 4 for a discussion of

the assumptions involved in these estimates). Using such techniques URS has estimated that the non-use value that can be attributed to the expanded national park is approximately \$5 million per annum for the pessimistic case, \$15 million dollars for the conservative case and \$25 million for the optimistic case. Additionally, there is a perceived willingness for people to pay more for protection of mountain ash forests, rainforest and old-growth forests in preference to ecosystems in low rainfall areas. The willingness to pay was also supported by the following values contained within the recommended national park:

- a large contiguous protected area;
- CAR reserve system conservation of biodiversity across a range of habitat types and landscapes; and
- scenic landscapes and natural values that are attractive to visitors such as waterfalls, Aboriginal and historic places, rainforest and coastal areas.

In addition, willingness-to-pay respondents are likely to assume the area will be well managed and the integrity of the park values maintained. Finally, the scale of the national park was also important in this assessment of non-use dollar value with the 8-fold increase in national park area and the doubling of the area of ecosystems protected in permanent reserves likely to contribute significantly to the willingness of people to pay for this particular outcome.



Table 4. Reservation Status of Ecological Vegetation Classes (EVCs) in the Angahook-Otway Study Area (see following page for a key to the table)

Column 1

Ecological Vegetation Classes (EVCs)	2	3	4	5	6	7	8	9	10
	Area in ha Pre-1750 Extent	Area in ha Current Extent	Percent Remaining	Conservation Status	Existing Permanent Reserves	Area in ha Recom- mended Permanent Reserves	Other Public Land	VEAC Percent Change to Permanent Reserves	Recommended Permanent Reserves as Percent of Pre- 1750 Extent
Aquatic Herbland/Plains Sedgy Wetland Mosaic	690	10	1.4	E, R	0	0	0	-	0.0
Clay Heathland	2	2	100.0	R	2	2	0	0.0	100.0
Coastal Alkaline Scrub	25	5	20.0	V, R	1	1	1	0.0	4.0
Coastal Dune Scrub/Coastal Dune Grassland Mosaic	1,631	1,144	70.1		783	819	155	4.6	50.2
Coastal Headland Scrub	2,674	2,134	79.8		805	1,161	174	44.2	43.4
Coastal Headland Scrub/Coastal Tussock Grassland Mosaic	254	194	76.4	R	102	102	0	0.0	40.2
Coastal Saltmarsh/Mangrove Shrubland Mosaic	5	5	100.0	R	0	0	4	-	0.0
Coastal Tussock Grassland	305	223	73.1	R	140	150	13	7.1	49.2
Cool Temperate Rainforest	9,663	8,567	88.7		1,459	6,426	706	340.4	66.5
Damp Heath Scrub	1,541	571	37.1	R	425	462	5	8.7	30.0
Damp Sands Herb-rich Woodland	3,337	1,593	47.7		612	703	36	14.9	21.1
Estuarine Wetland	208	114	54.8	R	26	30	41	15.4	14.4
Floodplain Reedbed	112	0	0.0	E, R	0	0	0	-	0.0
Floodplain Riparian Woodland	1,853	42	2.3	E, R	0	0	1	-	0.0
Grassy Dry Forest	291	275	94.5	R	158	179	36	13.3	61.5
Grassy Forest	1,595	138	8.7	E, R	0	0	0	-	0.0
Grassy Woodland	35,787	623	1.7	E, R	1	15	8	1,400.0	0.0
Heathy Woodland	20,358	17,713	87.0		7,586	10,844	3,401	42.9	53.3
Herb-rich Foothill Forest	10,113	5,495	54.3		1,044	3,190	1,221	205.6	31.5
Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	6,107	4,165	68.2		17	1,452	1,976	8,441.2	23.8
Lowland Forest	74,561	32,562	43.7		6,902	11,924	10,384	72.8	16.0
Plains Grassy Wetland	11	2	18.2	V, R	0	0	0	-	0.0
Plains Grassy Woodland	4,725	47	1.0	E, R	0	0	1	-	0.0
Plains Sedgy Wetland	262	27	10.3	V, R	0	0	0	-	0.0
Riparian Forest	5,849	3,347	57.2		798	1,392	1,179	74.4	23.8
Riparian Scrub/Swampy Riparian Woodland Complex	5,928	3,965	66.9		1,311	1,907	999	45.5	32.2
Sand Heathland	176	167	94.9	R	78	139	9	78.2	79.0
Scoria Cone Woodland	1	1	100.0	R	1	1	0	0.0	100.0
Sedgy Riparian Woodland	2,872	1,458	50.8		223	590	434	164.6	20.5
Shrubby Dry Forest	1,687	1,589	94.2		1,074	1,249	15	16.3	74.0
Shrubby Foothill Forest	36,857	29,589	80.3		10,404	16,902	5,741	62.5	45.9
Shrubby Wet Forest	37,579	32,448	86.3		5,446	16,607	9,425	204.9	44.2
Stony Rises Woodland	4,471	2,106	47.1		13	15	5	15.4	0.3
Swamp Scrub	9,367	497	5.3	E, R	5	11	105	120.0	0.1
Swampy Riparian Woodland	1,926	239	12.4	V, R	0	0	43	-	0.0
Wet Forest	48,911	40,944	83.7		8,571	27,991	5,093	226.6	57.2
Wet Heathland	4,074	2,016	49.5		803	1,260	404	56.9	30.9
Wet Sands Thicket	1,299	1,270	97.8		451	912	267	102.2	70.2
Total:	337,107	195,287	57.9		49,241	106,436	41,882	116.2	31.6

Key to Table 4

Data in Table 4 were derived by GIS computer analysis, comparing:

- the pre-1750 extent of EVCs—that is, the distribution of EVCs as it is thought to have been immediately prior to European settlement;
- the current extent of tree cover—that is, areas where indigenous tree cover is present, based on satellite imagery; and
- the current and recommended public land use categories.

Many small public land units are not picked up in the public land GIS layer. For example, none of these figures include roads and roadsides, for which no estimate of extent exists. In addition to Table 4 for the study area as a whole, presented here, VEAC has prepared tables for each of the main bioregions in the study area. These tables are available by request from VEAC.

Several figures in Table 4—including totals—differ slightly from the corresponding figures presented in the corresponding table in the Angahook-Otway Discussion Paper. These differences reflect GIS variations and subsequent corrections to the status of many parcels of land and other data. Also, many of the column totals are greater than the sum of the areas in their column—the differences are accounted for by relatively small areas for which no EVC is mapped, such as cleared areas and water bodies.

Column 1: Ecological Vegetation Classes

The names of the 38 Angahook-Otway EVCs mapped within the study area.

Column 2: Pre-1750 Extent

The total area in hectares thought to have been occupied by each EVC prior to European settlement.

Column 3: Current Extent (public and private land)

The total area in hectares currently occupied by each EVC—that is, that part of the pre-1750 distribution where indigenous vegetation cover is currently present.

Column 4: Percent Remaining

The current extent (column 3) as a percentage of the pre-1750 extent (column 2), for each EVC.

Column 5: Conservation Status (JANIS)

The status of each EVC in terms of the categories developed by JANIS. The assessments refer to the study area as a whole and take no account of EVC distributions outside the study area or in bioregions within the study area (the latter are presented in the bioregional tables available on the VEAC website). The percent remaining (column 4) is a key factor in assigning EVCs to JANIS categories: E = endangered, V = vulnerable, R = rare.

Column 6: Existing Permanent Reserves

The total area in hectares of each EVC in existing public land categories which comprise the existing permanent conservation reserve system. The existing conservation reserve system also includes informal reserves not included in these data.

Column 7: Recommended Permanent Reserves

The total area in hectares of each EVC in existing public land categories which comprise the conservation reserve system recommended by VEAC in this Final Report.

Column 8: Other Public Land

The total area in hectares of each EVC in all public land categories outside the permanent reserves recommended by VEAC in this Report.

Column 9: VEAC Percent Change to Permanent Reserves

The percentage increase in representation in recommended permanent reserves (column 7) compared to existing permanent reserves (column 6), for each EVC.

Column 10: Recommended Permanent Reserves as Percent of Pre-1750 Extent

The area of recommended permanent reserves (column 6), as a percentage of the pre-1750 extent (column 2), for each EVC.

Threatened Species and Geological Sites

While a CAR reserve system is implemented with a view to optimising protection of biodiversity, including those elements about which little is known, there are often key values that are reasonably well known and which are desirable to protect in permanent reserves. It is important that specific provisions are made to protect these values rather than relying on ecosystem representation. Threatened species are common examples of such values—they are often reasonably well researched because of their conservation status, and many threatened species require a high level of protection and even active management for their conservation. Inclusion of such threatened species in permanent reserves is a high priority.

Sites of geological and geomorphological significance in the Otways are also reasonably well documented, particularly those of international, national, and state significance.

Tables 5 and 6 show the representation of a range of threatened species and significant geological sites in existing and recommended permanent reserves in the Otways.

Cultural Heritage Sites

Sites of European cultural heritage are documented in the Victorian Heritage Register (VHR) and in the Land Conservation Council's (LCC's) South-western Victoria Historic Places Special Investigation. These sites are listed in Table 7.

All sites within the study area recorded on the VHR are within the recommended national park. Lorne Pier has recently been nominated for listing on the VHR and is not included in this summary.

Over half of the sites included in the LCC study will also be afforded additional protection within the Otway Ranges National Park. The remaining sites are largely buildings utilised for education or transport purposes located within townships.



Table 5. Representation of Selected Threatened Species in Existing and Recommended Permanent Reserves

Threatened Species

Common Name (see Appendix 2 for scientific names)	Victorian Conservation Status (see Appendix 2 for key to symbols)	Total Number of Records in Study Area	Number of Records in Permanent Reserves (and percent of total)	Number of Records in Recommended Permanent Reserve Additions	Number of Records in Permanent Reserves (and percent of total)	Number of Records in Other Public Land	Number of Records in Freehold Land
Animals							
Australian Grayling	v, L	26	2 (8)	7	9 (35)	15	2
Common Bent-wing Bat	L	9	5 (56)	3	8 (89)	0	1
Ground Parrot	e, L	9	3 (33)	5	8 (89)	0	1
Masked Owl	e, L	16	8 (50)	7	15 (94)	1	0
Spot-tailed Quoll	e, 15	46	7 (15)	20	27 (59)	9	10
White-footed Dunnart	v, R	30	9 (30)	3	12 (40)	10	8
Plants							
Beech Finger fern	v, L	14	1 (7)	9	10 (71)	4	0
Brooker's Gum	r	34	7 (21)	18	25 (73)	4	5
Dwarf Boronia	r	2	1 (50)	1	2 (100)	0	0
Forest Bitter-cress	v	1	0 (0)	1	1 (100)	0	0
Slender Fork-fern	v	9	2 (22)	6	8 (88)	1	0
Starry Daisy Bush	k	7	2 (28)	3	5 (71)	1	1
Tall Astelia	v, 7	8	0 (0)	8	8 (100)	0	0

Table 6. Representation of Sites of Geological and Geomorphological Significance in Existing and Recommended Permanent Reserves

Significance (see below for list of individual sites)	Total Number of Sites	Number of Sites in Current Permanent Reserves (and percent of total)	Number of Sites in Recommended Permanent Reserve Additions	Number of Sites in Recommended Permanent Reserves (and percent of total)	Number of Sites in Other Public Land	Number of Sites in Freehold Land
International	2	1 (50)	1	2 (100)	0	0
National	6	5 (83)	1	6 (100)	0	0
State	9	4 (44)	4	8 (89)	1	0

Feature Name	Significance
Dinosaur Cove	international
Torquay to Aireys Inlet coastline	international
Lake Elizabeth and landslide	national
Lion Headland to Slippery Point	national
Pebble Point	national
Point Lewis dinosaur locality	national
Port Campbell National Park	national
Sentinel Rocks fossil locality	national
Binns Road quarry	state
Cape Otway	state
Cape Volney fossil locality	state
Devils Kitchen fossil locality	state
Racecourse Steps, Moonlight Head	state
Ramsdens Cave, Cape Patton	state
Kaanglang Road quarry	state
Love Creek pillow basalt	state
Point Franklin	state

Table 7. Representation of Sites of European Cultural Heritage Significance in Existing and Recommended Permanent Reserves

Significance (see below for list of individual sites)	Total Number of Sites	Number of Sites in Current Permanent Reserves (and percent of total)	Number of Sites in Recommended Permanent Reserve Additions	Number of Sites in Recommended Permanent Reserves (and percent of total)	Number of Sites in Other Public Land
Victorian Heritage Register	3	0 (0)	3	3 (100)	0
LCC Historic Places	11	1 (9)	5	6 (55)	5

Feature Name-Victorian Heritage Register
Cape Otway Lighthouse (H1222)
Knott's No. 3 Sawmill (H1818)
Henrys No. 1 Sawmill (H1815) tramway and tunnel (H1817)
Feature Name-LCC Historic Places South-western Victoria SI
Great Ocean Road and associated features (A70)
Marchbank sawmill, tramway and double incline, Weeaprounah (A8)
Knott's No. 3 Sawmill, Wyelangta (A9)
Dinosaur Cove fossil discovery site, Otway National Park (A69)
Lighthouse complex, Cape Otway (A186)
Telegraph station, Cape Otway (A187)
Henry and Sanderson sawmill and features, Barramunga (A10)
Primary School No. 2162, Lorne (A140)
School Principal's residence, Lorne (A141)
Erskine House, Lorne (A142)
Railway Station, Pirron Yallock (A137)